The Concept of Environmental Monitoring in the Indian Context

Jurgen Oestereich

Environmental degradation seems to be the price for economic development in India. The problems of unplanned expansion and industrial diversification have been aggravated by the lackadaisical attitude of the responsible agencies where there is hardly any data collection, leave alone monitoring of pollution levels. The author suggests that local people should be roped in for the job of monitoring and supplied the competencies as well as the mandate to curb the ever increasing menace of pollution.

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In India, the demographic growth in many rural and urban areas has triggered off the emergence of secondary centres such as Agra, Ludhiana, Raipur, Vishakhapatnam etc. These towns have now reached a population of under one to over two million inhabitants. Any regional scientist would be enthusiastic about the mutual stimulation of demographic and economic development in these growth poles, and any development theorist would be delighted about the industrial diversification in scale and kind happening there. Yet, it seems that experts, in their theories, have overlooked one particular aspect: the environment. These towns like most other fast growing ones have high population densities (500 pop./ha or more) and houses and severely polluting production units. In the process of blind expansion without any planning and environmental control they have destroyed nearly all vegetation in and immediately around them.

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The temperature in the built-up areas is constantly several centigrades higher than elsewhere, making the towns a purgatory in summer. Sulphurdioxide, particulate matter, hydrocarbon and ozone go unfiltered into the air, hence, the atmospheric immissions are excessive. The sewage carrying all kinds of organic and inorganic micropollutants — most of them noxious to toxic — remains completely untreated. Over the years, effluents loaded with heavy metals and trace elements have accumulated untreated in basins, pools and slow-flowing canals and, consequently, contaminate the groundwater.

Although being regarded as unfit for consumption, it is still used for irrigation, thus increasing its toxicity in a vicious circle. Waste is piled up or dumped at random without any separation of hazardous substances. Environmental degradation has obviously become nearly irreversible. According to some doctors practising in a town like Ludhiana, the life expectancy of workers has decreased considerably. What has happened here is bound to happen wherever this kind of growth occurs or will occur. It seems that many people (and especially those who have a better chance to survive) accept the situation as the unavoidable price to be paid for economic development (Choudhuri N., 1984).

On the other hand, concern for the environment and the surrounding eco-system, has some tradition in India. Various brands of Hinduism preach respect for nature and forbid the killing of living creatures. In various parts of the subcontinent, groups such as the Bishnoi people in Rajasthan and Punjab can be found living in the 17th century; the founder of this Hindu sect, having well understood the particular eco-system of his region, could convince his followers to keep and not cut the Acacia trees, to respect antelopes and wild animals and not hunt them, to take out of nature only what could be restored. More recent phenomena are the environmentalists as individuals or as groups, for example the well-known Chipko movement, whose followers protect with their bodies trees under threat to be felled. Doctors and other professionals, who understand that their lives and those of their children are directly affected, have started to gather in Non-Governmental Organisations and pressure groups. Particularly famous is the "Centre for Science and Environment" in Delhi which has published important studies on India's Environment[1]. They have understood that for their fight the access to and the proper use of environmental data is crucial.

From Environmental Data Collection to Environmental Monitoring

In India — a country which may be regarded as exemplary for those countries in the South in which ecological problems are discussed at all, environmental recording is vested in the highly specialized Pollution Control Boards (PCBs) at central and state levels. Their task is to observe certain standard indicators of the environment. At present, these relate only to two of the four media air, water, soil/solid matter, and the life sphere[2]. The selected atmospheric and hydrospheric data are recorded at only a limited number of measuring stations, usually confined to the biggest cities and not necessarily to their worst corners. The measuring taken of, for example, SO_2, Suspended Particulate Matter (SPM) H_xC_x, Ph-value, BOD, etc. are used for international comparison and for stipulating theoretical limit values — very strict ones for that matter, since they happened to be transferred to India from USA and Europe (Paulus S., 1989) — but not for controlling them effectively.

In fact, their application is rather haphazard as the affair of the Taj Mahal reveals (D'Monte, 1985). Under international pressure the very restrictive limit values for sulphurdioxide which is particularly dangerous to the marble of the monument could be enforced with respect to the oil refinery in some distance, but not with respect to the still more dangerous pollution originating from traditional furnaces in Agra town near-by. The hydrosphere for example, is severly affected by DDT which is still being used excessively because it is a very cheap pesticide being produced in the country on licence. At certain intake points upstream it has been recorded in excess, but seems to have vanished somehow downstream although degrading effects persist. Only recently it has been established that the substance changes into the possibly still more vicious DDE and other dangerous trace elements, but the Indian PCBs are not interested in pursuing the matter.

By and large, the measuring taken are understood as statements in themselves and not as indicators repre-

1. Centre for Science and Environment (1984) India's Environment 1982-1983 (CSE) New Delhi. Centre for Science and Environment (1986) India's Environment 1984-1985 (CSE) New Delhi. Centre for Science and Environment (1989) Towards Green Villages (CSE) New Delhi. Centre for Science and Environment (1991) Floods Flood, Plains and Environmental Myths (CSE), New Delhi. Chiakriya Vikas Pranali (1991) A Way Forward for India's Rural People (CSE) New Delhi.

2. Generally, the dynamics of the environment can be observed in two ways: The more scientific way is to deal with them as a system of interconnected circuits of individual substances, from the most frequent ones such as oxygen, carbonate, sulfate etc. down to spurious metals and the rate but important trace elements. The simpler way of recording used by UNEP, WHO and most Pollution Control Agencies is to lump these circuits together into the circuits of the four media atmosphere (air), hydrosphere(water), limnosphere (minerals) and biosphere. This approach lends itself to identify for each circuit intake and outlet points for monitoring. Information is recorded in terms of any circuit being polluted with "immissions" at any indiscriminate point of intake, and in terms of bearing "emissions" originating from identifiable outlets. The intake of energy and solid matter in the form of fuel, goods etc. may be polluted by "immissions" too, while the respective "emissions" occur in the form of solid waste and waste energy (temperature increase) as well as in the form of industrial products and solid waste. Finally, the biological circuit in flora and fauna is connected through intake and output — food and organic waste — to the human settlement unit.

Table 1. Levels and Elements of Environmental Monitoring

Level	Elements		
	Observation	Short-term Intervention	Long-term Intervention
Supra-local level	Scientific analysis	Legal action	Formal planning
Local level	Biological monitoring	Popular participation	Change in life-style

senting a reality which asks for political action[3]. The Government has not yet fixed any danger levels for smog-ozone (O_3), the key-indicator for the toxic photochemical smog is not even recorded-, for contaminated water, for radioactive soil, contaminated food etc. And even where danger is immediately obvious like in the cities quoted, there are no precautions and predetermined arrangements for action. Whatever warnings could be broadcasted, they would not be received. And if heard, they would not be grasped. And if understood they could not be translated into necessary sets of actions, such as smog-alarm or detoxication campaign. On the whole, the political class is not aware of the dangers of poisonous immissions and emissions, does not care about the degradation of the environment, and is ignorant of the potential and self-purifying capacity of nature. Consequently, no Government in India is prepared to consider curatve or preventive measures in environmental matters let alone to initiate the necessary actions for them.

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However, individuals oppose this general ignorance and negligence, and awareness-creating groups grow and proliferate. Coalitions between them and individual agents of the PCBs, and sometimes even the PCBs informally press for transforming environmental recording (sometimes falsely called "monitoring") into true environmental monitoring, which combines observation and practical intervention and relates to the two levels of professionals and laymen. This can be visualized by table 1.

While the need of professional monitoring — usually highly specialized and therefore centralized — is generally accepted, the need for local laymen monitoring is quite often disputed. The situation found in India suggests however, that local monitoring combined with the growing ability of the laymen to read maps etc. is indispensable and even constitutive for sound environmental management. Citizen organisations may play a vital role in it. Only with efforts on all levels environmental degradation may be stopped and in future, hopefully, reversed.

Environmental monitoring at professional and local level is involved in the five functions of environmental management which are:

- Understanding the relevant mechanics of the local eco-system.
- Warning of pollution as threat to human health and to the regenerating capacity of nature.
- Allocating natural resources for the purpose of economic production and every-day consumption.
- Devising curative measures to remedy damages already occurred,
- Conceiving preventive and upgrading measures for a given eco-system.

Table 2. Range of Environmental Monitoring

Understanding nature	Observation		
Warning of pollution	Observation	Short-term action	
Utilizing nature	Observation	Short-term action	Long-term action
Curing ecological damages		Short-term action	Long-term action
Upgrading the eco-system			Long-term action

3. Measurements and indicators of facts are primarily means and useful to the degree to which they are consistent, easy and unexpensive to be obtained, observed and handled and, most important, to the degree they are acceptable to all parties concerned in a given situation at academic or practical level. A proof of their acceptability and a means of effective handling is their "mapability". Their status as indicators is ambiguous. Indicators are statements about a complex reality cut down to selected single or composite parameters in nominal, ordinal, cardinal, proportional, or some sort of indexed scale and loaded with more or less deliberate values. Mathematical operations with indicators should not be mistaken to represent operations in the real world.

The still loose institutional set-up allows for conceptionalization of organising appropriate environmental management. Table 2 combines the list of functions with the elements of monitoring. Any conceptualization of environmental management has to account for these five functions of Environmental Monitoring.

Understanding Nature

The most general and at the same time scientifically most refined purpose of recording and measuring is to find out what really happens in the media circuits between output and input. The example of DDT shows that both a refined analysis of the bio-chemical reactions in nature and a continuous observation of the actual eco-system during the annual life-circle and beyond complement each other. Establishing intense cooperation between scientists, technicians and laymen on the spot requires a common language. It has been found in India as well as else where, that the method of biological monitoring leads quite quickly to this common ground of communication. Biological monitoring calls for the fusing of laboratory facilities and scientific analysis with registering and recording through simple means and tools the ecological processes, their state and flow equilibrium[4]. This has helped for example to identify the noxious effects of eucalyptus trees on the soil as well as the beneficial results of water lily cultivation on highly polluted water bodies.

If the subject of observation is connected with the life sphere of the local observers, it is not difficult to teach them the methods required. If pollution and environmental degradation are threatening their life and that of their children, they will be motivated to observe more carefully than ambivalent staff of the PCBs, who puts a detecting device in its place and passes from time to time to keep record. At the same time, the awareness created through such observations and recordings will be much more effectively disseminated in the respective communities and reach local leaders and politicians. This facilitates the translation of environmental issues into protection measures and other actions.

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While biological monitoring through teachers, health staff and other local professionals has been successfully carried out in some rural pilot projects, the situation is more complicated in urban areas mainly for three reasons:

Those who suffer from or are threatened by environmental degradation are often — particularly in segregated societies like the Indian one — those who are weak and far from the points of decision-making.

Any urban environment, being complex by definition, is more difficult to analyse than a rural one.

Constant changes and degradation processes make it impossible to identify a pre-determined flow equilibrium. In fact, any urban system lives in an "artificial" flow equilibrium.

For these reasons, citizen organisations specialized in environmental observation are needed. In India, the Centre for Science and Environment may be regarded as a prototype for this function being, at the moment, more concerned with rural areas.

Warning of Dangers from and for the Environment

The second function of environmental monitoring is to warn of excessive pollution potentially dangerous to human health or, more generally, to the regenerative or self-purifying potential of nature. This may relate to unforeseen natural events (climatic inversion, excessive rains), to criminal action (nuclear fall-out) or to behavioural negligence (e.g. non-point source emmissions), or to a combination of several causes (e.g. smog). With respect to warning, professionals at central level should be able to advise on installing effective warning systems, and laymen at local level should be given competence to check on the warning thresholds and the working of the mitigating measures. In a way, alarm arrangements related to these events may be seen in analogy to natural disaster warning networks relating to floods, droughts and cyclones for which the establishment is under way in India(UNDRO, 1989). Warnings may be tailored to certain intake points, or better, to emission points related to key substances.

In any case, the function of warning would fall too short, if it stops at monitoring some routine detector points. Monitoring agencies must make sure that signals

4. Biological monitoring fuses the biosphere with the three other circuits. It is observed if life goes undisturbed in air (insects, spores), water (aquatic life, plants), and soil seen as "black boxes".

are not only installed, but heard and understood, and that they will trigger off automatic counteractions and mitigating measures. Such interventions have to be predetermined in space and time, i.e. programmed and mapped, well in advance. Only the actions are identifiable, enforceable and effective. In India, like in many other countries, the establishment of urban warning systems is hampered because the local authorities do not possess the corresponding competences. Hence, legal improvements including a definition of the role of public participation is necessary.

Allocating Nature

The standard key-procedure for allocating certain amounts of air, water, minerals or bio-matter to be consumed by applying production units as well as certain amounts of emissions to be released into these media, is the granting or withholding a No-Objection-Certificate (NOC). The implicit idea is that nature is capable of digesting a certain amount of pollution through its capacity of self-purification. This level of immission, however, can be controlled only indirectly through controlling the emissions of production units. Consequently, legal provisions like a Law on Air Pollution Control, a Clean Water Act etc. require some sort of authority for controlling the prescribed standard of emission at certain points. Any production under NOC depends on the state of art in filter and treatment technology and on sophisticated calculations on risk assessment. These Laws impute environmental engineers at the production and at the control end to control each other. Without these the whole system is necessarily exposed to corruption. In any case, it is advisable to have external checks, e.g. through those people who are possible affected. To assist them wherever necessary would be and is already the role of citizen organisations.

In India, the power of granting NOCs is vested in PCBs which do not incorporate engineers familiar with the technologies of production, treatment and filtering but are under pressure from NOC-applicants. At the same time, some of the limit values are so ambitious, that it is difficult for any industry to comply with them. Worse still, they apply to formal enterprises (i.e. those paying taxes) only. The vast and growing small scale industry sector is exempted from any restriction, and "non-point-sources" i.e. the agricultural, domestic emissions and those from small-scale production are not recorded at all. Non-point-source pollutions have, however, become critical in Indian growth poles. Their contribution to the overall pollution is estimated to make up even 80 per cent of the total.

Although monitoring at the scientific and professional level is understood as being necessary, there is a general feeling that this can be done by sophisticated instruments only. Even obvious findings presented by doctors and those affected by NOC-misuse are not taken seriously. Biological monitoring is not regarded as scientific. There is obviously a great deficit already in the simple observation of the reality and of nature in particular, resulting from ignorance on the part of the general public and negligence on the part of the authorities. The holy rivers and lakes used for ritual bathing but highly polluted, are notorious for this.

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All this makes it evident that the legislation rests inadequate. At the same time, laymen observation and public militancy with respect to environmental dangers are perceived as direct threat by the people who reap profit and power from the existing situation. This can only change, if procedures for short-term action both at central and local level are reconsidered and brought into a new relationship in order to allow for the necessary feed-back between observation of the effects of industrial and agricultural production, and the long-term pursuance of these activities.

Long-range planning for a sustainable utilization of the given natural resources is possible only on the basis of this feed-back. This is the basis, too, for the indispensable change in life-style, which is easy to speak of in general terms, but which cannot be enacted except in form of many small changes in production, consumption and in daily behavior, and which cannot come about without heavy conflicts. The agencies in the position to advise in this field and possible to decide on competing interests, could be the PCBs. Yet at present they lack the mandate as well as the scientific authority and the engineering competence to play this role.

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Remedy for Environmental Damage

The fourth function of environmental monitoring is to help conceiving curative and remedial actions. Since damage evidently has been caused (with or without violation of prescribed norms) and will be caused for some time to come, cure and remedy should be considered at the first possible moment. In India today, the curative measures considered relate to salination, deforestation, desertification etc i.e. damage occurred in rural areas. Various Government Departments such as Agriculture, Irrigation, Forestry, Town and Country Planning etc. are called upon for co-operation and provide many relevant data, as well as those NGOs who embark on informal environmental monitoring in rural areas (Bandhyopadhyaya et al, 1985). Some PCBs have started to compile these data and draw the necessary conclusions from them[5]. This means assessing the ecological damage occurred and advising on remedial measures. From here to determining the compensation due from any violator of nature is a small, but decisive step which rests to be taken.

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In Indian towns, remedial measures must be directed predominantly against non-point-sources as the example of the pollution-prone town of Ludhiana shows. Recently the World Bank has proposed a giant sewerage treatment plant which is supposed to gather all dangerous effluents. Such an undertaking is extremely costly, all the more as the industrial units are required, in addition, to install filters etc. To be ultimately effective, cure also means recycling the entire groundwater by channelling it through a filter for removing the heavy metal pollutants. It is inconceivable how the running production in the town, and especially the small-scale enterprises, can afford all this.

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The alternative would be to group the many small-scale units according to their effluents, which then could be treated separately, in a way as to recover the maximum of the valuable substances released. The logic of the limit values has to be made understood and the small-scale enterpreneurs have to be convinced of the necessity of filters and treatment devices. This means introducing a long-term perspective into production and consumption routine. Only through this perspective the problem of domestic pollution could be tackled. Compared to the big treatment plant, an intervention on these lines would be much more economical and, above all, direct the public towards a sustainable life-style. Yet, it would take much more time and make World Bank finance superfluous.

Any such intervention — and especially the soft ones — interfere with established interests as the example of the steel furnaces at Agra has shown. In principle, PCBs could act as arbiters and direct whatever intervention is reckoned necessary. At the local level, municipalities and communities, provided they are given the indispensable competences, would be the right bodies to plan and carry out measures to remedy the environmental damage already occurred. Environmental monitoring by the communities concerned would be needed to guide the interventions on site and assess their results.

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Ecological Upgrading

The fifth function of environmental monitoring is to prevent environmental damage from occurring and, better still, to find ways and means of enhancing and strengthening the regenerative potential of nature. Ecological upgrading may take place, as has been shown, with traditional groups such as the Bishnoi. More recent movements like the students' groups of the WWF point in the same direction. Although not insignificantly often harrassed by military, police, private profiters and parts of the authorities, their number increases and the

5. For example, Punjab State Council of Science and Technology (1992) State of the Environment of Punjab State, (PSCCT) Chandigarh; Karnataka State Council of Science and Technology (1991) State of the Environment of Karnataka State, (KSCCT), Bangalore.

prominence of the local leaders grows, especially with such environmentally detrimental projects such as the Namara Dam.

In urban situations, much more is required and big projects are often, as has been seen, not the best solution. Regrouping of production units and a change in production technologies is possible. Intensification of gardening and landscaping is in itself a positive move and may lead to further changes in lifestyle. Awareness programmes, information and training exercises are necessary to improve the general public's understanding and to motivate it to care for the generations to come.

This change in outlook must be complemented by more aggregate prognosis and planning, especially spatial planning on national, regional and local level. In India the GTZ has proposed the selection of industrial locations through scanning of appropriately classified areas, e.g. according to the "Ecological Profiles Method"[6] while state planning units prefer the screening of given areas (administrative territories) for adequate land use. Ecological management would be the ultimate step to replace the pointwise intervention of the current Environmental Impact Assessment Method (EIA), which is nothing more than a kind of balance of the ecological effects of a given project (i.e. a plant in a particular location, a road along a given line etc.)

6. This method consists basically of the superimposition of ecological data sets from various sources (on-site observation, satellite maps). The resulting topologies with regard to air, water, soil, natural hazards and socio-economic facts are subsequently classified with some ranking in view of their suitability for industrial sites. The binding force of such a document is its most important feature, proportional to the degree by which public and private decision-makers identify themselves with its stipulations. Hence, the way in which the communication process is conducted plays an important role. See Werner, G. (1990) Environmental Planning : Issues, Approaches, Instruments (CPCB mimeo) New Delhi.

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Whatever method is used for planning, more important still is the existence of competent decision making untis. The recent move towards decentralization in India offers the opportunity to establish, at the level of municipal corporations, a platform for discussion and decision making. This presupposes the local political units, municipal institutions and local communities, to be accepted as institutions for combining professional and laymen advice in the handling of environmental observation, of control, of warning thresholds, of curative and preventive measures, as the final steps leading to environmental management. Such measures in turn, cannot succeed without an informed and motivated public, able to control the facts, norms, explanations and instruments, and generating genuine data and knowledge in environmental matters and being prepared to change its own lifestyle in keeping with sustainable environmental management.

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Special Report

Technological Cooperation: An Asian Imperative for Future

Frans Mardi Hartano

Technology is expected to play a crucial role in the development of Asian nations because the business world as well as the public sector will become more technology or knowledge intensive. There exists splendid examples in Asia to prove that technology has not bear fully utilized. What are the reasons that led to the inappropriate use of technology? Why do we have to develop technological cooperation in order to be able to make the best use of technology? The author attempts to answer these questions.

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Technology has played an important role as an instrument of development for many industrialized countries around the world. It is expected to play an even more important role in future, since the business world as well as the public sector will become more technology or knowledge intensive. This phenomenon will be more significant in the newly industrialized countries or those that are getting industrialized soon. Some East Asian countries have achieved this economic status. But the industrial and technological policies and strategies of many Asian governments frequently reflect that technology has not yet been utilized to its full extent as a powerful tool of development.

Some Asian countries and their business corporations have used technology extensively to spur their development with significant results. In the early seventies, the Green Revolution caught up with many of these countries. For example, Indonesia which was one of the largest importers of rice in the seventies, has been able to become self-sufficient in the late eighties by combining extensive use of fertilizers, extension of irrigation networks, new seeds which are high yielding and more resilient against pests, controlled use of pesticides and herbicides, and also resorting to agricultural mechanisation. We cannot deny that this achievement was due partly to the synergic collaboration that exists between agricultural research institutions in Indonesia and those in other counters, especially other ASEAN countries, like the IRRI in the Philippines.

In the mean time, Indonesia has also been successful in developing its agro-based industry, while Singapore is now known for its hi-tech and service industries. Malaysia is one of the premier chip producers of the world, and has been successful in developing, producing, and marketing its own car, the Proton Saga. The industrial progress in Japan, the "Little Dragons", and the

"Tigers" of South-East Asia are now joined by the "Awakening Big Dragon-China". There are reasons to believe that this progress will soon be followed by similar advances in South Asia. India will surely play an important role as an industrial giant in the near future. From these examples of industrial growth, we can easily see the important role of technology, but at the same time, we also recognise that technology, in many cases, has not yet been fully and appropriately utilized.

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Utilization of Technology: The Asian Problem

There are many reasons that can lead to inappropriate utilization of technology. First, technology, especially hi-tech, tends to be glamorous and glittering which frequently cloud its real value. Firms tend to acquire technology because of the image that it will bring to them rather than for its performance. This pervasive fascination with the state-of-the-art technologies, especially those dedicated to improve production efficiency, has become a serious obstacle to the development of sound and economically efficient production systems that can be utilized to their maximum potentials. This problem is enhanced by zealous vendors of technologies who capitalize on the ignorant customers who do not have the necessary know-how of either the working or the potentials of the new technologies. Asian manufacturing firms need to renew their production facilities to meet the growing demand for higher quality, less expensive, larger variety, customer oriented products and services, and that too with shorter delivery schedules. For example, ASEAN's success in the export market has come mainly from the availability of cheap natural resources and their ability to manufacture, at high volume and low cost, products that were invented and designed in the West. Now, as some ASEAN countries already begin their next development cycle, businesses are being forced to innovate. Growing numbers of them are therefore, investing in production technologies, hoping that it will enhance their innovative abilities. However, it is important that the renewal of these facilities be made in an appropriate and economically justifiable way. Production technologies are becoming less expensive at faster rates, but their adoption still requires a lot of investment. With the growing scarcity of financial resources in most of the Asian countries as reflected in the high cost of capital, it is imperative that investments in technology be made after its feasibility, suitability, and acceptability are diligently assessed. Technology should not be kept in showcases, but has to be put to work to the limits of its full potential and even more.

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Second, technology is frequently considered as being the end or objective; not as the means to achieve progress in the development of business corporations. People still think that value added is created by technology, especially production technology, while, in fact, it is created whenever customers show their goodwill towards the products and services offered by the firm. Learning industrial development from the more advanced industrial countries, Asian corporations have been doing well by combining cheap labour and advanced technologies (Selwyn, 1993). However, like their predecessors in their early days of development, they tend to perceive that possessing, mastering, and developing a given technology is more important than utilizing it to the maximum extent of its potentials. This is based on the belief that if they want to win in global competition, they have to acquire, master and develop the technologies themselves. This perception of technology is enhanced by their desire to become technologically independent, neglecting the cost of achieving the goal. In addition, this perception also forgets that owning, mastering, and developing a technology do not always lead to economic success and competitiveness. Owning a technology is not a prerequisite to mastering and developing it; what is needed is the ability to get access to the latest technological information. Firms, in cooperation with their respective governments have to develop a world-wide, scanning capability for technological information with a careful assessment of their need and assurance of their full utilization. Thorough comparison with similar technologies has to precede the decision to acquire the technology. Developing this scanning capability in Asian corporations requires collaboration among the business firms as well as the research and development institutions of the respective countries. The key-word for the full utilization of technology in the future would be interdependence and not independence or dependence.

Owning, mastering, and developing a technology do not always lead to economic success and competitiveness.

Third, the urge to be competitive has led firms to invest in production technologies, while the situation actually demands change in the non-manufacturing activities of the firm. Management's mind set is fixed at the old business paradigm of selling what can be produced. People tend to treat firms as production units and neglect the fact that firms are actually business units that include various non-manufacturing activities such as finance, marketing. procurement, and other supporting functions. This phenomenon is especially true in many Asian countries such as Indonesia which do not have a well-developed tradition in trade and services. This treatment of a firm as a production unit is enhanced by the fact that in many Asian companies, engineers with their unique deterministic and rational way of doing things, play a dominant role in the firm. While these conditions have been successfully implemented in the past, resulting in an intelligent combination of cheap and advanced technologies, it is doubtful that they will work in the future, The business situation of the future according to Hanan (1993), is that the product is not the star that bears most of the system's price, but, instead, it is the value contributed by the service—not the service itself — that would be appreciated by the customers as reflected by their goodwill towards it. So, it is understandable that, for the present, the production cost tends to become less than the service and delivery costs that go with the products. Consequently, improving or renewing the production technology will frequently produce less significant results than the efforts to reduce the costs of service and delivery. Unfortunately, this lesson is not easily learned by Asian business corporations.

The situation actually demands change in the non-manufacturing activities of the firm.

Fourth, new technologies have shorter half-lives compared to those used in the past. Some technologies, such as computers, are changing very fast and become obsolete within 3 to 4 years. Many Asian firms, operating relocated factories, are facing this problem. Most of the relocated production technologies are probably still in good operating condition, but rarely can they meet the contemporary production standards in terms of efficiency, quality, and flexibility. While relocated units could increase the international product life cycle (IPLC) of the relocated production facility and so could safeguard the corporate interests of the investing firms, it might create problems for the host country, especially if those facilities cannot meet the production, safety, health, or pollution standards. In the mean time, if the facility is not as efficient as the emerging ones, it can create pressure on the management to keep wages low. The problems created by relocated production facilities that use obsolete technologies can be overcome by applying reverse engineering principles in the utilization of these facilities. The purpose of reverse engineering is to rejuvenate the facilities, give them new uses, make them more productive, lengthen their economic as well as technical life, make them more flexible and responsive to customer needs, and improve the quality of their performance. This is not an easy thing to do, since it would need the services of people and institutions with the right combination of ingenuity, innovation, knowledge, and experience. Although reverse engineering usually does not attract as much attention as new inventions, it is a knowledge-laden process that requires the full support of all those concerned with improving the competitiveness of the firm or industry. This is another issue in technology deployment that can be best solved through collaboration, since a reverse engineering service can be easily extended across the borders by those who have the core competence to provide it.

Improving or renewing the production technology will frequently produce less significant results than the efforts to reduce the costs of service and delivery.

Fifth, technology diffusion through reverse engineering is basically the practice of the technological followership paradigm, which usually lacks the aura of glamor in contemporary society and support from the government. To be an assiduous "follower" seems somehow to have acquiesced in defeat, abandoning adventure for the haven of routine. However, what determines improvements in productivity and product quality — thereby enhancing the competitiveness of firms and industries — is not the rate at which significant technological innovations are developed, but the speed and extent of their applica-

tion in commercial operations. How so ever, feasible the designs of new products and production processes may be from an engineering standpoint, it is the prospects for their diffusion into use that ultimately impart economic value to the new knowledge (David, 1986). Certainly both as a field of business endeavour and as a matter for scholarly investigation, the technological followership paradigm lacks the radiance that usually surrounds the process of designing and commercially introducing new technologies (technological leadership paradigm). but we may not forget the fact that being a follower in the technology race does not deny us the opportunity to be, the winner.

It is the prospects for their diffusion into use that ultimately impart economic value to the new knowledge.

Some Asian countries have had the opportunity to apply the technological followership paradigm at a large scale as a consequence of the relocation of sunset industries form the industrialized countries, especially Japan. For example, China and South East Asian countries are particularly favoured as production bases for the labour intensive and resource-intensive segments of Japanese companies' global operations. Some like Singapore and later also Malaysia, Thailand, and Indonesia, have also been used as export platforms to the West and other Third World destinations. In the mean time, the Philippines also has become the favoured place for investments and relocations of Taiwanese corporations. Some relocated industries, after going through extensive reverse engineering, have shown good economic prospects, although they are also vulnerable to external economic turbulence. The inflows of relocated investments form Japan into ASEAN during the 1951-1990 period totalled around US $ 31 billion. By comparison, total inflows into the Asian NIE's over the same period was US $ 18 billion while inflows into Oceania was US $ 21 billion. The whole of Latin America,, another favoured destination, was US $ 44 billion. Given ASEAN's relatively small GDP size and population base, the inflows into ASEAN is thus relatively heavy (Sopiee, 1993). However, this opportunity for growth will be of great value for the firm or industry, if only they can add value to the investments through reverse engineering and carefully avoid its potential as a limiting factor for accelerated business growth.

Sixth, relocated industries tend to create a rigid industrial structure that delimits the potential of technology to enhance the competitiveness of the business enterprise. While relocating industries is economically prospective, in the long run, it could become problematic for the receiving countries and firms. Since this will lock countries into the "flying geese" type of industrialization, it requires an intetdependent relationship among the members of the flock, the balance of this relationship is normally titled towards the leading country or its firms. In order to be able to improve the position of one country industry firm within the flock, it is imperative that the country industry firm break out of the mould of development as shaped by the gradual maturing of the technology that it seeks. This could be achieved, if the firm is seen not as a production unit that is dominated by its technology, but as an independent business entity that is willing to use the most advanced technologies, in production as well as business, such as information technology, whenever the need arises to transform the business position to a higher level in the economy. In other words, businesses have to be reengineered so that they can achieve dramatic improvements in critical areas of performance, such as cost, quality, service, and speed which are of value to the customers, by utilizing technology to its full extent and beyond and thus creating a competitive turnaround of the business (Hammer & Champy, 1993; Hartanto, 1993).

Relocated industries tend to create a rigid industrial structure that delimits the potential of technology to enhance the competitiveness of the business enterprise.

Seventh, Asian industries and firms have begun to feel the growing need for flexible technologies to meet the higher order demand of their customers. The ability to respond effectively to meet this demand is frequently hindered by the existing technologies that tend to be rigid and policies, and psychological barriers that limit the freedom of action of the business. Manufacturing technologies of the past that are dedicated to produce specific products, are usually not flexible enough to meet the variety and changing demands of contemporary customers. Although there are growing signs that certain Asian industries and firms are beginning to replace their older technologies with more flexible, state-of-the-art ones we cannot neglect the fact that such technologies

are place at a distinct disavdvantage in competition with their predecessors whenever they come embodied in, or are technically interrelated with, the indivisible capital goods that may burden the user with heavy fixed cost charges. This is especially true when the old techniques are embedded in extremely durable physical plants with low maintenance requirements and relatively efficiently operations.

Thus, the legacies of the past capital formation decisions, as well as the cost of new investment, may combine to create differences which will determine the timing and pattern of technology diffusion within firms and industries. Durable facilities, surviving from earlier epochs, may pose barriers to the introduction of best-practice methods that cannot be surmounted by the working of normal competitive market processes (David, 1986). On the other hand, according to Pavitt (1986), in order to be able to understand our inability to renew technologies, we also have to look at the diffusion of skills, strategies, and structures capable of maintaining a continuing stream of successful innovations and imitations. He also stated that in modern manufacturing, technology is localized in firms, differentiated in nature, and cumulative in development. This is in line with Atkinsons and Stiglitz (1969) contention that under such circumstances, the technological choice of firm reflects not only the relative factor cost, but also the skills accumulated through past technological activities, together with expectations about future technological activities and market developments. Further, accumulated technological skills can become an inhibiting factor for real growth, because it is often frequently too narrowly rooted in technical know-how that tends to neglect the broader implications of running a successful business. In some Asian countries which are not rooted in the tradition of trade, such as Indonesia, this narrow "engineering mind set" will create development problems of its own, since it is still based on the old business paradigm of selling what we can make and not in producing what the customers need.

We also have to look at the diffusion of skills, strategies, and structures capable of maintaining a continuing stream of successful innovations and imitations.

Eighth, Asian industries and firms in their effort to utilize technology to its full advantage will also have to face the dilemma of profitability versus job creation. This is especially true for countries with large populations, such as China, India, Indonesia and the Philippines. In these countries, creating new job opportunities, combined with national pride, has become a sensitive issue that requires not just feasible solutions, but also acceptable means. This means that in looking for those solutions, we also have to take the socio-physchological barriers into account.

The need to create more jobs within a country usually gives rise to the issue of increasing the local content of products. The adoption of a policy to provide incentives for those who increase the local content of their products could run against the universal trend towards globalization as a means to improve the economic performance of the industry or the firm. In fact, the dilemma could probably be best viewed as an issue of balancing a pressing, current need to create more jobs against the long term effort to build a business capacity on the basis of specific core competences. This dilemma is pervasive in the ASEAN context. Mandating the increase of the local content in products manufactured in any ASEAN country would be detrimental to the ASEAN spirit of cooperation as reflected by the accelerated adoption of AFTA through the CEPT (Common Effective Preferential Tariff) scheme. Instead, by adopting a manufacturing policy that would make the best use of available capabilities and core competencies of ASEAN industries and firms, we could capitalize on the best that ASEAN industries and firms can offer and, thus, creating excellence and the necessary competitive edge in the global market. Of course, this policy should not be limited to cover ASEAN countries only, but ultimately must include other countries of the world as well. This would, in turn, result in a sustained, long term growth, which will eventually create more job opportunities. If this industrial policy can be successfully implemented, it could be used to fend off accusations of unfair trade practices, especially those coming from the United States. We can expect that such accusations will become more intensive in the future, since the ASEAN economy is becoming bigger (Kingston, 1993). This ASEAN example will also be true for other parts of Asia.

The eight reasons underlying the problems encountered in the utilization of technology with in the Asian context that are elaborated here will have a significant impact on how we can make technology become the effective instrument to build a competent and competitive industry. Understanding these issues will be the prerequisite to building Asian competitiveness in future.

Asian Competitiveness Through Technological Collaboration

The way to face the issue of maximum and effective utilization of technology in the Asian context will now be focussed on the mind set of the decision makers at the industry and firm level, the technological paradigm used in the business context, and the strategy that could be adopted in order to enhance the role of technology in building Asian competitiveness. Without neglecting other factors that could influence the utilization of technology in ASEAN industries and firms, a set of propositions will be submitted here for further discussion.

Proposition 1: Implementation of a positive-sum strategy in the deployment of technology and development of strategic alliances among Asian industries and firms could enhance their total business capacity and competitiveness most significantly.

Asian industries and firms, being late comers on the global business scene, do not have the option to capitalize on their past advantages of operating in resource rich countries with relatively low labour costs. They are required to undo their old ways of doing business and adopt new attitudes that stress the importance of their real business capacity and competitiveness, which are rooted in their human capital and its technological support. However, renewing the business capabilities have to be done in such a way that would balance change and continuity carefully (Fry & Srivasta, 1992). The deployment of new or renewed technologies within the industry or firm together with its managerial implications will become the element of change, while continuity is preserved through the adoption of an incremental process of change. On the other hand, strategic alliances will set the mould for long term growth and stability of the firm. The term "technology" used here is not limited to production technologies alone, but will also include others used in the office or as means to provide services, while a firm" is perceived as a whole business entity, which usually includes one or more production units.

Although the above mentioned policy of renewal seems to be universal in nature, its importance will be highly enhanced when it is applied within cultures that attach importance to the preservation of harmony. This is the reason why applying the positive-sum strategy in building business capacity and competitiveness in Asian industries and firms could provide us with a higher probability of success, because the efforts that will be made for this are designed to suit the existing business culture found among most Asian industries and firms. These efforts will start with careful comparisons of possible alternatives, searching for the best alternative, listening to critics and supporters alike, making contacts and building strategic alliances, and ending it by patiently and continuously adopting and adapting new ways of incremental improvement.

Lasserre (1993) found out that East Asian Countries have been successful in building their global competitiveness despite the fact that they are late comers, because the industries and firms have a long term view allowing for trial and error, learn indirectly from local agents, emphasize product and service quality at the expense of immediate profitability, identify new or unexplored markets, implement innovative, non-classical ways of competing, and possess a permanent willingness to learn. The use of state-of-the-art technologies in an appropriate and effective way could enhance the capacity and competitiveness of the business firm. In other words, the most important thing that has to be achieved by Asian industries in the global market is establishing credibility through the development of technology, leading to the penetration of entry barriers with the help of customer good will. These achievements are then institutionalized through the establishment of a business network consisting of distributors, suppliers, and those who provide the services. This pattern of development, with slight differences, is used by many ASEAN conglomerates when they build their business capacities and competitiveness.

Proposition 2. Better strategic deployment of technology among Asian industries and firms can be achieved, if they are guided by an inspirational long term global business vision.

A striking phenomenon behind many successful Japanese ventures is their ability to commit themselves to the achievement of a long term vision. Long term global business visions provide the guiding light for the firm's strategic actions, including their way of investing in and development of technology. Combined with strong commitment and sense of direction, these visions become the mobilizing force with focus on and efforts at enhancing the firms capabilities to sense and interpret change correctly and adapt themselves to it rapidly (Lasserre, 1993). Other Asian firms also need this kind of inspirational business vision to guide their actions. However, these visions have to be attuned to the reality of globalization and the Asian cooperative spirit, meaning that its fulfillment will eventually lead to benefits that can be felt across Asia and the world. The key to such an achievement is business netwroking with a vision.

A striking phenomenon behind many successful Japanese ventures is their ability to commit themselves to the achievement of a long term vision.

In order that the development of technology can produce results which are in line with the visions as described above, firms have to make sure that the technologies that they employ will enable their members to achieve the best in a cooperative spirit. This will also mean that the technology that may be employed by a firm would be the one that enhances the core competence of the firm, while at the same time, its development will be followed by acknowledging that there are other firms that can meet the requirements of excellence of the total production process. The other firms have to develop their own core competences, but most importantly, they have to be complementary to each other. If this is the case, interdependence among firms on the development of core competences can be achieved, although the firms come from different countries of the world. In other words, successful implementation of this Proposition will depend on the firms' capability to achieve complementarity of core competences among interdependent firms participating in the total production process, anchored around a long term global business vision.

Proposition 3. In order that technology development can be made more selectively to enhance the firm's capability to meet the customers' demands in terms of cost, quality, variety, timing, and delivery, Asian firms have to develop their technological information scanning capability in cooperation with other industries, firms, research and development (R & D) institutions and individuals.

Enhancing the capability to satisfy customers will become the role of any new or renewed technology to be deployed by the firm. Technology should be deployed because of its enabling capability. And consequently, its deployment has to increase the core competence of the firm. Achieving this end is not an easy task, since it will require intensive scanning of technological information, in order to ensure that the deployed technology be the best of its kind. Scanning has to be performed world-wide. Asian industries and firms have to work together to achieve this end. Embassies around the world are required to participate in this endeavour. However, this could be of mutual benefit, if only technological information sharing among Asian industries, firms, and R & D institutions, is also initiated and sustained.

Empirical findings have supported that free access to technical knowledge could contribute to the competitiveness of the firm that has the knowledge, because such free access tended to stabilize the industry as a whole (Garud & Kumarswamy, 1993). However, sharing technical knowledge among firms with complementary competences working towards a common purpose, namely producing parts of the same product or service, will eventually produce benefits for all. Sharing technological information, when it is implemented properly, should reflect the win-win spirit that underlies the Asian cooperative effort.

Free access to technical knowledge could contribute to the competitiveness.

Proposition 4: Strategic technical partnering among Asian firms with complementary core technical competences could enhance their overall business capability and competitiveness.

Hagedoorn (1993) has found out that technical complementarity, reduction of the innovation period, market access, and influencing the market structure are the most mentioned motives underlying strategic technology partnering, However, technical complementarity and reduction in the innovation time span seem to be less relevant in mature industries, such as chemicals, consumer electronics, food, and the automotive industries. For a mature industry, motives related to market access and restructuring appear most appropriate. Such industries seem to attach importance to environmental changes, globalization, and new products. For example, entering a foreign market can be made possible only through alliances with international producers. mature industries are also very sensitive to changes in the market that tend to change their oligopolistic position.

Technological complementarity is a significant motive for technology partnering for firms and their partners that have wide arrays of activities and technological competencies. Industries that require different core competencies, have a clear need for technological complementarity. For example, the industrial automation manufacturers are clearly in need of cooperation with users from other sectors of industry, as well as with companies that are competent in information technology.

Software companies also need technical cooperation with their users.

The reduction of innovation period seems to be the motive for technical cooperation whenever the competitiveness of the firm can be jeopardized by new entrants. This is especially true for industries that have a volatile market for products with a multi-technology content. These industries need to combine existing mature technologies with new products and services to meet the changing market. Technology partnering among firms with complementary technical core competencies could reduce the innovation time significantly and, thus, create benefits for all the participants.

Most Asian industries usually cannot be considered as being mature, with the exception of some of those bigger companies operating in the industrial countries. Products are usually delivered to the customers bundled within a set of services, requiring the support of different competences. Many Asian firms are producers of these products. Although there are firms that are geared to produce the complete product or service all by themselves, many of them have already adopted global or, at least, regional networking as their way of doing business. The major motive for such technological cooperation seems to be the complementarity of their technical competences, The synergic combination of these complementary competences would become the core of the firm's competitiveness and enhanced capability. While cooperating with each other, they will also be able to reduce the innovation time-span, which could bring additional advantage to the firm. Viewed from this perspective, technological cooperation among Asian firms seems to be imperative for the future, if they want to maintain their competitiveness in the global market.

These opportunities can be realized by only those Asian corporate leaders who have the vision and the will to transform their business into competitive entities.

Conclusion

Technological cooperation requires a change in the mind set and needs to be explained with different business paradigms. Such a cooperation is strategic in nature and should have the attention of top decision makers. Asian industries and firms have to learn and understand the new business context that leads to the need for strategic technological cooperation. They have to unlearn many business practices, especially those related to the development of technology and interfirm cooperation. They have to change policies to make way for new opportunities that can be opened through technological cooperation that could eventually lead to progress that goes beyond present expectations. But, ultimately, these opportunities can be realized by only those Asian corporate leaders who have the vision and the will to transform their business into competitive entities that can bring wealth and welfare to the people of Asian countries in future.

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India's Financial Sector: Overgrowth & Dysfunctionalities

Kamal Nayan Kabra

The author examines some aspects of the nature of the Indian financial sector and its place in the national economy. Evidence is presented to prove that the excessive growth of this sector is basically an indicator of the non-functional features of the economy exhibiting growth fundamentalism. It is suggested that the relationship between the financial and the real sectors has to be considered before proposing imminent changes for the former.

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A mega structural adjustment programme, initiated in mid-1991, seems poised to enter the financial sector. Two expert committees have submitted their conclusions and recommendations indicating the direction and character of the proposed changes (Ministry of Finance, 1994). The restructure of financial sector is a live-wire issue.[1] India has a vast and varied financial system with growing sophistication in terms of institutions and instruments (Appendix I listing the institutional diversity). However, in so far as both the organised and unorganised components persist, it remains dualistic like the real economy.[2] The fact that the number of rural branches of the banks increased from 1860 in 1969 to over 35000 in 1993 (58 per cent of all branches) suggests that the informal rural sector cannot be considered totally isolated. Similar trends are indicated by the fact that in place of one bank branch for about 65,000 persons in 1969, we now have a bank branch for every 11,000 persons. (RBI Report on Currency and Finance, 1992-93). In addition to the institutions listed in Appendix I, we also have a large number of non-banking financial companies (NBFCs) which, according to A.C. Shah Committee, number over 35,000 and lately have seen the addition of a number of subsidiaries floated by various banks as also the growth of a large number of companies providing a variety of financial services. The NBFCs have experienced a real runaway growth during the last 2-3 years netting big gains, as reflected in their cash earnings per share (CEPS). (Business Standard, 1993). Little wonder, even SAIL is contemplating entry into financial services. (Economic Times, June 8, 1994).

1. An indicator of the highly emotive approach is that these changes are dubbed 'reform' by the government, while the bank and insurance employees are set on a long agitational path with a series of general strikes all over the country.
2. The economy has been conveniently divided by Kornai, (1971) into real sphere financial sphere and control sphere.

We also have some really gigantic public sector financial institutions (PFIs) like the Unit Trust of India, LIC, GIC, the Stock Holding Corporation of India, Discount and Financial House of India Ltd. OTC Exchange of India Ltd., etc. These organisations are a part and parcel of the large shares, securities, money and debt markets. Owing to our huge public debt (subscribed largely by the banks and PFIs), the need to change their portfolios by the banks in response to changing SLR, CRR requirements and changes in interest rates, we have an active market in gilt-edged securities, whose turnover over a short-spell exceeded Rs. 12 lakh crore as revealed by the Janakiraman Committee's report on the financial market scam of 1992. (RBI, 1992, 1993)

We have one of the largest and fast growing capital markets in the third world, next only to Mexico, Korea and Taiwan with listing of over 6500 companies, having market capitalisation at the end of 1992 approaching $ 86 billion or Rs. 25000 crore in which the number of investing public is fast approaching 3 to 4 crore (Kabra, 1993).[3] The daily turnover of Bombay Stock Exchange alone is in the range of Rs. 200 to Rs. 300 crore, while the country-wide figures, prior to the entry of nearly 150 FIIs, was around Rs. 450 crore daily. Thus huge yearly stock market trading of the magnitude of nearly Rs. 1.5 lakh crore, nearly a quarter of our GDP at current prices and a little more than the GDP contributed by the manufacturing sector, is symptomatic of the emerging casino character of the Indian financial sector populated by carpetbaggers. The dulling impact of curbs on badla is a sharp pointer to this effect as also the reduction in the fluctuations in share prices since then. (Economic Times, 30th May 1994). The highly speculative nature of our stock market is seen in: the small share of new issues (presently around Rs. 25000 crore per annum) to secondary market transactions, the proposal to start BSE index-based futures and, too much money chasing too few scrips, (as the marketable part, after allowing for necessary long-term holdings by promoters-controllers and holding of stocks worth over Rs. 70000 crores by the PFIs, is rather small)

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3. However according to Palkiwala N. the number is 22 million. (Economics Times 23 March 1994).

with average returns on annualised basis on Bombay Stock Exchange being 20 per cent (Sept. 1977 to Sept. 1992). Given the fast pace of turnover and liquidity, even small returns per deal add upto an attractive annualised rate of returns with its inherent scope for tax evasion providing the real icing.

There has been both widening (i.e. expansion) and deepening (i.e. greater volume of financial transactions between the financial and real sectors and intra-financial sector transactions) of the financial sector. This is also seen in the variety of newer instruments like, deep discount bonds, zero-interest partly convertible debentures, equipref, floating rate bonds, CPs (worth Rs. 9000 crores) CD, Eurobonds, GDRs, etc. growth of securities and bonds market, (whole sale debt market), newer financial services like leasing, merchant banking, venture capital fund, equity research, financialisation of commodity markets through widespread informal future markets in many commodities, hyper growth of State lotteries, etc. Thus we find that the spread, diversity, depth extensive interaction between the finance and real spheres etc. have grown quite significantly.

An indication of the growing size and importance of the financial sector can be seen in term of the share of financing, insurance, real estate and business service sector in our national economy i.e. their share in our GDP, particularly in relation to the real economy producing the wherewithal for meeting human needs and their continued extended production.

In absolute terms this sector contributed nearly Rs. 11,000 crore in GDP in 1981 (at current prices). This amount increased to a little less than Rs. 40,000 crore in the year 1991 and in a big spurt following 'liberalisation' in a matter of just one year it went up to over Rs. 45.5 thousand crore in 1991-92 and further to Rs. 51.4 thousand crore in 1992-93. The contribution of this sector in constant 1980-81 prices doubled to nearly Rs. 21,000 crore in 1991-92 and reached the level of Rs. 24.3 thousand crore in 1992-93. While during 1990-91 this sector saw a real growth rate of 2.8 per cent, during the following year the rate jumped to 12.7 per cent. On this enlarged base, there was a growth of 2.8 per cent in 1992-93. This is reflected in the growing size of the financial sector in our GDP. While during 1980-81 it contributed 8 per cent to GDP, at the beginning of the 1990s the financial sector produced one-tenth of our GDP, which increased to 11.1 per cent in 1991-92 and 10.9 per cent in 1992-93. Similar trends are visible when we look at the share of the financial sector in our NDP. For instance, compared to the growth of 2.7 per cent over

the previous year in 1990-1991, this sector recorded an annual growth rate of 13.3 per cent during 1991-92 and 2.5 per cent in 1992-93.

The contribution of banking and insurance accounts for the bulk of the value-added generated in the financial sector. While at the beginning of 1980s banking and insurance accounted for about one-third of the sectoral total, during the first two years of the 1990s its share became nearly one-half of the total. In terms of annual rate of growth, compared to 2.1 per cent growth during 1990-91, the banking and insurance sub-sector achieved

The contribution of banking and insurance accounts for the bulk of the value-added generated in the financial sector.

a growth rate of 21.7 per cent in real terms and 30.6 per cent in nominal terms during 1991-92 and 2.5 and 13.6 per cent correspondingly in 1992-1993. It can be seen that the contribution of the financial sector to GDP is comparable to that of the registered manufacturing and trade, each taken separately; with the former being 10.9 per cent and the latter being 11.8 per cent. Or to look at it a little differently, the financial sector accounts for double the contribution of public administration and defence to GDP or, for that matter, double the share of transport, storage and communication and a little more than double that of construction.

The financial sector accounts for double the contribution of public administration and defence to GDP or, for that matter, double the share of transport, storage and communication and a little more than double that of construction.

This is also reflected in the relative rates of growth achieved by various sectors. During the year 1991-92 the overall rate of growth of the financial sector was 11.1 per cent and of the banking and insurance sub-sector was 6 per cent and remained practically the same during the following year. This relatively faster rate of growth of the sector was achieved in the face of the negative growth of agriculture and manufacturing, both registered and unregistered, and the overall sluggish rate of growth of gross domestic product at factor cost at 1.1 per cent in 1991-92 and in terms of quick estimates at 4 per cent in 1992-93. Without the rapid growth of the financial sector, the overall growth rate actually achieved by the economy would hardly have been possible. Thus what we see is recession and stagnation in the real economy and a hyper growth in the facilitating financial sector: a disproportion which, in conjunction with the associated real and control sphere changes, distances this growth from the well-being of the people at large.

What we see is recession and stagnation in the real economy and a hyper growth in the facilitating financial sector: a disproportion which distances this growth from the well-being of the people at large.

An analysis of financial flows by sectors also brings out that the financial sector has grown quite sizeably in comparison to the growth of the real economy. The total value of financial flows in the Indian economy was Rs. 3709 crores in 1968-69. It reached Rs. 172,356 crores in 1990-91, an increase of over 46 times within a period of 21 years which implies, on an average, more than twice (non-cumulative) growth each year. Two important producing/consuming real economy sectors, viz. private corporate sector and the household sector, accounted for 3.1 per cent and 35.9 per cent of the use of the flow of financial resources in 1968-69. This share declined to 2.1 per cent and 33.9 per cent respectively during 1990-91. On the other hand, the financial flows (of over 46 times larger absolute volume) used by the financial institutions (banking and other financial institutions) increased over the same period their share from 38.7 per cent to 44.3 per cent. (based on CSO data as given in CMIE, Basic Statistics Relating to the Indian Economy, August, 1993, Tables 13.16-1 & 2).

The essential function of financial intermediation performed by the financial sector institutions and instruments arises from the separation of savers from investors. Thus, divergence between the inter-sectoral composition of gross domestic savings and capital formation, along with the proliferation of financial instruments, and extensive trading and speculation in them, may explain, at least partly, the relative overgrowth of the financial sector. In our case the household sector is the main saver, while the private corporate sector and the public sector are the net deficit, investing sectors. Lately the role of household sector as a supplier of savings has increased considerably.

Table 1. Draft of Financial Saving of the Household Sector

(per cent of total)

	1980-81 to 1985-86	1987-88 to 1990-91
Director Financing		
Private Corporate Sector	9.6	4.0
Government Sector	24.1	28.6
Indirect Financing to		
Private Corporate Sector through:	15.7	18.6
Banking	6.9	6.0
Other Financial Institutions	8.8	12.6
Govt Sector through:	49.6	48.7
Banking	33.9	28.2
Other Financial Institutions	15.7	20.5
Total Financing	100.0	100.0
Private Corporate Sector (1.a + 2.a)	25.3	22.6
Government Sector	73.7	77.3
Other Sectors	1.0	0.1

Source: RBI Bulletins, Jan. '91 & June 1993. *Flow of Funds Accounts of the Indian Economy*: 1980-81 to 1985-86 & 1987-88 to 1990-91.

This is reflected in the growing proportion of household saving in the form of financial asset. Financial savings accounted for about 30 per cent of the gross savings of the household sector in 1981, rising to 36 per cent in 1991 and becoming nearly 40 per cent in the year 1991-92. (Table 2). These financial assets are equal to 13.3 per cent of NDP marking a big spurt from 1981-82 level of 9.4 per cent. Among the financial instruments, shares and debentures have experienced a phenomenal growth; up from 1.5 per cent to 8.3 per cent in 1991-92. Even in the course of just one year, savings in the form of shares and debentures increased from 5.9 per cent in 1991 and 8.5 per cent in 1992, exceeding Rs. 12.25 thousand crores. During the first nine months of 1992-93, fresh issues amounted to 11.2 per cent of gross domestic savings. The share of institutional saving in the form of insurance and PF also showed an over 2 per cent points increase.

Among the financial instruments, shares and debentures have experienced a phenomenal growth; up from 1.5 per cent to 8.3 per cent in 1991-92.

An estimate of the magnitude of resources requiring intermediation by the financial institution can be had from two factors. One, the volume of financial savings in 1991-92 increased by nearly Rs. 13,000 crore over the preceding year, becoming 13.3 per cent of the NDP. Second, as a result of such intermediation, the private corporate sector was able to increase its share in gross capital formation by over seven times since 1981, with its share in gross capital formation rising to 4.7 per cent of GDP from 2.5 per cent in 1980-81. Similarly the public sector also has been able to invest over 10 per cent of GDP at current prices while its savings are nearly 2 per cent of GDP. (Table 3).

Total financial assets which were equivalent to 62 per cent of GDP in 1981, became 94 per cent of the GDP in 1989.

Table 2. Household Savings in Financial Assets

Year	Household Sector Savings in the form of financial Assets (Rs. Crores)	Net Domestic Product (At Current Market Prices) (Rs. Crores)	Percent of NDP	Percent of Household Saving
1980-81	8609	123926	6.94	39.40
1985-86	18578	236006	7.87	51.72
1986-87	23339	263126	8.86	53.21
1987-88	26820	299860	8.94	45.66
1988-89	27554	357672	7.70	39.20
1989-90	41577	408416	10.18	45.19
1990-91	46042	478981	9.61	43.39
1991-92	55672	547691	10.16	47.04
1992-93	55803	634506	8.79	44.25

Source: Report on Currency and Finance Vol. II 1992-93 statistical Statements (Page No. 10 & 11).

A suggestive indicator of the size and growth of the financial sector can be in terms of the total assets of the sector, say viewed in relation to GDP, and their distribution among banks, non-banking institutions, etc. (Table 4). It can be seen that total financial assets which were equivalent to 62 per cent of GDP in 1981, became 94 per cent of the GDP in 1989. During the same period the banking sectors' assets increased from 34 to 45 per cent of the GDP and the assets of specialised institu-

Table 3. Structure of Gross Capital Formation and Gross Saving

(Percent of GDP)

	1981-82	1985-86	1990-91	1991-92
Public Sector				
Gross Capital formation	11.1	11.8	10.5	9.5
Gross Savings	4.6	3.2	1.1	–1.7
Over-all deficit	–6.5	8.6	9.4	–7.8
Private Sector				
Gross Capital formation	11.5	9.5	15.8	16.0
Gross Saving	16.4	15.7	22.5	22.6
Over-all Surplus	4.9	6.2	6.7	6.6
Private Corporate Sector				
Gross Capital Formation	5.9	2.9	4.5	5.7
Gross Saving	1.4	2.0	2.6	2.8
Over-all Deficit	–4.5	–0.9	–1.9	–2.9
Household				
Gross Capital Formation	5.6	6.6	11.3	10.3
Gross Saving	15.0	13.7	19.8	19.9
Over-all Surplus	10.6	7.1	8.5	9.6
Total Gross Capital Formation	22.6	21.3	26.3	25.5
Total Gross Saving	21.0	18.9	23.5	24.3
Net Capital Inflow	1.6	2.4	2.8	1.2

Source: 1. Reserve Bank of India, Report on Currency and Finance, 1991-92.
2. Centre for Monitoring Indian Economy. Basic Statistics Relating to the Indian Economy, Aug. 1993.

another recent development i.e. the growing role of external finance and financial institutions. This factor has been activated by the opening up of the Indian financial sector. Foreign Institution investors (FIIs) numbering about 150 and 9 foreign brokers were registered by the SEBI (and more are trooping in) for operating in the Indian Stock Markets and are estimated to have invested about $ billion in the stock market and much more is in the pipeline through the 'grey markets'. This triggered off a fresh boom in our stock market which turned out to be short-lived on account of badla restrictions. A good number of international financial companies started their operations in India, investing in both blue-chip and smaller companies. Many Indian companies have planned Euro issues and some have actually tapped both the institutional and small individual investors abroad. With the listing of and trading in our scrips in stock exchanges abroad, the financial operators have lucrative arbitrage opportunities.

The relative overgrowth of the financial sector and the hyper active financial market derive sustenance from another recent development i.e. the growing role of external finance and financial institutions.

Table 4. Structure of the Financial System

Gross Financial Assets of Financial Institutions

	1981		1989	
	(Percentage of Total Assets)	(Percentage of GDP)	(Percentage of total Assets)	(Percentage of GDP)
Banking System	69	43	60	56
i. Reserve Bank	14	9	12	11
ii. Banks	55	34	48	45
Specialised Financial Institutions	11	7	17	16
Social Security Institutions, Insurance, Pension & Provident Fund	19	12	23	22
Financial System Total Assets	100	62	100	94

Source: RBI Annual Report 1989-90 & Report on C. & F. 1989-90.

tions from 7 to 16 per cent of GDP. On the basis of the foregoing, there appears to be little doubt that the financial sector has really acquired a high measure of depth and breadth in India.

The relative overgrowth of the financial sector and the hyper active financial market[4] derive sustenance from

Recently big non-banking financial companies from abroad, like Morgan Stanley have entered the Indian Market by setting up asset management subsidiaries and have mobilised nearly Rs. 1000 crore from India's investing public. A number of such foreign companies with minority stakes have set up shops with Indian partners. These developments are clearly a fall-out of the policy of extending liberalisation to the financial sector, including banking and insurance, which is being implemented in

4. A recent report stated that financial dealings amounting to a sum equivalent to the world GDP takes place in just a fortnight only. (*Business Standard*), June, 1994.

terms of the recommendations of the Narasimham Committee and Malhotra Committee Reports.

Financial inter-relations ratio, i.e., the ratio of net increase in financial assets during a given year to the amount of net fixed capital formation during the same year, is a good indicator of the extent to which financial assets are related to or contribute to net fixed capital formation. The process of making savings available to the investors for real capital formation involves intermediation by financial institutions, as they, by dint of specialisation, large-scale operations and specialised knowledge, can reduce cost, and allocate savings to relatively more profitable uses. The process of real physical capital formation and that of intermediation, involving creation of claims and counter-claims have to proceed together and for balanced growth the two have to maintain a broad proportionality. But as the chain of intermediaries elongates involving trade in claims and counter-claims and newer instruments are created for the purpose by financial engineering, the financial sector may start growing *per se*: there would not obtain any proportionality between the two. The advantages of specialisation and specialised expertise tend to remain confined to the financial sphere. Newer combinations of terms and conditions, periodicity, sharing of risks and returns give rise to a variety of financial instruments and financial derivatives, moving within the confines of the financial sector.

The process of real physical capital formation and that of intermediation, involving creation of claims and counter-claims have to proceed together and for balanced growth the two have to maintain a broad proportionality.

In such a situation, the dealings among financial institutions, involving a variety of financial papers, tend to increase without a commensurate increase in physical capital formation. This is an indicator of excessive, dysfunctional financial intermediation and of creation of and trade in financial assets with no direct and often little positive bearing on the process of real capital formation. The financial inter-relations ratio has increased from 1.09 in 1980-81 to 3.2 in 1991-92, indicating a large disproportion between the creation of real, fixed assets and financial assets. (Table 5)

The financial inter-relations ratio has increased from 1.09 in 1980-81 to 3.2 in 1991-92, indicating a large disproportion between the creation of real, fixed assets and financial assets.

The newer and bigger financial institutions have generally adopted the corporate form of organisation and

Table 5. Financial Inter-Relations Ratio

(Rs. Crores)

Year	Net Increase in Financial Assets				Net Fixed Capital Formation			
	Financial Saving	Private Corporate Sector	Public Sector	Total (1+2+3)	Gross Fixed Capital Formation	Less Consumption Fixed Capital	Net Fixed Capital Formation	I/II Ratio
1980-81	8610	2284	4654	15548	26276	12087	14189	1.09
1981-82	9614	2496	7254	19364	28079	12788	15291	1.26
1982-83	12739	2908	7822	23469	29296	18595	10701	2.19
1983-84	13294	3172	6781	23247	29632	14469	15163	1.53
1984-85	17879	3991	6526	28396	30784	15448	15336	1.85
1985-86	18538	5318	8457	32313	32974	16340	16634	1.94
1986-87	23312	5212	8002	36526	35997	17293	18704	1.95
1987-88	26785	5790	7223	39798	39955	18334	21621	1.84
1988-89	27114	8731	8101	43946	42800	19476	23324	1.88
1989-90	41809	11945	7347	61101	46802	20732	26070	2.34
1990-91	45608	14393	5591	65052	51563	21915	29648	2.19
1991-92	58563	16633	10176	85372	49772	49772	23171	3.20

Source: National Accounts Statistics (1991, 1992 & 1993) Page No. 49 & 53.
Report on Currence & Finance, Vol. II, 1992-93, Page No. 10.

raise their corpus from the capital market. They hire professional financial analysts and operate as highly organised, professional entities using front line management techniques. At the same time, there has already taken place a fairly large degree of globalisation of India's financial sector. Not only has the number of foreign banks operating in India (56 banks from 21 countries) increased but their branches have increased from 127 in 1980 to 140 in 1991 while during 1992, 8 additional branch licenses were granted. (Economic Times, 30 April, 1992)

Thus, along with overgrowth, one can see increasing sophistication in India's financial sector. This 'sophistication' has also impacted management and accounting practices verging not infrequently on sharp and illegal practices, particularly, but by no means exclusively by the foreign banks (Lok Sabha Secretariat, 1993)

Recent policy changes have tended to contribute to the growth of the financial sector. Since such an expansion is taking place in the context of recessionary conditions in organised manufacturing, tightening of public spending, mainly public investment and strict enforcement of prudential norms regarding lending and shortage of good quality assets, the banking sector is flush with liquidity (Table 6). Economic Times, 30 December, 1993). This is a sure indication of over-expansion of the financial sector vis-a-vis the real sector. Many other changes in the financial sector policies like permission to float new banks, both by the private sector and foreign interests, write currency options, increased investments in PSU bonds, increased buying of commercial paper, sale of nationalised banks' equity on the capital market, changes in interest rate policies, reduction in pre-emption of credit by the government, closure of uneconomical bank branches and setting up of non-banking financial subsidiaries by the banks, indicate that while enforcing stricter profitability standards, the over-growth of the financial sector is being accelerated. The uncertainty over forward trading and badla in the stock markets is the only major change which is likely to rein in the growth of the primary and secondary financial markets. The setting up of the National Stock Exchange would activate the wholesale debt market. The huge accretion to our foreign exchange reserves would also contribute to the over-expansion of the financial sector.

Table 6. Percentage of Aggregate Deposits to GNP at Current Market Price

(Rs. crores)

Year	Aggregate Deposits of Banks	GNP at Current Market Prices	Deposist as % of GNP
1980-81	35030	136358	25.7
1981-82	41795	159800	26.2
1982-83	48233	177498	27.2
1983-84	56923	206645	27.5
1984-85	67062	229919	29.2
1985-86	79862	260814	30.6
1986-87	95126	291144	32.7
1987-88	111319	330582	33.7
1988-89	131386	392097	33.5
1989-90	154899	448255	34.6
1990-91	180281	524032	34.4
1991-92	212080	602667	35.2
1992-93	252799	696167	36.3

Source: RBI Report on Currency and Finance, Vol. II, 1992-93, Economic Review (P. No. 191).

While enforcing stricter profitability standards, the over-growth of the financial sector is being accelerated.

Various steps like contribution from the public exchequer to the equity of the banks to bolster up their capital base in terms of adequacy norms and enforcement of transparent and realistic accounting norms and procedures may contribute to better financial performance by the banks and thus release the brakes which obstruct their growth. However, little evidence has surfaced to indicate the waning of political influence peddling with the banks. Though additional supervisory agencies are being set up, little evidence is available to show reduced scope for scandals, scams and shenianigans in the financial sector.

In sum, neither does there seem to be any realization of the disappropriate growth of the financial sector, nor any attempts to apply brakes in order to enforce a functional relationship between 'financial circulation' and 'industrial circulation' to use Keynesian expressions. (Keynes, 1930)

Neither does there seem to be any realization of the disappropriate growth of the financial sector, nor any attempts to apply brakes in order to enforce a functional relationship between 'financial circulation' and 'industrial circulation'.

Why do we view the over-growth of the financial sector unfavourably? How is it dysfunctional? It is obvious that financial services are a crucial, essential component of large and complex industrialised and industrialising economies. As these services grow and diversify in terms of functions, institutions and instruments, they provide intermediation with greater efficiency in terms of costs, risk-management, ease of access and appropriateness of allocation. They employ people, increasingly with higher skills and competence. They undertake value-addition and hence contribute to growth. A powerful indicator of the essentiality of the financial services sector is the growth of the informal financial sector in order to cater to the needs of the small, scattered and informal micro producers on terms and in a manner applicable (not necessarily suitable) to them. (Ghate, 1992)

However, the essential point is that they are a mechanism for the creation, mobilisation and allocation of financial wherewithals. They are a means, and instrumentality; and their size, role, growth, cost etc. have to be analysed in terms of the economy-wide real tasks they perform. It is true that the allocative role cannot be judged in terms of the size of the savings mobilised and allocated. That would have to be related to the cost entailed, the terms on which allocation is made and the efficiency (social and/or private) of the pattern of allocation. But to the extent financial intermediation involves the creation and settlement of a series of claims and counter-claims, of which only some are related to actual physical capital formation or other production-related tasks and others are intra-functional sector transactions, the cost of finance goes up and the allocative 'efficiency' has to be judged in terms of the given chain of intermediaries.

Such financial sector transactions lead to the creation of income flows (many of which originate in speculative activities) many of which are not related to the performance of tangible, concrete, production-related functions. Such transactions have neither a real, nor a social counterpart and can be justified only in terms of a prior or axiomatic acceptance of the utility, relevance and value of the organisations which generate them. Their justification in abstract, value-based categories like the economic 'freedom' to create organisations/institutions and instruments and to enter into deals according to one's own volition is to misread the nature of finance (i.e., claims and counter-claims like money, near money, credit for varying lengths of time and involving a variety of terms on which these transactions take place) which gives one rights and command over the goods, services, wealth and skills of others. It is a freedom which denies the essence of freedom (i.e., the realisation of constraints in social interaction) in the sense that such deals redistribute real income and wealth simply on the basis of the permissibility or tolerance of such financial institutions without any *quid pro quo*. These financial institutions make a draught skills, personnel, physical resources, infrastructural facilities, etc., which have substantial opportunity cost in terms of real goods and services, both public and private.

The real resources gobbled up by secondary stock market speculators, leasing companies, currency speculators, dealers in options, swaps etc., institutions dealing in many new-fangled financial instruments capable of multiple, multi-stage trading etc. arise on two counts. One is the real resources used up in the process of these activities. Second the 'incomes' they obtain make a draught on the available goods and services in the economy, which no longer remain available to the other real and control spheres of the economy. Obviously, such transfers of real resources are dysfunctional to the economy. No real loss of efficiency in terms of the amount of mobilisation of savings and their-allocation could come about if a number of such intermediaries were done away with.

No real loss of efficiency in terms of the amount of mobilisation of savings and their-allocation could come about if a number of such intermediaries were done away with.

If the purpose of economic liberalisation and structural adjustment is to improve the competitive strength of the system of production and to make finance a facilitator of this process, the rate of savings has to go up and the available savings have to be used for improving infrastructure, R & D and other long-term capital formation. The 'industrial circulation' in the system has to increase so that we improve technical and economic efficiency. If rates of return are high and attractive in the financial sector, it would/could cause a diversion away from real capital formation — a diversion from real investment to financial investment.

This would reduce our capacity to innovate and rationalise our productive apparatus. In fact, the real investments would be undertaken only if the long-gestation period returns on them, with greater risk and uncer-

tainty exceed those in short term, quicker and far less risky financial assets.

To improve the competitive strength of the system of production and to make finance a facilitator of this process, the rate of savings has to go up and the available savings have to be used for improving infrastructure, R & D and other long-term capital formation.

Even in terms of employment generation, dealers in financial assets are likely to create far fewer jobs. In fact, the hyper-growth of and high returns in stock, money, forex, real estate and credit markets may induce actual and potential engineers, scientists, etc. to switch over to financial analysis, equity research and such like activities, which would make for slower growth, greater dependence on imported technology and a surge in speculative activities. The growth resulting from the financial sector's unbridled widening and deepening will hardly have any positive impact on the availability of jobs and goods and services, and on external viability. On the contrary, such a pattern of growth would worsen the structural retrogression with which we are already saddled. Only those who are votaries of growth fundamentalism i.e., who accept the desirability of growth *per se*, irrespective of its patterns, cost, sharing and foregone opportunities would rejoice at such a breakneck, hyper growth of the financial sector as has been in India lately, particularly since the 1980s.

The growth resulting from the financial sector's unbridled widening and deepening will hardly have any positive impact on the availability of jobs and goods and services, and on external viability.

Our analysis in terms of an over-grown or over-mature financial system can be understood in terms of what Gurley and Shaw (1960) called 'balanced growth', which refers to growth of all real and nominal stocks and flows at the same rate. Over the last decade, the growth of financial stocks and flows has been higher than that of real stocks and flows, along with increased maturity of the financial sector in terms of the variety of instruments, services and institutions and their organisation and management. This account is incomplete in so far as no reference was made to state-run lotteries including daily and single-digit lotteries, not to mention, illegal private lotteries like matka. To use Gurley and Shaw categories, there is no dearth of financial assets to stimulate savings by way of rates of return, safety and suitability in terms of the maturity, size, liquidity, etc. through the offer of many financial derivatives. In fact, compared to the obtaining savings rate, we have far too many financial instruments and they are over-traded through a variety of financial institutions (Gurley & Shaw 1960), many of them specialise in various financial derivatives (i.e., hybrids of various financial instruments by way of their terms and conditions like options, swaps, teji-mandi etc.). The claims which arise from illegal stashing away of black incomes and wealth through informal financial instruments and institutions, like havala and havala-deals run into huge sums and are in addition to what has been discussed.

Only those who are votaries of growth fundamentalism would rejoice at such a breakneck, hyper growth of the financial sector.

In fact, despite increasing financial maturity, the rate of savings is not picking up; it has come down considerably from the peak it reached during late 70s, not to speak of the inability to joint the league of the East Asian nations with 30 to 40 per cent rate of savings. During the 1950s and 1960s there were discussions concerning the obstacles to economic progress on account of an immature financial system (Gurley & Shaw, 1960). Now we witness a situation of role reversal, where an over-mature financial system is unable to stimulate savings, investment and growth of the real sectors proportionate to its own size, diversity and maturity. It can be seen quite easily that a growing disproportion between the real and financial sectors would spur faster nominal growth and build up the macro inflationary pressures. This happens simply because of the growing disproportion between goods-producing and services sector, which leads to greater increase in the demand for goods than for services as this kind of structural change is occurring at a fairly low level of per capita income. Another factor which may contribute to macro-economic instability is that, given the present level of financial growth, the mobility of

money and finance both within the country and internationally increases with unsettling effects on the real economy.

Since organised finance, with mixed public and private sector presence, tends to have large financial companies, they become relatively less inclined to serve the small investor. If financial sector reforms tend to involve privatisation with strict capital adequacy norms, greater orientation towards market-guided lending, (which *ipso facto* becomes less targeted or socially directed, with liberalised or freer interest rates) and reorient the financial institutions towards greater financial profitability, the smaller entrepreneurs would tend to have more difficult and limited access to the financial wherewithal to support capital formation. Similarly greater freedom in the capital market regarding capital issues, pricing, disclosure norms, larger minimum size of subscription to new issues etc. would tend to be unfriendly to the small investor.

Weakened allocative regulation of the financial sector may make it difficult to enhance prudential regulation and supervision, particularly when the emphasis is on off-site supervision and control and self-regulation, as the Narsimham Committee has proposed.

Factors about the initial conditions obtaining in the financial sector and the relationship between the financial and the real sectors have to be kept in view in devising any changes in the financial sector, its organisation and regulation.

Under this framework, over-borrowing becomes a relatively easy task. The financial institutions, flush with liquidity, spurred on to show rising profitability in an environment of market-friendly policy regime would court the bigger borrowers, who may well resort to multiple source borrowing. True, credit rating agencies enter the picture and may make for better quality performing assets. However, the credit-rating agencies bypass the small entrepreneurs and companies. But it is not unlikely that the combined weight of the demand and supply side forces may make for over-borrowing by a few large firms, involving high moral hazard and high risk exposure, which may eventuate into bankruptcies. The unfolding combination of an over-grown financial sector (contributing to growth for its own sake) with the market, profit and deregulation oriented financial sector reforms, particularly during periods of macro economic stress (Capiro et al., 1992) may turn the financial sector into an additional source of instability.

The unfolding combination of an over-grown financial sector with the market, profit and deregulation oriented financial sector reforms, particularly during periods of macro economic stress may turn the financial sector into an additional source of instability.

Just as growth and/or development cannot be a mimetic exercise, whether in content, strategies, instruments and/or structural ratios, (they have to be historically-rooted and context specific), the financial sector growth too has to be highly specific to prevalent conditions; lessons can be learnt but they cannot be carbon copies.[5] It is true that financial savings constitute 74 per cent of total savings in USA and 80 per cent in Europe. But that has a lot to do with the organisation of those economies and the stage of their industrialisation and is not something which reflects *per se*, a condition let alone a necessary condition of growth. Such factors about the initial conditions obtaining in the financial sector and the relationship between the financial and the real sectors have to be kept in view in devising any changes in the financial sector, its organisation and regulation.

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5. Alexander Solzhenitsyn has this to say on what is going on in the name of economic reform in Russia. 'Monkeys-mimic. One should not mimic anything. Our life, spiritual and otherwise, must grow out of our tradition, our understanding our customs, our atmosphere. Yegor Gaidar's policies are brainless *Pioneer*, June 2, 1994.

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Appendix 1

Network of Major Financial Institutions

Reserve Bank of India (RBI) Central Bank)		
Commercial Banks	**1971**	**1991**
Number	87	300
Branches of which	12014	60.528
a. *Rural Banks*		
Number		196
Branches		14,531
b. *Foreign Banks*		
Number		24
Branches		139
Cooperative Banks		1991(No.)
State Cooperative Banks		28
Central Cooperative Banks		356
State/Central Land		19
Primary Agricultural Credit Societies		88000
Primary Cooperative Banks		1,397

Term Lending Institutions

c. *All India*

Industrial Development Bank of India (Apex Development Bank) IDBI

Industrial Credit and Investment Corporation of India (ICICI)

Industrial Finance Corporation of India (IFCI)

Industrial Reconstruction Bank of India (IRBI)

National Bank for Agricultural and Rural Development (NABARD)

Agricultural Finance Corporation (AFC)

Export-Import Bank of India (Exim Bank)

Small Industries Development Bank of India (SIDBI)

National Housing Bank (NHB)

Housing Development Finance

Housing and Urban Development

Infrastructure Leasing and Financial Services Ltd. (ILAFS)

Risk Capital and Technology Finance Corporation Ltd. (RCTFC)

Tourism Finance Corporation of India Ltd. (IFCI)

The Technology Development and Information Company of India Ltd. (IDICI)

Deposit Insurance and Credit Guarantee Corporation (DICGC)

Shipping Credit and Investment Corporation of India Ltd. (GCICI)

Export Credit Guarantee Corporation

c. State Level Institutions

State Financial Corporations (SFCS)

Number : 1991 18

State Industrial Development Corp. (SIDCS)

Number : 1991 26

Social Security and Investment Institutions

Life Insurance Corporation of India (LIC)

General Insurance Corporation of India (GIC)

Employees Provident Fund (EPF)

Unit Trust of India (UTI)

Mutual funds

Number : 1990 7
(excluding UTI)

□

Imagination is more important than knowledge.

— Albert Einsten

Futures, Options & Other Financial Innovations in India

L.M. Bhole

"Forward trading cannot be recommended unless the gains to traders can be shown to be accompanied by gains to producers, manufacturers, and consumers. Social gain and not private gain is the justification for forward trading and this case can be established only in some cases".

— Committee on Forward Markets

This paper examines the usefulness, desirability and feasibility of introducing derivatives like futures and options in India. It argues that the theoretical arguments, the empirical evidence, the testimony of experts, the financial folklore, and the regulatory history show that the economic and social case for them is very weak indeed. It also points out a number of factors which severely constrain their scope and feasibility in our country. This, however, is not to be taken as a case for lifting the ban on 'badla' trading.

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The financial sector in India has witnessed phenomenal growth, diversification and innovations during the past four decades. Many of these financial innovations have been "supply-led" rather than "demand-determined" or spontaneous [Bhole, 1985, 1992]. People from certain quarters are now demanding that financial derivatives such as futures, options, swaps and warrants be also introduced in Indian markets for suitable commodities, financial securities, and currencies. Many misconceptions exist in the minds of people regarding their nature, utility and success abroad. There is, therefore, a need for an informed discussion and a clear understanding of the various aspects of these derivatives so that the decision regarding their creation is not emotive and imitative. Further, the decision must be made only after taking into account the interests of not only the market operators but also of the investors, producers, consumers, and the society as a whole.

What are Derivatives?

Derivatives or derivative securities are contracts whose values are derived from the values of underlying widely held and easily marketable assets such as agricultural and other physical (tangible) commodities, or foreign exchange, or short-term and long-term financial instruments like bonds or equities, or intangible things like commodities price index (inflation rate), equity price index, and bond price index. Derivatives are also known as "deferred delivery or deferred payment instruments." The advanced countries have witnessed the enormous and rapid growth of bewilderingly complex varieties of

pure and hybrid derivatives over the years. While options, futures, swaps, warrants are examples of pure derivatives, captions, options on futures are hybrid derivatives. The values of derivatives and those of their underlying assets are closely related. Usually, in trading derivative securities, the taking or making of delivery of underlying assets is not involved. The transactions are mostly settled by taking offsetting positions in the derivatives themselves. There is, therefore, no effective limit on the quantity of claims which can be traded in respect of the underlying assets (Becketti, 1993).

Futures & Futures Markets

Futures are highly standardized contracts between the sellers or "writers" or "shorts" and the buyers or "longs" which obligate the former to deliver to the latter given assets in specified quantities and of specified grades at fixed times in future at contracted prices. The contracts may be designed in such a way as to give the sellers an option as to the grade, place, and date of delivery. The period of contract (deferment) may be several months; it normally varies between 3 to 21 months abroad. Depending on the underlying assets, one can talk of commodity futures and financial futures; stock index futures and interest rates futures are the examples of the latter. While the stock index futures are traded on various share price indices rather than an any individual share, interest rates futures are written on fixed income securities such as Treasury bills and bonds, industrial bonds, commercial paper, certificates of deposits, and mortgage loans (Edwards & Ma, 1992).

Futures are highly standardized contracts between the sellers and the buyers which obligate the former to deliver to the latter given assets in specified quantities and of specified grades at fixed times in future at contracted prices.

Futures contracts are traded on futures markets or futures exchanges which are usually the wholesale markets. Instead of trading with each other, the buyers and sellers trade with the exchange, as a result of which they do not have to worry about each other's credit worthiness. The exchanges, in turn, protect themselves by requiring traders to maintain normal and additional margins large enough to cover movements in prices. The settlement of the outstanding contracts on the expiration dates takes place as per the prescribed rules of the exchanges. The futures exchanges have features which are very similar to those of stock exchanges: all dealings are centralized in them; trading hours are limited; trading takes place on the basis of open outcry; prices are recorded publicly; trading on the floor is limited only to members who are admitted after stringent scrutiny, at high prices, and after obtaining guarantees; and transactions are settled by clearing houses mostly owned and operated by the exchanges themselves (Goss & Yamey, 1978).

Although futures contracts provide for the delivery of contracted assets, in practice, only a small proportion of contracts which are not offset by the corresponding opposite contracts are settled by the actual delivery. Hence, futures markets are sometimes called, "paper markets". In fact, they are not even paper markets because trading on them is certificateless; the only paper that is exchanged on them is the contract notes.

Futures & Forwards

Forward contracts (forwards) and markets for them have flourished for centuries in many countries including India. The forward markets can be said to be the forerunners of the futures markets. The contractual provisions and the obligations of trading parties highly resemble, and many people regard them as substitutes for each other. However, the following crucial distinctions distinguish them from each other: While the terms of futures are standardized in respect of trading units and the quantity, quality, place and timing of delivery, the forward contracts are customized i.e. they are tailored to the specific needs of individual counterparties. While the futures are traded only on the organized and recognized exchanges, the forwards can be traded on the OTC markets and off-exchanges. This changes the nature of risk borne by the contracting parties in them. While the forwards are mostly for the actual delivery, futures are not normally so.

Options

Options are contracts which impose the obligation on sellers to deliver, and which give buyers the right, without imposing obligation, to buy stated quantities of assets of stated quality at some future dates at the contracted prices. The buyers (holders) of options have the right to decide whether to exercise them and at what point to exercise them. The sellers have no such rights; they are only obligated to make delivery or take delivery whenever the buyers decide to exercise their options. When the

buyer has the right to pay the agreed price (strike price) and receive delivery of the asset, it is called the "call option", and when the right is to deliver the asset and receive the payment, it is called the "put option". The buyers have to pay one-time non-refundable premium to the sellers for the right enjoyed by them. While the potential loss to the sellers is unlimited, it is limited to the extent of the premium to the buyers [Edwards & Ma. 1992].

Options are contracts which impose the obligation on sellers to deliver, and which give buyers the right, without imposing obligation, to buy stated quantities of assets of stated quality at some future dates at the contracted prices.

The date on which the buyers actually exercise the options is the exercise date, while the last day by which the options have to be exercised is the expiry date. The options in whose case these two dates can be different are known as American options, whereas those in whose case the two dates are the same are called European options. Usually, options are issued for a period not exceeding nine months with expiry dates approximately three months apart.

A complex variety of options exists on the world options markets. There are simple options such as commodity options, stock options, bond options, currency options, stock index options, and options on futures; compound options such as swaptions, floortions, and captions; and synthetic options which combine options and futures positions. Among these, stock options may be on individual stocks or on various stock price indices; the former appear to be in greater vogue. In the case of options on futures, their holders acquire the right to buy or sell futures contracts rather than the underlying assets.

Option holders do not receive any dividend or interest payment; they have no say in the policies or the companies. Options yield only capital gains which may enable their holders to enjoy a tax advantage. Options are traded on OTC as well as recognized options exchanges. The latter has features which are very similar to those of futures exchanges.

Futures & Options: Comparison

Although exchange-traded futures and options may act as substitutes for each other, they have some crucial differences: In futures, the risk exposure and profit-potential are unlimited for both the parties, while in options, risk exposure is unlimited and profit potential limited for the sellers, it is the other way round for the buyers. The maturity of contracts is longer in futures than in options. In futures, there is no premium paid or received by any party, while in options, the buyers have to pay a premium to the sellers. While futures impose obligations on both the parties, options do so only on one party i.e. the sellers. Both the parties have to put in margins in futures trading, only the sellers have to do so in options trading.

Futures and options originated sometime in the seventeenth century. But for centuries they remained relatively obscure and unimportant financial instruments with only unofficial and fragmented markets, and difficult and costly transactions. The significant growth of formal, organized, officially recognized F & O markets even abroad took place only during the past two decades. The number of F & O exchanges was 39 in Europe and Japan, and 11 in USA in 1980. USA alone accounted for 60 percent of the total futures business in the world in 1990 (Edwards & Ma, 1992).

The F & O business abroad has undergone significant structural changes over the years. As far as the futures business in USA is concerned, the share of agricultural commodities in the total trading volume declined from 78 percent in 1960 to 20 percent in 1990. While there were almost no futures markets there in interest rates, foreign currencies, equity indices, and energy products in 1960, futures in these assets accounted for 73 percent of the trading volume in 1990. Among these, it is the interest rates futures which dominate the market at present, whereas equity indices futures and currency futures constitute minor segments of the market. Among interest rates futures, it is the treasury bonds futures which dominate the market. The share of futures in equity indices, foreign currencies, treasury bonds, and interest rates was 5 percent, 10 percent, 27 percent, and 45 percent, respectively in 1990. In contradistinction, the major part of the options business is in common stocks, and it takes place on individual stocks, stock indices, and stock index futures (Edwards & Ma, 1992).

In India, the only derivatives which exist at present are non-tradable warrants, non-tradable, buy-back options on industrial bonds as well as units, and forwards in certain commodities. There also exist derivatives-like "carry forward" facility in equities and Repos or Ready Forward transactions in government securities. The for-

ward trading in India first began in cotton in 1875 and since then, it has been taking place in a few agricultural commodities at a number of centres. Similarly, untraded options in commodities have existed for many years in this country. Some typical Indian terminology has evolved in this context. The call, put, and double options are called here as "Teji", "Mandi", and "Teji-Mandi" options, respectively; and the options sellers and buyers are called as "option eaters" and "option appliers", respectively. All option trading is illegal in India (Natu, 1962).

Arguments for Futures & Options

Different types of risks such as default risk, interest rate risk, and price risk are involved in holding and trading of various types of assets. These risks arise as a result of unanticipated adverse changes (fluctuations or volatility) in, say, interest rates or prices of assets. F & O are useful in controlling, shifting, avoiding, eliminating, managing efficiently such risks through hedging, arbitrating, and acquiring insurance against them. In times of erratic trading, volatile interest rates and exchange rates, monetary chaos, national income turbulence and volatile markets, F & O enable investors to modify suitably the risk characteristics of their portfolios, or to shift the risk on to those who are willing to assume it for earning higher profits. They increase the capability of markets to absorb risk, and this has a beneficial effect on the level of industrial and commercial activity. In their absence, the cost of risk to society would be higher and it would, therefore, be worse off [Chamberlain, 1981].

F & O enable investors to modify suitably the risk characteristics of their portfolios, or to shift the risk on to those who are willing to assume it for earning higher profits.

F & O serve to disseminate information which enables the society to discover or form suitable/correct/true/equilibrium prices. They serve as barometers of futures trends in prices which result in the formation of correct prices on the spot markets now and in future. They provide for centralized trading where information about fundamental supply and demand conditions are efficiently assimilated and acted on. The economic and social benefits of accurate and equilibrium prices thus arrived at are many, the superior allocation of resources being one of them. Being highly liquid and by spreading risk among various market participants, they enhance liquidity and reduce transaction costs in the markets for underlying assets. They can be usefully deployed by investors such as individuals and managers of large pools of funds in their strategies for proper asset allocation, yield enhancement, and achieving portfolio goals, They provide opportunities for using certain kinds of special knowledge to obtain portfolio which offer higher expected returns than other portfolios comprising common stocks, bonds, etc. with the same degree of risk. They help to smoothen out price fluctuations, to narrow down the price spread, to integrate price structure at different points of time, and to void gluts and shortages in the markets. The existence of speculation, competitive trading, and differing risk-taking preferences of the operators helps in achieving these results. They act as "starter form of investment" which results in a wider participation in the securities markets. They attract young investors, who would not otherwise invest in stocks, to the security industry or stock market. They act as catalysts to the growth of stock markets {Swanson, 1984). They have investor as well as social utility because they offer important advantages of diversification, and enable the society to reach the position of Pareto Optimality by developing "complete markets" (Cox & Rubinstein, 1985).

There are reasons and evidence to believe that the social importance of F & O markets has been blown out of proportion by imagining that their alleged advantages or services are real and essential. The case presented already implies that over the centuries, the markets for a vast number of commodities and assets where F & O trading has been absent, have been afflicted by severe drawbacks. The fact that the trading volume in derivatives markets is always in many multiples of the value of underlying assets, and that transactions there are rarely settled by actual delivery, clearly signify that the major motivation behind the growth of these markets has been to satisfy the speculative and gambling propensity or urge in some people. It is difficult to understand how the activities driven by the motivation of such a nature would lead to a reduction in instability and risk. This position can be explained with detailed arguments and relevant evidence as follows:

The social importance of F & O markets has been blown out of proportion by imagining that their alleged advantages or services are real and essential.

Dubious Role of Speculation

Although a number of advantages of derivatives are usually cited, speculation has been the primary purpose of their birth, existence, and growth. if hedging, risk management, etc. were the real purposes, forward trading was enough. But the market operators were not content with it and they evolved futures trading because it did not offer much potential for making speculative profits. The futures are not suitable for acquiring desired supplies of assets, and they are not used for such a purpose. They are primarily used by speculators who are not interested in making and taking delivery of assets. Hardly one or two percent of all futures contracts are settled by the actual delivery of goods (Goss & Yamey, 1978). The operators who have money to back their judgements about future changes in prices enter these markets with the only purpose of making quick and high speculative profits. Futures markets cannot exist without speculation. Very conservative estimates have shown that the speculation accounted for 37 to 50 percent of futures trading in America in 1990 (Edward & Ma, 1992).

These markets are not only speculative but also distinctly encourage speculation. Their existence motivates waves of speculative buying and selling by professionals and amateurs, which influences the levels and changes in prices in such a way as to have serious adverse effects on the fortunes of those who ar engaged in production and distribution (Goss & Yamey, 1978).

Does it mean that speculation is bad? A wide spectrum of views is prevalent in this regard: speculation is good, desirable, and necessary; it is good and necessary to a limited extent; it is not necessarily undesirable; it is bad and should not be encouraged.

The first of these viewpoints has been encouraged by the thinking of classical economists who believed that speculation is beneficial; that it performs important and useful economic functions and services; that it brings about a better allocation of suppliers over time, and that it increases the efficiency of markets. Following the classical views, it has been argued that speculators buy when the supplies are abundant and sell when they are scarce, and thereby they reduce fluctuations in prices. In the markets, genuine sales and purchases may not equal each other. In such a situation, speculators balance supply and demand and avoid periodic gluts and shortages, protecting markets from sudden jerks and jolts, and from marked fall and rise in prices (Natu, 1962).

It has been further argued that speculators take a view of the market in future, which is contrary to the view of manufacturers, producers, traders, and consumers, and this brings sobriety in the markets and prevents prices in futures markets from rising too much or falling too sharply. This, in turn, controls fluctuations in prices in the spot markets (Committee on Forward Markets, 1980).

The futures are not suitable for acquiring desired supplies of assets, they are primarily used by speculators who are not interested in making and taking delivery of assets.

Such arguments making speculation virtuous are totally unconvincing for a number of reasons: Firstly, they implicity assume that all speculations are, what Marshall called, "constructive speculation", while in practice, most of it is "professional speculation" or "movement trading" which is highly destabilizing. There is also a question of defining the limit of "constructive speculation" i.e. can we say that speculation is good even if it accounts for, say, 75 per cent of transactions? Secondly, they erroneously assume that while all the non-speculators consistently take a uniform or homogeneous view that prices will either rise or fall in future, all the speculators take a uniform or homogeneous but the opposite, dissenting, divergent view of the market. Thirdly, there are no reasons why speculative supply and demand themselves would not add to the imbalance between genuine supply and demand, to gluts and shortages, to sudden jerks and jolts, and to price fluctuations. The economic theory wrongly assumes that speculators were more knowledgeable, better informed, farsighted and foresighted people, while, in practice, they have been found to be mostly the gamblers and market manipulators. Actual experience amply shows that the sudden and sharp gyrations, booms, depressions in market prices rather than their stabilization have been the common, frequent, widespread consequences of the speculation. This can be the only logical outcome of the get-quickly-very rich mentality of the speculators.

It should be realized that the acclaim for speculation calls in question the case for market system or price mechanism or the legitimate functions of the normal market. The argument that speculation is as legitimate as the securities markets is highly misconceived. The primary (securities) markets have far greater substantive justification than the speculative market. The former "provide for" the society, while the latter does nothing of the kind. To present the need for speculation for balanc-

ing the market is to admit that the conventional market mechanism is incapable of clearing the markets and allocating resources efficiently.

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Risk Management

The case for derivatives for efficient risk management is also overplayed. If risk management was the real purpose, it could have been met by forward trading. Being extremely speculative, derivatives themselves are highly risky, which is reflected in the proliferation of an unending stream of compound or hybrid derivatives. A study discussing the question as to whether dealing in derivatives would increase the risk faced by banks, has pointed out that it may not increase the total risk provided an appropriate regulatory framework to control the risk effectively is set up, but it would certainly not result in the reduction in risk, and that there would be an emergence of certain new types of risk, the management of which may not be easy and simple (Becketti, 1993).

Therefore, before multiplying derivatives *ad infinitum* for risk management, it may be more sensible to adopt appropriate policies so that market volatility itself is reduced, minimized and almost eliminated. Philosophically, the modern economic man's enthusiasm for developing a long chain of complex and devious market instruments for risk management is inconsistent with his high praise for risk-taking as the vehicle of innovation and development. It raises the crucial question whether he is a risk-taker or a risk-averse being. The phenomena of operators entering into contracts to sell and at the same time buying back those contracts, and creating composite, joint, hybrid, synthetic derivatives after derivatives reflect that the modern economic man is indeed being too clever in this business of risk management.

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Price Stability

The contribution of derivatives to price stabilization also is highly suspect. They, in fact, often cause wide fluctuations in prices by disrupting the markets for underlying assets. They widen the range of fluctuations in the prices of hedge contracts beyond what is warranted by the demand and supply conditions, and make trading more risky for the genuine operators (Natu, 1962). They may help in price stabilization only in the properly organized, competitive, and well-regulated markets. But if the markets possess these characteristics, price stabilization can as well be achieved without derivatives also.

Displacement Effect

An important but usually neglected aspect of the theme under discussion is the displacement impact of the growth of derivatives markets on the primary markets for various assets. The expansion in derivatives markets may reduce the volume of business on, say, the new issue market as a result of which, the corporate units, particularly the smaller and new ones, may face severe difficulties in raising fresh capital. The enthusiasts for these markets deny such a possibility because, according to them, the investors in derivatives are not the same as the investors in new industrial securities. It is argued by them that the former do not usually buy shares and other securities of the new and old companies, and, therefore, if derivatives are not available, they would not come on the securities markets at all (Swanson, 1984). This is not really convincing because it assumes rigid segmentation of investors in respect of different investment avenues. Moreover, if the derivatives do really possess so many special benefits/uses which they are said to offer in comparison with industrial securities, the substitution effect must take place. If it is held that it does not take place, it would imply that the benefits must not be real. In either event, the case for derivatives gets significantly weakened.

It is quite logical that the derivatives must have one or more of the following effects on the stock market: They may influence the price and volume behaviour of the underlying stocks. They may divert trading activity from the underlying stocks, and the resulting decline in liquidity might increase stock price volatility. An abnormal stock price behaviour may be observed near expiration dates of derivatives. The composition of equity investment may undergo a change i.e. the supply of risk capital to new and small companies may be less, and it may become more costly (Weller, 1992; Cox & Rubinstein, 1985).

The Chicago Board Options Exchange (CBOE) had sometime back commissioned some internal studies in this context. Their main conclusions were that options trading had no adverse effect on the stock market; that during periods of uncertainty, CBOE had attracted a number of investors to return to equity type risks through various hedging strategies made possible by options trading; and that it had helped to improve the efficiency of the stock market (quoted by Cox & Rubinstein, 1985). We agree with Cox and Rubinstein that these "findings" cannot be regarded as definitive until they are confirmed by wholly independent investigators.

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Empirical Evidence

The empirical evidence on the issues discussed is of mixed or conflicting nature. However, if we take into account both the direct and indirect evidence comprising technical studies, the testimony of experts, financial folklore i.e. perceptions, attitudes, beliefs of the common people in this regard, and the regulatory history, the case against derivatives emerges to be far stronger than the case for them.

There are some studies (for example, Working, 1960; Pavaskar, 1970; Naik 1970) which have shown that price effects of futures trading were more often than not clearly beneficial, and that manipulations and speculative excesses in different futures were exceptionally few. On the other hand, many people have blamed the collapse of the Dutch economy in the seventeenth century on the options trading. Similarly, the options schemes during 1920s in Europe and America had left a very bitter taste in the mouth of a large number of people there. Further, it has been held by many that the stock index futures trading was responsible for the world-wide stock market crash in 1987; the studies by Brady Commission and Securities and Exchange Commission in USA have found that such a trading was a significant factor in accelerating and exacerbating the 1987 stock market crash.

A study of forward markets in commodities in India has pointed out that such markets permit unscrupulous speculators to manipulate the markets, to corner supplies, and to organize "bear raids" and "bull raids", as a result of which, the prices at times fluctuate violently (Natu, 1962). Similarly, it has been found that the Indian stock market has been characterized by unhealthy, wild, excessive, persistent speculation; that resulted in irrational price behaviour as well as high degree of volatility in respect of both the "specified" and "non-specified" groups of shares; and that it has led to the "formation" or "discovery" of prices which are "artificial" i.e. which have had nothing to do with economic fundamentals (Gupta, 1992). A 100-rupee share of two organizations (SBI & CIPLA) being quoted for Rs. 20000 and Rs. 30000, respectively, and the suspension of trading of 69 scrips by the Bombay Stock Exchange, in the month of February 1994, are the most recent but not isolated examples of the extremely destabilizing impact of the absolutely excessive, wild, and lunatic speculation in the Indian stock market.

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Coming to the testimony of experts, Mr. Alan Greenspan, the President of the Federal Reserve Bank of New York said, "..it is by no means clear whether the recent financial innovations have increased or decreased the inherent instability of the financial system; the growth and complexity of derivatives should give us all cause for concern"; and many investors in USA have warned that "derivatives might one day trigger a catastrophic chain reaction in world financial markets" (quoted by Becketti, 1993, p. 27). Similarly, John Shad, the former Chairman, Securities and Exchange Commission, USA, categorically stated, "futures and options are the tail wagging dog. They have also escalated the leverage and volatility of markets to precipitous, unacceptable levels" (Indian Express, 20.11.1993). In similar vein, J.W. Crow, Governor of the Bank of Canada, opined that the explosive growth in the volume and variety of financial derivatives might have increased the level of risk in the financial system. It is not clear as to how derivatives markets transfer risk across institutions, and how much these

markets would be under stress, and what are the possible systematic implications of pressures in these markets (Crow, 1993, p. 8).

The explosive growth in the volume and variety of financial derivatives might have increased the level of risk in the financial system.

It is also necessary to note that people in general have always considered options (derivatives) to be speculative, risky, and not quite straight; and there has been considerable opposition to options trading by the leading security firms themselves. In USA, although option trading has been going on for many years, it has always carried the stigma of misuse, speculation, and avoidance or violation of certain laws. In many countries, the farmers and others have opposed options and futures trading, and have demanded and often agitated for the closure of markets for them because of their being speculative and leading to price fluctuations (Swanson, 1984; Edwards & Ma, 1992).

Thus, although derivatives may not be the "invention of the devils", the fact remains that historically and contemporaneously, the public attitude towards them has been overwhelmingly one of suspicion, intense criticism, hostility, and opposition. For hundreds of years, they have been notorious as shady things which have caused many financial evils, including the collapse of the economic systems. As late as in 1978, the options faced "mountain of criticism bordering on sheer hostility" in England, where many people have charged that the traded options market is just a "casino" (Chamberlain, 1981, pp. 1-3). The image of the share market in the mind of Indian public is that of "Satta Bazar", which the market has done everything to prove.

The fact that options and futures trading has often been banned or declared illegal, and that systematic and close regulatory mechanisms had to be created everywhere to control them, can also be taken as a good enough evidence against them. For example, option trading was banned in UK during long periods of 1733 to 1860 and 1932 to 1958. In other years, option trading on London exchanges has remained a peripheral activity. The setting up of a number of tax-avoidance schemes involving creation of fictitious options has made Inland Revenue in UK mistrust options altogether (Chamberlain, 1981). The official surveillance, supervision, curbing, regulation, and banning of derivatives trading have been so old and so ubiquitous that it is simply not possible to brush them aside as arising out of ignorance, bias, manipulation, antipathy, and political act.

The indulgent and approving attitude of the market operators, traders, and their supporters towards futures, options, and speculation goes counter to the foregoing disapproval and abhorrence in the minds of the general public and regulatory authorities everywhere and at all times. The extra-ordinary usefulness of speculation and speculative financial instruments as projected by the classical economists and market operators, goes ill with the hostility which people who have to work hard for their living often develop, against the mysterious gains that the speculators make in offices by dealing in goods which they would not even recognize (A.P. Lerner, quoted by Goss & Yamey, 1978, p. 32).

Scope & Feasibility in India

Apart from their doubtful desirability and utility, what is the scope for development of F & O markets in India? Is it really feasible to develop them here to any significant and meaningful extent?

One of the lessons from abroad is that it is the interest rates futures in general and Treasury bonds futures in particular which constitute a major part of futures markets there. Now, the scope for developing this market segment is very much limited in India because of the largely regulated interest rates regime even at present; the narrow, shallow, institutional, and captive nature of government bonds market; and the very limited development of secondary markets in industrial bonds. On account of such institutional features, futures markets, even if they are artificially superimposed, would remain highly inactive and illiquid. The liquidity of the markets, as it is well-known, depends upon the presence of a large number of investors and the possibility of a large number of investors, and a large volume of contracts or transactions. The scope for development of rupee-based as well as cross currency options and futures also is limited because of the lack of depth in the spot and forward markets in Indian Rupee; a very weak term funds market; little integration of foreign exchange and money markets; the limited number of market participants; and the absence of infra structural facilities as well as technical expertise with banks and other potential participants.

As far as the common stocks are concerned, it is within the realm of possibility to develop F & O markets in them. Those who advocate the development of these

derivatives have primarily equities in their mind. Many see them as an alternative to "badla" trading in equities. However, given the crisis through which the stock market has been passing of late, it would be unwise and undesirable to increase its speculation-potential by adding highly speculative financial instruments such as F & O. Moreover, given the fact that while the primary market in shares is geographically widespread but the secondary markets in them are mostly confined to a few centres, and while the major part of the primary market in industrial securities is in industrial debentures but the major part of secondary markets is in shares, new markets in stock futures and stock options would serve only a limited population; and it can be expected that they would hardly serve the interests of the genuine investors.

Given the crisis through which the stock market has been passing of late, it would be unwise and undesirable to increase its speculation-potential by adding highly speculative financial instruments such as F & O.

As said above, the current interest in F & O trading is primarily the result of market operators finding it difficult to freely operate and make big profits on the equities market. However, the case for F & O must be independently established; the evils of "badla" trading do not automatically establish the case for F & O; they are not substitutes for each other. The experience in UK is quite relevant here. During 1970s, the stock market there had been characterized by extreme volatility, exodus of individual investors, and dominance of institutional funds. It was then felt that options trading would be helpful in arresting such trends. But nothing of the kind happened because options market remained limited to a small number of underlying shares. It was discovered that options do not offer any magical solutions to wider problems although they may help somewhat in modern portfolio management (Chamberlain, 1981).

Another constraint on the development of F & O markets in India is that the number of participants in such markets is bound to remain quite small. Given certain restrictions on the investment pattern of banks, insurance organizations, provident and pension funds, and small savings organizations (which together account for the major part of savings mobilization in the country), and given their own investment preferences along with those of individuals and households, the F & O markets in most of the underlying assets would necessarily remain narrow and shallow. In that event, they would be left at the mercy of speculators and market operators.

Before launching new securities, it would be worthwhile to carry out a systematic and dispassionate assessment of and learn suitable lessons from the working of innovations such as commercial paper, certificates of deposits, stock-invests, venture capital funds, etc. which have been recently launched in the country. The progress in all such cases appears to have been tardy. Further, as indicated earlier, only a very limited success has been achieved so far, inspite of long years of efforts, in developing equity culture and secondary markets in debentures in our country. All these past developments must have a sobering effect on everyone concerned. The experience of developing OTC exchange and National Stock Exchange should show that the creation of well-organized and efficiently functioning futures and options exchanges is going to be a time-consuming, costly, and uphill task indeed. It is also beyond the nation's means at present.

As the supporters of F & O markets also admit, these markets function with a semblance of stability, and "tolerable" levels of speculation, frauds, misappropriations, and shady deals only if they are closely and effectively regulated and controlled. In today's social, political, and ethical milieu in India, can we vouchsafe such a stringent and honest regulation and generate confidence among the people? The ground reality is that we cannot. For example, even in the somewhat better years of 1950s and 1960s, the Forwards Markets Commission (FMC) had often felt handicapped in dealing with the actual situation in the market. The problems of enforcement of provisions against illegal options contracts and kerb trading had proved insoluble because of the involvement of the entire trade in malpractices. The market operators had been manipulating, artificially and with impunity, the prices to their own advantage and to the detriment of the trade as a whole (Natu, 1962).

The problems of enforcement of provisions against illegal options contracts and kerb trading had proved insoluble because of the involvement of the entire trade in malpractices.

The treatment of the findings of the Joint Parliamentary Committee which investigated the recent unprecedented multi-billion stock scam, the treatment meted out to the strict and effective functionary of the relevant apex regulatory organization (SEBI), the vicious clout and stranglehold of the members of exchanges, the countless defaults, frauds, malpractices, misappropriations which are daily taking place with impunity literally everywhere and at every level, and the continued existence of illegal forward/kerb/options trading in shares/commodities, definitely signify that the nation, at least at present, totally lacks the will and capacity to make the markets function in a fair, healthy, non-speculative, and stable manner. To start F & O in such a milieu would mean opening up one more avenue for defrauding the common, simple, genuine but unprotected investor and for destabilizing the Indian financial system.

Conclusions

Systematic, careful, and intelligent forward planning for creating adequate appropriate educational and training facilities, and promoting ethical and moral ethos are absolute prerequisites which need to be put in place before contemplating the creation of F & O markets. The financial development must be in accordance with the existing institutions, psychological attitudes, the pattern of preferences, and the readiness for absorption in a given milieu. Where the majority of investors are small, technically unequipped, and risk-averse, what is really needed is to develop the active, easily accessible, convenient, decentralized, retail primary markets for simple financial instruments such as deposits, debentures, government bills and bonds, units, and ordinary shares rather than complex instruments whose mechanics and risk-return trade offs are not easily understood even by the experts. The consolidation of the financial innovations rather than their multiplication would prove to be a better policy for developing a healthy and stable financial system in the country.

The consolidation of the financial innovations rather than their multiplication would prove to be a better policy for developing a healthy and stable financial system in the country.

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The greatest losses are unknown and unknowable.

— Dr. W. Edwards Deming

Indian Public Sector Banks: Strategic Focus

Asish Saha

Indian economy is undergoing a phase of restructuring under the present policy of economic reform. Success of the reform initiatives will largely depend on the transformation of the public sector banks into a new vehicle of progress. The author feels that there is a strong case for defining the mandate for this group of banks in clear terms. He has argued that 'right leadership' with strategic vision is needed. Enlightened leadership is expected not only to provide the appropriate strategic focus to the public sector banks but will also initiate appropriate structural, systemic and procedural adjustments within the banks to meet the new needs of the environment.

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The Indian banking and financial system is presently undergoing a new phase of metamorphosis under the financial sector reform initiatives of the Government. The goals of the reform are basically two fold: ensuring that the banking sector supports, rather than obstructs improved efficiency and competitiveness of the economy and that domestic and international confidence on the banks is maintained; as financially sound banks need to be both profitable and have strong balance-sheet, making public sector banks aim for reasonable profitability and capital adequacy. (Discussion Paper, 1993) It is quite apparent from these statements that the public sector banks should become more conscious of their bottom line and bring the word 'commercial' back into their vocabulary. However, the statements fail to answer the question as to what would be the shape of Indian banking in the new era of economic liberalisation and globalisation of the Indian economy. It also falls short of addressing the fundamental issue as to the 'role' that is being assigned to the public sector banks of the country. One would like to recollect here that if the Indian banking system could today take its due pride in the significant achievements made by it during the post nationalisation era, it is so because the mandate of nationalisation clearly specified its role: "... to extend the reach of banking and financial services to all parts of the country and to all sections of the society. It was also aimed at widening the net of resource mobilisation". As of December 1993, of the total deposits of Rs. 3,03,087 crores of the scheduled commercial banks, Nationalised banks accounted for 56.3 per cent and State Bank and its subsidiaries for another 28.3 per cent. Of the aggregate credit of Rs. 1,75,665 crores, Nationalised Banks accounted for 50.9 per cent and the State Bank and its subsidiaries another 34.6 per cent. This clearly indicates the monumental presence of the public sector banks in the entire economy. The entry of new commercial banks in the

private sector is unlikely to change the complexion of the game atleast during the nineties. It is, therefore, imperative at this stage that conscious efforts be made to specify the expectations of the Government from the public sector banks in clearer terms that will enable these banks to shape their strategic focus for the future. While defining the new role for the Public sector banks in the country it is also imperative that one should take into cognizance the latest trends in the world banking scenario and the debates that are on regarding the emerging roles of the banks in the international arena. This is expected to provide vital clues in providing the needed directions to the banks in the new reality.

What is a Bank? What are its Roles?

"Today's bankers hope that their customers know what their bank means to them — but if asked to describe exactly what a bank was, most customers would fumble for words. Even worse for today's bankers is the fact that although they can feel comfortable that they know what a bank was — a financial intermediatry that accepted deposits and onlent these funds — they have widely differing views on what a bank is, and what will it be in future" (Hosking, 1993). This has been the result of the forces of change blowing through the banking industry worldwide. Most of today's commercial banks have apparently sought either to become more comprehensive in their coverage of the financial sector, or to find a profitable niche on which to capitalize. There is an opposite deep-seated view which states that banks are to be judged differently from other commercial organisations because they are public institutions/utilities and are not ordinary commercial entities (Goulandris, 1993). Regulatory athorities across various countries have long viewed commercial banks as a core constituent of the financial infrastructure of a country, to the point that some large banks are seen as being "too big to fail" (e.g., Continental Illinois Bank in the US) on the ground that closure of such banks could precipitate a general collapse of the country's financial system. Controversy regarding the definition of the banks arises primarily due to the fact that different groups of people viz., the customers, the owners, and the society at large, have different expectations from the banking organisations and this has quite often resulted in conflict of interest between these groups. In either of these cases, bank strategists wrestling with these issues have attempted to define a bank in terms of 'what it does'. They have tried to answer the question: what is the core competence of a bank and what business should it be in?

In the US and elsewhere, Citicorp declared that banking is first and foremost an information business: money is information in motion. This view arises from an extreme and growing recognition amongst bankers worldwide that money transmission and information concerning that function is an important part of their business. Bankers Trust is another interesting example: in the late 1970s and early 1980s, the bank moved away from the traditional relationship, corporate banking to become a 'whole-sale' bank, surviving not by servicing captive corporate clients but by being the best in the market at doing the deal or providing the service required. Bankers Trust, despite being very successful as a deal maker and service provider, is reportedly moving back to having a number of core clients — this clearly represents a return to relationship banking.

Banking is first and foremost an information business: money is information in motion.

The large commercial banks in UK have historically occupied an unusual position somewhere between being quasi governmental institutions like utilities and being comfortably mature commercial business, operating in near cartel conditions. The focus of the bank management has usually centered on lending, with the liability side of the balance sheet maintained by access to money market funds to support the traditional range of deposit products. Increasing competition has blurred the difference of the commercial banks from the building societies, although for corporate clients the commercial banks are still the main providers of lending, money transmission and other services. Forces of deregulation and developments of the financial markets have forced the banks to re-examine and reshape the way they do business, even to the extent of entering entirely new areas of activity, and leaving old ones: Recent acquisition of Abbey Life by the Lloyds Bank provides a clear indication of this underlying trend.

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World wide, general banking market is getting crowded with non-bank financial companies. Many of these companies are even successfully competing with the banks and it is becoming increasingly difficult for the banks to take on this competitive development head on. Even the erstwhile customers are now able to effectively disintermediate the banks. Some of the large corporate customers now attract higher credit ratings than many of the banks and are therefore able to raise money at cheaper rate not only in the domestic but also in the international capital markets. They are also becoming active in the debt market removing the need for the bank to act as an intermediary. As a result, most of the banks are on the look-out for new pastures in order to cope-up with the competitive pressure in their conventional markets. Under such circumstances, defining a bank by what it does will be a dynamic process changing as the markets in which banks must survive also change. By getting defined by the marketplace and strive for sustained profitability and growth may sound logical in the case of most of the business. But the moot issue is to what extent the commercial banks can genuinely be considered as any other commercial business? It needs to be reemphasized here that customer and public perception of what is expected from a bank significantly differs from that of other business so that even a vocal minority can directly influence government policy towards banks. Clearly customer perception of what a bank represents is as important as their own view of what business they are in. It appears therefore that for the successful banks of the 1990s and beyond, ability to redefine themselves as required by the customer's needs will be crucial.

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Strategic Dilemma of World Banking

The world banking system today is facing a serious dilemma regarding their strategic focus for the future. A shift in the regulatory emphasis towards the size and composition of capital fund of the individual banks in

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relation to its deposits and risk adjusted assets has triggered conscious strategic decisions by the bank management away from the balance sheet size and growth to competitive advantage (Saha, 1993). To quote from a recent interview of the Chairman of the Lloyds Bank, the most profitable of the Big Four banks in the UK "...we put capital strengths and profits before size because of critical mass" (Banking World, February, 1993). The focus on capital has also become evident in the US banking system. Pressure to reduce costs, staff and branch numbers, sales of non-core business, withdrawl from some geographical and product market, raising of new-equity capital and a sharper focus on profitability rather than size are becoming the central strategic objectives of most of the US banks (Llewellyn, 1992). The same pressures of bank capital and profitability have also affected the economy by limiting the ability or willingness of the banks to meet the credit demands of their customers in recent years. A large percentage of non-performing advances in the asset portfolio of the banks in the development countries has become an added burden to carry and appropriate strategic responses are being worked out to come out of this situation. For example, in Japan, the total estimated level of bad debt in 1993 at 21 top banks, using official Ministry of Finance (MOF) is about ¥ 15 trillion, about twice the level of a year ago (Banking World, May 1993). Unofficial estimates of bad debt is put to about ¥ 31 trillion. While the individual banks are trying to work out their specific approaches, the authorities are taking measures to help banks deal with the bad loan problem. The MOF has encouraged the establishment of the Cooperative Credit Purchasing Company (CCPC), jointly owned by the banks, as a way of getting bad loans off the bank's book. The CCPC purchases at a generous 66 per cent of the loan's face value. Another method used by the banks to reduce their assets is to securitize loans and sell them to other institutions such as foreign banks, life assurance companies, etc.,: the balance of loans securitization reached about ¥ 2.3 trillion by the end of March 1993. Distressed debt trading estimates in the US went up from about mere $ 1.6 billion in 1989 to as high as about $ 16 billion in 1993 and is expected to get tapered off in the forthcoming years. Cargill Financial

Markets estimates that about $ 10 billion US money is presently dedicated to the distressed debt market. As US investment opportunities begin to dry up, the attention of the US 'Vulture Funds' or unregulated investment funds is getting shifted to London and Europe, where the 'distressed debt' market is in its infancy. The market in UK bank debt increased fourfold in 1993: it is estimated that about $ 4 billion of principal debt was traded in the UK in 1993 (up from about $ 1 billion in 1992) probably at a discount of 40 per cent. It is estimated that European distressed debt totals $ 500 billion, which includes all types of bad debt excluding sovereign debt. It is projected that the traded market for European debt will double in 1994 to $ 8 billion and will increase to $ 13 billion in 1995 outstripping the US market. At present there is a debate in the UK regarding the code of good practice which would make it clear to the buyer that the debt carries with it reponsibility to abide by the tenents of London Approach (the Bank of England's informal philosophy on work out). The critics of the 'Vulture Funds' have expressed apprehensions that these funds could force a company into liquidation. However, the lead managers of these funds argue that the buyers are willing to buy because they believe that they have the expertise to assist a company in reconstruction. However, the regulatory authority has admitted that if this market develops in a constructive way in the UK, trading of debt at an appropriate market price could become a useful part of any solution (Warner, 1994).

Pressures to reduce costs, staff and branch numbers, sales of non-core business, withdrawl from some geographical and product market, raising of new-equity capital and a sharper focus on profitability rather than size are becoming the central strategic objectives of most of the US banks.

As a result of the macro economic policy reforms initiated by the Government, Indian industries are likely to undergo considerable restructuring. Therefore, in the near future, the banking system also will have to tackle the fall-out of the contemplated industrial restructuring process on their lending portfolios. The highly restrictive industrial exit policy has been one of the major factors behind the wide-spread sickness in the industrial sector, both in public as well as in private sector. In the changing economic scenario of the country it can be visualised that absence of a well-defined exit policy will add to the woes of the commercial banks as well. In addition, unless the Urban Land Ceiling Act 1976 is suitably modified to facilitate the use of blocked resources in the form of urban land in the sick and the potentially sick units, it will be difficult for the Indian Commercial banks to meet the massive requirements of fund for industrial restructuring. However, the fact remains that the Indian commercial banks will have to work out appropriate strategic measures to handle the forthcoming challenges like mergers, amalgamation, divestiture, etc., to ensure that the fall out of industrial restructuring becomes less painful on the quality of their lending portfolio and finally the bottom line of their balance sheets. This however does not necessarily imply that banks will be immune to the genuine financial difficulties of the units financed by them. Decisions in this regard should give due weightage to commercial prudence rather than any other socio-political considerations which have at present chocked the commercial banking system in the country.

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The overall strategy for the broader financial sector reform of the Government is to make available a wide choice of instruments accessible to the public and to producers. This is initiated to ensure a better match between the demand of the savers with those of producers in terms of returns, maturity, risk and liquidity. As a result of the reform initiatives being pursued by the Government, the activities in the capital and money market are likely to increase steadily over the years. Steady activation of the money and capital market in India will have a direct effect on the country's public sector banks e.g. increasing number of companies would like to go directly to the capital and/or money markets with newer instruments to raise funds. More and more 'blue-chip' companies will also access the international capital/money markets to meet their funding requirements. As a result, the proportionate dependence of the existing good accounts on the commercial banks is likely to go

down steadily in future. As this trend gains stronger grounds it will adversely affect the growth in profitability of the commercial banks unless they respond to the new reality with appropriate strategic positioning in the emerging market of corporate finance. Clearer focus of the nature of the contemplated business by the Public Sector banks will also enable them to counter the threat being posed by the newly established private sector banks in the 'whole-sell' end of the market.

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Significant changes are taking place in the pattern of savings of the Indian households and consequently in the deposit mix of the Indian banking system during the recent years. The profile of the deposit mix of the scheduled commercial banks indicates that term deposits from public grew by 19.89 per cent in 1989, by 16.73 per cent in 1990, by 15.04 per cent in 1991 and by 16.60 per cent in 1992. Savings deposits from public grew by 11.10 per cent in 1989, by 19.55 per cent in 1990, by 12.70 per cent in 1991 and by 12.42 per cent in 1992. Of late, term deposits with less than one year maturity are accounting for larger percentage of the total term deposits: term deposits less than one year were only 12.8 per cent in March 1990, went up to 19.2 per cent in 1992 and around 26 per cent by March 1993. This implies that slowly but surely the profile of the fund available to the commercial banks wiill be of shorter maturity and therefore conscious strategy needs to be worked out by the banks in deciding the maturity profile of their assets. More specifically, the banks will have to carefully structure their lending mix and the mix of securities in their investment portfolio to match the maturity profile of their liabilities on a dynamic basis.

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Role of Indian Banks in the Eighth Plan

The Eighth Five Year Plan document (1992-97) aims for an average growth rate of 5.6 per cent per annum during the period for the banking system. Financing investment of Rs. 7,98,000 crores calls for massive domestic effort particularly when the net inflow from abroad is kept at a moderate level of 1.6 per cent of GDP. Intersectoral flow of funds as presented in the Eighth Plan, indicates that in respect of the projected level of public sector investment of Rs. 3,61,000 crores, 71.6 per cent is to come from borrowing out of the savings of households, 9.34 per cent from the rest of the world and the balance from own savings. Loans from financial institutions by the Public Sector is projected to be of the order of Rs. 2,02,255 crores during the 1992-97 period. Of the projected private sector investment of Rs. 4,37,000 crores, the private sector is expected to mobilize resources of the order of Rs. 68,300 crores from the market. The household sector's investment of Rs. 2,88,000 crores is expected to be met out of its own savings of Rs. 6,05,170 crores, which is assumed to grow at 21.6 per cent of GDP during the Eighth Plan period. The balance of savings of the household sector is expected to be transferred to private corporate sector and the public sector.

Growth and diversification of agriculture to achieve self sufficiency in food and generate surplus for exports remain at the centre of the Eighth Plan objectives. The projected share of investment in agriculture is 18.65 per cent during this plan compared to 15.24 per cent during the Sixth plan and 11.23 per cent during the Seventh Plan. There will be an increased demand for credit due to the commercialization of agriculture. Regarding non-cash agriculture, mandatory credit would continue from the point of view of long-term economic, social and political reasons. In all likelihood the Service Area Approach is likely to continue. The Plan also emphasizes that developmental plan activities stand a better chance of success when undertaken with people's active participation.

The Indian banking system has to play a significant role not only as 'mobilizer of fund' but also as 'purveyor of credit' to actualise the growth projections of the Eighth Plan. The system has already proved its ability to be an effective mechanism in the transformation process of the society and wiill have to continue to play the role of a 'change agent' in future. However, it has also to be recognised that, during this process, the health of the banking system which got adversely affected due to various reasons (as has been aptly pointed out even by

the recent Report of the Committee on the Financial System) should receive due attention of the management of the banks as well as the policy planners of the country.

The Indian banking system has to play a significant role not only as 'mobilizer of fund' but also as 'purveyor of credit' to actualise the growth projections of the Eighth Plan.

Absence of clarity regarding the expected role of the public sector banks in the new environment, their goals and objectives in the changing economic perspective and finally their strategic focus in the forthcoming future has left the system in a state of utter confusion. As a result, it is feared that the MOUs signed by them may hardly stand the test of time! For most of the weak banks, which are obviously larger in number, signing a document like MOU was essentially to encash an opportunity to survive. Though the same may not be equally true in the case of the few so-called profit making banks, the question remains as to what constructed their present financial strengths and, even if one assumes their official figures, it is doubtful whether these banks are really clear about their future role and the corresponding strategic positioning in the emerging economic reality! Weaknesses of the individual banks in formulating the strategic focus for the future is even recognised by the Finance Ministry has clearly stated that banks need external agents to diagnose their organizational and financial problems and assist them in shaping appropriate strategic responses.

Shaping the Strategic Focus: Some Issues

The Public Sector Banks will have to spearhead the process of transformation of the Indian economy to the new era of globalisation. They will have to continue to play the role of catalysts in this transformation process of the country but with a difference : contrary to the earlier era of massive growth across the length and breadth of the country which has seriously affected their health, the new era should be characterized by efforts to ensure the continuing strength of their balance sheet. This implies that there should be a major shift in the attitude of the banks towards their future business profile which has itself opened-up a significant challenge to the Chief Executives of the commercial banks in managing the change.

Leadership & Management

Leadership has emerged as one of the most important requirements of any business in a dynamic environment : the more fragmented and diversified an organisation becomes, the more leaders it requires, and the faster moving an organisation's market or commercial environment, the more it needs 'changing' rather than 'running'. Therein lies the fundamental difference between the task of leaders and managers. Leaders create and articulate vision, manages ensure it is put into practice (Syrett & Clare, 1992). In the context of the Public Sector Banks in India, the issue of 'right leadership' is probably the most crucial element for the future success of the banking system. It is often said that the management of the banks is struggling in an exhausting insomnia which impairs the lucidity so desperately needed to cope with the new challenges forcefully and imaginatively. They are losing if not already lost their capacity to dream and are becoming drowsy managers of crisis which they cannot solve by their own means. Symptoms of such a state of affairs are already apparent in their public posture which s marked with a sense of defeat, anxiety, cynicism and a loss of will to rebuild the future of the banks. This sense of frustration has also percolated down the organisational hierarchy and has even reached the grass-root level. The foremost challenge facing tomorrow's leader is to re-energise their organisation to meet the new needs of the environment. He has to take into cognizance the fact that in each industry, in a specific period/situation there is always a strategic thrust needed to produce optimal results. Conscious selection of an appropriate strategic thrust is the need of the day for the Indian Public Sector Banks. The identification of the specific thrust of the individual banking organisation should match with their strategic capabilities measured in terms of the profile of managerial competence, strength of organisational structure, systems and processes, work technology and finally the culture and values of the organisation. The key objective of the top management is not only to create strategic advantage but also to sustain it in dynamic environmental scenario through continuous improvement and innovation in products, processes and technologies. To make this happen, the top management

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of the bank will have to look at the changes in the environment with fresh eyes to create value not only for its customers but also for its own employees. Getting back to strategies in essence implies getting back to a deep understanding of what the banking business is all about. Indian banking system is a reservoir of talents and therefore possesses the inner capability to meet the challenges of the future. Moreover, the existing customer base of these banks represent an unmatched stock of 'information capital' regarding the country's household savers, corporate and other customers including the agricultural borrowers. When complemented with better information technology and a stronger legal enforcement infrastructure, these customer relationships will constitute a vital resource of the Public Sector Banks to meet the emerging competitive environment of the future (Discussion Paper, 1993).

When complemented with better information technology and a stronger legal enforcement infrastructure, these customer relationship will constitute a vital resource of the Public Sector Banks.

Enlightened management in some banks in India has succeeded in infusing a sense of team-work and disciplined risk taking into their organisation, This needs to be made the 'norm' rather than exception and for this there is need to change the decision-making culture in the banks which has often times been adversely affected by the 'over-developed' vigilance mechanism. The more successful Public Sector Banks appear to be those which have preserved a sense of institutional identity and *esprit de corps* over time. Moreover, there is a close relationship with the appointments of the Chief Executive Officer from within. Banks with a tradition of promotion from within have typically been better managed and are more resistant to undesirable external pressures in their lending and staffing decisions. In splitting the functions of Chairman and Managing Director, with the chairman in part-time non-executive capacity, it has been argued by the Government that this will ensure that strategic and policy issues are not neglected under the weight of operational pressure. It can be reasonably hoped that the above mentioned spirit of the Government as has been reflected in the Discussion Paper for Finance Minister's meeting with the Chief Executives and Trade Union Leaders in December, 1993, will be the guiding force behind the decisions of the Government in the appointments of Chief Executives of Public Sector banks in the country.

Issues Relating to Structure, Systems & Procedures & Technology

Organsational restructuring to meet the challenges of the environment has always been a highly debated issue in the world banking arena. Today it is especially true in the case of large banking organisations in corporate America where attempts are underway to break the large sprawling corporation down to separate components/divisions : trust, consumer banking, investment banking, etc., to allow more entrepreneural spirit by allowing more people to be rewarded according to the value they create (Chew, 1992). Though there are merits in rewarding divisional management based only on factors over which he has control, many banks are reluctant to adopt the said restructuring path, because of the fear of upsetting the 'delicate balance' that the CEO thinks exists. "The talk about society having an interest in not allowing banks to fail has led to a situation where no large banks are allowed to fail. (Round table discussion, Undated). This has not only resulted in appalling distortions in the credit market but has also acted as a protective cover to the inefficient banks with gradually shrinking market position to continue to exist. These banks have also started losing their best operating heads and functionaries which has further added to their woes. How to liquidate insolvent institutions in an orderly manner without having unfortunate consequences to the society at large is a public issue which regulators and legislators have not been able to come to grips which has resulted in a 'gridlock' in the US banking.

Some of these issues are today also quite relevant in India, especially in the context of the Public Sector Banks. To sustain the control requirements of massive expansion in the network of branches across the length and breadth of the country, the Indian Public Sector Banks have moved from two-tier to three-tier to a four-tier structure in the organisational hierarchy. This four-tier structure alongwith innumerable layers of decision making within each tier have finally led them to create a organisational maze that became counterproductive to the business needs of the banks. It has also "militated against prompt decision-making, improved productivity and profitability" (Discussion Paper, 1993). The system has gradually lost the customer focus and banks are today finding it difficult to meet the competition from the new entrants in their field. Absence of appropriate career

progression opportunities in the Public Sector Banks provided a golden opportunity to the new banking organisations and non-banking finance companies to snatch 'talents' from them and use them effectively in their search for a quality-slice in the banking market. If the system has to transform itself into technologically sophisticated, commercially responsive, managerially innovative business units, each Public Sector Bank has to initiate a thorough overhauling of its internal organisational structure supported by appropriate internal control mechanism and the decision support structure. Improved technology has to be aggressively pursed to strengthen internal control, accuracy of transactions and records, support decision making of management, facilitate innovation of new services and a higher level of customer satisfaction. The training establishments of the banks also need to be refocused in support of the new business strategies and goals of the Public Sector Banks in India.

If the system has to transform itself into technologically sophisticated, commercially responsive, managerially innovative business units, each public sector bank has to initiate thorough overhauling of its internal organisational structure.

Conclusions

It is also hoped that future Government decisions with regard to banking will be guided by a spirit of a facilitator with political will in this process of transformation rather than any philosophy of 'populism' and intervention for narrow short-term gains. One may recall here one of the significant observations of the Committee of the Financial System which states, "populism and political and administrative influence bordering on interference should have no place in the lexicon of banking and finance but unfortunately, over the years, competitive populism has affected banking and credit operations" (Report of the Committee on the Financial System, 1991). One would also like to recall that "slow decision-making of the Government deprived banks of leadership at crucial times... the tenure of the senior management was frequently too brief", these have also adversely affected the health of few public sector banks in the past. If India is to succeed in her race for globalisation, history should not be allowed to repeat in the arena of banking.

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Narrow minds think nothing right that is above their own capacity.

— Rochefoucauld

Foreign Capital Inflows: Long Run Desirability & Short Run Management

Pradeep Agrawal

Liberalization policies have led to large foreign capital inflows which could improve domestic investment and thus the GDP growth. But they could also be destabilizing or immiserizing by earning excessively high returns. This paper evaluates the long-run desirability of various types of foreign capital inflows for promoting economic growth without creating repayment crisis, short-run management of these inflows to minimize the impact on domestic inflation, exchange rate, etc. It is argued that policies that put a ceiling on all foreign capital inflows, or allow Rupee to appreciate are sub-optimal. The paper suggests better alternatives.

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As a result of the economic liberalization policies of the last three years there have been large foreign capital inflows reaching US$ 5 billion during 1993-94. These augment domestic investment as Indian industries gear up for greater competition and export orientation. However, there are also apprehensions regarding the repercussions of the relatively large capital inflows including the fear that they can lead to increased inflation and appreciation of the Rupee, which could hurt export efforts. Portfolio investment by foreign institutional investors raises the spectre of instability and excessively high returns being made by foreign speculators. Foreign direct investment, on the other hand, may adversely affect the domestic industry.

The Reserve Bank has been having difficulties managing the large capital inflows over the last year and press reports indicate that it is considering putting a ceiling of US $ 5 billion on such capital inflows, or even allowing the Rupee to appreciate. These policies are sub-optimal; in fact further economic liberalization, including reductions in import tariffs and domestic interest rates, will help derive greater benefits from foreign equity investment.

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Types of Foreign Capital Inflows

(a) Public borrowing

The fundamental problem with public borrowing is that it is likely to be used to finance current account

deficits (mostly current consumption) or public sector investments which usually have poor returns. Thus repayment of such loans often becomes difficult as we have been experiencing since the late eighties, and sometimes leads to serious debt crises, as has been the case with many Latin American and African countries.

Concessional borrowing by the government from international lending agencies is the cheapest source of foreign capital. This should be continued while trying to improve the returns from investments made using these funds. However, commercial borrowing by the government from foreign capital markets should be minimized because of the higher interest rates.

(b) Allowing foreigners to deposit in Indian Banks or purchase Bonds in Indian capital markets

Given the high domestic interest rates in comparison to the low international rates (and a stable Rupee), this will lead to large inflows of foreign capital at the high domestic interest rates. This is undesirable given that it is possible to borrow at much lower international interest rates. In fact this is the classic way in which the Latin American countries, Chile, Argentina and Uruguay got into severe debt crises during the late seventies and are still struggling to resolve them (Agrawal, 1922). In this context the argument of Brecher and Diaz Alejandro (1977) also needs to be taken into account. They have argued that in the -presence of tariffs, foreign capital inflows that receive their full (untaxed) marginal product, can be welfare reducing. Hence this method of foreign borrowing should be avoided.

(c) Foreign portfolio investment

Foreign portfolio investment is the investment by foreign investors in the shares listed on the Indian stock exchanges. Currently only foreign institutional investors (FIIs) are permitted to buy shares in the domestic share markets. Foreign portfolio investment buoys the domestic share market and makes more equity funds available to domestic firms, at least in the medium to long run.

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Fears have been expressed that foreign investors may be short run speculative players who may add to the instabilty of our share markets and foreign exchange reserves, and that they may make excessive returns, creating a long run drain on the Indian economy. Regarding the instability of foreign portfolio investment, it should be noted that only foreign institutional investors have been allowed permission to invest on our share markets and they usually have a long run horizon since they often represent Pension Funds etc. Excessive instability of portfolio holdings is not in the self-interest of foreign institutional investors, for if they try to sell off their share holdings *en masse*, the share markets will fall so sharply that they will stand to lose money. While there is always a certain degree of instability in the foreign portfolio investment, the experience of East Asian countries suggests that it can be expected to grow over time (Table 1).

Large inflows or outflows or portfolio investment can sometimes occur as a result of social, economic or political events (as happened with the NRI deposits in 1991-92 following the assassination of Mr. Rajiv Gandhi). The best remedy for this is to anticipate and be prepared in advance. One, the government should try to prevent the market from falling when it is a result of foreign institutional investor's sell-off, because it only allows foreign investors better returns from sell-off. Two, the Reserve Bank can consider placing an informal ceiling on the amount of annual inflows when they appear to be excessive and beyond the capacity of the domestic share markets to absorb without causing excessive price fluctuations. Currently, a ceiling of around US $ 2 billion might be considered. Three, the Reserve Bank should maintain a good amount of reserves. For, the fear that they may be unable to withdraw their money later can itself trigger large scale withdrawals (as was also the case with NRI deposits in 1991-92).

The fear that foreign institutional investors may make excessive returns is justified, to some extent. Firstly, the argument of Brecher and Diaz Alejandro (1977) is applicable to this type of foreign capital inflow too. Secondly, given the high domestic interest rates (and the fact that yields on shares have to be higher than interest rates because of the higher risk involved in equity), returns on shares can be expected to be in the neighbourhood of 20 percent in Rupee terms. This would be very high by international standards if the Rupee maintains its nominal value. If the Rupee depreciates (which seems unlikely for now), this problem would be less serious.

This suggests that we may have opened ourselves to foreign portfolio investment somewhat prematurely. However, if the trade and financial sector reforms proceed at the right pace and we significantly reduce our tariffs and interest rates over the next few years, the

Table 1. Annual Flows of Portfolio Investment in East Asian Economics

(Million US dollars)

Year	Singapore	Korea	Malaysia	Thailand	Indonesia	China
1975	–2	0	268	1	0	0
1976	50	74	52	–1	0	0
1977	96	70	63	–76	0	0
1978	–127	42	79	76	103	0
1979	–78	8	194	180	60	0
1980	13	40	–11	96	46	0
1981	–48	60	1131	44	47	0
1982	–29	15	601	68	315	41
1983	–49	188	668	108	368	20
1984	–151	333	1108	155	–10	83
1985	175	982	1942	985	–35	742
1986	–549	301	30	–29	268	1567
1987	252	–113	140	346	–88	1051
1988	–293	–482	–448	530	–98	876
1989	–76	–29	–107	1486	–173	–180
1990	–873	811	–255	–38	–93	–241
1991	–1245	3116	170	–81	–12	235
1992	–1190	5742	–1108	750	–88	–57

Source: International Finance Statistics, 1992; International Financial Statistics, January 1994.

arguments against foreign portfolio investment would no longer be applicable. In the meantime, the fact that foreign portfolio investment helps develop and deepen our share markets, mitigates some of its possible drawbacks.

Given the likelihood of high returns being made on foreign portfolio investment for the time being, it will be appropriate to raise the long run capital gains tax for foreign investors from 10 to 20 percent (possibly in stages). This is also justified on the grounds of equity between foreign and domestic investors (the latter have to pay 20 percent). It is worth noting that the yields available to foreign institutional investors in the European and North American stock markets are currently quite low (5 to 10 per cent), thus it is quite possible to attract such funds even with the increased capital gains tax. Our capital gains tax can be higher than that of other emerging markets such as Korea, Taiwan and Malaysia since the real interest rates, and yields on shares, in these economies are lower.

(d) Indian firms floating shares in international share markets

Large and well established Indian firms have been allowed to issue shares in the international (mostly European) share markets over the last year through the Global Depository Receipt (GDR) mechanism. Quite a few firms have undertaken such issues bringing in nearly US $ 2 billion. These share issues provide additional equity funds to major Indian firms to undertake further expansion and restructuring. The advantage of such issues is that the issuing firm has a clear incentive to use these funds productively. Even if it does not, there are no public liabilities or repayment crises, the risk being borne by the foreign investors.

The international share issues do not suffer from some of the main disadvantages of foreign portfolio investment. One, international capital markets being extremely large compared to the size of Indian firms' issues, the foreign share issues do not lead to large price fluctuations and the resulting speculative pressures, that would be likely if the same amount of foreign capital was to come into the domestic share markets as foreign portfolio investment. Two, the yields expected by investors in the international capital markets are currently significantly lower than those in the domestic share markets and can be expected to remain lower[1] given the relative scarcity of capital in India.

1. While very large differences cannot exist between domestic and international prices, they will take time to build up. It will also be cushioned to some extent by the fact that investors in domestic share markets are subject to the capital gains tax while investors in international share markets are usually not. If we reduce our tariffs and interest rates in the meantime, the problem may never become unmanageable.

Thus, it is better to let the firms issue shares directly in the international share markets. Any controls or regulations should only aim at proper quality controls to maintain a good reputation for the Indian issues.

(e) Indian firms floating bonds in international capital markets

Indian firms have also been allowed to borrow in the international capital markets by floating bonds since early 1993. This has the advantage that the Indian firms are able to borrow at much lower interest rates prevailing in the international capital markets, rather than paying the high domestic interest rates. At the same time, the debt (at least in the case of bonds floated by private firms) remains a private one and is not liable to become public liability even when a particular private firm is unable to meet its repayment obligations. This automatically imposes a market discipline and only the well established firms who can make good returns on investments will be able to raise funds. This discipline is very much needed, hence it is preferable not to give any government guarantees on such debt.

Private firms whose debt is not publicly guaranteed face very similar incentives to productively use the money raised in the international capital markets whether they issue bonds or shares. However the bonds will require repayment of the principal at some stage, which could possibly create repayment problems if our foreign exchange reserves were not well managed. In view of the prevailing high reserve, and low interest rates prevailing in the international capital markets, government is pressure to issue shares rather than bonds is not justified. Such a preference may be justified in the case of publicly owned firms whose debt could become public liability if the firm fails to repay it.

International issues of bonds are possible only for very large and well established firms. There is considerable merit in further developing facilities for borrowing in foreign currencies at international interest rates for smaller firms, especially exporters, who can benefit from better credit facilities to finance the purchase of imported inputs. This can be achieved by allowing commercial banks to extend credit to exporters in foreign currency at close to international interest rates. However, such loans must be required to be repaid in the foreign exchange only to make sure that they are mainly used by exporters and do not boil down to inflows of type (b). Similar facilities are provided to exporters in most East Asian countries whose economies have been performing very well.

There is considerable merit in developing facilities for borrowing in foreign currencies at international interest rates for smaller firms, especially exporters, benefit from better credit facilities to finance the purchase of imported inputs.

(f) Foreign direct investment

Foreign direct investment is used to create or purchase facilities for undertaking direct production, usually jointly with an Indian partner. Foreign direct investment provides investment capital as well as modern technology, increasing the growth rate of GDP and employment. Export oriented foreign direct investment is particularly useful as it provides automatic access to world markets and boosts domestic exports (as well as employment) through backward linkages with the domestic economy.

Some concerns regarding foreign direct investment are as follows: One, it can stifle the growth of domestic firms. While this may happen in a few cases, foreign direct investment usually promotes investment and growth of domestic firms through joint production, as can be seen from the experience of our automobile industry. Two, foreign direct investment can possibly make excessive returns in highly protective markets when domestic prices are significantly higher than international prices (Naya & Imada, 1990). This is largely mitigated by our high corporate tax rates. Nevertheless, if we want to use foreign direct investment on a large scale, we should continue to reduce our tariffs and quantitative restrictions on imports, especially those on consumer goods, and usher vigorous competition by allowing many multinational companies in a sector that is opened to foreign direct investment (rather than creating foreign monopolies, such as Maruti until recently). Three, foreign direct investment can lead to foreign domination. This concern is outdated and exaggerated. China, Malaysia and Singapore, some of the largest recipients of foreign direct investment, are subject to no more (in fact less) pressures than India. At times, the foreign companies can also be used as emissaries to put our point of view across to the governments of their home countries. A detailed analysis of the East Asian experience with foreign direct investment is available in Agrawal et al (1993).

Foreign direct investment can earn profits only when the particular investment is profitable. Thus it does not create the kind of economic crisis that poorly managed

foreign debt has created in many developing countries. Since foreign direct investment is often used to finance imports of capital and other inputs, its contribution to domestic inflation or currency appreciation is usually marginal. Thus foreign direct investment is likely to be beneficial to our economy and should be promoted.

Relative Merits of Various Foreign Capital Inflows

From the perspective of using foreign capital inflows to promote investment and long run GDP growth, without creating repayment crisis, there are three important considerations. One, foreign capital inflows must be channeled into productive investments, rather than financing current consumption. Two, investments financed by foreign capital inflows should yield returns higher than the cost of these funds to the economy. Three, exports growth should be sufficient to finance repayment of foreign capital inflows in foreign exchange.

These criteria suggest that public and publicly guaranteed foreign borrowing of type (a) should be restricted mostly to concessional loans available from multilateral lending agencies while foreign borrowing of type (b) at the high domestic interest rates, should be avoided. Foreign direct investment and issuing bonds and shares in the international capital markets by Indian firms appear to be fine. However, the desirability of foreign portfolio investment is questionable since it might be earning excessive returns. In order to make better use of foreign direct and portfolio investment, it is desirable to try to further reduce our interest rates and tariffs. In order to ensure easy repayment of the foreign capital in future, it is essential to promote exports vigorously and to ensure that most of the foreign capital inflows are used to finance investments and/or exports growth.

Unfortunately the foreign borrowing of India (and most other developing countries) has been mostly public and publicly guaranteed borrowing [type (a) and (b), rather type (e)], partly because of government policies and partly because only a limited number of firms in developing countries are established enough to be able to raise significant amount of funds in international bond markets. Thus, our analysis above would suggest generally poor performance for countries with large public or publicly guaranteed foreign borrowing.

Only a few countries, like Japan and Korea, which have had efficient and export oriented economies and whose governments were very prudent have been able to use foreign debt effectively to improve their GDP growth, that too in the 1960s and 1970s, when the foreign loans carried relatively low interest rates. Even Korea found the interest rates of 1980s too difficult to manage and experienced a mini debt crisis in the early eighties following which it has greatly reduced its foreign debt, while encouraging foreign equity investment.

On the other hand, countries employing mostly equity funds can be expected to do well since foreign equity funds are automatically directed to high yielding investments and do not create public liabilities even if the firm to utilize the funds properly.

Table 2 shows data on public and publicly guaranteed foreign debt, foreign equity investment, and the average rate of growth of GDP for the period 1980 to 1990 for two groups of countries: (A) countries with large public and publicly guaranteed debt, and (B) countries with large foreign equity capital (mostly foreign direct investment) inflows. The Table shows that economic growth performance of the countries employing large amounts of foreign public and publicly guaranteed debt, but not foreign equity capital, has been generally poor. On the other hand, the GDP growth performance of the developing countries in Group B (all are from East Asia), which have employed large amounts of foreign equity capital, has been outstanding. Although these countries have also used some debt, the simultaneous increase in their foreign exchange reserves often mitigated the increase in debt to a large extent (which is not the case with countries of Group A — Table 2). In fact the Group B economies employing large amounts of foreign equity capital have been hailed as "Tigers" and their economic performance called a "Miracle" (World Bank, 1993). This supports our analysis and suggests that foreign equity investment is a good means of augmenting domestic investment.

Foreign Capital Inflows: Short to Medium Run Management

Our discussion shows that many forms of foreign capital inflows can be helpful in promoting long run economic growth. However, it is essential that they be managed properly in the short to medium run as well. When mismanaged, they can create major macroeconomic destabilization that can ruin the entire economic liberalization programme, as was the case with Chile and Argentina (Agrawal, 1992). Thus, it is important to understand the implications of large foreign capital inflows. The primary impact is on the exchange rate of Rupee relative to foreign currencies and on domestic inflation.

Table 2. GDP Growth Rate, Foreign Equity Investment, Public Debt and Foreign Exchange Reserves for Selected Economies (in million US $)

Country	Avg. Annual growth rate of GDP 1980-1990	Foreign Equity Investment		Public & Publicly Guaranteed debt		Foreign Exchange Reserves	
		1980	1990	1980	1990	1980	1990
A. Countries with large foreign public debt							
Argentina	–0.40	2263	6856	10181	46146	6057	4295
Bangladesh	4.30	0	8	3420	11464	299	603
Brazil	2.70	16171	27421	40824	82098	5042	7430
Chile	3.20	34	5965	4705	10339	3038	6068
India	5.30	11	71	18372	61097	6043	1205
Mexico	1.00	12345	19818	33915	76204	2688	9446
Nigeria	1.40	3513	8174	4284	33709	9593	3863
Philippines	0.90	435	3498	6363	24108	2846	868
B. countries with large Foreign Equity Investment							
China	9.50	0	17753	4504	45319	2262	28594
Malaysia	5.20	5528	21556	4007	16107	4114	9327
Singapore	6.40	3792	23170	1811	13281	6491	23187
Thailand	7.60	1613	12028	3943	12572	1552	13247

Source: 1. World Development Report, 1992 and 1993.; 2. World Debt Tables, 1992-93; 3. International Financial Statistics Yearbook, 1992.

(a) Exchange Rate

While some of the funds raised through foreign equity investment and foreign borrowing may be used to finance imports, large amounts of net inflows still exist. This increased supply of foreign exchange creates pressure for the Rupee to appreciate against other currencies. If the Reserve Bank (RBI) does not intervene and the Rupee is allowed to appreciate our imports will generally increase while exports would decline and thus current account deficits would increase. Then the foreign capital inflows would be financing mostly current consumption rather than investment for the future. This would create difficulties when the foreign capital has to be repaid, as has been the case with foreign public debt that India accumulated in the mid to late eighties.

Thus appreciation of Rupee would be highly inappropriate and the Reserve Bank must continue to buy enough foreign exchange to keep the Rupee from appreciating. In fact, since the domestic inflation rate has been significantly higher than the international inflation rate, even keeping the nominal exchange rate constant amounts to appreciation in real terms, which should be avoided.

Rupee appreciation can be considered only after we have managed to achieve significant current account surpluses for 2 to 3 years in a row.

A few countries such as Japan, Korea and Singapore have allowed their currencies to appreciate over the last 10 years. However, this has usually been done on the strength of persistent current account surpluses, not because of large foreign capital inflows. Most other countries receiving large capital inflows but not enjoying current account surpluses, such as China, Malaysia, Thailand and Indonesia have, in fact, allowed their currencies to depreciate, despite the capital inflows (Table 3). Thus Rupee appreciation can be considered only after we have managed to achieve significant current account surpluses for 2 to 3 years in a row.

(b) Domestic Inflation

Purchase of foreign exchange by the Reserve Bank to keep the Rupee from appreciating has been leading to rather high build up of foreign exchange reserves. The main problem associated with this is that in order to buy the foreign currencies, the Reserve Bank must release an equivalent amount of Rupees, which contribute to the "reserve money" (or the monetary base) and thus increases the money supply by the money multiplier (about 3.12) times the increase in reserve money.

The increase in money supply would fuel inflation which is undesirable. For, it requires further depreciation of the Rupee to keep it from appreciating in real terms

Table 3. Inflation Rate and Exchange Rate for Selected Economies Experiencing Large Foreign Capital Inflows

Year	China		Malaysia		Indonesia		Thailand		Singapore	
	Inflation rate	Exchange rate per US $	Inflation rate	Exchange rate per US $	Inflation rate	Exchange rate per US $	Inflation rate	Exchange rate per US $	Inflation rate	Exchange rate per US $
1980	11.50	1.53	6.70	2.22	18.00	626.80	19.80	20.63	8.50	2.09
1981	13.10	1.75	9.70	2.24	12.20	644.00	12.60	23.00	8.20	2.05
1982	7.90	1.93	5.80	2.32	9.50	692.50	5.30	23.00	3.90	2.11
1983	11.90	1.98	3.70	2.34	11.80	994.00	3.80	23.00	1.10	2.13
1984	8.20	2.80	4.00	2.43	10.50	1074.00	0.80	27.15	2.60	2.18
1985	5.60	3.02	0.30	2.43	4.70	1125.00	2.50	26.65	0.50	2.11
1986	8.70	3.77	0.70	2.60	5.90	1641.00	1.80	26.13	–1.40	2.18
1987	8.80	3.77	0.30	2.49	9.20	1650.00	2.60	25.07	0.50	2.00
1988	9.40	3.77	2.60	2.72	8.00	1731.00	3.80	25.24	1.50	1.95
1989	6.20	4.77	2.80	2.70	6.50	1797.00	5.40	25.69	2.40	1.89
1990	9.00	5.22	2.60	2.70	7.40	1901.00	6.00	25.29	3.50	1.74
1991	13.90	5.43	4.40	2.72	9.20	1992.00	5.70	25.28	3.40	1.63

Source: International Financial Statistics Yearbook, 1992.

which will imply purchase of even larger foreign exchange reserves! The East Asian economies experiencing large capital inflows have kept their inflation rates fairly and at single digit levels (Table 3). To control inflation, the Reserve Bank must sterilize the increase in the reserve money. This can be done by one or more of the following three methods:

- By an open market operation, i.e., by selling an equivalent amount of Government Securities to the public which leads to withdrawl of an equivalent amount of reserve money from the economy. We need to develop our markets for government securities in order to be able to carry out open market operations on a larger scale.
- By increasing the cash reserve requirement (CRR) of banks. By impounding additional reserves from banks, it neutralizes some increase in reserve money due to foreign capital inflow. This is the step recently taken by the Reserve Bank when it increased the CRR from 14 to 15 percent. Banks however do not like it since it reduces their income because the Reserve Bank pays only about 5 percent on the reserves held with it. This can be corrected by appropriately increasing the interest rate paid by the Reserve Bank on the reserves of banks (by approximately 0.5 percent for each 1 percent increase in the CRR).
- By reducing monetization of government budget deficits and other components of reserve money growth.

The Reserve Bank has been using all three of the above options, but is still finding it hard to control domestic inflation because of the large increase in foreign exchange reserves over the last year (about US $ 9 billion). This is because RBI holds only a limited amount of government securities and cannot undertake open market operations on a large scale. Similarly cash reserve ratio also can not be raised much higher, thus it is of limited help in sterilizing large capital inflows. The press (e.g., Economic Times, 18 May 1994) has reported that the Reserve Bank is considering imposing a ceiling of US $ 5 billion on foreign capital inflows, or even allowing the Rupee to appreciate. Are there better alternatives? In this regard, it should be noted that not all capital inflows be sterilized. For, the part of the foreign capital flowing into India is net of the part used to finance imports of capital goods and other inputs, to liquidate previous debt, or undertake any investment abroad. And only the net foreign capital inflow is likely to have to be purchased (and sterilized) by the Reserve Bank to keep the Rupee from appreciating. This argument explains the Reserve Bank guidelines requiring Indian firms floating bonds or shares in the international markets to use these funds mainly to finance imports of capital and other goods and to retire past debt.

Only the net foreign capital inflow is likely to have to be purchased (and sterilized) to keep the Rupee from appreciating.

Among the equity capital inflows, foreign portfolio investment can not be subjected to such guidelines, and is likely to contribute most to the foreign exchange reserves (which must then be sterilized). Considering its instability and excessive returns discussed earlier, this is the type of inflow on which a ceiling (preferably informal) can be considered.

A better solution is to allow larger capital inflows and use them to increase investment in the economy so as to raise the rate of growth of output and employment. What we need is more imaginative policies to reduce the pressure on inflation and the Rupee revaluation.

As for the other types of inflows, a better solution is to allow larger capital inflows and use them properly to increase investment in the economy so as to raise the rate to growth of output and employment, both of which are badly needed to increase public confidence in the policies of economic liberalization being pursued by the government. What we need is more imaginative policies to reduce the pressure on inflation and the Rupee revaluation. Some suggestions in this regard are as follows:

- Boost the demand for imports to reduce the need for the Reserve Bank to buy foreign exchange reserves. However, if future repayment crises are to be avoided, the foreign capital inflows must be used to finance investments (while maintaining high rate of exports growth) rather than current consumption. This suggests further reduction in custom duty on the import of capital goods (with greater reduction for those used in manufacturers of exports). This will help boost our stagnant investment by reducing the cost of capital. Possibly some further reduction in duty on import of intermediate goods can also be considered to help raise demand, production and investment, thus boosting GDP growth. These duty reductions will increase imports, thus reducing the need for the Reserve Bank to buy foreign currency to keep rupee from appreciating. But since, we mostly encourage investment (rather than consumption), this is desirable as well as sustainable without creating problems for the future.
- Allow some of the pent-up demand for foreign exchange holdings in India to be satisfied so that the Reserve Bank does not have to buy foreign exchange reserves to keep the Rupee from appreciating. The current availability of foreign exchange can be used to take controlled steps towards greater currency convertibility by allowing individuals and firms (perhaps only enhanced facilities for the exporters and importers in the beginning) to hold foreign exchange in limited amounts. By reducing transactions costs, this policy will facilitate imports and exports and thus increase production.

Full capital account convertibility should wait until the reform process is nearly completed, so as to avoid large capital inflows or outflows, which can be highly destabilizing (as our current experience with limited inflows shows). However, allowing individuals and firms to hold limited amount of foreign currency funds is quite appropriate at a time when we have the problem of having an excess of such funds.

Banks can also be allowed to use funds such foreign currency deposits to give foreign currency from loans to exports. This will allow small exporters access to cheaper foreign currency loans, reducing their interest costs and boosting exports. As we develop experience, we can gradually develop "Offshore Banking" where Indians will be allowed to hold any amount of foreign currency accounts, while foreigners will be allowed to deposit money in such accounts. Since all transactions remain in foreign currency, this does not lead to increased domestic money supply or inflation but makes exporting and importing easier, improving the efficiency and productivity of the trading sector in particular.

Note that both the options considered here will expand domestic investment and thus increase the rate of growth of production and exports. On the other hand, currency appreciation will hurt exports (and therefore investment and GDP growth) while putting a ceiling on total foreign capital inflows will reduce investments and hence growth of GDP and exports. Thus, to the extent that the foreign capital inflows can not be converted into reserves and sterilized by the Reserve Bank, the options of tariff reduction on capital and intermediate goods and/or allowing individuals and firms to hold limited amounts of foreign exchange is clearly preferable to the options of allowing real currency appreciation or putting a ceiling on the foreign capital inflows.

Conclusions

From the perspective of using foreign capital inflows to promote investment and long run GDP growth, without creating repayment crisis, non-concessional public and publicly guaranteed foreign borrowing should be minimized, foreign deposits in Indian banks and foreign purchase of bonds in Indian capital markets should be strictly avoided given the high domestic interest rates. Foreign direct investment and floating of bonds and shares by Indian firms in the international capital markets should be beneficial to our economy and should not be restricted, except to require that the funds be mostly used for investments and for increasing exports. However, benefits for foreign portfolio investment are questionable because of the high returns on them. Thus, either an increase in capital gains tax or an informal ceiling can be considered in this case, especially in case of high foreign capital inflows.

Non-concessional public and publicly guaranteed foreign borrowing should be minimized, foreign deposits in Indian banks and foreign purchase of bonds in Indian capital markets should be strictly avoided given the high domestic interest rates. Foreign direct investment and floating of bonds and shares by Indian firms in the international capital markets should be beneficial.

The foreign capital inflows should not be allowed to lead to appreciation to the Rupee or to an increase in domestic inflation beyond the single digit level. In the case of large foreign capital inflows which the Reserve Bank finds difficult to sterilize, further reduction of customs duty, especially on capital goods, and/or allowing individuals and firms to hold foreign currency in limited amounts, are better options than currency appreciation or restrictions on desirable forms of foreign capital inflows.

In order to make better use of foreign equity investment, it is desirable to try to further reduce our interest rates and tariffs since this reduces the possibility of excessive returns being made by foreign investors. It is also essential to continue vigorous efforts to promote exports to avoid any future difficulties in repaying the foreign capital.

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Just as there are no little people or unimportant lives, there is no insignificance work.

— *Elena Bonner*

Capital Market — Emerging Trends

Nand Dhameja

The capital market in India has become broadbased. It has grown in terms of volume, instruments and agencies, particularly after 1991. There is a need to build on the momentum gained and to integrate various agencies involved so as to watch the needs and expectations of growing economic liberalization, argues the author.

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The capital market in India has experienced phenomenal growth, particularly in the last decade. The economic reforms and the Industrial Policy of July 1991 initiated to unshackle the industrial economy from the cobwebs of bureaucratic controls and regulations have brought about a change in the industrial climate. The highlights of the Industrial Policy 1991 have been: abolition of industrial licensing for all industries except eight, pruning down the list of companies reserved for public sector, automatic approval for technology agreements related to high priority industries, constituting a Foreign Investment Promotion Board (FIPB) to invite and facilitate investment in India by international companies in projects considered to benefit the Indian economy, permitting foreign equity holdings in certain industries, facilities for portfolio investment by Foreign Investment Institutions, permission to reputed companies to float equity abroad, amendment of the MRTP Act to enhance the threshold limits of assets and creation of NRF as a social security mechanism for employees of the public sector sick industrial units wound up. Accordingly, equity holdings of the Government in thirty public sector enterprises have been disinvented during the last three years by selling 143 crore shares for Rs. 7192 crore to banks, financial institutions and private individuals, and the shares of certain PSUs have been listed on stock exchanges.

In fact, financial markets in the developed and developing countries have experienced a rapid accelera-

Financial markets in the developed and developing countries have experienced a rapid acceleration of 'globalisation finance' and 'global neoclassicism' has emerged under which national governments or even international regulatory system neither can nor should control the flow of capital borders.

Table 1. Capital Issues by Private Corporate Sector: 1960 to 1992-93

(Rs. crore)

December	Equity shares	Debentures	Total	As % of	
				Net Savings	National Income
1960	80.4	9.4	89.8	8.0	0.8
1961	88.6	12.4	101.0	9.7	0.8
1962	78.4	29.9	108.3	8.2	0.8
1963	71.2	23.0	94.2	6.2	0.7
1964	83.7	11.5	95.2	5.7	0.5
1965	81.0	21.7	102.7	4.8	0.5
1966	63.3	15.3	78.6	3.1	0.4
1967	64.7	21.6	86.3	3.7	0.3
1968	68.4	28.0	96.4	4.2	0.3
1969	63.0	33.3	96.3	2.8	0.3
1970	76.7	14.8	91.5	2.4	0.2
1971	78.7	8.7	87.4	2.0	0.2
1972	97.7	51.7	149.4	3.6	0.3
1973	98.6	14.9	113.5	1.6	0.2
1974	107.2	23.8	131.0	1.8	0.2
1975	68.3	30.1	98.4	1.1	0.2
1976	65.8	40.5	106.3	0.9	0.2
1977	82.0	29.1	111.1	0.9	0.2
1978	92.6	50.0	142.6	0.9	0.2
1979	108.5	33.3	141.8	1.0	0.1
1980	92.9	102.9	195.8	1.2	0.2
1981	170.3	130.7	301.0	1.6	0.3
1982	124.9	286.7	411.6	2.4	0.3
1983	155.5	616.2	771.7	3.9	0.5
1984*	244.7	664.9	909.6	4.6	0.5
1985*	244.7	613.6	858.3	4.3	0.4
1986*	899.6	845.7	1,745.3	7.5	0.7
1987*	1,008.2	1,555.7	2,563.9	9.4	1.0
1988*	1,109.8	667.3	1,777.1	4.6	0.6
1989*	1,035.5	2,136.9	3,172.4	6.6	0.8
1990*	1,226.7	5,246.4	6,473.1	9.8	1.4
1991*	1.298.8	2,931.4	4,230.2	5.8	0.8
1992*	1,732.0	4,019.8	5,751.8	6.7	1.0
1993*	9,822.0	9,574.0	19,396.0	20.4	2.8

* Years ended March

Note: The above series has been compiled from various issues of "Report on Currency and Finance" published by the RBI. However, the figures for the year ended March 1993 were compiled independently by CMIE.

Source: CMIE — Economic Outlook various issues.

tion of 'globalisation finance' and 'global neoclassicism' has emerged under which national governments or even international regulatory system neither can nor should control the flow of capital borders (Tariq Banuri & Schor, 1993).

India has approx. 6500 companies listed on stock exchanges, the second largest in the world, first being the US. With the market capitalisation of Rs. 305,000 crore in December 1993 (Economic Survey, 1993-94) which is approximately 45 per cent of Gross Domestic Product, Bombay Stock Exchange (BSE) accounts for more than three-fourth of the total market capitalisation; the stock market activity is concentrated in a few companies. CMIE estimates that nearly 48 per cent of the total market capitalisation was accounted for by 50 top companies.

Table 2. Capital Issues to Public: 1988 to 1993-94

	1988-89	1989-90	1990-91	1991-92	1992-93	1992-93 (Apl-Dec)	1993-94 (Apl-Dec)	1993-94
Number of Capital Issues	253	379	335	572	1,038	682	750	1,165
Capital Issues (Rs. Crore)	5,465	12,287	9,683	13,450	28,195	21,564	21,235	30,933
as % of Net Domestic Saving	11.4	18.6	13.2	15.6	—	—	—	—
Distribution of Capital Issues (Rs. crore)								
By Type of Securities								
Equity & preference shares	1,060	1,808	1,522	2,396	16,561	12,188	10,689	—
Private sector companies	956	1,178	1,350	1,796	9,791	6,939	6,705	
Mutual Funds & Fin. Instt.	104	630	172	600	6,433	4,912	3,984	
Public sector companies	0	0	0	0	337	337	0	—
Non-convertible debentures	2,649	5,216	5,714	7,396	3,618	3,075	3,802	
Private sector companies	265	330	635	1,011	2,368	2,025	807	
Mutual Funds & Fin. Instt.	326	442	619	663	400	200	1,025	
Public sector companies	2,058	4,444	4,460	5,722	850	850	1,970	
Convertible Debentures	1,756	5,263	2,446	3,659	8,016	6,301	6,744	
My Mode of Issue								
Public issues through prospectus	2,513	4,430	2,544	3,250	14,205	10,711	12,846	18,510
Right issues	1,362	3,397	2,666	3,917	12,464	9,520	7,185	
Private placement	1,590	4,460	4,473	6,283	1,526	1,333	1,202	12,423
By Ownership								
Private sector companies	2,977	6,771	4,432	4,466	20,083	15,265	14,258	
Mutual Funds & Fin. Instt.	430	1,072	791	1,263	6,833	5,112	5,009	
Public sector companies	2,058	4,444	4,460	5,722	1,279	1,187	1,970	
Distribution of Capital Issues (percentage)								
Type of Securities								
Equity & preference shares	19.4	14.7	15.7	17.8	58.7	56.5	50.3	
NCD/Bonds	48.5	42.5	59.0	55.0	12.8	14.3	17.9	
Convertible debentures	32.1	42.8	25.3	27.2	28.4	29.2	31.8	
Mode of Issue								
Public issues through prospectus	46.0	36.1	26.3	24.2	50.4	49.7	60.5	60.0
Rights issue	24.9	27.6	27.5	29.1	44.2	44.1	33.8	
Private placement	29.1	36.3	46.2	46.7	5.4	6.2	5.7	40.0
Ownership								
Private sector companies	54.5	55.1	45.8	48.1	71.2	70.8	67.1	
Mutual Funds & Fin. instt.	7.9	8.7	8.2	9.4	24.2	23.7	23.6	
Public sector companies	37.7	36.2	46.1	42.5	4.5	5.5	9.3	

Source: CMIE

The latest report of the International Finance Corporation, Washington on Emerging Markets in Developing Countries indicates that while 3134 stocks registered on BSE were worth $ 59 billion, the 402 companies listed on Malaysia's exchange were worth $ 154 billion, the corresponding figures for China were 124 companies and $ 34 billion The report has also indicated that there was about 19 per cent decline in the value of stocks listed on BSE in the last quarter of 1993 and against the monthly value of stocks traded on the BSE of $ 1.2 billion, China's figure was $ 1.90 (Times of India, 1994).

Though industrial growth rate in India during 1992 and 1993 has been below 5 per cent per annum individual industrial houses are engaged in the exercise of restructuring and planning for modernisation, expansion and

diversification. The corporate sector is estimated to have a remarkable growth during the year 1993-94, and the Union Budget for 1994-95 lays thrust on the market – oriented economic policy. All these have led to growth in the capital market and the various agencies operating in it, including institutional investors, and mutual funds and Foreign Institutional Investors (FII). Finance Minister, Dr. Manmohan Singh, while presenting the budget proposals for the year 1994-95, emphasised the need of reforms in the capital market. The Minister stated: "The Government attaches high priority to reforms of the capital markets aimed at creating an efficient and competitive capital market subject to effective regulation by the Securities and Exchange Board of India (SEBI) which will ensure adequate investor protection. After a temporary setback in 1992 following the securities scam, the capital market recovered ground quickly. The funds mobilised in the capital market through public and rights issues, duly approved by SEBI, in the first ten months of 1993-94 were over Rs. 18,000 crore, as compared to less than Rs. 16,000 crore in the same period of 1992-93 and under Rs. 6000 crore for the full year, 1991-92. In addition, a number of Indian companies raised funds abroad through Euro-equity issues and Foreign Currency Convertile Bond Issues. The Government is committed to a thorough modernisation of the capital market and rapid improvement of trading practices with a view to ensuring transparency and speed of settlements. The model National Stock Exchange with screen-based trading is expected to begin operation by the middle of this year. The establishment of a Depository System of scripless trading is another important objective. Government intends to bring before Parliament separate legislation for the establishment of Depositories. The Government also proposes to make further amendments to the SEBI Act and the Securities contracts (Regulation) Act in order to give additional powers to SEBI".

After a temporary setback in 1992 following the securities scam, the capital market recovered ground quickly.

Economic reforms and measures towards liberalisation have introduced various legal and procedural changes, like the abolition of the Office of the Controller of Capital Issue (CCI), amendment of the MRTP Act and initiation of steps to involve private sector participation in various economic, industrial, commercial and public utility projects. Further, after the security scam, and various reports relating thereto, there have been oscillations in the stock prices. These have made the capital market more broad based and growth oriented in terms of volume, agencies and instruments.

Primary Market

Fresh issue market in India which was dormant during the sixties and seventies, came into prominence particularly in the mid eighties and has witnessed stupendous growth in the Ist two years after the abolition of Control on Capital Issue (CCI) in 1992, both in terms of volume and types of instruments. The amount annually raised from the capital market, while was below Rs. 150 crore upto seventies, reached Rs. 2000 crore in 1987. It exceeded Rs. 5000 crore in nineties, and reached Rs. 19,396 crore during 1993.

Another change which the capital market witnessed eighties onwards was that the debt became an important source of fund. As shown in table 1, on an average, debt accounted for two-thirds of the total funds raised by the private corporate sector during 1990 to 1993.

Public sector enterprises, mutual funds, and financial institutions have become important players in the primary capital market and public sector enterprises accounted for nearly two-fifth of the amount raised annually during 1988-89 to 1991-92. However, their share declined during 1992-93 and 1993-94, while that of mutual funds increased (table 2). During 1993-94, 1165 issues raised Rs. 30, 933 crore, of which Rs. 19613 or 65 per cent was raised in the second half of the year; and the distribution of issues was very skewed; the largest 30 issues accounted for about one-half of the total funds raised.

The level of activity in the capital market is reflected by the issue of shares and debentures through prospectus. The last two years have witnessed a stupundeous increase in the share of issue through prospectus, primarily because the companies were free to fix share premium after the abolition of CCI office in 1992. Such issues accounted for approximately 60 per cent of total issues during 1992-93 and 1993-94, while the figure for earlier years was below 30 per cent. In other words, private placement and right issues have been relegated to secondary position. During the year 1993-94, unusual entrants to the primary market through prospectus were public sector companies, financial institutions and nationalised banks. IFCI was the first national financial institution to sell equity through public issue of Rs. 525 crore.

Securities & Innovations in Instruments

While ownership securities dominated the primary capital market upto the seventies the issue of bonds by the public sector enterprises during mid eighties brought the debt instrument into prominence. Amongst debt instruments, convertible debentures by private sector companies became popular during eighties. As shown in table 2, the share of convertible debentures and non-convertible debentures in the total funds raised during 1988 and 1991 was 30 per cent and 50 per cent respectively.

However ownership securities have again come into prominence during 1992-93 and 1993-94 as Rs. 16,561 crore worth of shares were issued during 1992-93 — the figure for nine months of 1993-94 is estimated at Rs. 10,700 crore (more than half of the total funds raised), the increase mainly accounted for by the private sector companies. The abolition of the Office of Controller of Capital Issue (CCI) in May 1992, enabled companies to raise finance through the capital markets by issuing shares at relatively realistic prices. Free from the restriction of fixing issue price at low prices, a large number of companies came out with equity issues at premium. Thus the equity route appeared far more attractive with the chief attraction being the ability of companies to raise huge premium amounts, CMIE study of 462 companies showed five-fold increase of share premium reserve to Rs. 2654 crore during 1992-93 (CMIE, 1993).

Many novel financial instruments have been introduced in the capital market including: Zero Interest Convertible Debentures, Deep Discount Bonds, Option Bonds, Fully Convertible Cumulative Redeemable Preference Shares, Shares or Debentures with Detachable Bonds, Floating Rate Bonds and Naked warrants to promoters entitling them to convert later into equity shares at the market price.

Changes in Issue Objectives

Share/Debenture issues have generally been to finance specific manufacturing projects. However, issues in the year 1993-94 were floated with diverse objectives namely:

- — Investment into subsidiaries and group companies: examples are issues by Electric Control Gear (India), Uni-Metal Alloys and V.P. Polycon.
- — Retirement of Debt: examples are Amison Foods and Burr Brown (India).
- — Diversification and new entry into the 'service' sectors: like information technology (Infosys), aviation (by Damania Airways, East West Airways), and credit cards (by Mercard).
- — Escalation in Project Cost: in the case of Nagarjuna Fertilisers and BSES.

Preferential Allotment

During 1993-94 the primary market had many instances of preferential allotment to foreign collaborators and to promoters at heavy discount over the prevailing market price. These were subject to controversy and were strongly opposed by domestic financial institutions (for example, Bombay Dyeing, Mahindra & Mahindra, Essar Gujarat Ficom Organics). The following guidelines have been laid down by the financial institutions for preferential allotments in future:

- — The offer price should be set in the light of the average share price seen in the last six months.
- — Preferential allotments should be allowed only when shareholders holding 90 per cent of the equity vote for it. However, votes of shareholders beneficiary of preferential allotment should not be considered for the purpose.
- — These norms apply to both domestic and foreign companies.

On the other hand, interestingly in some of the public issues there was higher premium for the promoters as compared to that for the public. It is perhaps to build public confidence in the public issues. For example, in the Rs. 109 crore public issue of BPL Ltd., the issue price for the public was Rs. 115, while the promoters subscribed at a higher price of Rs. 165 per share. Similarly, for Rs. 275 crore fully convertible debentures Issue of ATV Petrochem, conversion would be at a higher premium for the promoters as compared to that for the public.

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Security & Exchange Board of India (SEBI)

The Central Bank is to regulate the commercial banks, monetary policy and related matters, while an independent statutory body regulates the securities market. Security and Exchange Board of India (SEBI),

hybrid from SEC of USA and SIB of U.K. was setup in 1988 to develop the capital market along healthy lines. The Board was given a statutory recognition in 1992 with the objectives to develop and regulate the securities market and to protect the interests of investors.

The Board has been vested with the responsibility to regulate business in stock exchanges and any other securities market; to regulate the working of stock brokers, mutual funds; to safeguard investors interest; to prohibit insider trading in securities and to carry out research in areas related to securities markets. The Board has issued a series of guidelines, rules and regulations for compliance by the companies issuing capital and the intermediaries operating in the market. Some of the important guidelines, rules and regulations are:

- — Guidelines for Disclosure and Investor Protection
- — Guidelines to Development Financial Institutions for Disclosure and Investor Protection
- — Regulations concerning Inside Trading, Merchant Bankers, Mutual Funds, underwriters
- — Rules relating to Portfolio Managers
- — Capital adequacy for brokers: For brokers belonging to BSE, CSE minimum deposit required is Rs. 5 lakh each, for Delhi and Ahmedabad Rs. 3.5 lakh each; for remaining stock exchanges Rs. 2 lakh each.
- — Advertisement and disclosures in the prospectus and letters of offer
- — 'Promise versus deeds' statement regarding the funds utilisation of a previous issue is mandatory for all companies entering the capital market.
- — Minimum subscription for public issues has been raised from 100 shares to 500 shares.
- — Clearance for financial institutions and banks for their capital issues has been made mandatory.
- — As per revised guidelines promoters are required to subscribe to at least 25 percent of the equity in each class of instrument when more than one instrument is offered. This is against no such requirement of subscription for individual instrument at present.
- — Proportionate allotment of shares for all public issues cleared by SEBI after Jan 1, 1994 has been made mandatory. Under this method of allotment, the number of shares to be allotted will depend upon the number of times the issue is oversubscribed and the number of shares applied for. However, to guard against any move of corporate takeover, it is proposed to impose a cap of 15 per cent on individual subscription in any public issue. First few companies to follow this method of allotment were: Micro Plantae in November 1993, and Lupin Laboratories in December 1993.

As a step to check oversubscription, forward trading was banned and a new trading system — the twin-track system was proposed. This new system would place every specified scrip on two "tracks" and would give investors the option of trading on either 'cash' or 'forward' basis. In 'forward' basis, the transaction must be completed within 15 days. Under the system, the physical delivery of shares or cash is inescapable and is expected to improve stock market operations and liquidity. However, the system has found little acceptability amongst the broker community and the stalemate continues.

In its task to develop the capital market and to regulate stock market, the issues before SEBI are safeguarding the interests of investors including that of recklessly high premium on public issues regulating and coordinating various agencies in the capital market; having members on its Board representing various financial agencies; and developing the system of market makers, scripless trading and custodian services.

Mutual Funds

Mutual funds or collective investment schemes are an important constituent of the capital market and provide the benefit of diversified portfolios and expert investment advice to a large number of investors. Upto the last four years it was the virtual monopoly of Unit Trust of India to have mutual funds. Nationalised banks were later on allowed to have subsidiaries for launching mutual funds; as a result, many nationalised banks have floated mutual funds which have become popular and important conduits for mobilising resources form the household sectors. It was only in 1992 that the Government permitted the setting up of mutual funds in the private and joint sectors and twenty private sector sponsors have been given approval by SEBI to set up mutual funds.

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With about half a dozen mutual funds already launched by the private sector, and Morgan Stanley, a foreign mutual fund, besides the public sector mutual funds by UTI, banks and insurance companies, the mutual fund industry has become extremely competitive, these mutual funds are listed on stock exchanges and there is a need of periodical disclosures by them.

Mutual Funds are governed by a uniform set of the regulations made by SEBI which in brief include the following:

- Mutual fund are to be formed as trust and managed by separately formed Asset Management Companies (AMC) each having a minimum stipulated networth of Rs. 6 crore, of which 40 per cent contributed by the sponsor.
- Investment by mutual funds in various securities to be as per laid down criteria.
- Regulations also prescribe the advertisement code, the contents of trust deed, investment management agreement and publication of scheme-wise balance sheets of mutual funds.
- Revised guidelines for investment by mutual funds into money markets to the extent as: upto 100 percent of corpus deployed for a period of six months, upto 30 percent for the next six months, and upto 25 per cent thereafter.

Share of mutual funds in raising resources from the capital market in India had has a phenomenal growth over the years. As per CMIE estimates, mutual funds raised Rs. 430 crore from the capital market in 1988-89. The figures for 1991-92 and 1992-93 were Rs. 1263 crore and Rs. 6833 crore — sixteen times increase over the period of four years. In percentages, the share of mutual funds raising resources from the capital market was below 10 per cent upto 1991-92 and increased to approximately 25 per cent 1992-93 onward. Further, 90 per cent of the funds raised by mutual funds were in the form of ownership securities, like equity and preference shares and only 10 per cent were in debt.

OTC Exchange

As a step to activate the securities market, G.S. Patel Committee on Stock Exchange Reforms (1986) and the Abid Hussain Working Group (1989) on the Development of the Capital Market had recommended the creation of a second tier stock market to provide access to the capital market for smaller or greenfield companies and to provide a pathway for companies with prospects of growth for graduating from one level to the other. Consequently, OTC Exchange of India (OTCEI) was set up by a consortium of premier financial institutions to provide the small and medium sized companies an access to the capital markets and the investors a convenient mode of investment.

The OTC Exchange seeks to replace the trading ring with a network of counters of OTC Members/Dealers located at different places in the same city as well as across cities.

Companies with issued capital from Rs. 30 lakh upto Rs. 25 crore are eligible for listing on OTC Exchange as per the criteria. Companies listed on the OTC Exchange cannot be listed on other stock exchanges and similarly companies listed currently on any other stock exchange cannot be listed on the OTC Exchange. The OTC Exchange, thus a second tier stock market, seeks to replace the trading ring with a network of counters of OTC Members/Dealers located at different places in the same city as well as across cities.

The OTC Exchange of India is a fully automated national level stock exchange. Upto December 1993, only 22 companies were traded on OTC Exchange of which seven were floated in 1993. During the year 1993, debentures of a few bluechip, companies were listed but trading in these was thin. It is envisaged to list equity shares of a few large companies listed on BSE and to link smaller stock exchanges of other cities to the OTCEI. However, the plan has not yet materialised (CMIE, 1993). The experience gained from the working of OTC Exchange has led to the setting up on National Stock Exchange at Bombay.

National Stock Exchange (NSE)

National Stock Exchange has been recently set up to provide a single, nation-wide market for securities under which an investor in one part of the country could trade with another located in any other part of the country. Unlike BSE, its members could be anywhere in India and it will have satellite communication and computer based trading which will be transparent and open to monitoring in an easy way. Initially it is expected to have operations in the wholesale debt market.

Existing stock exchanges in India have the characteristics of being fragmented markets, lack uniformity in

practices, lack an adequate mechanism to facilitate inter-market operations at low cost and low risk, and have a low level of technology of computer systems and telecommunications for dissemination of market information. A high powered study group on 'Establishment of New Stock Exchanges' recommended in 1991 the setup of the National Stock Exchange at Bombay as a model exchange. The other recommendations of the study group in this regard were:

- Establishment of a national stock market system (NSMS) with a three tier structure consisting of:
  - a principal stock exchange
  - regional stock exchanges
  - additional trading floors (ATFs) sponsored and managed by either a principal stock exchange or a regional stock exchange
- Setting up of the following support agencies:
  - a national clearing and settlement corporation to administer the clearing and settlement functions at the national level
  - a central depository trust
  - a securities facilities support corporation responsible for establishing and maintaining the network between exchanges.

It is envisaged that NSE would play a crucial role in developing a debt market, would commence operations in wholesale debt market by May, 1994, and would cover equity operations by the end of the year 1994. As an exchange, it is expected to meet the needs of the investors, members, regulators and issuers. Investors Expect price determination, transparency of operations and minimising of trading and settlement risks, Members of the exchange expect adequate infrastructure for trading and settlement, counter member guarantee and the promotion of legitimate business interests of the members. Regulatory agencies expect the exchange to comply with all the regulations to assist the members in framing and administering regulatory practices. Issuers expect to have a 'cost effective and timely mechanism to raise funds in the market'.

Since price determination and stability in price depends, to an extent, on a higher volume of trading, the NSE would have to compete with OTCEI, BSE and current unorganised debt market. Transparency would be assured to investors by the envisaged computerised trading, however it is already available on OTCEI and is expected on BSE. To ensure minimising of trading and settlement risk, 'the NSE will have to ensure delivery versus payment (DVP) not only between members but also business investors and members'. However, "this is likely to be a formidable task in the absence of a reliable central settler-cum-custodian-cum-Registrar and — transfer agent" (Mehta, 1994).

In addition, the various issues to be sorted cut are as follows:

- Since individual trading would be of a very high value, a member would expect the exchange to guarantee settlement of every intermember trade; will NSE be able to provide such guarantee, not yet provided by BSE and OTCIE?
- Fair business practices and transparency in operations are required to ensure that investors' interest in BSE is maintained. Though Computerised trading and settlement environment would make it an easy task, it would require standardisation of business practices.
- In the rapidly changing information and technology, the success of NSE would depend upon its cost effectiveness in providing services to all its participants.

Credit Rating

Credit rating is designed to identify the risks associated with various types of debt instruments and to provide the investor information that will help him determine whether he is getting a proper return for the risk he undertakes by investing in a particular debt instrument. It is not a general purpose evaluation of the company but an opinionated evaluation of the ability and willingness of the issuer company to meet its financial obligation on the debt instrument. Thus credit rating helps to bring about an orderly growth of the capital market and it shifts the responsibility of establishing corporate debt quality from the broker to the credit agency.

Credit rating is designed to identify the risks associated with the various types of debt instruments and to provide the investor information that will help him determine whether he is getting a proper return for the risk he undertakes by investing in a particular debt instrument.

Credit rating is mandatory for debt instruments having a maturity period exceeding eighteen months. At

present there are three credit rating agencies namely CRISIL, ICRA and CARE, all the three credit rating agencies lie within the regulatory powers of SEBI; CARE was set up by IDBI in collaboration with some banks and financial services companies in December 1993. CRISIL and ICRA have rated so far about 750 and 236 debt instruments respectively (Economic Survey, 1993-94).

Foreign Investment

Foreign investment comes in through three different ways: collaborations, portfolio investment by Foreign Institutional Investors (FIIs) and raising of funds abroad by public and private sector companies through Global Depository Receipts (GDRs) and Euro convertible Bonds. Foreign collaboration approvals also termed as Direct Foreign Investment. (DFI) witnessed a sharp increase after the economic liberalisation beginning August 1991. As shown in table 3, DFI exceeded Rs 4000 crore from 1992 onwards, while it had averaged Rs 170 crore annually before 1990. In terms of numbers, financial collaborations were around 200 before 1991 (total collaborations averaging 800); for the year 1992 the number of total financial collaborations were 692 and 152 respectively; the corresponding figures for the year 1993 (Jan-Nov) were 1313 and 671. It is estimated that foreign collaborators brought in $ 400 million during April to October 1993. It is reported that the government is considering automatic RBI clearance for foreign equity participation upto 75 per cent instead of the 51 per cent at present; and also to enlarge the list of industries enjoying clearance from licensing.

Table 3. Foreign Collaborations Approvals

Foreign Investment Approved (Rs. crore)		Foreign Collaborations Approved		
		Total No.	Financial Collaborations No.	Technical Collaborations No.
1985	126	1024	238	786
1986	107	957	240	717
1987	108	853	242	611
1988	240	926	282	644
1989	317	605	194	411
1990	128	666	194	472
1991	534	950	289	661
1992	3388	1520	692	828
1993 (Jan-Nov)	—	1313	671	642

Electrical machinery, chemicals and industrial machinery had a large number of foreign collaborations during August 1991 to June 1993; energy sector accounting for 62 out of the 2827 foreign collaborations, had the largest share of 45 per cent of the total investment, the food processing industry was the second largest. USA ranked first in the list of countries investing in India and had approximately one-third of the total investment approved, while Japan ranked second with half that of USA.

Energy sector accounting for 62 out of the 2827 foreign collaborations, had the largest share of 45 per cent of the total investment, the food processing industry was the second largest.

Indian corporate bodies in the public and private sectors tapped intentional capital markets raising funds through Global Deposit Receipt (GDR) and Foreign Currency Convertible Bonds (FCCB). Companies like Reliance Industries, Grasim Industires, Hindalco, Indian Rayon, SPIC, ITC, Mahindra & Mahindra, Gujarat Ambuja Cements, SCICI, Bombay Dyeing, TISCO, Arvind Mills ICICI, have raised funds from the foreign capital markets. Many companies have lined up for Euro Issues in the next few months. However, the IDBI and VSNL deferred their plans of raising funds abroad. A total of 27 Euro issues was completed during 1993-94 and US $ 2.5 billion was raised. Reliance industries collected the highest amount by garnering US $ 150 million in 1992-93 and US $ 440 million in 1993-94 (CMIE, 1994). Guidelines for the issue of GDRs and Foreign Currency Convertible Bonds (FCCB) were issued in November 1993, and the Revised Guidelines were issued in May, 1994. The guidelines require that a company desirous of raising foreign funds should obtain prior permission from the Government, should have a consistent track record of good performance for a minimum period to three years. The guidelines laid down the frequency and criteria of issue, listing requirements, transfer and redemption and taxation.

Foreign Institutional Investors

In order to widen the horizon of the Indian capital market and integrate it with the global market, the government decided to allow reputed foreign investors to invest in the Indian capital market, and issued Guidelines in September, 1992 to deal with investments by Foreign Institutional Investors (FIIs), including institutions such as Pension Funds, Mutual Funds, Investment Trusts, Asset Management Companies, Nominee Companies and Incorporated Institutional Portfolio Managers. FIIs are wel-

come to invest in all the securities traded on the Primary and Secondary markets including the equities and other securities/instruments of companies listed on stock exchanges including OTC Exchange of India, subject to a ceiling of 24 percent of issued capital for the total holdings of all registered FIIs, in any one company. The holding of a single FII in any company is subject to a ceiling of 5 per cent of the total issued capital. Such maximum holding of 24 per cent, will also include NRI corporate and non-corporate investments, but will not include direct foreign investment, and Investment of FIIs through GDR, Euro convertibles.

FIIs are required to obtain initial registration with SEBI, and also to seek RBI permission under FERA before making investment in the securities listed in Stock Exchanges in India. 145 FIIs registered with SEBI upto February 24, 1994, brought in funds worth $ 1319 million during 1993-94. By mid-march 1994, portfolio investment by FII has risen to $ 1.44 billion, and the estimates for the year 1994-95 are $ 4.5 billion (CMIE, 1994). However, the entry of FIIs, according to S.S. Nadkarni, President of the National Stock Exchange, has exposed the organisational weekness of the stock exchange trading system in India. If the efficiency of stock exchange trading and post-trade activity can be improved, investment by FIIs would increase substantially. The present system suffers from lack of transparency, enormous delay in settlement, bad deliveries, cases of forged shares and lost shares, mainly due to the tremendous physical movement of scrips.

The present system suffers from lack of transparency, enormous delay in settlement, bad deliveries, cases of forged shares and lost shares, mainly due to the tremendous physical movement of scrips.

Scripless Trading

Acute shortage of custodians to handle international stock purchases and primitive clearing and settlement system, hinder the inflow of funds exceeding $ 1.5 billion. Custodial work for FIIs at present is handled by Hongkong & Shanghai Banking Corp., City Bank, and Standard & Chartered Bank, and these banks have expressed with their clients not to activate their accounts, and have shut their doors to new customers.

Stock Holding Corp. of India Ltd. (SHCIL), having efficient service regarding clearance, settlement, depository and transfer of securities, commenced its operations in mid 1988. It has been providing services to Morgan Stanley Fund, ICICI mutual fund, UTI, GIC, CIC mutual funds but its activities have been affected by its low capital. It does not have a single FII customer, as per SEC regulations US investors can appoint a custodian whose equity is more than Rs. 600 crore; while SHCIL, has an equity of Rs. 10.5 crore and reserves of Rs. 5.04 crore.

State Bank of India (SBI) has set up a custodial services with capital of Rs. 600 crore. Similarly, IFCI has also set up custodian service subsidiaries. State Governments have been approached to permit revenue stamps to be affixed through a franking machine and this would pave the way for scripless trading and would move Indian trading steps towards international standards.

Traditional method of settlement/handling the paperwork, is costly and unmanageable, and it is essential, particularly when the capital market in India is becoming global one, to have national clearance and depository system (NCDS).

The primary objectives of NCDC include:

- to reduce substantially the paper-work-load and the paper handling costs in capital market;
- to ensure prompt and efficient process of registration and transfer of securities;
- to substantially reduce the system risk associated with the capital market;
- to standardise the procedures and practices in capital market operations;
- to confirm to international standards and to facilitate increased foreign participation;
- to promote qualitative growth of the capital market by facilitating custodial services and pledging of securities through book entries.

These are essential for capital market development and have been accepted in principle — the setting up of National Stock Exchange and SHCIL are steps in this direction. Further development of secondary market, and foreign inflows would require development of custodial services, defining of the custodian's job and operationalising his task.

PSU Disinvestment

In accordance with the Industrial Policy of 1991, Government equity holdings in 30 public enterprises was

disinvested with the target of 20 percent of capital to raise resources and encourage wider public participation. Approximately 143 crore shares have been disinvested and Rs. 7192 crore have been realised during the three years 1991-92, 1992-93 and 1993-94. The shares have been sold by inviting tenders from mutual funds, banks, financial institutions. Such disinvestment has been open to private and foreign mutual funds in the year 1993-94. These shares have been listed on stock exchanges, but there has not been much trading in such shares, the secondary capital market need to be strengthened to provide liquidity and stability to securities disinvested.

Conclusion

The capital market in India has become broad based. It has grown in terms of volume, instruments and agencies, particularly after the industrial policy of 1991. There is a need to build on the momentum gained and to integrate various agencies involved so as to match the needs and expectations of growing economic liberalisation.

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The creative process in today's corporation is by its very nature difficult to handle. Anything truly creative results in change, and if there is one thing a well-run bureaucracy or institution or major corporation finds difficult to handle, it is change.

— Max DePree

Co-operative & Regional Rural Banks in India: Major Weaknesses & Reforms

R.N. Agarwal

Cooperative and rural banks are an integral part of the Indian economic structure as they are the major lending agencies. The author analyses their growth and functioning and points out that structural weaknesses, failure to mobilise sufficient deposits, the mounting overdues and the lack of trained staff have led to the deterioration in their services. The article concludes with a series of recommendations to rectify the rot that has set in.

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Co-operative banks form an important segment of the Indian financial system. They are a part of the vast and powerful superstructure of cooperative institutions which are engaged in the task of production, processing, marketing and banking in India. Till 1961 co-operative credit societies were practically the only institutional source of rural/agricultural credit. They were the main lending agency and replaced to a great extent the informal sector lenders. The Rural Banking Enquiry Commission (1950) made special reference to the role of provincial cooperative as well as the district level central cooperative banks. It came to the conclusion that a sound and satisfactory co-operative banking system had come to stay. Various expert committees also examined the problem of agricultural credit from time to time and concluded that from the point of view of structural appropriateness there is no alternative to co-operatives at the village level for the provision of agricultural credit. The Rural Credit Survey Committee (1951) concluded that co-operation has failed. It made several recommendations to correct the position such as:

- State partnership through contributions by the state government to the share capital of co-operative banks.
- Effective integration of co-operatives with marketing and processing.
- Management through adequately trained personnel responsive to the needs of the rural population.

Based on the recommendations of the expert committees on rural credit, the Government has adopted a multi-agency approach under which both co-operative banks and commercial banks supplemented by regional rural banks (RRBs) and NABARD have to serve the rural sector. Since 1969, the relative importance of co-operative banks has declined but in the provision of rural finance the co-operative credit system plays an important

role on account of the existence of its vast network throughout the length and breadth of the country and its intimate knowledge of the conditions and problems of the local people.

In the provision of rural finance the co-operative credit system plays an important role on account of the existence of its vast network throughout the length and breadth of the country and its intimate knowledge of the conditions and problems of the local people.

Structure of Co-operative Banks

The co-operative system in the country though federal in its organisational structure is integrated vertically on the basis of the functional responsibilities of the various components of the system. The short-term co-operative credit structure has at its base the primary societies of all kinds viz. Primary Agricultural Credit Societies (PACS) which are expected to be multipurpose in character but in a large number of cases deal mainly in credit. Credit is also given by Land Development Banks at the state, district and village levels. Co-operative credit institutions operating in the country can be broadly classified as agricultural and non-agricultural banks. The former is the dominant part of the entire co-operative banking structure. They meet the short-term, medium term and long term needs of the rural sector. The Central Bank (RBI) and the government as well as NABARD provide finance, refinance facilities and guidance to the co-operative banks. At the apex are the state level co-operative banks (SCBs) in each state/union territory; at the district level are district central cooperative banks (DCCBs) and at the village level there are primary agricultural credit societies (PACSs).

The cooperative banks, thus form a pyramidal structure having three tiers. A large number of PACs provide a broad base to it. The structure of cooperative banks is as follows:

National Level

- Reserve Bank of India (RBI)
- National Agricultural Bank for Rural Development (NABARD)

State Level

- State Cooperative Banks (SCBs)
- Urban Co-operative Banks (UCBs)
- State Land Development Banks (SLDBs)

District Level

- District level Central Co-operative Banks (DCCBs)
- District Level Land Development Banks (DLDBs)

Village Level

- Primary Agricultural Credit Societies (PACs)
- Branches of land Development Banks.

Short and medium-term needs of the rural sector are met by the state and district level co-operative banks as well as primary agricultural credit societies with a uniform credit structure all over the country. Long term needs are met by the land development banks at all levels. They do not have a uniform credit structure. The three tier structure is interconnected through a two way flow of funds; one flow going downward from the higher financing agencies to the lower lending agencies and the other flow moving in the opposite direction from the lower credit agencies to the higher agencies. The SCBs themselves borrow from RBI besides raising funds through their share capital and reserves and deposits. The lower level institutions are required to keep all their surplus funds with their serious and they are not allowed to interlend. Land development banks do not accept deposits and therefore they are not banks in a true sense. Urban co-operative banks (UCBs) are similar to commercial banks in their operations. They normally cater to the needs of small borrowers.

Major Characteristics

Cooperative banks function on a 'no profit, no loss' basis and are managed on the principle of co-operation. They perform all the main functions of a bank but the range of services offered by them is narrower compared to those by commercial banks. They face stiff competition from commercial banks and several other financial institutions. Their main area of operation is in the agriculture and rural sector. However, they have increased their field of operation recently to urban and metropolitan cities.

The Reserve Bank of India and state governments lay down rules for co-operative banks in respect of their loan, investment and interest rate etc. Thus, cooperative banks are subject to government intervention and control.

They are required to maintain some specified percentages of CRR and SLR as is done by commercial banks. However, these percentages are lower and the percentage of lending to priority sectors is greater compared to the rates for commercial banks.

Table 1. Progress of Co-operative Banks

(Rs. crores)

Particulars	1969-70			1980-81			1985-86			1990-91		
	PACS	DCCB	SCB	PACS	DCCB	SCB	PACS	DCCB	SCB	PACS	DCCB	SCB
Numbers	163000	340	25	95000	337	27	92408	352	29	85967	356	28
Own Resources	242	174	83	754	670	345	1128	1007	616	1643	1716	901
Deposits	63	382	234	289	2423	1674	572	5088	3385	1349	10251	6128
Borrowings	618	331	249	2433	1187	608	3927	2288	1227	7761	5422	3572
Loans outstanding	540	873	709	1746	3210	2870	3140	7323	5516	4681	18477	12307
Total Advances	711	740	510	2608	2987	1836	4323	5475	3852	7278	11075	9660
Overdues	—	—	—	1089	939	162	1806	1696	292	3281	4220	986
Percentage of Overdues	—	—	—	—	32.5	10.0	41.8	37.8	9.2	45.3	58.0	18.0

Sources : Khusro Committee Report on the Agricultural Credit System 1993.
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Land development banks issue debentures to raise resources. The debentures are secured by mortgaging lands of the borrowers. Since 1981 a certain degree of uniformity has been brought about with regard to lending rates charged by commercial banks and co-operative banks. The interest rate structure has been revised recently in June 1990 and again in 1992.

Growth of Co-operative Banks

Implementation of the recommendations of the Rural Credit Survey Report (1954) gave a new impetus to the co-operative institutions and spelled a massive expansion of both the short-term and long-term credit system in partnership with the governments. Table 1 gives at a glance certain vital statistics relating to co-operative banks over a period of about 30 years. Total deposits of PACS together with DCCBs and SCBs have moved up from roughly Rs. 200 crores in 1961 to Rs. 4500 crores in 1980-81 and then to Rs. 17700 crores in 1990-91. However, the membership of PACS has declined from 2.12 lakhs in 1961 to 86,000 in 1990-91. This is attributed to the reorganisation of the credit system mainly because of the poor performance of PACS.

The number of urban (Primary) co-operative banks in the country increased to 1397 at the end of June 1991 with owned funds amounting to Rs. 1481 crores and deposits Rs. 10157 crores. Loans outstanding at the end of 1991 amounted roughly to Rs. 8000 crores. Thus the total deposits of co-operative banking sector (state, central and primary level taken together) increased to Rs. 27885 crores consisting of Rural Co-operative Banks' Deposit (17728), urban co-operative Banks' Deposit (17728) and urban co-operative Bank's deposit (10157).

There are three major competitors for rural deposits — the commercial bank's rural sector, regional rural banks and co-operative banks. The deposits of all the three components have increased over time from Rs. 329 crores, Rs. zero crores, and Rs. 624 crores respectively in 1969 to Rs. 23500 crores, Rs. 5141 crores and Rs. 17728 respectively in 1991. As a result of the expansion in banking facilities, institutional credit (co-operative banks and commercial banks) in the early 1950s which formed only 4.0 percent of total credit in the rural sector, has now increased to more than 65 percent. Further, there is evidence of substitution of traditional sources of funds by institutional credit. The trends in the deposits and long term loans given by the land development banks are depicted in table 2. Long-term loans given by the land development banks increased significantly from around Rs, 12 crores in 1961 to Rs. 765 crores in 1990-91. Total loans outstanding at the end of 1990-91 was Rs. 3738 crores. Overdues have also increased tremendously. Overdues as a percentage of demand have increased from almost zero to 52 percent in 1990-91.

Table 2. State Land Development Bank's Deposits, Loans and Overdues

(Rs. Crores)

Particulars	1960-61	1970-71	1980-81	1985-86	1990-91
Deposits and other borrowings	42	749	2056	2882	4904
Growth Rate (Annual)	—	32	8	7	2.5
Loans Issued	12	168	363	533	765
Loans outstanding	N.A.	638	1697	2625	3738
Overdues	0	14	243	323	739
Percentage of overdues to demand	0	23	53	45	52

Performance of Co-operative Banks

In the absence of profit and loss data for all the co-operative banks at the state, district or village levels, their performance is evaluated on the basis of data for some of the state co-operative banks only which are published regularly by Indian Banks Association. Although the data is not a representative of the entire set of co-operative banks, it gives some trends (table 3). The business of co-operative banks, in terms of their deposits, advances and assets, increased significantly over time. Although the total income and spread also increased significantly net profits have not gone up much. This is attributed to the rising establishment expenditure besides the operating expenditure. Performance ratios presented in table 4 supports the above explanation.

Table 3. Performance of State Co-op. Banks

(Rs. crores)

Particulars	1984	1986	1987	1991
No. of banks considered	8	8	8	18
Total deposits	374	690	865	2852
Total advances	227	386	506	1798
Total assets	389	835	1040	3524
Total income	48.9	81.3	105.5	382
Total expenditure	45.7	77.0	100.0	353.9
Estab. Expenditure	11.8	27.7	35.8	133.7
Spread	19.5	30.6	39.1	154.0
Net profits	3.2	4.3	5.5	28.4
No. of employees	4526	5562	5851	11699

Although the total income and spread also increased significantly net profits have not gone up much. This is attributed to the rising establishment expenditure besides the operating expenditure.

It can be inferred that profitability in terms of total income, spread or net profits as a percentage of total assets have not increased during the 1980s although the business has increased tremendously. This is attributed mainly to rising overdues, establishment and operating expenditures and mismanagement of banks.

Major Weaknesses

While the credit agencies have been able to register a substantial increase in the supply of credit and achieve the overall targets set out for them in the five year plans,

Table 4. Per Employee Productivity Ratios of SCBs

(Rs in Lakhs)

Particulars	1984	1986	1987	1991
No. of banks considered	8	8	8	18
Deposits per employee	8.99	12.42	14.79	24.38
Advances per employee	4.92	6.95	8.65	15.37
Income per employee	1.08	1.46	1.80	3.27
Estab. Exp. per employee	0.26	0.31	0.37	0.51
Total exp. per employee	1.01	1.38	1.71	3.03
Net profits per employee	0.071	.077	0.094	0.243
Profitability ratios				
Total income to total Assets (%)	12.60	10.47	10.14	11.27
Spread to total assets (%)	5.01	3.94	4.02	4.54
Net profits to total Income (%)	6.54	5.31	5.20	7.43
Net profits to total Assets (%)	0.823	0.514	0.529	0.806

the share of co-operatives has been on a continuous decline from 80 percent in 1969 to around 40 percent in 1991. This is mainly on account of the priority accorded to agriculture sector by other agencies of the credit delivery system and the unsatisfactory performance of a large number of co-operative banks. Although co-operatives have expanded their operations, their performance suffers from a number of inadequacies. The problems and weaknesses which beset the structure continue to be substantially the same as were identified earlier by the all India Rural Credit Survey Committee, 1954, and subsequently by Rural Credit Review Committee, 1969. It was pointed out that owing to certain structural weaknesses, failure to mobilize sufficient deposits, the mounting overdues and lack of trained staff, the co-operatives had failed to come up to expectations. The primary agricultural credit societies, functioning at the base of the cooperative credit system for providing short and medium-term loans to the rural sector, are not strong or efficient enough to discharge their responsibilities. Their deposits constitute around 10 percent of the working funds compared to about 60 percent for SCBs and DCCBs. Similarly, PAC's coverage of households in the rural sector is around 65 percent and out of this around 30 percent constitute borrowing members. Being small in size, unviable and uneconomical they are the weakest link in the co-operative credit structure. A minimum loan business of Rs. 10 lakh is required to make a PAC viable. As far as DCCBs are concerned, deposit mobilisation is as much as matter of lack of their will and inclination as of the weakness of their infrastructure. The deposits raised by them are at a higher cost than the rates at which they have to lend to PACs. Besides, they are not self sufficient

Owing to certain structural weaknesses, failure to mobilize sufficient deposits, the mounting overdues and lack of trained staff, the co-operatives had failed to come up to expectations.

in resource mobilisation and depend heavily on refinance facilities form other agencies. Co-operatives suffer from political as well as governmental interference and official bureaucracy — in respect of resource mobilisation, credit allocation and recovery of loans. This has adversely affected their profitability and viability.

Another major weakness of the co-operative system has been the tendency of higher level institutions to look after their own interest often at the cost of primaries. The commercial banks, regional rural banks and co-operative banks have failed bitterly to recycle rural credits. The state has gained considerable financial stake in the higher level organisations through participation in the equity and many other ways. As a result, the co-operatives have been superceded at all levels and instead of a democratically elected management these banks are managed by government officials nominated by the government. Consequently, co-operatives have become a government directed, government controlled and government regulated enterprises. This has distorted the principles of self government and federalism.

The net outcome of all these weaknesses has been that the PACs developed a high degree of inefficiency, high costs, low or negative profitability and absence of

Another major weakness of the co-operative system has been the tendency of higher level institutions to look after their own interest often at the cost of primaries.

self reliance. It is necessary to remove or at least minimise these deficiencies so as to recapture the spirit of co-operation and make the co-operatives self sufficient and viable.

Major Weaknesses of Land Development Banks

High level of overdues and consequent restrictions on fresh lending is one of the major problems of state/central land development banks. Loans overdue at the end of 1991 amounted to Rs. 3738 crores which forms 52 percent of demand and 19.8 percent of total loans outstanding. Since fresh lending is based on loan recovery, the whole chain of loan sanctioning and recovery is affected. Further, it is observed that the share capital base is very weak. For instance, owned funds of these banks amounted to Rs. 596 crores against overdues of Rs. 739 crores. This has eroded the credibility as well as capital base of the banks.

Another major weakness of land development banks is the existence of legal constraints. For instance, minimum period for long-term loan is 5 years and their activities are restricted to land based, with limited membership and so on. Also there exists weak functional co-ordination between the short-term and long-term wings of the co-operative credit system. This has affected their business, profitability and viability.

Strengthening Co-operative Banks

One of the major weaknesses is their low or negative profitability and in some cases non-viability of the units. Therefore the major task is to improve their gross income and net profits. This can be achieved by increasing the size of operation through diversification and other means as well as by reducing the establishment and other operating costs. The lending structure has also to be revised so that the cost of lending is always less than the benefits received through it. This requires a proper linkage of credit planning with development planning at district, block and village levels. Another major weakness lies in the government intervention and bureaucratisation of co-operative banks. This should be withdrawn as far as and at the earliest possible. Elections of the office bearers and management committees should be held regularly. Changes in co-operative society laws are also required so that the role of the Registrar of the societies is not of an overpowering one. The power of appointment of the secretary should rest with the society and not in any outside authority. The Secretary should be a qualified person. He should have avenues for upward movement and should be paid full salary and other benefits besides incentives for better performance. There should be training programmes for the secretaries and the managers of the banks at some regular intervals. Further, in order to reduce bureaucratisation of such banks their financial strength should be improved. In turn, the financial position can be improved by strengthening the share capital and deposit mobilisation.

Presently, for share capital assistance under the NABARD rules, societies should not have overdues exceeding 40 per cent of the demand except in respect of certain categories. Under this condition most banks do not qualify for assistance from NABARD. Hence it is recommended that overdues should be reduced significantly through different schemes such as the rehabilitation of weak units. A bank is considered weak when its estimated bad and doubtful debts, other overdues above three years and accumulated losses exceed 50 per cent of its paid up capital and reserves. For deposit mobilisation, co-operative banks should start/accelerate efforts to handle deposits. For proper management of funds the lending policy has also to be modified along with deposit mobilisation. This requires the introduction of cash credit system in certain areas and the scale of finance fixed by DTC (District level Technical Committee) has to be modified according to the crop loan manual. There is no coordination between the various state co-operative credit organisations and system of balancing of funds within the system. As a consequence large amounts of funds are mismanaged and underutilised. Hence there is an urgent need for the establishment of a national co-operative apex institution. Finally, organisational weaknesses need to be removed. As explained earlier the coverage is inadequate, especially, in the north-eastern region and membership is also low for several reasons. Therefore such areas have to be covered and membership increased. Resources are inadequate mainly on account of overdues and losses which have a chain effect. Recovery panels should be formed and legal and social measurers should be adopted to recover the bad debts. Reserve Bank of India (RBI) has already taken some steps in this direction. With a view to enabling weak banks which were either ineligible or were on the verge of becoming ineligible for refinance support, a 12 point action programme has been formulated and circulated by NABARD to all state governments. State governments have also taken some steps to improve the performance of rural co-operative banks.

As far as the re-organisation of urban co-operative banks (UCBs) is concerned RBI has recently (June 1993) announced its policy, for registration, licensing and other allied matters following the acceptance of the Report of Maratha Committee that was appointed in September 1991. According to the new policy, organisation of new urban co-operative banks will be permitted by adopting a liberal approach on the criteria of need, potential and prospects of areas in which such banks are proposed to be organised. Urban banks already operating in the metropotitan/urban/semi-urban centres will be allowed to extend their area of operation to the peripheral rural areas. To arrest sickness among urban co-operative banks, weak and non-viable banks would be weeded out by merger/amalgamation with stronger units. State governments have also been advised to promote appropriate amendments to state co-operative societies laws to impart true democracy and autonomy in their functioning. These steps in the right direction but not sufficient. A high powered national apex body is immediately required to concentrate fully on the co-operative banks and carry out the desired changes.

A high powered national apex body is immediately required to concentrate fully on the co-operative banks and carry out the desired changes.

Regional Rural Banks

With the nationalisation of fourteen major commercial banks in 1969 a special obligation was laid on the banks to step up their advances for agricultural and allied activities. There was a specific reservation of a prescribed percentage of loans for this purpose. However, the general impression was that these banks could not reach the rural population. With a view to seek guidance to help the poor and especially the rural sector of the economy besides small scale industries and other sectors, a banking commission was appointed in 1969 under the chairmanship of Prof. A.M. Khusro. The commission submitted its report in 1972 wherein it expressed doubts on the capabilities of commercial banks for giving adequate coverage to the rural sector in the near future. It proposed the establishment of a new class of rural banks in two alternative ways:

- By converting some selected viable primary agricultural societies into rural cooperative banks.
- By forming a rural subsidiary bank
  - — by setting subsidiaries of commercial banks in rural areas or
  - — by forming primary agricultural credit societies as subsidiary of a commercial bank.

The concept of a regional rural bank was designed to meet the full credit needs of all medium and small cultivators, agricultural labourers, rural artisans and other small entrepreneurs in the rural areas. The Banking

Commission also presented details about the capital structure, interest rate policy and linkages with other government bodies. However, the recommendations of the banking commission were not implemented until 1975 when the Prime Minister Mrs. Indira Gandhi announced a Twenty Point Economic Programme. One of the points in the programme related to the issue of rural indebtedness. Thus, the government considered the setting up of new alternative sources of credit to the weaker section of rural society and suggested the formation of an expert committee for this purpose. Consequently, a committee was formed on 1st July 1975 under the chairmanship of M. Narasimham. The report of this committee was submitted within the prescribed time limit of one month on 30th July 1975. The committee felt that the existing credit institutions would not be in a position to fill the kind of credit gap which existed in the rural economy of the country. The committee was of the view that the major objectives of regional rural banks should be to mobilise resources from the region and deploy it within the same region. The committee further envisaged that regional rural banks (RRBs) should be a part of scheduled commercial banks and each RRB should open 50-60 branches. A beginning was made in October 1975 with the formation of five such banks under Regional Rural Banks Ordinance 1975. The paid up capital of each rural bank si Rs. 25 lakhs, fifty percent of which has been contributed by the Central Government, 15 percent by the state governments concerned and the remaining 35 per cent by the sponsoring public sector commercial banks which are also responsible for the actual setting up of RRBs. The committee has further suggested that the bulk of deposits of RRBs should be in the form of savings and fixed deposits. They may raise their resources by borrowing from their sponsoring banks and as refinance from the Reserve Bank of India. The bulk of the advances of RRBs should go to small/marginal formers, landless labourers and rural artisans. The management of each RRB will vest in a nine member board of directors headed by a chairman. The Central Government shall have the powers to appoint the chairman and raise the strength of the Board upto 15. The concerned state governments shall have two directors while the sponsoring bank shall nominate the balance of three directors.

Following the recommendations of the Kelkar Working Group (1986) the composition of Board of directors in addition to a chairman is to be as follows:

Government of India (2) RBI (1); NABARD (1); Sponsor Bank (2) and State Government (2).

Special Concessions

In order to help the RRBs during the initial stages of development, the Reserve Bank of India has granted a number of concessions to RRBs to keep their costs low for conducting their business. They are as follows:

RRBs can pay higher rates of interest on deposits for all periods of maturity upto five years compared to the rates payable by scheduled commercial banks. These rates of interest are at par with those offered by the district central cooperative banks operating in the areas and lower than the deposit rates offered by the village level primary agricultural credit societies.

The rate of interest charged by the RRBs on its loans to the rural sector would be at par with the rate charged by the primary co-operative societies.

RRBs can avail funds from two special funds of the Government of India viz. National Agricultural Credit Operation Fund and the National Agricultural Credit Stabilisation Fund.

RRBs are permitted to maintain CRR of 3 percent only compared to the high figure of CRR applicable to scheduled commercial banks from time to time. Similarly they are required to maintain SLR at 25 percent only.

- They are eligible to avail themselves of refinance from NABARD to the extent of 90 per cent of their schematic lending and 50 per cent of their non-schematic lending at 6.5 per cent and 7.0 per cent respectively. The sponsor bank shall provide upto 35 per cent of non-schematic lending at 8.5 per cent. These concessions were reviewed by the Kelkar Committee in 1986. The committee recommended that the paid up capital of each RRB be raised to Rs. 100 lakhs, the quantum of refinance to be provided by sponsor banks reduced to 2 per cent and the interest rate on such refinance be brought down to 7.0.

Growth of RRBs

The branch expansion of RRBs has been fast, evenly distributed and phenomenal (table 5). The establishment of RRBs and the expansion of their branches has been more pronounced during the first half of 1980s. RRBs increased from 85 in 1980 to 188 in (1985) and then to 196 in 1991. Corresponding figures for their branches are 3279, 12606 and 14531 respectively. Similarly districts covered by RRBs also increased significantly during early 1980s.

Table 5. Growth of Regional Rural Banks

Year	No. of RRB	District Covered	Branches opened during the year	Total No. of branches
1975	6	12	17	17
1980	85	144	859	3279
1985	188	333	2361	12606
1991	196	385	452	14531

Deposit mobilisation and total loans advanced over time by RRBs are shown in table 6.

Table 6. Deposits and Loans of RRBs

(Rs. Crores)

Year	Deposits Total	Mobilised per RRB	Loans outstanding		
			Total	Per RRB	C-D Ratio
1976	7.58	0.39	9.8	0.51	129
1980	199.83	2.35	248.0	2.95	124
1986	1714.94	8.84	1784.8	9.20	104
1991	5141.00	26.23	3804.0	18.41	74.4

It is obvious that RRBs have achieved a considerable degree of success in taking banking services to the remote areas and providing institutional credit to the weaker sections. Loans have been given for various purposes in the different regions of the country. Purposewise and region wise distribution of advances are in tables 7-8 as at the end of September 1991.

RRBs have achieved a considerable degree for success in taking banking services to the remote areas and providing institutional credit to the weaker sections.

Table 7. Purposewise Distribution of Loans

(Rs. Crores)

	Purpose	Amount outstanding
1.	Short term	645
2.	Term Loan and Agr. Activities	671
3.	Allied Activities	534
4.	Rural Artisans & Cottage Inds.	321
5.	Retail Trade & Self Employment	1143
6.	Consumption Loan	44
7.	Other purposes	411
8.	Indirect	35
	Total	3804

Western and southern regions of the country have large credit-deposit (C-D) ratios viz. 97 and 130 respectively, while other regions have this ratio around 60. North-eastern and western regions have low levels of outstanding loans with high percentage of overdues compared to other regions. At the aggregate level also the per centage of overdues in the total loans is very high (around 33 per cent). These overdues have affected the working results of RRBs. At the end of 1991, it is found that out of 196 RRBs only 44 were able to manage marginal profits and 134 have eroded a part of their share capital. Their profit and loss position over time is shown in table 9.

Table 8. Region wise Distribution of Loans and Overdues

(Rs. Crores)

Region	C-D Ratio	Amount Agr.	Outstanding Non. Agr.	Total	Overdues
Northern region	57	19053	20747	39800	13253
North-Eastern region	80	5858	11137	16995	7059
Eastern region	64	28537	53015	81552	25205
Central region	58	50737	578814	108551	32030
Western region	97	14535	6530	21065	7560
Southern region	130	66292	46106	112398	40167
Total	74	185014	195346	380360	125274

Table 9. Profit & Loss Position of RRBs

(Rs. Crores)

Year	Profit Making No. of RRBs	Bank Amount	Loss Making No. of RRBs	Banks Amount
1976	26	0.11	14	0.025
1980	56	2.18	29	1.04
1986	46	4.32	148	33.55
1991 (Dec.)	44	5.00	152	55.00

A disquieting feature in the functioning of RRBs has been their unsatisfactory working results giving rise to mounting losses over the years. The number of loss making RRBs has been increasing over time. During the years 1980-86 this number increased significantly from 29 to 148. In 1991 out of 196 RRBs, 152 banks were found in the red with the total losses accumulating to Rs. 550 crores. Besides, a number of RRBs were not able to comply with the statutory requirements in respect of CRR and SLR. The major factors which have contributed to the erosion of profitability include their lending structure, (RRBs are mandated to confine their lending to weaker

sectors of the society at a very low rate of interest), small size of business, high cost of servicing, huge overdues and inefficiency and low productivity in the system.

Restructuring of RRBs

Restructuring of RRBs is essential because in the near future they may face serious problems in terms of their profitability and recovery of bad debts. Their cost of servicing shall go up further on account of the increase in pay and allowances of their employees at par with those of sponsor banks. A basic prerequisite for a successful financial sector reform is that the rural credit delivery system, which has developed serious problems in the recent past, is revamped and an enduring institutional structure put in place. It is imperative to devise a rural credit system which is self sustaining and does not require large subvention. Therefore, better alignment of interest rates and mix of target and non-target lending would be required. Management of RRBs has to be improved for enhancing productivity and efficiency. The Agricultural Credit Review Committee (1993) appointed by the Reserve Bank of India which examined the issue had come to the conclusion that RRBs should be merged with their sponsor banks. The Narasimham committee has recommended the creation of rural banking subsidiaries of public sector banks to take over the rural branches of banks and left the option open to RRBs and their sponsor banks as to whether the RRBs should retain their identity or whether they should be merged on a voluntary basis with the sponsor bank's rural banking subsidiary. Recently, the Government of India has proposed merger of all RRBs into a National Rural Bank (NRB). A steering group of representatives of the Government, major sponsor banks, NABARD and RBI, has made the following recommendations:

It is imperative to devise a rural credit system which is self sustaining and does not require large subvention. Therefore, better alignment of interest rates and mix of target and non-target lending would be required.

- NRB should comply with capital adequacy norm. The paid up capital should be Rs. 500 crores. This should be shared by the Government (51 per cent), NABARD (25 per cent), financial institutions/public sector banks (15 per cent) and RRBs' employees (9 per cent).
- SLR requirement should be reduced from 25 to 20 per cent.
- Organisational structure should be modified as per the group's suggestions.
- The existing staff of sponsor banks should continue with NRB on a deputation basis.

However, the final decision of the Government on the changed set up of NRB is awaited. It is hoped that the needed changes will be implemented to enable the cooperative and rural banks to rise up to their full capabilities. □

We live in a world of problems which can no longer be solved by the level of thinking which created them.

— Albert Einstein

The Indian Small Scale Sector in the New Economic Setting

K.R. Pillai

The economic reform process initiated in 1991 has been a matter of considerable discussion among policy makers, academicians, entrepreneurs and the economic administrators in the country. As an important constituent of the Indian economy, small scale sector has come to attract a good deal of attention. The future role of small scale sector in the evolving economic setting and the challenges it may have to face to sustain its place as an important contributor to the development process are analysed in this paper.

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Small enterprises are defined with reference to different criteria; level of investment in plant and machinery, turnover of the unit or employment provided. In India, the criterion of investment in plant and machinery is followed independent of technology, production process or other considerations. Such a definition was designed to ensure a certain physical size as the upper limit. However, there exists a policy of upward revision of the limit which could, by and large, take into account the inflation factor. Within the broad spectrum of small scale industries, there are three limits currently in vogue: a limit of Rs. 5 lakh for tiny units, Rs. 60 lakh for small scale units and Rs. 75 lakh for ancillary and export-oriented units. As part of the planned strategy, it has been the policy of the Government to give special dispensation to the small scale sector, comprising reservation of products, assurance of subsidised credit, purchase and price preferences, provision of infrastructure facilities, fiscal reliefs and various forms of development and support services. The growth of this sector, over the years, has been largely due to the availability of these services which have strengthened the private initiative. During the last 12-year period [1980-81 to 1992-93], the number of SSI units has grown by an annual average rate of 8.1 per cent from 8.74 lakhs to 22.35 lakhs. The average annual growth rates in output, employment generation and export earnings were of the order of 18.2, 5.4 and 22 per cent respectively during the period. In absolute terms, in 1992-93, the value of output produced by SSI sector was Rs. 2,09, 300 crore with Rs. 17, 784 crores export earnings while the sector supported 134 lakh persons by way of different forms of employment. The sector as a whole, comprising modern small scale units, including powerlooms, khadi, village industries, handlooms, sericulture, handicrafts and coir is expected to contribute Rs. 2,92,994 crore by way of output, Rs. 40,827 crore as

export earnings and support employment to 490 lakh persons by March 1994.

Special Characteristics

The policy frame for the small sector has been influenced by several special characteristic of the sector such as the high employment intensity, low capital intensity, lower level of investment, short gestation period, flexibility and adaptability to the fast changing requirements of the market, scope for innovation, facilities to make use of the locally available raw materials, local crafts and skills. These characteristics of the small scale sector are likely to remain so, independent of macro level policy changes. Government policy for the development of this sector has always kept in view the social consideration, particularly employment generation, as the principal determinant of support. Due to this over riding importance given to social considerations and welfare aspects particularly in the initial years, efficiency and viability in operations seem to have suffered. Indian small scale sector, in spite of its intrinsic strength, has often held out the impression that it is a problem ridden sector.

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The Second Census

The Second All India Census of Small Scale Industries, with 1987-88 as the base, is the latest available official document giving the status and problems of the sector. Out of a total of 9,86,861 units covered 3,04,856 units were closed, 57,041 units were non-traceable and out of 5,82,386 units on which data were collected and tabulated, the value of average investment in fixed assets was Rs. 1.6 lakh while average investment in plant and machinery was less than Rs. 1 lakh [Rs. 95,000 to be precise]. Among the units covered, over 80 per cent were proprietary concerns while about 17 per cent were partnership firms. Corporate entities set up either as private or public limited companies constituted 2 per cent of the total number. Ancillary units accounted for hardly 0.52 per cent of the total number of units. More than 99.13 per cent of the sick units are in the small scale sector. These sick units account for 26.9 per cent of the total credit to the small scale units. However, such credit formed hardly 2.5 per cent of the total bank credit in the country as at the end of March 1992. (Economic Survey, 1993-94).

Profile of Problems

The following problems have a bearing on the image of the sector: The sector is not adequately served by the most critical input, viz. credit; technology level of SSI units is largely low; quality of products leaves much to be desired; SSI units hardly follow any sound management practice; SSI products are not competitive in the market place in terms of quality and price, and in the absence of state patronage and protection, the very survival of these units will be threatened; SSI units are more prone to industrial sickness than units in the medium and large sectors; SSI managements hardly make any efforts for market penetration and improving market share; research and development efforts by way of product innovation and process development are less than adequate; operational efficiency of SSI units impinges on a slender margin of profit; and long term sustainability of SSI units cannot be assured in the absence of on-going support measures. It is not possible to precisely say to what extent the above features are empirically valid. However, there is some basis to believe that the sector is afflicted by the above deficiencies though in varying degrees.

Financial Sector Reforms

The financial sector reform package, which was based on the recommendations of the Narasimham Committee, had much in common with the structural adjustment and liberalisation programme initiated in the country in mid-1991. In brief, the financial sector reform aimed at giving autonomy to the management of financial institutions and banks; realignment of ownership of banks and financial institutions so as to enable them to access the market for augmenting their share capital; introduction of prudential norms — accounting procedures, provisioning and income recognition; quality based classification of assets of banks and financial institutions; adherence to the internationally accepted capital adequacy norms; scaling down of directed credit programmes and directed investment programme so that along with operational flexibility, banks are provided with more lendable resources which they could deploy on commercial consideration and freeing of the interest rate so that market driven rates could be applied by banks and financial institutions in their lending programme.

New Policy for SSI Sector

Immediately after the initiation of the economic reform process in July 1991, Government of India came out with a comprehensive policy package for promotion and strengthening of small, tiny and village enterprises in India. This package had the following important components, viz. financial support measures, infrastructural facilities, marketing and exports, modernisation, technology and quality upgradation, entrepreneurship promotion, simplification of rules and procedures and measures targeted at development of handloom, handicraft and other village industries. The Government had also announced that a special set of measures exclusively targeted at the tiny units would be formulated and announced; this, however, is yet to come through. While a detailed analysis of the components of this package at this point of time may not be necessary, it needs to be conceded that the package had rightly focussed on imparting vitality and growth impetus to the sector to enable it to contribute its mite fully to the economy, particularly, in terms of growth of output, employment and exports. In the background of the persistent demand for concessional financing, Government had made it clear that the focus would henceforth be on adequacy of credit rather than on concessionality. Simultaneously with the shift in focus from subsidised/cheap credit to adequacy of credit, it was proposed that quality of credit delivery should be ensured and a special monitoring agency be set up to oversee that the genuine credit needs of the small scale units are fully met. Unlike the medium and large scale units which have access to capital market, SSI units, by and large, do not have such access. To overcome this deficiency, the package has provided for other undertakings to have share participation upto 24 per cent in the SSI units. This provision had the intention of helping SSI units to have access to capital, technology and market through reinforcement of linkages with medium and large units which were advantageously placed. In order to help the smaller of small scale unit augment their equity, the scope of the National Equity Fund Scheme was widened by doubling the project cost and eligible amount of assistance. Recognising inadequacy of working capital as a major problem area, the scope of the Single Window Scheme [SWS] of the Small Industries Development Bank of India [SIDBI] under which both term loan and working capital are made available through a single agency was widened and the coverage of the scheme was extended to commercial banks. Introduction of factoring services to factor the debts of SSI units and proposal for enabling prompt settlement of bills of SSI units etc, are the other important measures forming part of the package. By way of promotional and support services, the policy frame also proposed measures for industrial infrastructure, technology promotion, quality promotion, entrepreneurship development, skill upgradation and market promotion.

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Nayak Committee — Credit Policy Measures

Availability of credit, particularly working capital, with reference to adequacy and timeliness, has been a major problem area for SSI units. In order to study the problem related to flow of credit to the sector and make recommendations, Reserve Bank of India appointed a high power Committee under the Chairmanship of Mr. P.R. Nayak, a former Deputy Governor of the Bank. On the basis of the sample study conducted by the Committee, it was found that on an average, small scale units received working capital about 8.1 per cent of the value of their output. The tiny and decentralised units received credit facilities of a much lower order at 2.7 per cent of the value of output while in respect of the larger SSI units, the percentage worked out to 18.7. The Nayak Committee made several important recommendations aimed at stepping up the flow of credit to the sector, simplifying the mechanism for determining the volume of credit and underlying the need for giving first preference to the credit requirements of the smaller of the small scale and tiny sector units. Most of the important recommendations of Nayak Committee have been accepted by the RBI and incorporated in the credit policy measures announced in April and October 1993. At present, loans upto Rs.

25,000 carry a concessional rate of interest while loans between Rs. 25,000 and Rs. 2 lakh attract a fixed rate of 14 per cent. In respect of loans beyond Rs. 2 lakh, RBI has prescribed a minimum rate of 14 per cent with freedom to banks to charge higher rate depending upon their perception of risk and other relevant factors. In the case of small scale units requiring working capital facility upto Rs. 1 crore, the facility is to be computed at a minimum of 20 per cent of the existing/projected turnover of the unit concerned. In the case of foreign banks, 32 per cent of their net credit has been fixed as the minimum level of priority sector credit and within this 32 per cent, SSIs and exports have been fixed a sub-target of 10 per cent each. The level of priority sector credit for Indian banks has been fixed at 40 per cent of bank credit. While no minimum limit has been fixed for SSI sector in the case of Indian banks, they have to ensure that out of their lending to SSI sector 40 per cent of the credit should be given to cottage, tiny, khadi and village industries. Marketing organisations specialising in marketing of the products of SSI sector are now required to be provided with credit facilities by applying liberal norms of lending. Based on the recommendations of Nayak Committee, RBI has prescribed a revised definition of industrial sickness in the SSI sector which enables identification of incipient sickness. In order to take care of the credit needs of SSI units in an integrated manner, banks and State Financial Corporations have been advised to make increasing use of the SWS of SIDBI and assume lead responsibility in the 85 districts of the country where there is heavy concentration of small scale units.

It needs to be restated that the essential characteristics of the reform process are the competitiveness and application of market forces that will become the order of the day. It, therefore, follows that the financial sector reform when implemented in full measure, will exert pressure and affect, with varying levels of impact, the future of small scale units. Those in favour of the financial sector reforms, insofar as they relate to banks, have always taken the view that the directed lending programme earmarking 40 per cent of the net bank credit for the priority sector has contributed largely to the contamination of the quality of assets of banks. The return from such lendings was below the opportunity cost of these funds. Besides, the practice of pre-empting a sizeable chunk of the deposit resources of banks through the SLR and CRR route has curtailed the availability of their lendable resources. The returns from these investments were lower than those offered by the market. In effect, the administered interest regime and the directed credit and investment programmes of banks affected the profitability of banks. It was in this context that RBI has scaled down the SLR, CRR ratios and permitted a fair amount of deregulation in the interest rates. However, in regard to priority sector lending, RBI reiterated that the norm of 40 per cent will continue. More lendable funds have, thus, been made available at the disposal of the banking system. Banks, however, have not found it necessary to deploy these funds for the purposes in view. The net result was a subdued growth in non-food credit. The banks' plea seems to be that the accent on profitability, quality of portfolio, application of income recognition and provisioning norms are compelling factors for them to deploy the resources in less risky and more rewarding avenues. Apparently, the resources made available to the banks by scaling down their investment in SLR bonds have been utilised by banks for making investments in Government securities or other instruments. It is obvious that profitability of banks would improve in this process while it cannot be claimed that the new policy has ensured larger credit support for productive purposes. In the credit policy announced by RBI on May 14, 1994, several reasons have been put forward for the subdued growth of non-food credit. These factors, however, do not justify the less than fair flow of bank credit to one of the most important segments of the country's economy, viz. the village and small scale industries. The decline in non-food credit was a matter of concern in general terms, while VSI sector has been hit hard as it had to take a major share of the ill-effects of the new policy. A noticeable decline in the percentage share of credit to SSI surfaced after the financial sector reform process was put in the place. Continuance of this situation would not seem to go well with the avowed policy of Government and the RBI that all genuine credit requirements of the small scale sector will be fully met.

The decline in non-food credit was a matter of concern in general terms, while VSI sector has been hit hard as it had to take a major share of the ill-effects of the new policy.

SIDBI's Role

The institutional framework obtaining in the country for the development of small scale industries consists of the banking system, the State-level financial and development corporations, the various promotional agencies set up at the initiative of the Central and State

Governments and SIDBI. SIDBI was set up in 1990 under a special statute as the principal financial institution for promotion, financing and development of small scale industries in the country with an added responsibility to co-ordinate the functions of institutions engaged in similar activities. Initially, SIDBI took over the portfolio of its principals, the Industrial Development Bank of India, in small industry financing and promotional activities. During the last four years that SIDBI has been in operation, it took major initiatives in addressing the more pressing problems faced by the small industry sector. SIDBI's main areas of functions can be divided into two: viz. financing and developmental. In the areas of financing, SIDBI's assistance takes the form of term financing, bills financing, working capital financing and equity financing. In the sphere of developmental and support services, SIDBI focuses attention on technology upgradation and modernisation, entrepreneurship development, development of managerial cadres for small industries, skill upgradation, quality promotion, marketing support, raw material distribution, environment management and support to voluntary organisations engaged in assisting the socially and economically disadvantaged segments of people.

In the matter of term financing which continues to be the main function of SIDBI, a twin route is followed: refinancing the term loans sanctioned by primary lending institutions like banks and State-level institutions and extension of term loans directly to small industry concerns. In the case of bills financing also, SIDBI follows two distinct routes: discounting of bills covering sale of equipment and components and rediscounting of bills where banks discount the bills arising out of sale of equipment or other small industry products. SIDBI has also joined as co-promoter in the setting up of two factoring companies which are engaged primarily in the factoring of products of SSI sector. Apart from making a significant contribution to share capital of these two factoring companies, SIDBI also extends resource support to augment their working funds. In respect of working capital financing, SIDBI operates the SWS under which refinance is provided to banks and State-level Corporations covering their term loans and working capital facilities to small scale units in an integrated manner. The procedure is simple, covered under the Automatic Refinancing Scheme. Since small scale industries do not have access to capital market to raise equity capital, SIDBI has specially tailored schemes like the National Equity Fund Scheme, Seed Capital Scheme, Scheme for Ex-Servicemen and the scheme targeted at women entrepreneurs — the Mahila Udyam Nidhi Scheme. SIDBI also operates a scheme for Venture Capital support targeted at innovative projects which do not qualify for funding support from conventional sources.

Indirect financing through refinancing and rediscounting was the principal form of assistance under IDBI, while with the launching of several schemes for direct assistance by SIDBI, a shift in favour of direct lending is clearly visible in the operations in the last 2 years. This shift will necessarily have to be gradual due to SIDBI's statutory position as an apex institution and the limited network of its branches. During the last 4 years that SIDBI has been in operation, it sanctioned assistance under various schemes aggregating Rs. 13,795 crore and made disbursements of Rs. 10,955 crore. As at the end of March 1994, SIDBI had an outstanding portfolio of Rs. 8,800 crore. This level of assistance from SIDBI is expected to catalyse investment of Rs. 25,530 crore and provide employment to 63 lakh persons when the projects are implemented. These figures speak of the volume of SIDBI's operations and the significant contribution made by the Bank within a short span of its operations towards small industries development in the country.

SSI Sector — The Future Scenario

The policy prescriptions for small scale sector have to keep in view the characteristics of the two distinct segments, viz. modern small scale sector including powerlooms and the tiny and decentralised sector consisting of khadi and village industries, handlooms, handicrafts, sericulture and coir. Development programmes for these two segments have to run parallely. At the policy level, it has been stated with renewed emphasis that there will not be any dilution in regard to the priority status enjoyed by small scale sector in regard to credit dispensation. Reservation policy for industrial products in the small scale sector, purchase and price preferences and certain fiscal reliefs in their favour are unlikely to witness major changes. Government policy, henceforth, will be one of reassuring infrastructural and other promotional support to this sector. These measures by themselves are not sufficient conditions to promote the growth of the sector

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as a vibrant segment of the Indian economy given the several characteristics of the sector which have, over the years, come to stay. Attention would, therefore, have to be focussed on the following critical areas:

Government policy, henceforth, will be one of reassuring infrastructural and other promotional support to this sector.

From the point of view of banks which are required to give continued priority attention to this sector, a more over-riding consideration hereafter will be the quality of their portfolio which they cannot compromise. There is a general belief that small industry financing has been a major contributory factor of contamination of banks' portfolio. Even when banks are permitted to access the market to augment their share capital, in a competitive environment, the ability of banks to raise equity capital will be primarily determined by their financial position which has a direct bearing on the quality of their portfolio. While priority attention may continue to be given as a matter of policy, in view of the compulsions to ensure the quality of their portfolio, banks will have to be extremely selective in supporting small scale units in future. The growth of sickness in the small scale sector has sent alarm signals to banks and this single factor is held out by them to justify the absence of purposive action on their part in stepping up their assistance to the sector. If the small industry portfolio of banks have turned bad, many factors could have contributed to that: the credit decisions of banks could have gone wrong, changes in the external environment could have operated to the disadvantage of small enterprises and management deficiencies and mismanagement on the part of small entrepreneurs could have affected the performance of the assisted units. These, however, are not sufficient justification in denying credit to the small scale sector which has been making a consistently significant contribution to the development of the country's economy. In other words, mistakes of the past should not hold back the banks from extending assistance to new entrepreneurs in the small scale sector and also to existing units which are not in default to the banks. The extent of credit blocked in sick SSI units is hardly 2.5 per cent of the total bank credit. In an environment characterised by operation of several external factors beyond the control of the bankers and the assisted SSI units, bank credit of 2.5 per cent blocked in unproductive assets of SSI units could be considered a permissible limit.

The growth of sickness in the small scale sector has sent alarm signals to banks and this single factor is held out by them to justify the absence of purposive action on their part in stepping up their assistance to the sector.

Looking at the average size of small scale units (Rs. 1.6 lakh in fixed assets and Rs. 0.95 lakh in plant and machinery] as could be seen from the Second Census Report, it needs to be considered that the large majority of SSI units are ill-equipped to follow any worthwhile management practices, maintain useful information on financial performance and related matters and provide the necessary feedback to financing banks to enable them to make realistic assessment of the problems faced by their assisted SSI units. The transaction cost in servicing a small scale unit is much higher than that for medium and large scale units. A major factor which has been contributing to sickness in the small scale sector has been their very weak equity base rendering many of the small scale units incapable of any shock absorptive capacity to withstand external factors witnessed in the competitive environment. Till August 1991, small scale units were entitled to concessional finance apart from other reliefs which rather than facilitating rehabilitation encouraged many units to get them classified as sick so as to escape rigours of recovery proceedings by credit institutions. What is really required now is to clean up the balance sheets of banks by provisioning and write off of outstanding credit to small scale sick units which have no chance of viable turnaround.

A major factor which has been contributing to sickness in the small scale sector has been their very weak equity base rendering many of the small scale units incapable of any shock absorptive capacity to withstand external factors witnessed in the competitive environment.

Small enterprises should henceforth look to timely and adequate availability of credit rather than concessional credit. Even in the pre-1991 years when concessional credit was available to small scale units, they were in actual practice bearing an interest burden on par with

medium and large units if account was taken of the guarantee fee they had to pay for the guarantee cover of the small industries credit guarantee scheme which was not applicable to medium and large units. It has not been conclusively proved that small industries do not have the interest absorptive capacity comparable to that of the medium and large units.

Small enterprises should henceforth look to timely and adequate availability of credit rather than concessional credit.

A major limiting factor to the growth of the small scale units is the small size of the firms and all available incentives are even today related to either the size of the firm or the size of the loan facility which encourage them to remain small without any compulsion to graduate to higher scales of operation. So long as the size remained small, hardly any possibilities existed to absorb new technologies or derive the benefits of scale economies or to have the organisational wherewithal to follow sound management practices. Small entrepreneurs often justify their inability to devote any attention to financial management, accounting, production or marketing management on the plea that they are 'one-man enterprises'. As a class, they display a tendency to depict all the problems faced by them as relating to availability of credit. It was hardly appreciated that availability of credit without adequacy of management results in inefficient use of scarce resources.

Availability of credit without adequacy of management results in inefficient use of scarce resources.

The numerical growth of small scale industries has been mainly the result of what is called the 'herd instinct' discernible among our small entrepreneurs. Before taking a decision to launch a small scale unit, however small that unit be, very little attention is given to assess the market for the product. Many entrepreneurs seem to believe that reservation of a product for the small scale sector presupposes the availability of market. Adherence to quality standards seems to be the least priority area of concern. Reservation of a product for small scale sector, availability of credit support and examples of others taking up the same product seem to be sufficient considerations for small entrepreneurs for choosing a product line although market for the product and viability of operation ought to have been the primary factors determining the choice of a product.

By and large, the working relationship between large undertakings and their ancillaries has remained anything but smooth and cordial.

In the emerging competitive environment, it is necessary for the larger among the small enterprises to establish and reinforce their linkages with medium and large enterprises as the latter has necessarily to depend on the former for sourcing their components and other supplies. There has been a conscious policy for encouraging ancillarisation. But ancillary units account for hardly 0.52 per cent of the number of small scale units in the country as could be seen from the Second Census of small scale industries. Of course, there could be a number of small scale units, not strictly falling within the definition of ancillaries making supplies to large undertakings. By and large, the working relationship between large undertakings and their ancillaries has remained anything but smooth and cordial. The fact that large undertakings and their ancillaries are not on equal footings operates to the disadvantage of the latter. Quality, technical specifications, delivery schedules and the price factor of the supplies are the principal determinants of an enduring relationship between mother units and ancillaries. Mother units always take the plea that deviations from accepted norms and specifications are factors coming in the way of ancillary development; ancillaries feel that a less than fair treatment is meted out to them taking advantage of the relative bargaining power of the mother units. In the changed environment where market forces and competitiveness primarily determine the success of any economic activity, the interlinkage between small scale suppliers and the purchasers from the large scale sector needs to be strengthened through appropriate strategic alliances. This will facilitate access to capital, market and technology, the very same objective which was sought to be achieved by the new policy package introduced by Government of India in August 1991.

Small enterprises, unlike the medium and large units, have a commendable record in the matter of contribution

to exports. Items like garments, leather and leather goods, gem and jewellery, food products, dyes and chemicals have a fair share in our exports. A major benefit of the reform process is the significant growth in exports achieved in dollar terms during 1993-94. RBI's Credit Policy and the Exim Policy for 1992-97 have several features designed positively to encourage Indian exports. Small enterprises are ideally placed to take advantage of these policy measures if special attention could be given to the quality of their products, factor productivity through induction of new technologies and overall efficiency in operations. Most of the incentives offered to the small scale sector operate as incentives to remain small and in the process, there are hardly any compulsions to grow. Small enterprises seem to remain an insulated sector not responsive to the changes taking place outside their units although they have the inherent capability to quickly respond to any change. They seem to believe that availability of credit will solve all the problems they face while what really matters is not availability of credit *per se* but the efficient utilisation of the financial and other material resources. Over a period of time, reliance on special dispensation should give way to self-reliance when small enterprises should be able to claim their due share in credit and other services not on the virtue of smallness of their size but on the basis of their contribution and competitiveness. □

The interlinkage between small scale suppliers and the purchasers from the large scale sector needs to be strengthened through appropriate strategic alliances.

So the rank and file has good reason to believe that a commitment to quality comes at the highest level. That's a big step, but it's only a step. An even bigger step is getting the hourly workers to understand that continuous improvement not only benefits them but also needs them. Opening up the channels and getting them to communicate is vital because, as Deming and Joseph M. Juran said, the people on the floor know the process better than their boss or anybody up the line. Many of the best ideas for building a better quality product are in their heads, waiting to spring out.

— K. Theodor Krantz

Technological Transformation in Indian Manufacturing Firms

T.R. Madan Mohan, K.N. Krishnaswamy & K.B. Akhilesh

Technological transformation at the firm level has a discerning role on the socio-economic development of a country. Our understanding of the factors influencing the technological transformation at the firm level and at different stages of adoption, adaptation and innovation, is rudimentary. There is a need for empirical studies for the development of a theory of technological transformation. This study takes a step in that direction through a multivariate analysis of data gathered from 89 manufacturing firms in India. The study found that factors internal to the firm are more critical and the organizational and managerial factors are different for different stages.

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Technology, in the sense of knowledge organized to do a task, has always played a major role in the economic and social development of a country. It is not surprising therefore, that in the developing countries, technology and its development are the key concerns of the policy makers. To achieve indigenous technological capability, many developing countries, including India, have resorted to an Import-Substitution-Industrialization (ISI) strategy (Nixon, 1982). The success of this strategy depends much on how technology is managed at the level of the firm. Technology management in these firms is concerned with successful management of the process of technology adoption, adaptation and innovation. This process, termed as the technological transformation process, is both longitudinal and dynamic. Despite three decades of inquiry, little is known about the mechanics of technological transformation process (Fransman, 1985). While the search for simple, universal principles on the lines of Kim (1980) are important at the academic infancy stage, close look at the underlying behaviour is wanting.

Technology management in these firms is concerned with successful management of the process of technology adoption, adaptation and innovation.

Previous studies have focused on certain aspects of the transformation process. Dahlman et al. (1985) based on their collective experience with newly developing countries described the technological capability of a firm as a combination of production capability (capability to operate and maintain a production system), investment capability (capability to set up or expand new production systems) and innovation capability (capability to innovate

products and processes). They argued that firms use production capability as the foundation for developing capabilities in investment and innovation. Kim and associates (1980, 1983, 1985, 1987) on the basis of their analysis of Korean firms observe that management capability and technology policy of a firm are important for its long term development. Studies have also attempted to describe how firms adopt imported technology, what factors influence product adaptations, how learning-by-doing- and learning by learning influence innovation at these firms (Alam, 1988; Amsden, 1977; Enos & Park, 1988; Fransman, 1984; UNIDO, 1977; Wangwe, 1986). They have observed that product technology with low complexity (in terms of training required etc.,) was adopted easily. Collaboration agreements influence the product adaptation efforts, product feature adaptations which lowered customer's cost were easily accepted and that technical and production synergy and proficiency fostered new product developments. Studies have also focused on the importance of organizational issues such as planning (Khan & Manopichetwattana, 1989), information content and clauses of collaborations (Subramanian, 1984). customer management (Kim, 1987; Von Hippel, 1978), management of production (Abernathy & Townsend, 1975). functional flexibility, support for creativity (Becker & Whister, 1981; Dosi 1988), etc.

Researchers have viewed the external environment of the organization as the source of events and changing trends which create opportunities and threats for individual firms. Pavitt (1984), based on a survey of UK firms, observed that technological opportunities and threats vary considerably amongst sectors. Desai (1988) observed that importation acts as a stimulus to R & D and this effect differs between homogeneous and differentiated firms. Alam (1988), in a study on technology development in Indian manufacturing firms, reported 'firms mostly exhibited process innovations and environment (regulations) seemed to influence these'. Soni (1989) observed that highly diversified firms operating in high concentration markets are likely to be less innovative and have below average performance than smaller, narrowly diversified firms operating in low concentration markets. On the other hand, large firms are more than proportionately innovative, when innovations are materially different from existing products. Finance, especially adequate risk capital (used in a broad sense to mean 'own funds') or venture capital (used to mean 'borrowed capital) has also found to be critical for successful technological transformation process (Bhatt, 1978; Fluitman & White, 1981). Researchers have acknowledged the role of government on the technological transformation process. From active support in the form of subsidies, tax benefits and more indirect methods, government regulations have a significant influence on the economic benefits of technological transformation (Kilpatrick et al., 1984).

From active support in the form of subsidies, tax benefits and more indirect methods, government regulations have a significant influence on the economic benefits of technological transformation.

While many interesting insights into technology related issues have been offered by these studies, one finds there are a few inherent limitations of these studies. Firstly, they tend to study the technological transformation behaviour by concentrating on the relationship between a few environmental and structural variable at a time. Thus many critical intervening variables, particularly those relating to strategic implementation are ignored. Since most of these studies concentrate on interactions of selected variables and/or focus on the process of selection, adoption and adaptations in a discrete fashion, they fail to provide an adequate understanding of the causal significance of factors that shape technological transformation process in a firm. Secondly, most of these studies have been cross-sectional, focusing mostly on eliciting particular behaviour (Kim, 1980). Longitudinal studies spanning over at least one technology-life cycle are required to understand the dynamics of the technological transformation process. Studies of Hall (1976) and Mintzberg et al., (1976) reveal the importance of the time dimension in understanding the dynamics of organizational process. Technological transformation process is a longitudinal process. Studies of technology transformation process reveal the variety and complexity of the way in which behaviour differ across organizations. While the search for simple, universal findings on the lines of Kim (1980) are important at the academic infancy stage, close look at the underlying behaviour is wanting. As Chang (1990) noted there has been little research focusing on the relationship between different technological and managerial factors, such as strategy, structure, process, etc. On the contrary, most studies try to equate this factor. The cross-industry analysis of technological issues, has not yet gained enough momentum.

Methodology

A study was conducted to identify the managerial, organizational and environmental variables influencing adoption, adaptation and innovation in manufacturing firms. The data was obtained from a field study. Two hundred and thirty firms in capital good sector, located across India were contacted of which eighty-nine responded. The capital-goods sector was chosen for the following reason. The factor-price adaptations and developments of product variants are possible in this sector and thus it allows one to trace the dynamics of development completely. Most of the sample firms incorporated around 1979-80, manufactured more than one product and were found to employ different technologies. The sample included both public and private sector firms in machine tools, chemicals, and the electrical and electronics industry. While some of these operated in monopolistic markets, the majority operated in the competitive sector. All these firms had internal R & D units and approximately one-fifth of them occasionally manufactured new products. Table 1 presents the industry and ownership details of the sample. The sample was classified based on the value of the paid-up capital into three groups — small, medium and large. The large units are those having paid-up capital of Rs. 10 million, the medium ones between Rs. 5 and 10 million and small ones less than Rs. 5 millions. The details of paid-up capital is provided in table 2.

Table 1. Industry and Ownership Details

Industry Type	No. of firms	Type of firms	No. of firms
Machines & mechanical	42	Public sector	18
Electricals	8	Private Sector	63
Electronics	24		
Chemicals	15	Joint Sector	8
Total	89	Total	89

Table 2. Size of the Firms in the Sample (based on paid-up capital)

Size of the firm (capital in Rs millions)	No of firms
> 10	8
5 – 10	50
< 5	31
Total	89

The measures used in this study can be grouped under organizational and managerial, environmental variables and those relating to adoption, adaptation and innovation. Table 3 lists these variables and their measures. All the variables were defined on a five-point Likert scale. Appendix I lists the definitions and

Table 3: Organizational and External Variables and their Measures

Variable	Measures
Technology planning	Planning horizons Fomalization of planning Technology Evaluation Extent of external contact (Khan & Manopichetwattana, 1989)
Customer focus	Lead-user (Von Hippel 1978) Customer involvement in product development
Input controls	Vendor development Procurement Policies Production planning and control systems
Production focus	Production objective Production focus (Skinner 1978)
Manpower planning	S & T personnel in decision making R & D personnel choice Objective setting Team Building Extent of formalization Remuneration Packages Entry restriction (Roberts 1988)
Manpower Development	Succession planning Extent of training in computers Planning for training Training and Development Job rotation (Boddy & Buchanan 1986)
Budgetary Systems	Budget planning Budget involvement — R & D Chief Budget allocation in R & D
Corporate allocation	Budget flexibility Corporate allocation
R & D commitment	R & D commitment to short-term R & D commitment to long-term
Government policies	Public emphasis Government policies
Openness to change	Receptivity for change Extent of induced change Extent of structural change
Support for Creativity	Adhoc systems Suggestion systems Support for experimentation Recognition for creativity
Technology content	Technology content
Sophistication of industrial units	Sophistication of industrial units (Weiss & Birnbaum 1989)
Trade fair	Trade fair
Support of Financial Institutions	Financial institution role (Erruza & Rosenberg 1982)

measures of the variables included in the study. In this study changes in technologies of product, process and operations at various stages of technological transformation have been used as simple outcome measures of adoption, adaptation and innovation. The critical incidence technique (Flaganan, 1954), was used to identify the stages and define the changes. This technique has been found useful for classification and researchers have effectively employed this technique to identify the stages of technology development (Utterback, 1971). Table 4 lists the measures of adoption, adaptation and innovation. Technological output measures were obtained from new product catalog, development and engineering records, Confederation of Engineering Industry awards, and the export awards of each organization.

Table 4. Adaptation and Innovation Measures

Stage		Measures
Adoption	1.	Time of adoption
	2.	Similarly of technology
	3.	Changes for establishing production
	4.	Initial changes in production process (Enos & Park 1988)
Adaptation	1.	Changes in manufacturing
	2.	Changes in reliability
	3.	Quality, performance
	4.	Number of operations changed
	5.	Operating system changes
	6.	Changes in product features (Fransman 1985)
Innovation	1.	Project effectiveness
	2.	Outlicense/inlicense
	3.	Patents
	4.	Awards
	5.	Design softwares
	6.	Quality and frequency of ideas. (Fransman 1985)

Churchill's (1979) recommendations for developing reliable measures for a multi-item questionnaire were followed in developing measures for the variables. According to this procedure, items with low-item correlation were dropped from the questionnaire. The SPSS package was used for this purpose. For each variable, item scores were summed up an averaged to compute the measure. The advantage of Churchill's method is that it improves the reliability of the questionnaire usually assessed by reliability index, Cronbach's Coefficient Alpha. The coefficient Alphas for the sixteen variables ranged from 0.71 to 0.89, remarkably high for a questionnaire measuring complex constructs.

The multivariate relationships between organizational, managerial and environmental variables at various stages of the technological transformation process were assessed using the multiple regression analysis. Though both multiple regression and analysis of variance techniques explain the variability, the former was chosen for it does not assume that independent variables should be totally uncorrelated (Darlington, 1968). Considering the ease of a few variables (yet optimum) in explaining the variation, step-wise regression with R^2 increment by at least one per cent was undertaken.

Results

The results of step-wise multiple regression of organizational and environmental variables on adoption are presented in table 5. Technology planning, customer focus, trade fair, government policies and sophistication of neighboring industrial units entered as predictors for adoption. Except for sophistication of industrial units, the other beta-coefficients were statistically significant. Technology planning alone accounted for eighteen per cent of the variance explained. Determination of the technology-market structure with special reference to customer preferences, penetration, technology content and planning for establishing of production is necessary to foster early technology adoption. Inclusion of technology planning and customer focus indicate the perceived strategic importance of selecting an appropriate technology and thus need for effective planning systems. The inclusion of government policies is due to their perceived role on technology adoption of the firm. Government policies influence the selection of technologies in regulated economies through licensing, tariffs, import restrictions and transfer-pricing of the imported technologies. Trade fair included as a predictor indicates that the technology selection and transfer is mostly conducted through formal channels.

Determination of the technology-market structure with special reference to customer preferences, penetration, technology content and planning for establishing of production is necessary to foster early technology adoption.

For adaptation (table 6), government policies, manpower planning, production focus, technology content and openness to change were the principal predictors. The productivity of the firm also entered the equation but its beta-weight was not-significant. Inclusion of govern-

Table 5. Results of Step-wise Multiple Regression Analysis — Adoption

Criterion Variable	Predictor Variable entered for set-cut off (step)	Test for final equation (t-value)	Multiple correlation (cumulative after each step) and 'R' adjusted for d.f in parenthesis	F-value (after each step)
Adoption	1. Technology planning	2.784**	0.42 (0.42)	18.659**
	2. Customer focus	2.153*	0.467 (0.458)	12.018**
	3. Trade fair	2.237*	0.503 (0.486)	9.611**
	4. Government policies	2.064*	0.537 (0.513)	8.522**
	5. Sophistication of industrial units	—1.119*	0.547 (0.516)	7.088**

*significant @ $P < 0.05$; **significant @ $P < 0.01$

Table 6. Results of Step-wise Multiple Regression Analysis — Adaptation

Criterion Variable	Predictor Variable entered for set-cut off (step)	test for final equation (t-value)	Multiple correlation (cumulative after each step) and 'R' adjusted for d.f in parenthesis	F-value (after each step)
Adaptation	1. Government policies	3.851**	0.438 (0.438)	20.701**
	2. Manpower planning	2.771**	0.530 (0.523)	16.832**
	3. Production focus	2.071**	0.556 (0.541)	12.650**
	4. Technology content	–2.127**	0.586 (0.566)	11.011**
	5. Openness to change industrial units	1.732	0.605 (0.579)	9.581**
	6. Productivity	1.521	0.615 (0.584)	8.305**
	7. Budgetary systems	–1.391	0.627 (0.590)	7.476**

*significant @ $P < 0.05$; **significant @ $P < 0.01$

ment policies, accounting for about 19 per cent of variance, suggests that in the Indian market the impetus for adaptive efforts (in most cases import substitutions) was perceived to emanate mostly through government initiative and control. Inclusion of production focus, the managerial emphasis on manufacturing, suggests the perceived influence of learning on adaptive efforts. Technology content, is a decision embarked at adoption stage itself. In collaborative agreements with regulatory clauses, not only is the freedom of recipient firms to change the original designs and specifications limited, but the assimilation of imported technology may also be retarded. Inclusion of technology content perceived as a predictor for adaptation indicates the influence of cost-information trade-off decisions on adaptive efforts. Hence, the technology selection should explicitly consider the technology content in order to facilitate appropriate technology adaptation in a firm.

Hence, the technology selection should explicitly consider the technology content in order to facilitate appropriate technology adaptation in a firm.

As seen from table 7, technology planning, openness to change, input controls, support for creativity, productivity, corporate allocations, technology content, manpower development and budgetary systems entered as the predictors for innovation. Technology planning, open-

Table 7. Results of Step-wise Multiple Regression Analysis — Innovation

Criterion Variable	Predictor Variable entered for set-cut off (step)	Test for final equation (t-value)	Multiple correlation (cumulative after each step) and 'R' adjusted for d.f in parenthesis	F-value (after each step)
Innovation	1. Technology planning	2.811**	0.538 (0.538)	35.422**
	2. Openness to change	2.043**	0.587 (0.587)	22.650
	3. Input control	0.455	0.624 (0.613)	18.081
	4. Support for creativity	1.581	0.642 (0.625)	14.690
	5. Productivity	2.274**	0.659 (0.639)	12.728**
	6. Corporate allocation	2.254**	0.672 (0.647)	11.242**
	7. Technology content	–2.092	0.686 (0.658)	10.312**
	8. Manpower development	1.939	0.701 (0.669)	9..661**
	9. Budgetary systems	1.325	0.709 (0.673)	8.869**

*significant @ P < 0.05; **significant @ P < 0.01

ness to change and corporate allocations were most consistent predictors with technology planning alone accounting for about 29 percent variance. Surprisingly, R & D commitment was found to be weakly associated with innovation.

The predictors included for different stages of technological transformation process offer interesting insights. The inclusion of technology content as a predictor for both adaptation and innovation reveals the importance of making right decisions at the selection stage. The inclusion of customer focus as a predictor for adoption revealed that customer tastes and preferences should be considered explicitly when the firm chooses and adopts a new technology. The absence of customer focus in both the adaptation and innovation stages may be assumed to suggest either lack of market research or lack of influence of customers on the firms. The inclusion of government policies as a predictor for both adoption and adaptation revealed the significant influence of federal policies like import substitution policy on these efforts. But its non-inclusion in the innovation stage would lead one to feel that either innovation in a firm is not policy driven or that the government has failed to formulate innovation stimulating policies.

It is also interesting to note that corporate allocation entered as predictors only for innovation. Corporate allocations are necessary to support innovative projects which are in general risky, though generally budgetary systems are relevant to both adaptation and innovation. The inclusion of corporate allocations and budgetary systems as predictors for only the innovation stage highlight the role of top management support in sustaining and promoting innovation activities. The variables support for experimentation, manpower development and corporate allocation are predictors of the innovation stage. Firstly, this reveals that in order that a firm innovates, a general climate permitting experimentation and deliberate policies developing key manpower are required. Secondly, adaptation efforts attempted seem to be manageable ones with no formal allocations required to sustain the risk of experimentation. This result supports Burns & Stalker's (1961) argument that managerial and organizational mechanisms required for innovation are different from those required for adaptation.

This reveals that in order that a firm innovates, a general climate permitting experimentation and deliberate policies developing key manpower are required.

Conclusions

Multivariate analysis of 89 manufacturing firms revealed the influence of organizational and managerial variables on the technological transformation process, offering empirical validity on the critical role of merchant capital. The inclusion of technology content in post-adoption stages reveals that the decisions made during technology selection have significant impact on technological adaptation and innovation. Hence, firms need to develop formal structures to scan and evaluate technologies. The importance of production focus on a firm's adaption of technology suggests that the firms should continuously examine the manufacturing facilities to meet the varying customer demands.

The study revealed that different sets of managerial, organizational and environmental variables influence different stages of the technological transformation process. The reasons for discontinuity in the technological transformation process beyond the adaption stage in many firms may be traced to the absence or presence of variables thrown up by this study. The study also revealed government policies significant influence on adoption and adaptation, but not on innovation at the firm level. The results are indicative and more carefully planned studies are required to explore the effect of variable composition on the discontinuity. Finally, the pattern observed in these firms needs to be gleaned further to generalize the findings and develop a theory towards effective technological transformation.

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Appendix I

Technology planning: This variable refers to the organizational efforts and systems developed to track technological developments. Items for measuring this variables included planning horizons, formalization of planning, data management, technology evaluation, extent of external contact, etc.

Customer focus: This variable measures the organizational involvement of customer on design and development of new products and process. The items include lead-user management, Customer involvement in product development, Customer involvement in collaborated project.

Input controls: refers to the management of raw materials which includes vendor development, procurement policies, production planning and control systems.

Production focus: This variable refers to the way the manufacturing function is aligned to exploit business and corporate goals. The items included production objective, production focus.

Manpower planning: This variable measures the manpower planning issues such as S & T personnel in decision making, R & D personnel choice, objective setting, Team Building, Extent of formalization, Remuneration Packages, Entry restriction.

Manpower development: refers to the organizational commitment towards human resource development. The items include succession planning, Training and Development (planning and implementation), Job rotation.

Budgetary systems: This variable measures the organizational systems and procedure towards R & D. The items include Budget planning, involvement R & D Chief, budget allocation in R & D.

Corporate allocation: This variable refers to the mechanics of allocations to R & D, influence of current sales on R & D, budget flexibility.

R & D commitment: refers to Short-term or long-term commitment towards R & D.

Openness to change: refers to the degree to which the organizational encourages changes. The items include receptivity to change, extent of induced change, extent of structural change, R & D decentralization.

Support for creativity: refers to the organizational support to creative suggestions. The items include suggestion systems, support for experimentation (at different levels), recognition of creativity.

Government policies: This variable captures what the executives feel about the focus and support of Government policies, and what they ought to be.

Technology content: refers to at mode of technology transfer, i.e. blue prints, technical collaborations, financial or CKD.

Sophistication of industrial units: refers to degree of technical expertise in neighborhood units.

Trade fair: This variable measures whether trade-fair is used as an active mode of technology buying and what seriousness is attached by the recipient organizations to these.

Support of financial institutions: refers to the role of financial institution in initial stages, equity participation, technical aid, and investment support in R & D.

Adoption: In this study technology adoption has been construed as the process of espousing an artifact from another firm/lab into regular use without (intentionally) changing its form. The similarity (in comparison to one operating at donor's plant) of technology absorbed, duration of absorption and initial changes made to establish the production were used to measure adoption.

Adaptation: was construed as the process of structural or behavioral (performance) change in ingested technology or part of it that was beneficial to the firm. Adaptation was measured in terms of changes in raw material combinations, operational changes, scheduling and routing changes, sub-system integration, physical alterations and their corresponding changes in manufacturing operations (such as tooling).

Innovation: was construed as the process of reorientation or radical change in product form (features and specifications) wherein some may be eliminated and/or entirely new ones added. The number of patents, levels of productivity, shares of new products in sales, ratio of projects implemented to total projects undertaken by R & D, ratio of out licenses to in licenses, recognition awards and a top management perceptional measure of quality and frequency of ideas were the items measuring innovation. □

Structure of Japanese Innovation System

P.N. Rastogi

Given the acute shortage of natural resources and the grim post War situation, the emergence of Japan as an economic superpower presents an economic miracle. This article discusses the salient features of the Japanese industrial system with emphasis on the technovation process.

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Japan today is the world's foremost economic superpower. Its sophisticated products dominate the highly competitive international markets in terms of their quality and price. Its foreign exchange surplus runs into thousands of millions of dollars, and its currency 'yen' is one of the world's hardest. The living standards of its people have risen steadily, and are today comparable with the best in the world. The life expectancy, and educational standards are among the highest, and its population growth and crime rates among the lowest, in the world. The country attained highest output per person in 1987. Its industrial system over the years has coped successfully with various crises like petroleum price escalations, fluctuations of exchange rates, environmental pollution by smokestack industries, export trade barriers, upward valuations of Yen, competition from low labour cost newly industrialized economies (NIEs) of East Asia, recession in domestic and world economy, and uncertain global politico-economic conditions. It is presently engaged in the search for, and development of, technologies for commerce in the twentyfirst century.

The Bleak Background

The unexcelled success of Japan's economic primacy is all the more unusual in view of the country's harsh and bleak natural background. Japan is a small island nation with a geographic area of only 0.37 million sq.kms. As much as ninety percent of this small area is mountainous and barren. On the remaining tiny ten per cent area live and work its 120 million people. Food crops with the highest yield of rice per hectare in the world are however, very insufficient for domestic consumption. The country is singularly deficient in natural resources of raw materials and minerals. It is thus compulsively dependent on import of fuel, energy,, and all types of raw materials for its industries, and food for its people. Transport costs involved in large volume of imports from long distances add a further serious cost burden on the country's export efforts. Vulnerability of the

long lifelines of supply imparts a dimension of insecurity to the nation's manufacturing and trading activities.

The climax of the foregoing bleak and harsh factors, in a historical context, was the almost total destruction of the country's urban-industrial base in World War II. The industrial cities of Hiroshima and Nagasaki were obliterated by atom bombs, other cities and industrial units were reduced to ruins, and the surviving population was starving and destitute.

The Transition & Transformation

Japan's transition from its grim post-war situation, given its acute deficiency of natural resources, to its present state of global economic dominance, has led to the use of the term 'Japan's economic miracle'. The country's post-War economic transformation has been, and remains, a much investigated subject. The country is seen to possess a strong productivity culture, associated with the people's internalization of the norms of work excellence, duty/commitment, and cooperation, based on shared perceptions. The core values of this culture, engendering and reinforcing the productivity norms, consist of a high sense of patriotism involving a high level of anxiety concerning the country's vulnerability, rationalism based on *mu* (dispassion) and *wa* (harmony), and ethos of collectivism (Rastogi, 1986, 1988). The country's productivity culture is manifested in various ways like the employees' perception of the company on the same level as the family, the emergence of a national economic vision that the only way to assure country's self-respect and survival is to produce high quality goods for the world market at a price lower than anybody else's, and development of work systems where no defects are permitted in products, no inventories are accumulated, and no delays are allowed in the delivery of goods.

System Development

Development of the post-War Japanese industrial system may be seen to comprise two phases. The first phase lasting from early fifties to late seventies was characterized by achievement of very high levels of productivity, quality, and efficiency in manufacturing. The industrial development was based on the absorption of technologies imported from Western countries. The country did not have enough resources for developing its own technologies. This phase was however, also characterized by powerful innovations in the management of production e.g., JIT, Kaizen, TQM, cross-functional integration, quality circles, fluid organizational structures, life-long training of employees, concurrent engineering, and development and refinement of various productivity techniques.

During this phase, the Japanese enterprises emerged and established themselves as global market leaders in several branches of industry and product lines. By the end of this phase, they had apparently exhausted the possibilities of further imports of technologies from external sources on account of their own high capabilities in various areas. This phase may be termed as the phase of productivity and diversified technological capabilities of a high order. A notable feature of this phase is that direct foreign investment did not play any role in the country's industrial reconstruction. Even today, the Japanese remain unreceptive to foreign investment in their country.

Direct foreign investment did not play any role in the country's industrial reconstruction.

The second phase of system development may be deemed to have commenced from the early eighties. The Japanese industry in response to changing world market conditions, began to rely on endogenous R & D as the basis for sustaining its growth and development. Productivity and efficiency remained important, but receded in importance as the major differentiating factors of competitive effectiveness. They were no longer as important as in the last three decades. Western firms were narrowing down the cost and productivity differentials, while countries like S. Korea, and Taiwan were gaining competitive edge in the low-end technology goods owing to their low labour cost advantage. Under these conditions, industrial growth and market leadership could be sustained only on the basis of continuing development of new demand driven technologies.

Industrial growth and market leadership could be sustained only on the basis of continuing development of new demand driven technologies.

The course of technovation is however, beset with serious problems of high uncertainty, considerable risks of market and financial failure, and inordinate costs of investment in R & D over indeterminate long periods.

The Japanese industry and government have however, together succeeded in largely overcoming these problems. They have in tandem fashioned a highly effective system of technological innovation. This system has enabled them to not only sustain their dominant position in the global market place, but also to rewrite the rules of global industrial competition.

Mastering Change — Phase I

Japanese enterprises effectively resolved the core issues involved in the practice of productivity and incremental innovation during the period of phase one. Their productivity improvement efforts were fully integrated with their strategy towards the competitive positioning of their products in domestic and world markets. Factors underlying the success of Japanese industrial system during the three decades from fifties to late seventies may be outlined as follows. They continue to be operative and offer valuable lessons towards organizing for productivity as a way of life.

- Intense domestic and global competition, provides the pervasive stimulus towards continuous productivity improvement and innovation efforts. The latter form the basis of firms' competitive strategy. Domestic and global trade competition drive the Japanese industrial system.
- Human resource is viewed as the most critical of all the resources for production. Its value is developed continuously through regular training and education, throughout the working career of employees.
- Human resources are used in terms of fully utilizing the talents, creativity, and skills of all employees. Their jobs are broadly defined and require multiple skills.
- Extensive use of small group mechanisms (i.e., quality circles, and voluntary management teams) for the solution of productivity and quality problems and incremental innovations in a continuing manner.
- Sharing of a common and culturally reinforced vision, and perspective, by both managers and workers.
- Bottom up level of consensus-based decision-making.
- Assimilation, and further innovative development of imported technology to generate competitive cost margins for exports. Exports are vital for the nation's economic survival.
- Marketing strategy based on high volume market share, generated by high product quality, and low prices based on low profit margins. Short-term profit maximization approach is absent in Japanese firms.
- High rate of annual investment in the development of plant and machinery, and technology upgradation.
- Operations management treated as of high strategic significance. Receives intensive focus.
- Highly flexible, and harmoniously orchestrated corporate strategy toward facing challenges, and utilizing opportunities, with a minimal lag of time in the initiation and positioning of coping responses and mechanisms. Firms' ability to reorganize themselves quickly, is unmatched.

Their strategic orientation is that of being in a state of readiness to cope with sudden crises and changed situations.

- High level of cooperation between industry and government bureaucracy, toward the furtherance of nation's commercial interests.

The 'lessons' from Japan towards organizing for productivity are synoptically represented together in fig. 1.

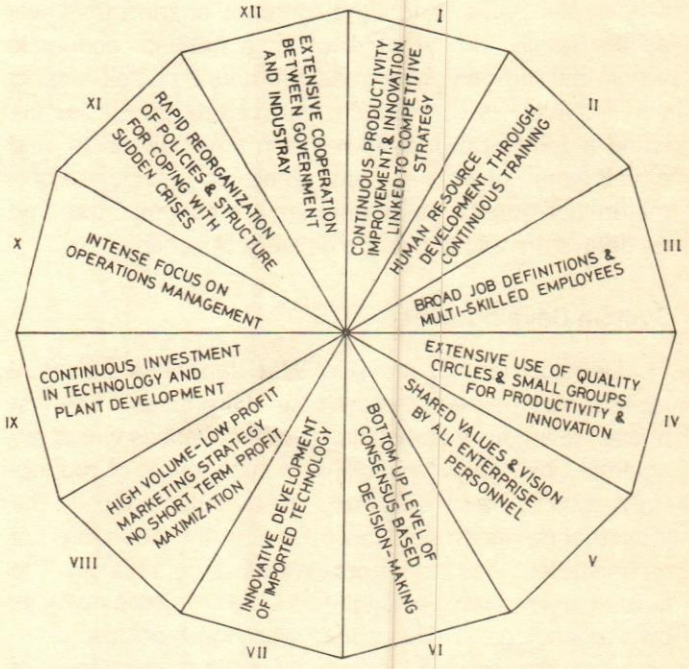


Fig. 1. Lessons from Japan toward organizing for productivity.

Intense Focus on Operations Management

In order to sustain and improve their competitive position in price and quality, and offset the disadvantage of high costs of total dependence on imports, Japanese firms pay enormous attention to operations management. Utmost economy, efficiency, and effectiveness in day-to-day production operations is deemed crucial to the success of their competitive strategy. Every aspect and phase of manufacturing process viz., product design, equipment design, plant's layout, infrastructure of facilities, vendor relations, inventory control (kanban or 'just-in-time' system), production scheduling, industrial engineering, process engineering, maintenance and loads of machines, quality assurance, characteristics of finished parts, tolerance limits, monitoring devices, capacity measures, set up times etc; receive tremendous attention toward continual improvement, and error-free operation.

Utmost economy, efficiency, and effectiveness in day-to-day production operations is deemed crucial to the success of their competitive strategy.

Synergistic Integration of Corporate Functions

The Japanese industrial system depicts high levels of excellence in productivity, in all the corporate functions, and their synergistic integration and orchestration. It regularly produces and develops new products, services, systems, and processes in a competitively most efficient manner. Its production function focuses on state-of-the-art technology, 'perfect' products, and their unit costs. Its marketing function possesses a global perspective. Its personnel function is characterized by commitment, reciprocated communal sentiments multi-skilled workers, and their continuous training. Its finance function emphasizes continuous investment in new plant and machinery, maximization of cash flow, long term growth, and low profit rate. Its managerial style is distinguished by a familistic gestalt, strong emphasis on productivity and quality, and integration across functions. Its productivity talent is enormous, and holds out valuable lessons for enterprises striving toward productivity-led growth.

Mastering Change — Phase II

The second phase of the development of Japanese industrial system is characterized by a focus on developing new technologies for coping with the increasing intensity of global competition in trade and technology. The route to competitive success through excellence and leadership in technovation is however, quite difficult. It is beset with unnerving uncertainities; unacceptably high levels of risks of failure; long horizons of sustained efforts; escalating requirements of financial, intellectual, and technical resources and unpredictable return on large volumes of investment. Uncertainty, costs, and risks are associated with each point in the technovation chain. Basic issues/questions such as the following need to be resolved in this context:

- What technologies should be developed and why? How may they be identified and conceptualized? How may their potential products and consequences be envisioned and assessed?
- How are the identified technologies to be explored? How is their feasibility to be established? What are their requirements of skills and resources?
- How may the development of feasible technologies be planned? What projects need to be formulated and implemented, where and by whom?
- How to commercialize the newly developed technologies rapidly? How to reduce the cycle time of new products' development?

And so on.

All these issues centre on determining the 'what', 'why', 'who', 'where', 'how' and 'whence' aspects of the technovation process for inception to commercialization.

The government and industry in Japan have largely succeeded in resolving these issues through their high level of cooperation. They have devised effective institutional mechanisms for facilitating the development of new technologies in a continuing manner. The structure of their innovation system is based on both technovation and productivity in a dynamically intendated manner. Its crucial feature is teamwork on a national scale.

The government and industry in Japan have largely succeeded in resolving these issues through their high level of cooperation.

Dynamics of Japanese Innovation System

The dynamic structure of the national system of innovation in Japan in a simplified from may be depicted as in fig. 2. The system is seen to be continually driven by the exogenous forces of global competition, and endogenous perception of Japanese decision-makers of the

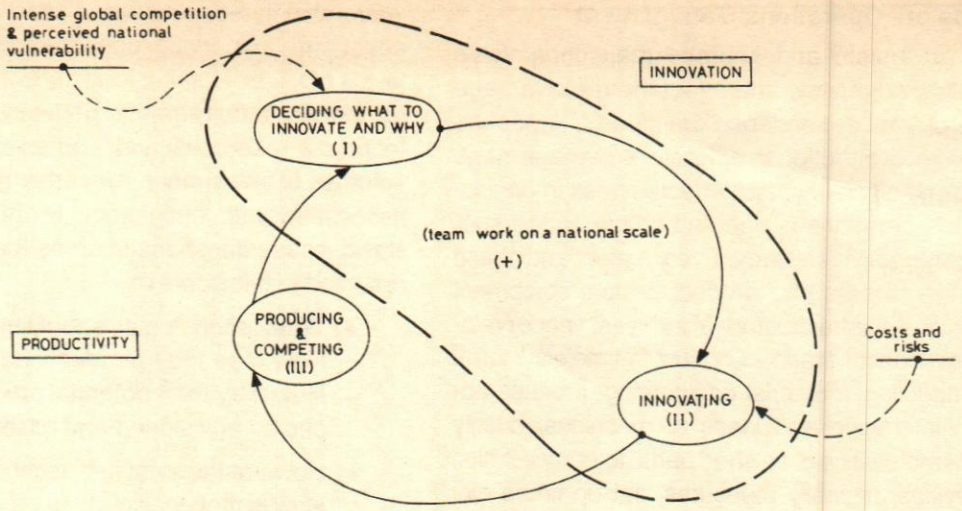


Fig. 2. Dynamic structure of the Japanese innovation system.

economic vulnerability of their country. The figure shows the sequential and cyclical relationship of the phases of technology development with productivity. Unless and until the developed technology is commercialized effectively in terms of globally competitive products, its competitive significance is nil. The module [III] of the system, and its nature and role are the same as in phase I of the Japanese industrial system. In this sense, the innovation system of phase II, builds on the strengths of phase I.

Module I: what to Innovate/Develop & Why:

Japanese government and industry cope with the problems of uncertainty, risk, and error in identifying technologies for innovation through intensive forward looking technology forecasting exercises at multiple levels. Technological forecasts at different levels are linked at the national level towards evolving 'long range visions'. The exercises involve wide participation of knowledgeable persons in government ministries, industry associations, firms, research organizations, and academic institutions. They lead to identification of areas with high growth potential. This is followed by the formulation and implementation of future oriented projects through well-defined, comprehensive, and flexible institutional arrangements.

Strong linkages between technological forecasting, long term planning, and selection of future-oriented projects enable both government and companies to plan for the future.

Strong linkages between technological forecasting, long term planning, and selection of future-oriented projects enable both government and companies to plan for the future with a clear picture of 'what', and 'why' of planning, decisions, and actions.

Technology forecasting and project identification exercises are carried out in parallel at five distinct levels as follows (Bowonder & Miyake, 1992(a)):

- The apex level Science and Technology Agency (STA), and the institutions like Exploratory Research in Advanced Technology Organization (ERATO) working under it
- Government Ministries of Agriculture, Education, Post and Tele-communications, Transport, and the most important one in the present context — Ministry of International Trade and Industry
- Various industry groups/associations
- Research institutions and academia
- Large firms.

There is continuing interaction and exchange of information among all these levels leading to utilization of the forecasts and assessments toward long term planning for technology development. Most of the projects identified for ERATO by STA are generic and future-oriented in nature.[1] They are deemed to possess application potential in many segments of national industry.

1. Ten interdisciplinary and long term oriented projects currently under implementation by ERATO are (Mori, 1992):
Ultra fine particle, amorphous compounds, fine polymers, perfect crystal, bioholonics, bioinformation transfer, superbugs, nano mechanism, quantum magneto flux logic, molecular dynamics assembly, biophoton, terahertz, morphogene, and molecular architecture.

The criteria used by MITI for the selection of technologies for development are (AIST, 1988):

- Highly innovative technologies, the development of which is likely to have far-reaching effects.
- Technologies, with R & D horizon of upto ten years, and requiring very large volumes of investment i.e., those which are too risky for private firms to attempt alone
- Technologies already being developed by other industrially advanced countries, and which therefore require rapid implementation to close the gaps, if any, in the competencies, capabilities involved in the competitive perspective.

Technological forecasting system is used extensively by the Japanese government, especially MITI, for industrial policy planning. MITI monitors technological trends and developments worldwide for assessing the status of indigenous technologies, and for identifying new industries with high growth potential. It thence specifies areas of technological thrust which Japan should concentrate upon, for every decade. MITI for example, was able to recognize the promise and potential of Information Technology in this manner, much earlier than elsewhere. Systematic development of this technology, in turn, enabled Japanese firms to become market leaders in semi-conductors, robotics, CNC machines, and flexible manufacturing systems, well ahead of firms in Europe and USA.

Technovation Identification Process

Salient features of the Japanese innovation system toward identifying areas of technovation, may be listed as follows:

- Focus on the identification of technologies of generic significance with high growth potential, and applicability in several branches of industry.
- Preparation of future-oriented developmental projects on the basis of the linking of technology forecasts at multiple levels.
- Active involvement of industry groups and firms in various technology forecasting exercises, followed by their participation in the formulation and implementation of projects in multiple forms and modes of institutionalize cooperation.
- All the phases of innovation are carried out in the projects starting from technological forecasting. They are oriented toward the rapid development and commercialization of the specified technological capabilities.

Information System for Technological Forecasting

Technological forecasting capability cannot be sustained in the absence of relevant, recent, and reliable technology intelligence information. Adequate data, information, and knowledge about worldwide developments in science and technology, competencies and capabilities, patents and products, manufacturing processes and cost structures, customers and markets, are extremely vital in this context. The Japanese industrial system possesses the capability of monitoring and compiling relevant intelligence information about industry and technology throughout the world at several levels. STA maintains a continually updated data base about new/emerging technologies. MITI maintains a most comprehensive data base regarding industries, markets, and technologies throughout the world. Similar data bases are maintained independently by large banks and trading houses (*sogoshosha*) whose operations extend all over the globe. All these data bases are accessible to firms for their planning and decision-making. Large industrial conglomerates have their own firm-specific systems for the collection and analysis of intelligence information. Technical staff of the firms are expected to monitor developments in their own and related fields in a regular manner. Several research agencies of the government, as well as, the autonomous research corporations setup by industry groups, also regularly disseminate information for the diffusion of technologies. Hence, the transaction costs associated with the collection, processing and analysis of information for identifying the areas of technovation, are exceedingly low for Japanese companies. Moreover, the availability of relevant and required information is not a serious constraint.

Technological forecasting capability cannot be sustained in the absence of relevant, recent, and reliable technology intelligence information.

The broad areas of technological thrust and development, and long term R & D projects presently pursued by government and industry in Japan relate largely to information technology, micro-electronics, new materials, and biotechnology.

Module II — Innovating

Problems relating to costs and risks, of technovation, and the availability and assembling of intellectual and

physical resources for implementing long term developmental projects whose outcomes are uncertain, have been resolved through the sharing of cost and risk between government and industry. A common pattern in this context is the government's (i.e., the STA and Ministries) initiation, sponsorship, and financial support for exploratory R & D projects till the feasibility of a new technology or capability is established. Such exploratory projects are usually implemented by the government's research agencies, autonomous R & D organizations, and universities, jointly and/or severally. After the promise and potential of new areas become evident, further work toward their development is taken over by the research consortia of intra-industry and cross-industry firms. MITI and working groups from industries play a major role in catalysing the cooperative research arrangements between industry, research organizations, and universities. Focus of such cooperative arrangements is towards quick building of technological competencies through the pooling of their resources and facilities. Japanese innovation system thus consists of diverse forms and modes of networking. The leading role in their formation is played by MITI and Industry Associations. They facilitate partnerships, exchange of information, reduction of risks and uncertainty, joint development of technology skills and capabilities, rapid diffusion of innovations, and resolution of issues relating to appropriation of R & D results. Network structures created through the cooperation of government and industry are characterized by a large variety of horizontal information flows. The latter in turn facilitate concurrent engineering which serves to reduce considerably the cycle time between the idea-generation inception phase of technovation, and its eventual commercialization.

For generic technologies of widescope, ramifications, and application potential, autonomous research corporations are created in order to develop them fully and rapidly for commercialization. In 1989, for example, MITI started Laboratory for International Fuzzy Engineering Research(LIFE) as an independent Centre (Fuzimori, 1990) for:

- Defining and establishing common basic technology by companies
- Promoting basic and verification studies by using the research potential available within the country
- Promoting theoretical studies by universities
- Promoting exchange of research information
- Increasing the information availability in fuzzy technology.

77 organizations became involved in this Fuzzy Logic Project. The role of MITI was limited to the preparation of a broad document highlighting the directions for future, bringing together interested organizations, and getting the commitment for financial support. The Centre on its own formulated and is engaged in implementing nine separate but interconnected projects as follows (Fuzimori, 1990):

- Decision making support systems
- Plant operating support
- Fuzzy control of processes
- Speech recognition
- Visual information recognition
- Fuzy memory systems
- Cognitive information processing
- Fuzzy expert systems based on neural networks
- Fuzzy computer.

The technological competencies resulting so far from the foregoing projects have already been commercialized in products ranging from washing machines, TVs, and cameras with fuzzy control systems to traffic regulating systems. Similar research corporations with wide industry participation have been established for robotics, metals, new materials, opto-electronics, artificial intelligence and biotechnological fields, among others.

Creation of such specialized R & D organizations represents an intelligent and important method for coping with increasing sophistication of technologies through coordinating the talents, and resources of firms, universities and research institutes. MITI has evolved this cooperative institutional mechanism for promoting the building of competencies/capabilities in important areas of specialization, defining the objectives and direction of development in clearer terms, bringing together interested organizations for their mutual benefit, and facilitating the diffusion and exchange of information in the country's industrial system.

Dynamics of Ideas

The foregoing structure of the country's innovation system in terms of its modules [I] and [II] shows the operation of teamwork on a national scale involving the close cooperation between the Japanese government, industry associations, research institutions, academia, and firms. Together, they have succeeded in integrating effectively the sequence of technology scanning, technology forecasting, long term planning and development of new technologies, and their rapid commercialization.

At a micro-level however, the Japanese system is distinguished by the dynamics of creative ideas involved in the search for, and generation of new technological knowledge through R & D.

The interplay of innovative ideas in Japanese innovation system consists of the following phases (Tatsumo, 1990):

- *Idea Recycling (Sairiyo)* — It involves finding new uses for old and existing ideas.
- *Idea Search (Tansaku)* — It refers to exploration and search for new ideas when existing ideas are seen to be inadequate.
- *Idea Nurturing (Ikusei)* — It is concerned with the seeding, incubation or cultivation of new ideas.
- *Idea Breakthroughs (Hasoo)* — It refers to generation of new breakthrough ideas built out of those seeded and nurtured.
- *Idea Refinement (Kaizen)* — It involves improving and adapting new ideas to the changed environment.

These ideative phases are characterized by sequential and cyclical linkages amongst them. The iterative pattern of these linkages may be depicted in Fig. 3.

These ideational phases are rooted in the folkarts and cultural values of the country. They are deemed to account for the role of organizational intelligence and idea scanning in Japanese innovation system (Bowonder & Miyake, 1992 (b)). It is also held that the strong cognitive psychological attribute of 'Idea Recycling' in the Japanese mental makeup accounts for the development of new R & D based on technology fusion i.e., refining and combining older technologies (ideas) to produce new ones. Analogously, the absence or weakness of this cognititive trait among Western innovators, may have blocked their appreciation and realization of such possibilities.

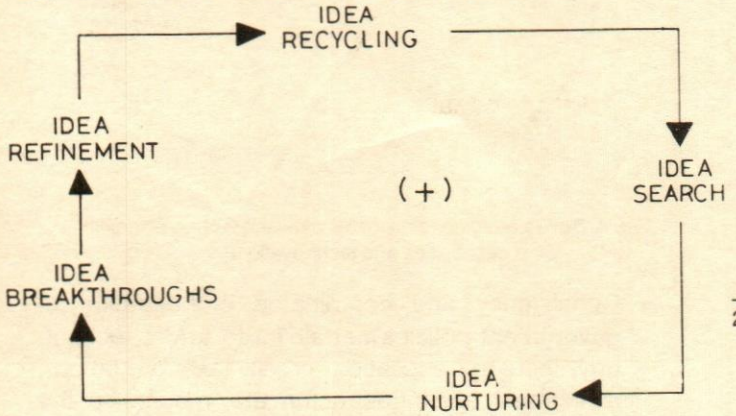


Fig. 3. Cyclic phases of ideation in Japanese innovation style

Salient Factors

The structure of Japanese innovation involves the dynamic and mutually supportive interplay between the development of new technologies, and their commercialization based on productivity and *Kaizen*. The innovation system is however, embedded within the nation's industrial system. the latter is characterized by a high level of synergy between technology management at the level of companies, and industrial/technology policy at the national level. This synergy stems from the vision of nation's economic future shared by both levels. Salient factors underlying the Japanese industrial system's prowess in productivity, technovation, and global competition may be briefly outlined as follows:[2] No order or priority is implied in their listing.

- Technology scanning and trend monitoring across the world is a strong capability of the system. Worldwide techno-industrial and market intelligence is a very low cost facility available to Japanese firms. It is carried out in an institutionalized manner by regular collection and analysis of information by the government, trading houses, banks, industry associations, and firms in their specific ways.
- Long term developmental orientation toward the creation of new technological competencies and development of generic technologies of wide industrial significance.
- The above is also included refinement and fusion of existing technologies toward development of new powerful 'hybrid' technologies.
- National level institutional structures and mechanisms for the promotion of technological innovations, and their rapid diffusion across the country's industrial system.
- Sustained development of firm-specific core competencies involving the harmonization of several streams of technologies, and which can be leveraged for competitive advantage across several product segments.
- Extensive inter-firm collaboration within and across industries toward developing new technologies.

2. For a further discussion of the factors outlined here, as well as, other facets of the system, see Bowonder and Miyake [1992 (a), (b)], Freeman (1988), Kodama (1992), Maruyama (1985), Nonaka (1990), Okimoto (1986), Hamel & Prahlad (1990), Rastogi (1986, 1988, 1989), and Tatsumo (1990), among others.

- High levels skills and capabilities toward rapid commercialization of new technologies into new businesses and products.
- Primacy of horizontal information flow structures for coordination, information sharing, and decision-making within and across organizations. Horizontal information flow structures and horizontal transfer of technology go together. They not only reduce delays between product conceptualization, design engineering, and commercialization, but also facilitate rapid diffusion of innovations to new fields. The diffusion of fuzzy logic concept leading to release in quick succession of camcorders, cameras, air-conditioners, washing machines etc; with fuzzy control systems, is a relevant example.
- Cross-functional integration across specializations, disciplines, and structural units towards managing and synchronizing dynamisms of the firm, the market, and the technology.
- A stable and harmonious relationship between users and suppliers, or between affiliated firms, subcontractors, vendors, customers, and others facilitating information sharing about technology and processes.
- Availability of low cost capital to companies from banks, enabling them to lower their cost structure of production, and insulating them from the shareholders' pressure toward short-term profit maximization.
- Intense competition among firms in the domestic market leading to continuing improvements in productivity, quality, cost and efficiency.
- Experience and design looping within firms in which inventors, researchers, and designers continuously accumulate their experience in various aspects of designing, manufacturing, product use, and service, toward learning and continuous improvement.
- Concept-crossing in quest of innovation, using the combination of concepts from different fields of specialization, requiring insights and foresight.
- Rapid renewal of products or product families through multi-cycle concurrent engineering, virtual design, and knowledge-intensive engineering, based on information technology.
- Rapid absorption and assimilation of acquired technologies through a variety of organizational learning mechanisms.
- Continuous business diversification in terms of a regular search for new market opportunities.
- Consolidation of diverse technologies through joint ventures, tieups, new product teams, or subsidiaries.
- Preponderance of industry funding for R & D (since the eighties) in the firms' unceasing quest for technological leadership in the global marketplace.
- Synergy between the unit level, the industry level, and the national level strategies toward promoting competitiveness in the global marketplace.
- Teams as the pervasive organizational mechanism for new ventures, technology acquisition, technology assimilation, technology transfer, technology assessment, system development, new product/process development, new business, and so on.
- A self-reinforcing or spiralling relationship between technoscientific capabilities and technovation underlies the Japanese innovation system. This relationship may be depicted as in fig. 4. The figure shows that growing generation of resources engendered by technovations, leads to rising levels of investment in R & D infrastructure. The latter, in turn, serve to enlarge the system's stock of technoscientific capabilities continuously. The growing capabilities amplify the system's prowess toward identification and exploitation of technovation opportunities. Such self-reinforcing relationship leads to a spiralling buildup of the country's technological strength.

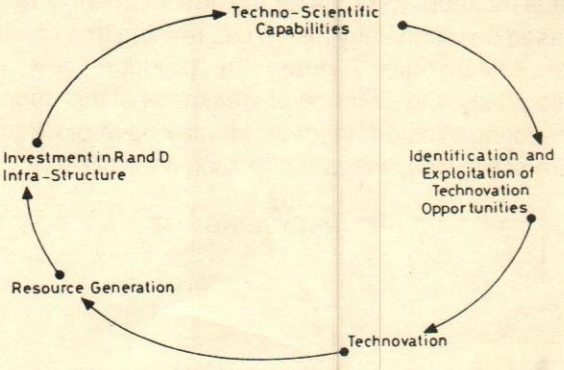


Fig. 4. Self-reinforcing relationship between techno-scientific capabilities and technovation.

- Consistency and coordinated orchestration of government policies pertaining to trade, technology, industry, education, credit, taxation, labour, investment, and infrastructure etc; in pursuit of the nation's commercial and economic interests.

Conclusion

The foregoing factors supplement those outlined in the Phase I. Taken individually, none of these factors is unique or extraordinary. But what differentiates the Japanese industrial system including its innovation subsystem, is the efficiency and effectiveness of its operation. More importantly however, it is its harmonious orchestration and synergistic complementarities, that distinguish the Japanese system from others in the world. This orchestration and synergy are accomplished through teamwork on the national scale. Behind this teamwork lies the shared vision of the country's economic future, and the shared perception of its economic vulnerability by its decision-makers.

Acknowledgement

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> Man's mind stretched to a new idea never goes back to its original dimenstion.
>
> — *Oliver Wendell Holmes*

S & T & Productivity as Perceived by the Public: A Delphi Study

V. Govindarajulu

Positive public attitude towards modern S & T is a vital link in the all round economic, industrial and cultural development of a nation. Public hostility and/or indifference towards modern S & T, on the other hand, is a drag on the growth of productivity. The results of this Delphi study conducted in the State of Kerala, highlight the public perception towards modern S & T, productivity and industrial development.

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Science and Technology (S & T) has become incorporated in our daily routines. Industrial development, economic productivity and thus national prosperity depend on the vital role played by S & T. Efficiency and productivity of a nation's economy are functions of the social technology of the people. Social technology is the level of knowledge base, entrepreneurship and social consciousness acquired by the people that continuously helps them to raise the quality of output of goods and services per given quantum of resource input. Gross domestic product (GDP) per capita or per capita income at any given time, is the index of the level of the social technology of the people and their economic productivity. The per capita income of some Asian countries, in 1993, (for example, Japan $23,800, Singapore $10,450, Taiwan $8,500, Malaysia $2,160, China $650 India $340) indicates their level of economic productivity, social technology, entrepreneurship, social consciousness and public perception and attitude towards modern S & T. Public hostility and/or indifference to S & T is an insurmountable hurdle to a nation's economic and industrial development.

Industrial development, economic productivity and thus national prosperity depend on the vital role played by S & T.

A positive public perception and attitude towards modern S & T is imperative for shaping more effective public policy options (The Royal Society, 1985) to accelerate the growth of the national economy. With this in view, a research project was initiated to assess and mapout the public perceptions and attitudes towards modern S & T in Kerala so as to help the development

agencies in the state(s) and country to harmonize various group interests by a process of reconciliation, while implementing large scale investment oriented S & T projects.

Methodology

The method adopted was a Delphi study, i.e., seeking the intuitive views of the concerned public and making statistical aggregate analysis of the data received with cross comparison and correlation with similar studies. A structured questionnaire was prepared and circulated to as many as 3000 volunteers in Kerala drawn at random and a 10 per cent response was received which is considered to be fairly good. Though many participants were from in and around Trivandrum district, they represented all parts of the State and country with a wide exposure to world developments. Hence the study results can be taken to represent the public perception of the state as well as the nation.

About 88 per cent were males and the rest females. They were aged between 20 and 60 years of which 38 per cent belonged to the age group 40-49 years followed by 26 per cent in the age group of 30-39 years, 20 per cent in the age group of 20-29 years, 14 per cent in the age group of 50-59 years and 2 per cent in the age group of 60 and above. Majority of the respondents (56 per cent) were post-graduates followed by 28 per cent doctoral, 10 per cent graduates and 6 per cent undergraduates. Currently 44 per cent of the participants are engaged in scientific research followed by 18 per cent in engineering, 12 per cent in government bureaucracy, 10 per cent in teaching, 4 per cent in management and 12 per cent other professions.

Given the Freedom: the Choice of Profession

Given the freedom, the respondents would like to accord first ranking (R1) to scientific research as the choice of their career and profession. It is followed by teaching (R2), engineering (R3), social services (R3), journalism and mass communication (R4), business and industry (R5), and so on (Table 1). It indicates the occupation prestige attributed by the public to different professions and careers. Similar trends to occupation prestige, in recent studies, were also attributed by the public in China and United States (Zhang Zhongliang, 1991; You Qin Li, 1993). It indicates the universal nature of occupational prestige attributed by the public.

Table 1. Given the Freedom: Choice of Profession

First Five Professions	(%) Respondents	Rank accorded
Scientific Research	36	1
Teaching	35	2
Engineering	12	3
Social Service	12	3
Journalism and Mass Communication	13	4
Business and Industry	25	5

World Problems: Role of S & T

The world develops by a process of constant struggle and unity, which resolve the contradictions that exist in nature, society and human thought, thereby raising economic productivity. These contradictions are perceived as societal problems. Recognition of such societal contradictions itself is half the solution. Therefore, it is heartening to see, that 88 per cent of the respondents to this study do recognize that the people in general face innumerable problems. And 86 per cent of them perceive that such problems do pose potential threats to ecology, environment and human habitat. An equal proportion of respondents assert that such threatening problems could provide ample opportunities to S & T and other professions in searching for feasible solutions. When asked to rank the groups which are capable of providing more feasible solutions to such threatening problems, the majority accorded R1 to scientists (Table 2). It is followed by technologists (R2), engineers (R3), decision makers in business and industry (R4) and decision makers in government (R5).

Table 2. Groups Capable of Providing More Feasible Solutions

Groups capable of providing feasible solutions	Respondents (%)	Rank Accorded
Scientists	35	1
Technologists	29	2
Engineers	34	3
Decision makers in Business and Industry	31	4
Decision makers in Government	21	5

The ranking by the public is precise as scientists, as a group are capable of understanding the basic laws that govern the development of nature, society and human thought; technologists, as a group are capable of developing viable and feasible models and systems to advance the knowledge base to the application levels; engineers, as a group, to convert these models and sys-

tems of knowledge-base on a social-scale; decision makers in business and industry, as a group of social entrepreneurs, to convert such knowledge-base into productive investment projects; and finally decision makers in the governments to put politics in the right perspective (i.e., the art and science of making desirable things possible) to mobilize the resources of states, nations and the world to convert all such societal contradictions into socially useful, productive opportunities. As the saying goes, for every economic problem there is a political solution. That means putting politics in command but on the firm understanding of the knowledge-base. Therefore, what is needed, here, is a mix of all the disciplines commencing from all directions, each one taking the lead from the strengths of its own discipline and merging with the strong points of others at the appropriate stages.

Therefore, what is needed, here, is a mix of all the disciplines commencing from all directions, each one taking the lead from the strengths of its own discipline and merging with the strong points of others at the appropriate stages.

S & T Development: Decision by Whom?

The public has given good regard to scientists, technologists and engineers. As these groups are capable of offering more feasible solutions to the world's problems, the public desires them to take the first three places of responsibility of decision making in the process of S & T development (Table 3). It is also significant to see that, each one taking the lead from the strengths of its own discipline and merge with the strong points of other. At the appropriate stages the bureaucrats in Governments, people in Non-Governmental Organizations (NGOs) and industries are accorded *R* 4th, 5th and 6th respectively to hold the responsibilities of decision making in S & T development. A synthesis of the roles of all the groups is necessary to obtain synergestic effects by striking a harmony of interests.

Table 3. Groups to hold responsibility of Decision making in S & T Development

Groups	Respondents (%)	Ranking
1. Scientists	54	1
2. Technologists	48	2
3. Engineers & Professionals	44	3
4. Bureaucrats in Government	38	4
5. Others (NGOs)	16	5
6. Business & Industries	14	6

Note: Multiple responses accepted

S & T People's Motives

People's motives towards certain disciplines are conditioned by certain internal urges inherent in them besides the opportunities for material and spiritual gains. Accordingly, the response, here, is more positive and corresponds to Maslow's desirable hierarchial theory of motivation. About 48 per cent of respondents accord R1 to the disciplines of science and technology as they give them opportunities for achieving self-accomplishment (table 4). It is followed by social recognition (R2), excitement (R3) and security and basic needs (R4). It is a surprising but desirable response, in the present days of a crisis ridden and poverty dominant society, where the majority of the people are generally driven by the basic and security needs. It indicates people's willingness to achieve self-accomplishment by advancing their knowledge-base despite all round backwardness and limitations. One has to consolidate and strengthen this urge for self-accomplishment by superimposing Herzberg's two-factor hygiene theory of motivation on Maslow's desirable hierarchial theory of motivation. That is achieved by providing conducive work environment. And such an environment will raise the economic productivity of our people at par with that of advanced countries.

Table 4. S & T and People's Motives

Motive factors	Respondents (%)	Rank accorded
Self accomplishment	48	1
Social recognition	38	2
Excitement	27	3
Basic needs & security	35	4

S & T Progress: Does it Benefit Modern Life?

Four decades back, a vast majority of the people in the country, particularly in the rural areas, were ignorant, suspicious and even hostile to modern S & T. One could recall such hostilities by the rural folk towards vaccination to small pox. But today the scene is the reverse. Growth in literacy and awareness through mass media and cultural exchanges by travel and tourism have made all such desirable changes possible.

Accordingly, an overwhelming majority (98%) of the respondents agree that S & T progress has immensely

benefited the mankind and modern life. However, 56 per cent assert that such benefits extended to the whole cross-section of the society, while 44 per cent that it covered certain pockets only. Over 54 per cent of the participants of this study assert that S & T progress has brought more of good impacts on society while 40 per cent assert that there are both good and harmful impacts in equal proportion and 6 per cent express nil opinion. Fortunately, none of the respondents attribute the occurrence of harmful societal impacts on S & T progress alone. Hence the need for consolidating the good impacts by weeding out bad ones by proper technology assessment (TA) and technology forecasting (TF) exercises and mass awareness compaigns. It should also be ensured that the good impacts spread to the whole spectrum of society.

Societal Benefits: The Direct Derivatives

People's perception and attitude towards modern S & T are conditioned by their direct experience with the modern amenities. Thus, public perception of societal benefits, as direct results of S & T efforts, are more realistic and positive (table 5). About 70-80 per cent respondents attribute modern medical aids, better transportation and communication network, electrical domestic appliances and family planning and child birth control devices as societal benefits derived directly from the results of S & T efforts. About 50-60 per cent respondents assert that better educational facilities, urban public utilities, declined infant mortality and better food preservation methods are other societal benefits. And 40-50 per cent view extended life expectancy and modern methods of recreation as the direct societal benefits due to S & T progress. This is an index of people's priorities and life styles. Rise in the per capita income can enhance the demand for such modern amenities much beyond the present level. Accordingly cost-effective and more productive technologies are needed to produce such amenities at competitive prices.

People's perception and attitude towards modern S & T are conditioned by their direct experience with the modern amenities.

Cost-effective and more productive technologies are needed to produce such amenities at competitive prices.

Table 5. Societal benefits as Direct Results of S & T Efforts

Societal benefits as direct results of S & T	(%) Respondents attributing
Modern Medical Aids	82
Better Transport & Communication Network	78
Electrical Domestic Appliances	76
Family Planning & Child Birth Control Devices & Systems	66
Better Educational Facilities	62
Urban Public Utilities	54
Declined Infant Mortality	54
Better & Effective Food Preparation & Food Preservation Methods & Systems	52
Extended Life Expectancy	48
Modern Methods of Recreation	40

Note: Multiple responses accepted

Harmful Societal Effects: Inherent or Byproduct of S & T

Harmful societal effects, in some cases, are both inherent and byproducts of S & T. The first generation technologies, which were energy-inefficient, exhibited both the characteristics. The problem gets intensified when there is disregard to public safety under the presumption that safety practices do not add to the benefits. But the present generation technologies strike a balance between social costs and social benefits. The public feels concerned and alarmed over the present day harmful societal effects derived as direct results of S & T efforts (table 6). About 60-80 per cent assert the arms race, militarization of industrial economy, environmental pollution and ecological imbalances as harmful societal effects that resulted directly from S & T progress. Another 40-60 per cent attribute the abuse of pesticides, insecticides and chemical fertilizers and excessive dependence on medicines and abuse of drugs as direct results of S & T. And 25-40 per cent respondents believe that food adulteration, low quality foods and degeneration

TA and TF exercises are to be conducted to anticipate the nature of impacts, overcome the negatives and consolidate the positives and educate the masses.

and withering of traditional values are the direct results of S & T progress. The direction of S & T efforts determines its results.

Sometimes the nature of the impact can be due to the inherent characteristics of the technology itself. So TA and TF exercises are to be conducted to anticipate the nature of impacts, overcome the negatives, consolidate the positives and educate the masses.

Table 6. Societal Harmful effects as Direct Results of S & T Efforts

Societal harmful effects as direct results of S & T	(%) Respondents attributing
Arms race & Militarization of Industrial economy	77
Environmental Pollution & Ecological imbalances	66
Abuse of pesticides/insecticides/chemical fertilizers	58
Excessive dependence on medicine and abuse of drugs	44
Food adulteration and low quality foods	34
Degradation & withering of traditional values	26

Societal Problems: The Root Causes

Societal harmful impacts due to S & T, obviously cause societal problems as well. They need to be thoroughly understood and properly tackled. When asked to identify some such societal problems caused by S & T progress, 58 per cent mention hampered human-relationship followed by 46 per cent environmental pollution, 27 per cent to economic imbalances and 23 per cent each to the misuse of drugs, adverse media impacts and increased warfare. Such societal problems and harmful effects emerge due to the inherent contradictions that exist between the competitive but cooperative nature of the progress of productive S & T worldwide on the one hand and the monopoly appropriation of the gains on the other. One has to resolve this contradiction by harmonizing production relations and not resist S & T progress as such.

S & T: Its Substantial Contributions

Public perception on certain areas in which S & T could make substantial contributions is conditioned by their direct experiences. It is a more logical but simplistic view. About 60-80 per cent of respondents assert that S & T could make substantial contributions to certain areas such as increased production and productivity of goods and services; exploration of space, earth, and ocean and optimum utilization of resources; better, fast, safe and economical means of transportation and communication and better and cost-effective child birth control methods and devices. About 50-60 per cent respondents think that S & T could make substantial contributions in providing better, effective and economic learning systems; improving the availability of quality food, controlling and preventing environmental degradation and ecological imbalances; complementing labour productivity; better understanding of the laws that govern the development of nature, society and human thought; and reducing labour intensity and substituting labour force in production of goods and services. Still there are about 30-40 per cent respondents who think that S & T could not make any substantial contributions in reducing natural disasters; crime control, and global wars by increasing international cooperation; promotion of global trade and promotion of democratization of society by competitive and cooperative ventures. An equal proportion of the respondents express nil opinion.

On the other hand, crime is naturally controlled when the material and knowledge-base of the society is democratized. That is, when people's entitlement to material and knowledge-base is enhanced according to their capabilities and contributions, more civilized and humane society is evolved. Such an entitlement is related to compulsory and universalized education and employment. Reduction of threats from wars, in turn, is conditioned by the globalization of capabilities through competitive and cooperative spirits. This demands promotion of global peace, understanding, harmony and respect for human values and rights. This, in turn, is conditioned by the knowledge and material base of the people in general.

Such interdependences and inter-connections among S & T and multiple human dimensions of the people are still in the meta-physical (abstract) state of development due to the widespread disparities in capabilities. Hence, the need for correcting the negative and indifferent public perceptions and attitudes by proper education and mass awareness compaigns.

S & T Areas: Public Funding

Public perception on public funding, in S & T areas, is conditioned by the objective realities of the current societal issues. Regarding the thrust of research areas the country should focus on while allocating funds, about 70-80 per cent of the respondents assert that public funding in S & T should be towards areas like improving health care and population control systems; prevention of environmental pollution, ecological imbalances and strengthening of agriculture and food. About 50-70 per cent stress improving education; increasing economic productivity; developing better and cost-effective means

of transportation and communication; clean and reliable sources of energy, remote sensing and weather forecasting, cost-effective and ethnically adaptive housing; and exploration of space, ocean and earth for optimal use of resources. However, a large section of respondents, 20-40 per cent, express nil opinion. Neutrality of such large section of population towards such topical issues could often be hurdles to the initiation of large scale S & T projects which are needed for fulfilling the basic needs of the people.

S & T Fields: India in the Lead

52 per cent of respondents assert that certainly there are a few S & T fields in which India is in the lead. And 10 per cent of respondents assert that India is in the lead in most of the S & T fields while 28 per cent assert none of the fields and 10 per cent express nil opinion. When asked to name some such fields in which India is in the lead, the following, in the order, have emerged:

- Space Research
- Agricultural Technology
- Textile Technology
- Atomic Energy
- Soft-ware development and advanced computer programming
- Mathematical and social sciences and philosophy
- Medicine and health care research

Interestingly these are the same S & T fields which have come under international pressures in the form of Missile Technology Control Regime (MTCR); Nuclear Nonproliferation Treaty (NPT); Trade Retaliations, Super and Special 301; and Intellectual Property Rights (IPR); Trade Related Intellectual Property Rights (TRIPS); Trade Related Investment Measures (TRIMS) in the Dunkel Draft Text (DDT) of General Agreement on Tariffs and Trade (GATT).

S & T Impacts: Lifestyle Changes

Lifestyles are culture specific. Culture is a function of man's economic relationship with nature on one hand and the fellow human beings in the society on the other hand in the process of production, distribution and consumption of goods and services. The economic relationship, in turn, is a function of S & T knowledge that induces changes in values, attitudes and aptitudes towards environment that surround the people. S & T also provides material base in the form of better goods and services that ultimately brings desirable changes in the life-styles. The public is well aware of the impact of S & T in changing the life styles. Thus about 44 per cent respondents feel that the rate of change of lifestyles, due to S & T progress, is too fast while 38 per cent think neither fast nor slow, 10 per cent feel too slow and 8 per cent express nil opinion. Telecommunications and electronics, transportation, automation, food and agriculture, information technology, domestic appliances, medicine, computers and engineering sciences are some S & T systems, which according to the respondents, make the rate of change of lifestyle too fast. In fact, S & T progress enables democratization of the knowledge-base worldwide leading to cultural cross-fertilization of thought processes that ultimately weed out obsolete customs and traditions. Once such hurdles are broken, S & T becomes a material force bringing rapid changes in values and lifestyles. Information technology plays a vital role in bringing such changes. And such changes, however slow or fast, are irreversible. Therefore, suitable educational programmes should be developed to enable the public to acquire positive attitudes towards lifestyles.

Development Issues & Action Plans

The study posed many currently debated development issues before the public and sought their perceptions, and action plans that could guide the country's S & T programmes to match emerging world trends. The consensus outcome is, precise and objective and hence

Therefore, suitable educational programmes should be developed to enable the public to acquire positive attitudes towards lifestyles.

worthy of consideration before undertaking S & T oriented large scale investment ventures:

Intellectual Property Rights

A strong IPR regime, granting patents indiscriminately and kept in force beyond the economic utility of the inventions, becomes an instrument of obstruction, in the hands of monopolies, which restrict the advancement of productive forces by competitive spirits (Daniele Archibugi, 1992). Therefore, a desirable IPR regime is one which is liberal, sensible, promotes productivity by competitiveness and respects the self-reliance of nation states. Indian Patent Act 1970 is one such, primarily aimed at promoting technological innovations, transfer and commercial production in the country. And hence it was applauded as a model patent law by all the developing countries. This was the case even with the patent

laws of the developed countries in their early stages of development. But, in recent times, India has been subjected to international pressures, trade sanctions and retaliations such as, Super and Special 301; TRIPS, TRIMS of DDT of GATT, to alter its Patent Laws fundamentally to fall in line with the strong patent regimes. This international pressure is brought under the belief that a strong patent regime will help promotion of global trade and commerce.

In this context, about 86 per cent of the respondents, did not accept the demand for strong IPR (Patent) regime, nor did they want India to sign DDT unless GATT agrees to revise its Text to accommodate the legitimate economic interests of developing countries including India. Only 14 per cent favoured the demand for strong IPR (Patent) regime and signing the DDT as it is presented today. A similar trend can be seen in the write ups of as many as 20 lead authors that appeared in the April special issue of JSIR (1993) that devoted itself to IPR and development perspectives. Here, about 65 per cent of authors favoured defending Indian Patent Act 1970 and country-specific liberal patent regimes while 35 per cent favoured changing Indian Patent Act 1970 to align with the strong patent regimes of Paris convention and DDT. Still there is a need for enlightening the public about the science of patent laws, their inherent limitations to protect the monopoly market rights of the first inventors, as in the modern S & T world—, parallel discoveries, inventions and innovations can take place autonomously due to the surging competitive productive forces. Under these conditions, India has to conduct her foreign relations, including trade and technology transfer, subject to the five principles of peaceful coexistence, while at the same time, safeguarding the basic features of Indian Patent Act 1970.

NPT & Global Security Plan

Nuclear Nonproliferation Treaty (NPT) and Global Security Plan are the schemes operated by the club of "nuclear-haves", mostly the west to control the spread of nuclear weapon systems among the "nuclear-havenots". This does not discriminate between nuclear programmes for peace and energy and for warfare. And, there is an international pressure on India to join this exclusive club of NPT. Or else it will have to face sanctions and retaliations on imports and exports in strategic areas of nuclear energy research.

In this context, 76 per cent to this study, did not want India to accept NPT membership while 24 per cent favoured it. Further the respondents made certain startling but relevant assertions indicating their perceptions and attitudes: NPT is not a treaty reached among equals but an imposed one. GSP is irrelevant as there is no external threat to this world. This means the threat to this world security is from within. NPT and GSP can be accepted if there is a universal agreement to dismantle the nuclear war heads of all countries simultaneously. Even if India joins NPT and GSP it should not be under duress.

Similar views were expressed by a group of eminent persons commissioned by the Government of India in the first quarter of 1993 to look into this aspect. Even a high level study group, commissioned by the Carnegie Endowment for International Peace, in its report titled "India and America after cold war", suggests to U.S. not to force India to sign NPT and MTCR under duress. And the majority of respondents think that India should reduce its budget on the Department of Atomic Energy by making nuclear power generation a commercially viable and self-supporting venture. One can reduce the burden of defence by improving friendly relationship with neighbouring countries through improved diplomacy. This demand is nothing but a call for the renewal of India's one time cherished foreign policy based on the five principles of peaceful coexistence and nonalignment.

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Earth Summit & Biodiversity

As S & T progresses, people's concern for clean environment increases. The developed countries could now come with third or fourth generation technologies, mostly automated, which are more environment friendly — hence the ceiling fixed on the upper limit of environmental pollution to 1992 level which the developed countries would like to impose on the developing ones. If the developing countries, with scarce resources, technologies and skills, want to reach the same level of development of developed ones via the routes of capitalist industrialization, they have to invariably depend on the inefficient, obsolete and environment unfriendly technologies. Therefore one group in the west is eager to shift such obsolete units to the willing partners in the developing countries. At the same time there is another

group which wants to put restrictions on the development as well under some pretext with which some groups in the developing countries would like to align either due to necessity or due to ignorance. Likewise, the developed countries would like to consider the biodiversity (bio-variety) of the world (mostly from developing countries) as universal properties and hence the demand for free access. At the same time any improvement they make on them through S & T inputs they would like to treat them as private properties, protected by IPR regimes, which the developing countries will have to acquire by paying a high price.

These are the contradictions of development inherent in the collective nature of production of knowledge and materials and the private nature of appropriation of the surpluses thus generated. The United Nation wished to reconcile the conflicts among these contradictions and strike a balance under the existing diverse socio-political-economic systems. This drama was enacted on the stage of the Earth Summit in June 1992 at Rio. In this context, an overwhelming majority (84 per cent of respondents) to this study did agree that the Earth Summit and Biodiversity Convention 1992 were good beginnings while 16 per cent did not consider so. However, it is observed that the Rio Treaty and Biodiversity Convention were heavily biased towards Multinational Corporations (MNCs), which according to the majority of respondents, should be checked. According to the respondents, country-specific action plans to protect national interests, should be incorporated into the Treaty. Mass awareness compaigns and peace movements should be taken up vigorously to restore the lost varieties of life forms in the high tides of green revolution. India should formulate suitable policies to protect bio-diversity on cooperative basis and strengthen environmental protection policies and Acts while venturing into large scale industrial developments.

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S & T in Strategic Areas: MTCR

Like NPT, Missile Technology Control Regime (MTCR) is the club of advanced countries who have stockpiled heaps of missile systems. Members of MTCR are presumed to have freedom of access to high-techs in the strategic areas. But they are barred from entering into business contracts with non-MTCR member countries, mostly the developing ones, to pass on the missile technologies. Thus, by restricting missile proliferation, MTCR member countries believe they could safeguard global security.

As Indian space research Organisation (ISRO) ventured to launch Polar Satellite Launch Vehicles (PSLV), Geostationary Satellite Launch Vehicles (GSLV) programmes with cryogenic rocket engine systems obtained from Russia on economy terms, the U.S. imposed a ban, under MTCR, on ISRO, restricting its deals with U.S. companies in strategic and aerospace industries under the pretext that the Indian space programme is aimed at developing missile technologies. However, if India joins MTCR and accepts to pay higher prices, the U.S. itself is willing to pass on the cryogenic rocket engine systems to Indian space programmes.

In the context of trade related conflicting interests, as cited above, over 86 per cent of respondents to this study did not favour India accepting MTCR terms. They assert so, for the reasons that, MTCR is an imposed one, and that it does not help those who want to acquire high-tech systems. The alternative suggested by the respondents is to strengthen peace movements that prevail over the arms race. Further, according to the respondents, India should use its missile technology development programmes to strengthen high-tech areas in the country and then extend its cooperation among Third World Countries.

S & T Oriented Large Scale Investment Projects

Today, India is torn between antagnoistic group interests. Different groups think that they are exclusive to one another in the development process. Ignoring the fact that human development is an integral part of ecological balance, the multiple dimensions of social development are counterposed to one another, instead of enabling them to play complementary roles. Thus, in India, agriculture is counterposed to industries and large scale industries counterposed to small scale industries, foreign trade is counterposed to domestic trade, domestic R & D and technologies are counterposed to import of foreign technologies, large scale S & T oriented investment projects in irrigation, power, space, defence, communication, transport, industry and infrastructure are counterposed to environment, ecology and human habitat, population itself is counterposed to development process and so on. Even modern S & T is counterposed to the future of human civilization.

Such conflicts emerge out of the objective realities that India continues to live with — the backward and obsolete productive forces sustained by the legacies of feudal and colonial rules. However, there is a surge of technologically driven productive forces advancing in the world simultaneously raising the living standards of the people by changing their production relations on more or less democratic norms. Indian society, as an integral part of the world is also influenced by this trend. Hence the urge for advancing the productive forces. But the groups, desiring to advance the productive forces, through mere contracting and subcontracting interests, ignore the simultaneous need for restructuring for more balanced and harmonious production relations. This is the source of conflict that counterposes several dimensions of human development resulting in stagflation. Public perception regarding this is objective and balanced. Thus, over 74 per cent desire to give top priority to S & T oriented large scale investment projects as they provide opportunities to raise the living standards. Yet they assert that such projects often induce negative impacts on the environment, ecology and human habitat. The basic principles to be respected here are the laws of conservation of biomass and bioenergy that enhance the network of all the groups concerned in the development process. In the absence of such corrective measures, the public prefers a large number of small projects with top priorities to projects aimed at eradiction of poverty, unemployment and illiteracy. They advocate reduction of import dependence in defence sectors as such dependence does not guarantee national security. Further, they feel that defence sectors should be made to serve civil needs as well and satellite communications systems, hydro electric power projects and non-conventional energy systems should be given higher priorities. Converting natural forests into biological parks does not find favour with the public. The respondents opine that priorities to nuclear power plants can be given if safety is guaranteed and power generation is made to earn its own return on investment. Further, they suggest according priority to missile technology programmes only as a means to advance high-tech in the strategic fields and earn return on investment by trading in defence systems and hardwares.

Priorities to nuclear power plants can be given if safety is guaranteed and power generation is made to earn its own return on investment.

Agriculture, Industry, Food and Health Care

The public perception, is that agriculture, purely on commercial grounds, is going to endanger food security and hence has to be checked. The educated unemployed should be urged to take up vocations in agriculture and industry. All waste lands should be brought under agriculture and awareness should be created to cultivate every piece of land. Development of agriculture and industry should promote employment and economy. And S & T should play an active role in promoting agriculture, industry, employment and economy. Mechanization of agriculture and automation of industry should enhance labour productivity and not replace the labour force.

Food security is synonymous with national security. Likewise, health is the wealth. Family welfare programmes should aim not only at regulating population growth in accordance with the means to feed but also should ensure food and health to one and all. There is a unity of consensus that top priority should be given to these programmes. The public asserts that more investment should be allocated to such areas. And S & T should focus on generating 225-250 million tonnes of food grains for 1,044 million people in 2001 A.D. by raising the yield per hectare manifold from the present level of 1.75 tonnes rice, 2.27 tonnes wheat, 0.82 tonnes jowar, 1.52 tonnes maize, 1.1 tonnes ragi, 16.22 tonnes potato and 5.55 tonnes sugar (The Hindu Survey of Indian Agriculture 1992). The productivity of food grains in the country, i.e. output per work force should be enhanced by maximizing the product of two factor ratios viz. output per hectare of land and hectare of land per work force. The former demands higher orders of productive technologies and the latter implementation of land reform acts as well as sharing of scarce resources. Simultaneously population explosion should be controlled by education following the Kerala model. Decentralized administration and acceleration of green revolution are suggested. Stringent checks on adulteration of food and drinks are sought. Indigenous health care systems are to be strengthened on the lines of modern health care systems. Mixing up of the politics of religion, castes and communal divides with the politics of development is to be avoided.

Education & Employment

Education and employment are complementary. Most of the country's antogonistic contradictions could be resolved if compulsory and universal education and employment are ensured to all eligible and able bodied people. Kerala has achieved a near cent percent success in universal education; yet it has a long way to go in

ensuring compulsory and universal employment to all. India, as a whole, is many years behind in achieving both these objectives. As per the 1991 census, the literacy rate was 52.2 per cent with a wide gap between males 43.88 per cent and females 39.42 per cent. During 1981-91 decade, the growth rate of literacy was 8.55 per cent and that of illiteracy 7.31 per cent, leaving 302 million illiterates even in 1991. And about 6.3 per cent of population, in the age group of 14-60 years, is non-working — the unemployed registered with Employment Exchanges was as high as 36.3 million in 1991, which grows at the rate of 10% per annum (Manorama Year Book, 1993).

The public perception, in this matter, desires to give encouragement to community level action plans and vocationalization of plus two stage for attaining education and employment to all. The purpose of education should be to build a vibrant, productive self-confident, self-reliant, scientific-tempered, value-oriented, more humane and cultured society and S & T should help to create such a society.

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Housing and Human Habitat

Housing and human habitat, in harmony with environment and ecology, is the index of developed and cultured civilizations. According to 1991 census, the demand for housing in Kerala was 11 lakh units (Tampi. K.M., 1993,). Of these, 55 per cent were substandard huts declared unfit for human dwelling, 27 per cent old ones awaiting demolition and reconstruction, 1 per cent only considered as standard units worth for human dwelling and 17 per cent as numerical shortage. A similar trend exists on all India basis as well. Thus, housing the millions is a massive public task. If such a massive task is taken in a coordinated manner, it could provide immense opportunities for investment, employment, innovative and productive techniques, methods and materials. The criteria on the choice of technique is the one that delivers maximum number of housing units per given unit of resources.

The public perception, here, is more positive. Accordingly, S & T should focus on cost-effective, modular-type, functional and economy houses by adopting Baker's type techniques which encourage utilization of local resources and skills that conserve materials, reduce costs and improve aesthetic values in harmony with environment and ecology. Housing design and construction should be fully engineered based on architectural principles rather than false prestige. Minimization of contractual and sub-contractual interests will also reduce costs while improving cost-effectiveness.

National Defence

Agriculture, industry, S & T and defence are considered the four vital elements of any nation. Without strengthening these four aspects concurrently one cannot think of a modern state. They are complementary to each other but if improperly handled and imbalances created they do become counterposing to one another. Though the public (about 85 per cent of respondents) is in favour of strengthening national defence, their attitude is conditioned by the imbalances that occurred due to the stifled nature of development as seen in agriculture, industry, S & T and defence. Thus, there is a demand for cut down in defence expenditure, unless the nation wants to do business in military hardware. Expenditure in defence can be brought down by strengthening peace movements, imparting military training to civilians to develop para-defence systems and improving the country's diplomacy and foreign relations.

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Small Scale Industrial Co-operatives in Kerala

K.V. Velayudhan & N.C. Pillai

Small scale industries have great significance as intermediary stabilisers and as the catalytic agents in accelerating economic development . However the small scale cooperatives in Kerala have not exhibited the momentum expected of them. This study reports the productivity trends of cooperative units in Kerala and recommends the removal of the lacunae present in the legal and administrative framework to address the problem.

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In a capital scarce, labour abundant country like India, wedded to the twin objectives of growth and social justice, the small scale industry is expected to resolve the chronic problems of poverty, inequality, under employment and unemployment. Large scale manufacturing enterprises have naturally their pride of place in the nation's economy; but the small scale sector as a supporting factor has become inevitable, and its importance as an integral part of the industrial system cannot be over emphasized.

The small scale industry is expected to resolve the chronic problems of poverty, inequality, under employment and unemployment.

Both theoretical considerations and the little empirical evidence reported in literature suggest that small enterprises are labour intensive and that they have a significant role in achieving rapid growth of both output and employment (Velayudhan, K.V., 1992).

In this context, it would appear that the industrial co-operative movement could possibly play a vital role in accelerating the momentum of small industrial development of Kerala which has a wealth of highly educated and skilled manpower. However, in spite of the encouragement extended by the Government, the movement does not seem to have been picking up. A study was conducted to analyse the factors that have affected the performance of the industrial co-operatives in the small scale industrial sector of Kerala with the specific objectives of measuring their growth and productivity.

Method of Analysis

Growth rate of a variable is defined as the rate of change per unit of time, usually a year. It is generally estimated either by arithmetic or statistical method. If there are '*n*' observations then the growth rate is obtained by the compound rate of growth obtained by the formula $p_t = p_0 (1+r)^T$ where r is the average annual compound growth rate, p_0 and p_t are the initial and terminal values and '*T*' is the time span. Statistical estimation of the growth rate, usually referred to as the trend growth rate, is based on growth equations. The growth equations may be specified in alternative forms such as linear, exponential, quadratic, logistic, etc. Different statistical methods such as the least square method, the maximum likelihood method, etc, are employed to get the estimated values of the parameters. Generally, the exponential trend equation of the form: $X = Ae^{bt}$ is estimated based on the least square principle. In the above equation, the estimated value of the parameter '*b*' gives the average annual trend growth rate. The major advantage of the statistical approach is that it enables the testing of the statistical significance of the estimated growth rate, besides being a summary measure derived from a series of observations.

Productivity Growth

Productivity expresses the input-use efficiency of the production process and productivity growth is recognized as a key element of economic dynamics. The rate of industrial growth is determined by the rate of expansion in productive resources employed in industry and the overall efficiency in the use of resources, viz. the rate of improvement in total factor productivity. Productivity is measured using different methods depending on the various connotations attributed to the concept of productivity. These methods may broadly be classified into: Partial productivity measures, and Total productivity measures.

The simple indicator of productivity is the partial productivity measures derived in terms of single input assuming other inputs to remain constant. This indicates the presence of as many partial productivity ratios as the number of individual inputs. Partial productivity ratio may be expressed either as average or marginal. Average productivity ratios as the number of individual inputs. Partial productivity ratio is the output per unit of input. Partial productivity measures express the productive efficiency of a given individual input. These measures do not express the overall productive efficiency. Total factor productivity (TFP) is the measure employed for this purpose. Several total factor productivity indices such as the Kendrick index, Solo index, Translog index etc are available for empirical progrostigation. Considering the theoritical importance and empirical relevance, the present study makes use of only the translog index.

Estimates of total factor productivity are designed to provide an indication of the change in the overall efficiency with which the resources are utilized in the production process.[1] If input and output consist of a single homogeneous commodity the total factor productivity is equal to the rate of growth of output minus the rate of growth of input. In a multi-product, multifactor case, the total factor productivity growth is the difference between the growth rate of aggregate output and the growth rate of the sum of the weighted inputs (Goldar, 1987).

The translog index developed by Christenson, Jorgenson and Lau is derived from the explicitly specified Translog production function which provides a second approximation to an arbitrary twice differentiable continuous function. The translog production function is characterized by constant returns to scale and varying elasticity of substitution ranging from 0 to α. It is specified (with two inputs) as follows:

$$\ln V = \alpha_o \alpha_L \ln L + \alpha_K \ln K + \alpha_T T +$$

$$1/2\ \beta_{KK} (\ln K)^2 + \beta_{KL} \ln K \ln L + \beta_{KT} T \ln K +$$

$$1/2\beta_{LL} (\ln L)^2 + \beta_{LT} T \ln K + \tfrac{1}{2} \beta_{TT} T^2 \qquad (1)$$

where V, K and L refer to value added, capital and labour respectively. T denotes time trend as a proxy for technical change.

Introducing the assumptions of constant returns to scale, perfect competitive equilibrium and Hicks-neutral technical change and further differentiating equation (1) totally with respect to time and rearranging the terms, we have

$$\frac{d \ln V}{dT} = S_K \frac{d \ln K}{dT} + S_L \frac{d \ln L}{dT} + A(t) \qquad (2)$$

where S_k and S_L are the value of shares of capital and labour respectively which under constant returns to scale, sum to unity. $A(t)$ is the growth of value added with respect to time holding capital and labour constant. Then equation (2) can be rearranged in the following form.

$$A(t) = \frac{d \ln V}{dT} - S_K \frac{d \ln K}{dT} - S_L \frac{d \ln L}{dT} \qquad (3)$$

1. A distinction can be made in this context between total factor productivity and total factor productivity growth. The former is a static concept which explains the level of productivity at a point of time where as the latter is dynamic in nature and measures changes in productivity over time.

Modelling the rate of technical change in terms of discrete points of time say t and $(t-1)$, we may write

$$A(t) = (\ln V_t - \ln V_{t-1}) - S_K (\ln K_t - K_{t-1}) \quad (4)$$
$$- S_L (\ln L_t - \ln L_{t-1})$$

Where $S_K = \frac{S_{Kt} + S_{Kt-1}}{2}$

$$S_L = \frac{S_{Lt} + S_{Lt-1}}{2}$$

Thus, the average rate of technical change may be presented as the difference between successive logarithms of value-added minus the weighted average of difference between successive logarithms of inputs, the weights being the corresponding average shares. The expression for $A(t)$ given in eq. (4) is termed as the average quantity index of technical change.

Measurement of Variables & Data Source

In the present study gross value-added is used to represent output. It is obtained by deducting the total value of input from gross exfactory value of output. Gross value-added at constant price is obtained by deflating the current value of output of each industry with corresponding official wholesale price index of a related base year. 1970-71 has been chosen as the base. The single deflation method is followed since it is rather a difficult task to get suitable deflators for the heterogeneous group of material inputs. In the category of labour, both workers and other than workers have been included. Value of gross fixed capital stock at constant price is used as the measure of capital. It includes plant, machinery and equipment, land and building. From the data collected from the co-operatives, estimates have been made of gross capital stock at constant price following the PIAM. In this study the year of establishment is regarded as the base year for the estimation of capital. Since the statistics available from the secondary source are found insufficient, a detailed primary investigation is undertaken.

Empirical Analysis

Growth of an industry may be measured in two ways: vertical and horizontal. The vertical aspects relate to the growth in the number of units over time and the horizontal aspects refer to the growth of output, value, equipment and fixed capital. The growth of industrial co-operatives at firm and industry level was analysed in terms of selected economic indicators such as value of output, value-added, employment and fixed capital.

The annual trend growth rate of output, value added, employment generation and fixed capital of the units have been presented in table 1. Seven out of the twenty units (01, 02, 04, 05, 13, 15, 18) show positive trend growth of output. Three out of these seven produce drugs, medicines and allied products and are controlled mainly by Ayurveda practioners. One unit which produces rubber products is controlled by rubber farmers. However the remaining three units producing agricultural implements, bell-metal products and machine tools, are controlled by the workers of the concerned units themselves. As in the case of output growth, seven units (01, 02, 04, 05, 13, 15, 16) show positive trend growth rates in valued-added also. In the majority of units, the rate of growth of employment is seen to be either zero or negative. The annual trend growth rates of employment of four units (01, 18, 19, 20) are positive.

Table 1. Annual trend growth rate

Unit code	Output	Growth rate of		
		Value added	Employ-ment	Fixed capital
01	4.95*	6.35*	4.37*	2.63*
02	4.75*	5.02*	0.00	3.68
03	–1.43	–0.49	0.00	4.21
04	12.52*	16.69*	0.00	2.48*
05	6.83*	9.53*	0.00	1.14*
06	–67.06*	–66.89*	–23.41*	0.09
07	–68.29*	–67.29*	–13.69*	2.56*
08	–11.19*	–13.49*	–2.03*	–0.74*
09	–53.74*	–15.29*	0.00	–1.49*
10	–2.34	–3.08	0.00	–3.66*
11	–9.25	–3.85	0.00	4.00*
12	–19.59**	–2.04*	0.00	–0.18*
13	5.80*	5.61*	–6.82*	0.42
14	–19.81*	–20.36**	–7.95*	–1.55*
15	14.68*	19.41*	0.00	–0.82*
16	–1.32	6.33	0.00	–2.11*
17	–8.87*	–11.78*	–1.30*	–0.53*
18	2.54*	–0.94	0.49	–4.49*
19	–1.74*	–2.39	5.86	–2.43*
20	–7.31	–3.72**	1.52*	–2.17*

* Significant at 5 per cent probability level
** Significant at 10 per cent probability level

The estimated growth equations presented in table 2 reveal the exponential trend growth rate of output, value added employment and fixed capital of various industries. Two industries (304, 349) show increasing trend in output while the remaining six industries (312, 313, 340, 343,

357, 360) exhibit declining trend. The trend growth rate of 'metal products industry, not elsewhere classified (n.e.c.)' (349) is the highest, namely 5.02 per cent per annum. The peculiarity of this industry is that its units are controlled mainly by the workers. Industry 304 which registered the next highest growth rate, 2.70 percent; is controlled mostly by Ayurveda medical practitioners, the workers having little say in management.

Table 2. Annual trend growth rate according to industrial groups

Industrial code	Output	Growth rate of Value added	Growth rate of Employ-ment	Growth rate of Fixed Capital
304	2.75*	6.11*	0.27*	1.12*
312	–3.99*	–6.00*	–4.80	–0.60*
313	–5.00**	–2.49*	–0.64**	–3.43
340	–0.77	–4.27*	0.00	–0.04
343	–1.39	–0.88	–2.42*	–0.46*
349	5.02*	8.20*	0.00	–0.59*
357	–2.73*	–3.42*	–0.35*	–0.51*
360	–2.57*	–1.08*	0.68*	–0.97*

*Significant at 5 per cent probability level
**Significant at 10 per cent probability level

The estimated growth rates of value-added for the industrial groups presented in table. 2 indicate that value-added of two industries (304, 349) are positive. It is observed that, as in the case of output, the manufacture of metal products had the highest annual trend growth rate, 8.20 per cent, per annum. Industry 360 has shown 0.86 per cent annual trend growth rate in employment while 304 records 0.27 per cent growth. Two industries (340, 349) have shown no significant change and others have shown negative growth. Thus employment generation shows little significant change and confirms previous observations specifically. It is obvious from the table that only one industry, 304, has registered positive trend growth of fixed capital (1.12 per cent) and all the other industries had negative growth.

The estimated trend growth rates of labour productivity, capital productivity and total factor productivity of the units studied for the period from 1980-81 to 1989-90, are presented in table 3. Labour productivity of the nine units (01, 02, 04, 05, 10, 13, 15, 16, 18) shows positive values. The evidence over the decade indicates a weaker rising trend in labour productivity of the majority of the units. However, the performance of the units on the basis of industrial groups helps to create a wide perception, pertaining to the industrial co-operatives, in the industrial scenario of the State. Capital productivity of the nine units, (01, 02, 04, 05, 10, 13, 15, 16, 18) shows an upward trend. Nine units have shown an upward trend of total factor productivity (01, 02, 04, 05, 10, 13, 15, 16).

Table 3. Annual trend growth rate of productivity

Unit code	Growth rate of Labour Productivity	Growth rate of Capital Productivity	Growth rate of Total Factor Productivity
01	3.69**	5.38**	8.89*
02	4.23	0.54	3.11
03	–0.5	–4.79	2.72
04	21.09*	17.73*	21.23*
05	9.67*	11.48*	8.36*
06	–54.12*	–78.08*	–53.92*
07	–80.29*	–9.05*	–60.20*
08	–20.87*	–21.89*	–22.83*
09	–11.79	–8.08	–13.23*
10	13.49**	15.37*	14.15**
11	–7.31	–11.30	–7.94
12	–22.20**	–22.09**	–22.22**
13	25.57*	18.13*	24.25*
14	–12.46	–10.01	–95.09*
15	29.39*	30.21*	29.12*
16	9.61*	553*	7.82*
17	–9.06*	–9.82*	–10.09*
18	0.03	5.08*	–0.95
19	–5.79	–5.19*	–6.59
20	–4.60*	–42.40*	–3.81*

*Significant at 5 per cent probability level
**Significant at 10 per cent probability level

Table 4 reveals the productivity trend of the units on the basis of industrial groups. Three industries (304, 343, 349) have shown an upward trend of labour productivity while the majority show a downward trend. This finding

Table 4. Annual trend growth rate of industrial groups

Industrial code	Growth rate of Labour Productivity	Growth rate of Capital Productivity	Growth rate of Total Factor Productivity
304	13.62*	11.47*	15.66*
312	–3.05	–12.55*	–4.83*
313	–4.55*	–4.68*	–9.15*
340	–2.31*	–1.10**	–3.65*
343	8.48	4.56	7.03
349	18.52*	19.94*	17.94*
357	–7.13*	–6.82*	–7.99*
360	–11.44*	–18.90*	–20.63*

*Significant at 5 per cent probability level
**Significant at 10 per cent probability level

elucidates the poor performance of the industrial co-operatives in terms of labour productivity. Capital productivity of three industries (304, 343, 349) out of the eight have shown an upward trend. However, the trend growth of total factor productivity of the industries presented in the table depicts the upward trend growth of three industries (304, 343, 349) and downward trend growth of the remaining five industries. In sum this reflects the poor performance of the modern small scale industrial co-operatives in the state.

Conclusions

It is clear that the growth performance of industrial co-operatives, on the whole, has been poor. However, certain units which are controlled by workers themselves present better picture. Similarly some units belonging to specific industrial groups such as drugs, medicines and allied products and metal products not elsewhere classified show comparatively better performance. Partial as well as total factor productivity analysis also reveals the dismal performance of the productive efficiency of the industrial co-operatives. The labour productivity, capital productivity and the total factor productivity of the majority of the units have shown falling trend. However, certain units, controlled fully by the member-workers and some others belonging to specific industrial groups such as drugs and medicines exhibit a relatively commendable performance.

In sum, the ideals of co-operatives are not being realised in the modern small scale sector. Their performance in terms of growth and productivity leaves much to be desired. However, the dismal performance of the individual units should not be interpreted to be the failure of the co-operative principles but as the result of the incompetence of the persons in position of control and authority. Further, the ability of the members, their technical know how, and their experience to contribute to production have not been utilised. Thus, the problems behind the non success of the co-operatives in the modern small scale sector of Kerala arise primarily due to defects in the formation and design of their functioning. The loopholes in the co-operative rules must have aided in overlooking these aspects in the registration of the units concerned. In principle, the co-operative is a sound and desirable democratic form of organisation; however in practice, the ideology, philosophy and principles have been given the go-by and the co-operative seems to have degenerated into an organisational form where the exploitative character of capitalist enterprises persist. The legal framework that has been provided for the co-operatives in Kerala provides freedom for all to start industrial co-operatives and opens wide scope for abusing the fundamental tenets of co-operation. Further, the lacunae present in the legal framework and the administrative system have enabled political and other interest groups to penetrate into the co-operatives for partisan gains. By addressing these problems, the co-operatives can be made to fulfill the requirements of this organisational form eliminating the exploitative characteristics of private capitalist firms.

The dismal performance of the individual units should not be interpreted to be the failure of the co-operative principles but as the result of the incompetence of the persons in position of control and authority.

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The best way to be ready for the future is to invent it.

— John Sculley

Cost & Productivity in Indian Agriculture

Sarathi Acharya

Agricultural productivity has been witnessing a growing trend in recent times owing to government policies of promoting new technologies in addition to expanding the area under irrigation. However, while price supports have induced farmers to grow more, the cost of production has spiralled causing serious concern. This study analyses the relationship between Cost and Productivity for various crops regionwise and concludes that productivity can be enhanced by proper application of material inputs and modern technology.

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In recent years, Indian agriculture has experienced continued growth, owing to which the aggregate per-capita food output has kept more than apace with the population rise. This has been consequent to a policy to spread the new seed-fertilizer technology in irrigated as well as rain fed tracts, in addition to expanding the area under irrigation. For reasons originating from considerations of sustainability and efficiency, however, this policy is now under serious discussion.

During the eighties, detailed crop-specific studies revealed that certain crops and areas performed better than others; as a result, regional disparities have been rising and the production base getting narrower (Bhalla & Tyagi, 1989; Mruthyunjaya & Kumar, 1989). The increasing production has also been accompanied by rising costs, and while price supports have provided incentives to farmers for growing more, some studies on the input structure find that the cost of production of some crops have become high in a regional as well as international context despite the vast subsidies offered and the extant cheap labour (Gulati & Sharma, 1990; Gulati Hansen & Pursell, 1990; World Bank, 1991).

Such a process, many say, has been accentuated as a result of bringing marginal lands under the plough, cutting the tree cover to expand the cultivated area, mono-cropping and excessive use of inorganic fertilizers (Rao, 1991). It is logically concluded that this cost led price spiral can damage the economy, and pose a serious ecological threat (Nadkarni, 1988).

In view of these major concerns some diagnostic issues relating to the cost structure and its relationship with productivity, emerge:

- What is the extent of variation in the cost of production and production of crops between different regions and what are its underlying causes? In this context, the main contention would be to establish a relationship between the intensity of cultivation and productivity.

- With regard to the issue of the composition of the cost structure, are the different inputs combined in conjunction with the technically required norms or is there a major deviation for reasons originating from inputs (non) availability and price?
- What are the rates of return in each crop and how are they related to the costs?

A few related questions have been addressed in the literature. The Commission on Agricultural Costs and Prices (CACP) periodically brings out reports on the costs of production of different crops, which form the basis for fixing output procurement prices. There is, however, scant or no discussion on the reasons for the persistent cost differences and the resultant differences in the rates of return. Some references to these aspects are available in Kahlon & Tyagi (1980) and Kahlon & George (1985), but their discussion is primarily focussed on the methodology of data collection rather than on inter-crop and inter-regional variations. This paper aims to understand the cost structure of different crops and their relationship with productivity. The data used are the Cost of Cultivation Surveys (COC), pertaining to the eighties (see Appendix).

The Total Cost

Table 1(a) contains data on the cost of production per quintal and land productivity of the 14 major crops grown in the 15 states, averaged over different years for the eighties at 1980-81 prices. The definition of cost here is the sum of all the factor and material inputs expenses actually incurred as well as imputed. The latter values are the market equivalents of the inputs provided by the farming households. The variables for which data are imputed are, the cost of own labour, rent on owned land and return to owned capital. Productivity is calculated in physical units, i.e. quintals per hectare. The relationship between these two variables is expected to throw light on the rationality of the incurred cost.

Data from tables 1a and 1b suggest that the variation in the cost per quintal is small compared to that in the yield rate, though it exists (table 1b). The general pattern shows that crops which have high (land) productivity, also have low unit cost. Some typical examples are as follows: wheat in Punjab has the highest land productivity and lowest unit cost, cotton in Maharashtra is least productive and most expensive and sugar cane in Karnataka has high productivity and least cost.

To examine the relationship between the unit cost and productivity, the former has been regressed on the latter. The estimates are given in table 2. The coeffi-

Table 1(a). Cost and Productivity of Production of Different Crops by State (1980-81 Prices)

Crop/State	Cost per Quintal (Rs.)	Productivity (Q/HA.)
Paddy		
Andhra Pradesh	115.28	33.40
Assam	86.19	18.25
Bihar	117.73	18.21
Haryana	114.64	35.23
Karnataka	100.11	34.50
Madhya Pradesh	119.76	13.83
Orissa	101.17	18.47
Punjab	99.58	53.26
Tamil Nadu	124.34	36.59
Uttar Pradesh	134.17	21.53
West Bengal	122.56	22.94
Wheat		
Bihar	128.53	21.14
Haryana	127.90	27.52
Himachal Pradesh	157.00	11.80
Madhya Pradesh	145.25	12.51
Punjab	119.44	32.04
Rajasthan	143.60	23.53
Uttar Pradesh	142.52	25.13
Sorghun		
Andhra Pradesh	169.39	5.94
Gujarat	200.19	7.23
Karnataka	131.82	8.46
Madhya Pradesh	133.46	7.84
Maharashtra	175.39	8.04
Maize		
Bihar	111.08	22.25
Himachal Pradesh	131.60	13.55
Madhya Pradesh	140.35	8.54
Rajasthan	186.94	10.11
Bajra		
Gujarat	143.36	11.11
Haryana	191.22	7.12
Maharashtra	306.64	4.84
Rajasthan	166.42	3.91
Uttar Pradesh	153.57	13.06
Cotton		
Gujarat	420.43	10.08
Karnataka	344.43	10.99
Madhya Pradesh	342.80	5.64
Maharashtra	460.84	3.89
Punjab	357.37	9.81
Sugar Cane		
Andhra Pradesh	13.04	738.55
Bihar	11.11	417.42

(Contd.)

Table 1(a) *(contd.)*

Crop/State	Cost per Quintal (Rs.)	Productivity (Q/HA.)
Haryana	12.25	353.83
Karnataka	9.30	830.47
Maharashtra	12.46	845.88
Tamil Nadu	10.03	960.80
Uttar Pradesh	11.94	403.15
Jute		
Assam	172.14	13.00
Bihar	144.37	11.13
Orissa	132.94	17.66
West Bengal	178.42	17.21
Moong		
Andhra Pradesh	280.41	4.17
Madhya Pradesh	278.13	3.45
Maharashtra	476.18	1.98
Orissa	249.25	3.24
Rajasthan	430.97	1.93
Tur		
Karnataka	246.28	4.55
Madhya Pradesh	244.51	6.48
Maharashtra	336.17	4.14
Uttar Pradesh	198.17	12.64
Urad		
Andhra Pradesh	236.04	4.81
Madhya Pradesh	268.23	3.98
Maharashtra	406.67	2.82
Orissa	170.18	4.75
Tamil Nadu	315.00	5.11
Uttar Pradesh	392.38	4.63
West Bengal	188.22	6.99
Gram		
Haryana	284.27	5.43
Madhya Pradesh	248.68	6.04
Rajasthan	211.27	6.23
Uttar Pradesh	236.60	10.13
Groundnut		
Andhra Pradesh	334.07	6.75
Gujarat	359.48	7.53
Karnataka	283.21	7.33
Madhya Pradesh	220.19	8.94
Orissa	199.48	11.27
Tamil Nadu	290.60	11.38
Mustard		
Assam	249.73	5.27
Haryana	224.45	9.53
Punjab	284.01	8.38
Rajasthan	225.09	8.31
Uttar Pradesh	261.47	8.73

Table 1(b). Coefficients of Variation in the Cost of Production and Productivity Across States (%)

Crop	Cost per Quintal	Productivity (Q/HA)
Paddy	15.76	45.96
Wheat	13.22	33.16
Sorghum	23.49	12.45
Maize	23.34	43.42
Bajra	23.35	43.82
Cotton	21.59	44.69
Sugar cane	17.24	40.23
Jute	22.44	22.31
Moong	30.21	26.81
Tur	23.61	53.40
Urad	29.98	23.56
Gram	20.51	32.08
Groundnut	24.25	24.50
Mustard	16.17	24.90

cients for all the 14 crops are negative, and in as many as 13, they are significant at 5 per cent confidence. Only in paddy it is significant at 10 per cent. These results suggest that crops and states which register high productivity are able to keep the costs down.

Economies to intensive cultivation can, as yet, be reaped in most crops in Indian agriculture. This is in spite of the fact that the fixed costs are very high in the better endowed regions. Arguments in the literature which suggest that the unit costs are on the rise owing to a drive to achieve high targets, are not supported on the aggregate by these data. On the contrary, the cost structure, in some extent, appears downward inflexible, i.e., low or poor utilization of land could make agriculture expensive and less viable. Only paddy shows a weak relationship, possibly because it is now increasingly being grown in low rainfall areas under artificially irrigated conditions, thereby raising its costs.

Low or poor utilization of land could make agriculture expensive and less viable.

This (spatial) analysis brings out the regional contrast sharply. The backward areas and low value crops can gain extensively by application of modern inputs, though it is more difficult to assert that a still higher application of inputs in the already developed regions and high value crops will help very much, unless the production frontier shifts.

Table 2. Regression Results in Unit Cost-Productivity Relationship
$\log (C/Q) = \log a + b \log (Q/\text{ha})$

Crop	Constant	B Coefficient	R^2
Paddy	2.14	–0.08 (1.49)	0.05
Wheat	2.45	–0.24* (5.11)	0.44
Sorghum	3.10	–1.04* (3.04)	0.35
Maize	2.53	–0.35* (2.88)	0.43
Bajra	2.51	–0.29* (3.38)	0.38
Cotton	2.79	–0.26* (3.29)	0.33
Sugar cane	1.52	–0.17* (2.06)	0.15
Jute	2.26	–0.35* (1.86)	0.15
Moong	2.84	–0.74* (5.65)	0.63
Tur	2.63	–0.31* (3.20)	0.53
Urad	2.84	–0.63* (2.51)	0.26
Gram	2.68	–0.37* (3.40)	0.33
Groundnut	3.12	–0.72* (4.15)	0.49
Mustard	2.56	–0.20* (1.59)	0.12

*indicates significance at 5 per cent confidence.
C = Cost; Q = Output

Components of Costs

Table 3, which computes the share of each major input in the total cost structure, reflects upon the composition of the inputs. This table presents data at the aggregate crop level and not by a regional break-up because the variation in the share of each cost component across states in the crops is not large, as seen from the standard deviation statistics (brackets in table 3). Here the share of factor inputs — labour and capital — in the total cost ranges between 69-89 per cent in different crops, which is large and comparable to that in high value adding industries. Sugar cane, wheat, cotton and groundnut are at the lower end of the spectrum while sorghum, bajra, moong and mustard are at the upper end. The former group of crops are those which fetch a high value and receive high input doses while the latter are of low productivity and use low inputs.

A possible explanation for these proportions emerges from the (low) state of technology and factor endowment in rural India; it is probably the lowest among major agricultural countries. Inputs on the aggregate, are generally applied in low doses in all crops, as observed from table 2. The proportion of factor inputs is high because there is downward inflexibility in these, since wages (or earnings) are already at the very subsistence levels in most of cases and land rents are computed at the opportunity cost in a land scarce economy. Thus, when the material input application is low, even a small quantity of factor inputs can show up as a high proportion.

A question that suggests itself from these tables is, whether there is a relationship between the composition of the cost and productivity. Table 4 shows regression results between the proportion of factor cost to total cost (in percentage) and land productivity (in quintals). In 10 out of the 14 crops, this relationship is negative, out of which, in 7 it is negative and significant at 5 per cent confidence. Only in tur it is positive and statistically significant. Thus in the 7 crops — paddy, wheat, sorghum, maize, bajra, jute and mustard — the share of factor cost and productivity are inversely related: meaning that a higher productivity is necessarily accompanied by application of greater material input doses — both in proportion and absolute quantity. It is weak among pulses and groundnut, possibly because of the extant (poor quality) technology package available to them.

A higher productivity is necessarily accompanied by application of greater material input doses — both in proportion and absolute quantity.

The fact that material inputs hold a key place in explaining variations in productivity, calls for a detailed examination of its major constituents. Table 5 presents partial elasticity estimates of production with respect fertilizer (and manure) and irrigation, the two main inputs. However, since the irrigation variable is not adequately measured (the cost is not an adequate measure), its elasticity can at best be considered indicative. The shares of each of these inputs in the total cost are the independent variables and the output (measured in quintals) is the independent variable. A double log regression has been fitted to obtain direct estimates of the (partial) elasticities.

The fertilizer elasticity is statistically significant with a right sign in 10 out of the 14 crops. It is not significant in maize, pulses other than gram and the oil seeds, possibly

Table 3. Percentage Distribution of the Share of Select Inputs in Total Cost by Crops (1980-88)

Crop/State	Land	Other factor Cost	Total factor	Fertilizer	Other material	Total material	Total
Paddy	37.85	41.13	78.98	10.65	10.38	21.02	100.00
	(4.25)	(7.90)	(7.86)	(5.47)	(3.75)	(7.86)	
Wheat	38.71	34.02	72.73	11.69	15.58	27.27	1000.0
	(5.81)	(4.93)	(4.28)	(4.06)	(3.33)	(4.08)	
Sorghum	38.56	46.70	85.26	8.92	5.82	14.74	100.00
	(6.47)	(6.15)	(4.47)	(3.01)	(2.46)	(4.47)	
Maize	42.84	40.57	83.41	10.77	5.82	16.59	100.00
	(5.82)	(6.85)	(2.41)	(2.55)	(2.42)	(2.40)	
Bajra	38.38	49.89	88.27	5.82	5.91	11.73	100.00
	(7.74)	(4.96)	(7.73)	(4.69)	(3.40)	(7.13)	
Cotton	36.40	35.26	71.66	12.78	15.56	28.34	100.00
	(8.32)	(6.71)	(8.54)	(4.98)	(5.50)	(8.54)	
Sugarcane	41.18	28.31	69.49	12.72	17.79	30.51	100.00
	(8.83)	(5.64)	(5.85)	(6.13)	(5.21)	(5.85)	
Jute	35.34	54.01	89.35	5.72	4.94	10.65	100.00
	(8.53)	(8.38)	(3.01)	(2.87)	(1.11)	(3.01)	
Moong	43.44	42.46	86.00	3.95	10.05	14.00	100.00
	(5.44)	(5.98)	(3.91)	(4.55)	(3.44)	(3.91)	
Tur	42.47	42.37	84.84	5.68	9.48	15.16	100.00
	(7.81)	(6.20)	(9.14)	(4.83)	(6.47)	(9.14)	
Urad	43.08	42.87	85.95	3.59	10.46	14.05	100.00
	(6.93)	(8.69)	(4.02)	(2.14)	(4.37)	(4.02)	
Gram	44.34	37.21	81.55	1.01	17.43	18.45	100.00
	(4.07)	(5.03)	(3.04)	(0.95)	(2.43)	(3.04)	
Groundnut	34.54	31.38	65.92	8.63	25.45	34.08	100.00
	(6.45)	(4.12)	(5.39)	(3.62)	(4.35)	(5.39)	
Mustard	44.87	41.86	86.73	5.26	8.02	13.27	100.00
	(5.46)	(7.14)	(2.73)	(2.17)	(2.43)	(2.73)	

Figures in parantheses show the standard deviations calculated across states.

because fertilizers are generally not applied in many of these crops in India. It is of interest to note that most of the crops that show statistical significance in table 4 also show the same for fertilizers in table 5. The importance of material inputs thus stands vindicated. The negative significant sign in cotton is somewhat inexplicable. The elasticity values with respect to irrigation, the other input that is complementary to fertilizers — even though measuring it by its cost may be inappropriate — shows significance only in 4 crops; a point understandable due to the said limitation.

These statistics suggest that on the aggregate, material inputs constitute a small component of the cost structure, and the main reason for this seems to be the subsistence nature of the farming practices. Thus, despite low wages, factor inputs have a dominant share in the total cost. There is a visible possibility of raising crop productivity by enhancing the use of material inputs, as indicated earlier.

Determinants of Productivity

The statistical relationships established so far exhibit a strong association between the inputs and outputs. The individual impact of different inputs on the output is now determined.

The main variants of productivity are the inputs themselves. The principal components of costs are, the materials, labour and capital. Here, a model is set up which establishes a relationship between these and the output. The four explanatory variables are, the labour input, capital input, irrigation and material inputs (other than irrigation). Irrigation has been separated from material inputs since its place in Indian agriculture is critical.

Labour input is measured by the total person hours employed in crop operations per hectare and material inputs are measured by the value of fertilizers, manures and pesticides at constant 1980-81 prices. There is no

Table 4. Regression Estimates of Factor Cost and Productivity Relationship

$\log (Q/HA) = \log a + b \log (FC/TC)$

Crop	Constant	Share of Factor Cost in Total Cost	R^2
Paddy	3.26	–0.03* (7.26)	0.54
Wheat	3.28	–0.03* (2.95)	0.21
Sorghum	3.02	–0.03* (3.45)	0.64
Maize	2.86	–0.06* (2.05)	0.28
Bajra	3.08	–0.03* (3.27)	0.36
Cotton	3.52	–0.003 (0.43)	0.01
Sugar cane	3.95	–0.008 (0.98)	0.03
Jute	3.23	–0.07* (3.69)	0.40
Moong	3.03	–0.01 (0.75)	0.03
Tur	3.63	0.03* (2.39)	0.39
Urad	3.29	0.009 (0.49)	0.01
Gram	3.52	0.02 (0.85)	0.01
Groundnut	3.68	0.007 (0.89)	0.04
Mustard	3.16	–0.06* (2.31)	0.22

*indicates significance at 5 percent confidence
FC = Factor Cost, TC = Total Cost.

Table 5. Partial Output Response Elasticity Estimates with Respect to Select Material Inputs

$\ln (Q/\text{ha}) = a + b \ln (x/tc)$

Crop	Fertilizer	Irrigation
Paddy	0.29*	0.17*
Wheat	0.47*	0.11*
Sorghum	0.30*	0.09*
Maize	–0.42	0.09*
Bajra	0.28*	0.04
Cotton	–0.41*	–0.04
Sugar cane	0.30*	–0.05
Jute	0.21*	–0.09
Moong	0.02	0.02
Tur	–0.26	0.11
Urad	–0.04	0.02
Gram	0.10*	–0.15
G'Nut	–0.14	0.01
Mustard	0.05	–0.15

*denotes significance at 5 per cent

direct measure of capital or land input available from the COC data. What is available is the rental value of land, computed in accordance with the prevalent land rent at that time in that region. This is an imperfect measure and also has a near perfect correlation with the output. Hence, it is not included (Rao & Miller, 1973). Lastly, irrigation is measured by the cost incurred on it (at constant prices). This is again an imperfect measure since different crops and areas require varying quantities of water and different modes of irrigation are priced differently. But the COC data leave no choice in the identification of variables. The dependent variable is the output, measured in quintals.

A single equation estimation procedure is applied using the OLS method. Equations for paddy, wheat and sugar cane have been estimated separately. The three coarse grains — sorghum, bajra and maize — have been pooled together since they are similar, they are grown in semi-arid environments and they are all grown in the kharif season. For similar reasons, data on cotton and jute are pooled and those of the three pulses — moong, urad and tur — and groundnut have been grouped together. The two rabi crops that are often intercropped together – gram and mustard — are pooled in one group. All the variables other than the cost of irrigation have been subject to log transformation; irrigation cost is maintained in the generic form since it has many zero values and cannot be subject to such a transformation.

The estimates, given in table 6, show that all equations other than the one of gram and mustard, are good fits showing the right signs and statistical significance. The material intensity coefficient is significant in all the equations. The yield rate will rise the highest by material input in wheat, followed by cotton/jute, and then paddy. In others — and unexpectedly so in sugar cane — the coefficient value is not high. In a similar contrast, the coefficient of labour for sugar cane is high.

Conclusion

Looking at inter-state cross-sectional data on the cost of production of different crops to judge the relationship between cost and productivity, the broad results suggest that there is little indication of falling yields in Indian agriculture, at least as seen from these data. The unit cost of production actually falls with higher intensity of cultivation. Productivity, to a great extent, is constrained by the low application of material inputs. Backward areas can extensively gain by modern technology packages. Lastly, the variations in productivity are considerably explained by irrigation, other material inputs and labour.

Table 6. Regression Results Explaining Variations in Productivity

Crop/Crop Combination	Constt.	Ln (Labour)	Dependent Variable: ln(crop value at constant prices)		
			Ln (Mat.) input	Irr.	R^2
Paddy	4.69*	0.29*	0.23*	0.0004*	0.79
	(4.80)	(1.76)	(4.78)	(3.23)	
Wheat	3.77*	0.39*	0.31*	0.0009*	0.84
	(6.40)	(4.22)	(7.74)	(3.88)	
Sorghum/Maize/Bajra	4.25*	0.39*	0.13*	0.002*	0.58
	(5.40)	(2.32)	(1.62)	(3.22)	
Cotton/Jute	3.99*	0.36*	0.26*	0.0006	0.47
	(4.32)	(2.93)	(4.31)	(1.13)	
Moong/Urad/Tur/Gr. Nut	2.95*	0.62*	0.13*	0.002*	0.54
	(3.64)	(4.36)	(2.81)	(3.03)	
Gram/Mustard	6.45*	0.09	0.13*	0.003*	0.55
	(11.74)	(0.79)	(1.84)	(4.34)	
Sugar cane	4.60*	0.47*	0.20*	0.0003	0.61
	(3.93)	(2.05)	(1.70)	(1.37)	

*Significant at 5 per cent confidence.

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Appendix

State/Crops	Years
Andhra Pradesh	
Paddy	1981/2-83/4
Sorghum	1985/6-86/7
Sugar Cane	1980/1, 82/3-84/5 & 86/7
Moong	1981/2-84/5
Urad	1981/2-84/5
Ground Nut	1981/2-83/4
Assam	
Paddy	1981/2-86/7
Jute	1981/2-86/7
Mustard	1981/2-86/7
Bihar	
Paddy	1980/1-83/4
Maize	1981/2-83/4
Sugar Cane	1981/2-83/4
Jute	1981/2-83/4
Gujarat	
Sorghum	1981/2-83/4
Bajra	1981/2-83/4 & 86/7
Cotton	1981/2-83/4
Ground Nut	1980/1-83/4
Haryana	
Paddy	1984/5-86/7
Wheat	1981/2-87/8
Bajra	1981/2-86/7
Gram	1981/2-87/8
Mustard	1980/1 & 84/5-87/8

(Contd.)

State/Crops	Years
Himachal Pradesh	
Wheat	1981/2-83/4
Maize	1981/2-83/4
Karnataka	
Paddy	1981/2-86/7
Sorghum	1980/1-83/4
Cotton	1981/2-83/4 & 85/6
Sugar Cane	1981/2-85/6
Tur	1981/2-83/4
Ground Nut	1981/2-83/4 & 85/6-86/7
Madhya Pradesh	
Paddy	1981/2-86/7
Wheat	1981/2-87/7
Sorghum	1981/2-86/7
Maize	1981/2, 83/4, 85/6-86/7
Cotton	1981/2-86/7
Moong	1981/2-86/7
Tur	1981/2 & 84/5-85/6
Urad	1981/2-86/7
Gram	1981/2-86/7
Ground Nut	1980/1
Maharashtra	
Sorghum	1981/2-83/4 & 86/7
Bajra	1981/2-82/3
Cotton	1980/1-83/4
Sugar Cane	1982/3-83/4
Moong	1981/2-82/3
Tur	1981/2-82/3
Urad	1981/2-82/3
Orissa	
Paddy	1981/2-84/5 & 86/7
Jute	1981/2-83/4 85/6-86/7
Moong	1981/2-86/7

State/Crops	Years
Urad	1984/5-85/6
Ground Nut	1984/5-86/7
Punjab	
Paddy	1981/2 & 1984/5-86/7
Wheat	1982-3-87/8
Cotton	1980/1-86/7
Mustard	1987-88
Rajasthan	
Wheat	1982/3-87/8
Maize	1982/3-83/4 & 85/6
Bajra	1981/2-83/4
Moong	1981/2-83/4
Gram	1981/2-86/7
Mustard	1981/2 & 83/4-86/7
Tamil Nadu	
Paddy	1980/1-81/2
Sugar Cane	1981/2-83/4
Urad	1981/2-82/3
Ground Nut	1981/2-83/4
Uttar Pradesh	
Paddy	1981/2-83/4
Wheat	1981/2-83/4 & 85/6
Bajra	1981/2-86/7
Sugar Cane	1980/1-82/3
Tur	1984/5-86/7
Urad	1984/5-86/7
Gram	1981/2-84/5
Mustard	1982/3-86/7
West Bengal	
Paddy	1981/2-84/5
Jute	1980/1-86/7
Urad	1984/5

□

All people ask for is a chance to work with pride and joy.

— Dr. W. Edwards Deming

Growth & Instability in Asian Agriculture

K.N. Ninan & H. Chandrashekar

Agricultural Growth in the Asian region during the recent few decades has been quite impressive when compared to that in other regions such as the Sub-Saharan Africa. But this growth has been accompanied by greater instability in crop yields and increasing production costs, due to technological, economic and environmental constraints. The paper analyses the growth experience of Asian agriculture and its implications for growth, equity and sustainability. It also, discusses the various strategies and interventions needed to accelerate and promote sustained agricultural growth in the Asian region, under diverse environments and constraints.

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Growth & Instability in Asian Agriculture

Evidences from across the globe suggest that despite modest to impressive agricultural growth rates recorded in several regions and countries during the recent few decades, instability in output and yield rates whether measured around the trend or mean too has increased. At the global level, production variability around the growth trend increased between the 1960s and 1970s in both absolute and relative terms. The associated probability of a major shortfall below the trend in world cereal production too increased (Anderson & Hazell, 1989). The growth pattern, nature and magnitude of instability in output and yield rates have varied across regions, crops and time. Variability in crop yields was observed to be relatively high in Africa, the Middle East, Australia and parts of Asia (Anderson & Hazell, 1989, Ninan & Chandrashekar, 1991); so also semi-arid regions reported greater level of instability in crop yields compared to humid and temperature regions (Anderson *et al.* 1987). Crop-wise, maize, barley and sorghum reported an increase in yield variability at the global level whereas rice and wheal recorded a slight decline (Anderson & Hazell, 1989). Instability in output and yield rates appears to have worsened after the advent of the green revolution raising doubts as to whether the new technology had elements which tended to aggravate yield instability. However, the experience of countries in this regard has varied. For instance, while instability in crop yields increased in India following the green revolution, (Ninan & Chandrashekar, 1991), in Bangladesh it is reported to have declined (Alauddin & Tisdell, 1988). This is because unlike in India where one finds greater diversity of crops and environments, in Bangladesh the environment is less diverse, with rice which is mostly irrigated or grown under assured rainfall conditions being the dominant crop. Not withstanding these contrasts, there can be no dispute that reducing instability in agriculture is of no less importance than accelerating agricultural growth itself. This is because an increase in agricultural

instability impacts on income, employment and consumption, and hence is of concern to producers, consumers and the economy as a whole. Moreover, evidences of a strong association between the poverty ratio and the level of agricultural performance have emphasised the need for reducing agricultural instability along with accelerating agriculture growth (Ahluwalia, 1978). Therefore, there has been considerable interest among researchers and policy-makers alike to understand the underlying causes behind crop yield instability in different contexts. The question of production costs in agriculture rising faster than the rate of growth in crop yields has been another area of major concern (Nadkarni, 1988; Conway & Barbier, 1990; Ninan & Chandrashekar, 1991). This along with the rising trend in crop yield instability has invariably focussed attention on the economic and environmental costs of alternate growth strategies.

Among the regions, agricultural growth in Asia has been quite impressive unlike in the Sub-Saharan Africa where it has been dismal. Not only has this growth been dominated by yield improvements owing to widespread adoption of modern inputs but has also enabled food output in the Asian region to keep pace with population growth. But this growth process has been accompanied by greater instability in crop yields and increased production costs due to various technological, economic and environmental constraints. It is also reported to have accentuated inequities in some pockets, both inter-personal and inter-regional as well as led to imbalances within the agricultural sector. For instance, rice and wheat production rose at the expense of coarse cereals which are mostly consumed by low income groups. These are hurdles to accelerating and realising sustained agricultural growth in the Asian region.

Growth & Instability

In this context an analysis was undertaken covering selected crops and countries in Asia, using data from the FAO Production Year books. For the analysis linear trends were used with slope expressed as per cent at respective means to measure growth. To measure instability the co-efficient of variation used, around the trend (CVT) or mean (CV) — wherever the trends are not statistically significant or negative). Though production variability arises on account of areas and yield variability and their interaction effects, the focus was mainly on yield instability. This is because unlike area which is subject to endogenous factors within a farmer's control, yield variations also arise on account of exogenous factors like weather which are beyond a farmer's control (Ninan & Chandrashekr, 1991). It is also the major variable of interest in comprehending production variability. Moreover, with land being a limiting factor in most Asian countries, prospects for sustained agricultural growth in Asia have to rely on accelerating and stabilising yield rates.

The analysis was restricted to selected crops viz., rice, wheat, millet, sorghum and maize which are major staples in Asia and covered the Asian region as a whole and for major producing countries. Apart from an analysis for the period as a whole, i.e., 1961 to 1991, disaggregated analysis of the data for two sub-periods, viz., 1961 to 1975 (Period I) and 1976 to 1991 (Period II), was also attempted. Though there is no specific reason for this demarcation, Period I broadly corresponds to the initial phase of the green revolution whereas Period II corresponds to the latter phase.

Table 1 summarises the results of the analysis. As evident, about 92 per cent of the world's rice output, about 50 per cent of the millet output and a third or more of the world's wheat, sorghum and maize output is accounted for by Asia. Yields of these five crops recorded a significant growth during the period under review for the Asian region as a whole. The growth rates were relatively high for maize and wheat, and low for millet. In Period II yields of wheat grew faster than that of other crops, followed by maize, rice, sorghum and millet. However, along with growth, instability in yields of these crops too also increased. The increase in yield instability was highest for those crops which registered the highest growth rates in yields. Over the two periods, except for maize all crops reported a rise in yield instability for the Asian region as a whole. For the entire period, the CVTs for sorghum and maize yields were higher than for other crops. Rice and wheat which benefited the most from irrigation and modern inputs reported relatively low level of instability compared to the other crops (with the exception of maize in Period II).

The increase in yield instability was highest for those crops which registered the highest growth rates in yields.

More than three-quarters of Asia's rice output is from China, India, Indonesia and Bangladesh. The rest is accounted for by a number of countries spread over south, south-east and far-east Asia Rice yields recorded a significant growth in all the selected countries during

Table 1. Growth and Instability in Crop Yields for Asian Agriculture (1961 to 1991).

Regions/ Countries and Crops	Percent Share in World or Asian output (1991)	Growth Rates (per cent per annual)			Instability (CVT/CV in per cent)		
		1961 to 1991	1961 to 1975	1976 to 1991	1961 to 1991	1961 to 1975	1976 to 1991
ASIA (to world output)							
Rice	91.8	2.2*	1.4*	2.5*	4.6	2.2	2.4
Wheat	37.3	3.8*	3.4*	3.9*	7.9	4.2	5.1
Millet	49.3	1.4*	2.1*	1.2*	7.0	4.4	7.9
Sorghum	29.7	2.9*	1.5**	2.2*	12.4	8.4	11.0
Maize	26.6	4.0*	4.9*	3.6*	8.5	14.7	4.1
RICE (to Asian output)							
China	39.3	2.9*	1.4*	3.3*	7.9	1.8	4.8
India	23.2	2.1*	1.4*	2.9*	8.2	6.8	6.2
Indonesia	9.3	3.5*	3.6*	3.0*	6.1	7.1	4.2
Bangladesh	6.0	1.6*	0.3	2.6*	8.0	5.1@	5.6
Thailand	4.2	0.9*	1.3*	0.6	5.9	5.0	6.6@
Vietnam	4.1	1.7*	–0.1	0.03*	11.6	8.6@	4.0
Myanmar	2.8	0.02*	0.7*	2.7*	11.3	3.7	9.9
Japan	2.5	0.6*	1.5*	0.4	5.6	3.8	6.6@
Philippines	2.0	3.2*	2.4*	2.6*	6.0	5.0	3.1
Korea Rep.	1.6	1.9*	1.9*	1.3*	7.4	6.5	7.6
Pakistan	1.0	1.8*	0.04*	–0.01	11.2	10.2	3.4@
Nepal	0.8	0.01*	0.003	1.4**	7.9	4.7@	8.5
Sri Lanka	0.5	1.7*	1.3**	2.7*	10.0	8.5	8.6
WHEAT							
China	46.2	5.1*	3.6*	5.5*	15.7	4.8	9.9
India	26.5	3.4*	4.2*	3.3*	6.5	9.5	3.8
Turkey	9.9	2.5*	2.4*	1.2*	8.8	10.8	5.3
Pakistan	7.1	2.9*	4.0*	1.8*	6.8	8.5	5.7
Iran	4.3	1.4*	0.8	0.7	10.1	11.3@	9.2@
Saudi Arabia	1.9	5.1*	1.0	8.9*	29.6	15.2@	12.1
MILLET							
India	63.0	1.5*	1.1	1.5**	12.5	14.3@	11.5
China	31.5	4.6*	2.4*	5.4*	19.4	2.4	15.0
Nepal	1.5	–0.5*	–0.5**	–0.9	10.4@	4.7@	12.5@
Pakistan	1.4	–0.3*	0.01	–1.7*	7.0@	4.4@	8.7@
SORGHUM							
India	62.9	1.7*	1.4*	1.3**	8.6	7.9	8.5
China	32.7	5.6*	16.7*	0.1	36.8	74.5	14.9@
Pakistan	1.5	0.5*	2.0*	–0.5**	7.0	5.1	4.1
Thailand	1.4	–2.2*	–0.4*	–2.7	24.9@	10.6@	18.9@
Yemen	0.8	–3.7*	–4.9*	–1.3	41.2@	27.8@	28.8@
MAIZE							
China	73.2	2.0*	1.5*	3.0*	7.5	2.9	5.9
India	6.4	1.4*	–0.4	2.5*	5.6	9.6@	10.3
Indonesia	5.0	3.2*	1.5*	4.0*	9.7	6.7	3.3
Philippines	3.7	4.1*	1.9*	7.6*	32.6	6.3	27.8
Korea D.P.R.	3.5	5.4*	0.9	4.8*	24.7	9.5@	17.7

Note: 1 (i) Growth Rates are linear trends with slope expressed as per cent at respective means.
(ii) *, **, *** — denotes statistical significance at 1, 5 and 10 per cent levels of significance; remaining growth rates are not significant at the above levels of significance.
2. CVT/CV are coefficient of variation around trend and mean respectively expressed in percentage terms. @ are CVs, the rest are CVTs.
Source: Computed from data in the FAO Production yearbooks (various issues), FAO, Rome (Italy).

1961 to 1991. These, however, varied across countries. While these growth rates ranged between 2 to 3.5 per cent per annum for China, India, Indonesia and Philippines, in the remaining countries they were below 2 per cent ranging from 0.01 per cent in Nepal to between 1.8 to 1.9 per cent in Korea Rep. and Pakistan. Growth in yields was higher in period II compared to Period I in a number of countries such as China, India, Bangladesh, whereas in Indonesia, Thailand, Japan, Korea Rep. and Pakistan it was lower than in Period 1. Instability in rice yields also rose during the period under review, the CVTs ranging from 5.6 per cent in Japan to 11.6 per cent in Vietnam. Over the two periods, instability in rice yields increased in most countries during Period II as compared to in period I. Rice is grown under diverse environments and constraints in Asia. Also yield-enhancing technologies have encouraged rice to move to marginal areas also which accounts for the rise in yield instability of rice, despite it being largely irrigated and benefiting from modern inputs.

China and India between themselves contribute to more than two-thirds of Asia's wheat output with the rest being mostly accounted for by Turkey, Pakistan, Iran and Saudi Arabia. Between 1961 and 1991, wheat yields recorded a significant growth in these six countries, the annual growth rates ranging between 3.4 to 5.1 per cent for India, china and Saudi Arabia, and between 1.4 to 2.9 per cent for the remaining countries. Although instability in wheat yields have also risen, it is interesting to note that instability in wheat yields have reduced in period II as compared to Period I in all countries except China. Like rice, wheat too has benefited the most from irrigation and modern inputs. However, China and Saudi Arabia which recorded the highest growth rates in wheat yields also reported the highest level of instability in yields too. The rise in wheat yield instability for the Asian region observed earlier appears to be dominated by the relatively high variability of China's wheat crop.

The absence of relevant data precludes us from identifying the reasons for the high variability of China's wheat crop, although there is no doubt that like rice, wheat too is grown under diverse environments and constraints in Asia.

India, China and a few other countries account for most of Asia's output of millet, sorghum, maize and other coarse cereals which are the staples of low income groups in Asia. The growth in yields of these crops has varied across countries and time. While maize yields recorded significant growth in the five countries under review, miller yields grew significantly in India and China, but declined in Nepal and Pakistan, whereas in the case of sorghum significant improvements in yields were reported in India, China and Pakistan, whereas Thailand, and Yemen reported a decline. For these three coarse cereals, along with growth, instability in yields too have risen in many countries for the entire period. What is striking is that the magnitude of yield instability in the case of sorghum, maize and millet is quite high in a number of countries when compared to the same for rice and wheat, For sorghum the CVTs/CVs ranged between 7 to 41 per cent; for maize from 5.6 to 33 per cent and 7 to 19 per cent in the case of millets. Unlike rice and wheat, coarse cereals are grown under less favoured conditions which explains their relatively higher variability.

Our findings are generally in tune with that of other studies viz., that instability in crop yields have moved in sympathy with growth in Asia as elsewhere; and instability in rice and wheat yields being lower than that of coarse cereals (Mehra, 1981; Barker *et, al*, 1981; Hazell, 1982; Nadkarni & Deshpande, 1982, 1983; Anderson *et. al*, 1987; Ninan & Chandrashekar, 1991). The studies also indicate that not only is variability of unirrigated farming higher than that of irrigated farming but also yield variability is more pronounced than area variability (Dhawan, 1987; Ninan & Chandrashekar, 1991). Though the level of relative instability for some countries and crops is low by international standards, absolute variability for large low income countries are large (Valdes & Konandreas, 1981); further with large on-farm retentions of crop produce and highly skewed income distribution patterns in LDCs, even small variations in relative instability have important economic and welfare implications (Hazell, 1982).

Factors Behind Yield Instability

What are the factors affecting yield instability? Are they solely weather-related or are there other factors too which explain this phenomenon? This has been an issue of major concern to researchers and policy-makers alike.

There is no doubt that climate is an important factor behind yield instability. Semi-arid regions reported greater level of instability in crop yields as compared to other regions, which points to the role of climate in affecting yield instability. Climate encompasses a host of factors such as temperature, frost, rainfall, etc. Changes in one or more of these factors can affect yield variability through changes in the length of the growing season and environment conducive to crop growth. A study from the United States, for instance, noted that the difference between U.S. maize yields in the 1930s and 1940s was due

to the unusually high temperatures of the 1930s (Thompson, 1969, vide Barker *et. al*, 1981). Fears of a global warming due to ozone-layer depletion have alarmed environmentalists and agricultural scientists alike because of its potential disastrous consequences on crop growth. Rainfall is another important variable affecting yield variability. A recent study from India observes that agricultural output has become more sensitive to rainfall in the post-green revolution period, with the elasticity of output with respect to rainfall increasing for most crops except wheat and some rabi (winter) crops in this period (Rao et al, 1988). This phenomenon is attributed to the strong complementary relationship between the use of modern inputs and availability of moisture either through rainfall or irrigation, as also to the fact that growth has taken place under diverse environments and constraints. Other empirical evidences (Nadkarni & Deshpande 1982) however, suggest that rainfall could not wholly account for the increased yield variability and other factors too such as economic and institutional particularly the state's and man's inability to cope with droughts, floods and other calamities have their impact. While these findings were based on the Indian experience, they are as much valid for the rest of Asia and perhaps other parts of the globe too.

Economic and demographic compulsions necessitated extension of cultivation to marginal lands or riskier regions which also led to greater instability in crop yields. Intensification of agriculture through use of modern or improved agricultural inputs and techniques in both resource-rich and ecologically fragile areas such as semi-arid and hilly regions has aggravated yield instability. For instance, a study in India observes that despite an improvement in coarse cereal yields along with a reduction in their area, yield instability also increased sharply. The C.V. of finger millet output in Karnataka, India, rose from 6 per cent prior to the green revolution period to 53 per cent thereafter and similarly for minor millets from 7 to 37 per cent and pearl millet from 22 to 27 per cent (Ninan & Chandrashekar, 1991).

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Though an association between instability and growth was also observed in the context of traditional agriculture (Sen, 1967) it has worsened after the advent of the green revolution, raising doubts as to whether the new agricultural technology had in-built traits which tended to accentuate instability, Widespread adoption of high-yielding crop varieties, chemical fertilizers and pesticides coupled with greater susceptibility of these new crop varieties to pests and diseases have aggravated instability (Mehra, 1981; Hazell, 1982). The use of HYVs with a narrow, common genetic base in place of the genetically more diversified traditional crop varieties evolved over centuries as well as substitution of relatively eco-friendly organic manures with chemical fertilisers, have contributed to greater yield instability, However, we have already noted the contrasting experience of India and Bangladesh in terms of the green revolution's effect on crop yield instability and reasons for the same. A number of studies, however, observer that the yield instability accentuating properties of HYCs, chemical fertilisers are neutralised in the presence of assured irrigation which has a stabilising effect on crop yields (Cf. Mehra, 1981; Rao et.al. 1988). However, irrigation per se need not ensure a lower level of instability. For instance, a study in Punjab, India noted that districts relying on tubewell irrigation recorded lower level of instability compared to other districts which depended primarily on other sources or irrigation (Mehra, 1981). Though owing to complementary relationships in agriculture access to irrigation itself can provide the necessary fillip to use of more HYVs, chemical fertilisers etc., their can be no doubt that access to assured irrigation helps offset whatever destablising properties HYVs and chemical fertilisers may possess. The findings of a recent study from India are worth citing (Dhawan 1987). A cross-sectional analysis of inter-state data for the period 1973-74 to 1984-85 noted that in nine out of eleven states irrigation helped to lower farm instability. The stability gain in yield due to irrigation was found to be more than the gain in crop area. Also the stability gain in yield following irrigation was found to be more conspicuous in the states with low or medium rainfall as compared to high rainfall states. All these indicate the stabilising role of irrigation on crop yields.

Access to assured irrigation helps offset whatever destablishing properties HYVs and chemical fertilisers may possess.

Economic incentives, institutional changes and adoption of modern technology have induced changes in traditional crop patterns and systems. Risk-spreading and risk-adjusting crop systems and practices like multiple-cropping and crop diversification which were the hallmarks of traditional agriculture have given way to monocropping and crop specialisation under green revolution-based agriculture which has increased risks in farming. Yield correlations across crops and regions following the green revolution have reduced the scope for pooling risks which also have contributed to greater yield instability in India, other parts of Asia and elsewhere (Hazell, 1982; Nadkarni & Deshpande, 1982; 1983; Anderson et al, 1987).

Technological upgradation of agriculture has also involved more commercialisation of agriculture. This has led to greater reliance on market inputs and market-oriented production. Though this has enabled closer integration of farmers with the outside economy it has also made them more vulnerable to market uncertainty and market distortions (Nadkarni & Deshpande, 1983; Rao et. al, 1988; Ninan & Chandrashekar, 1991). Disparties in infrastructure development like irrigation, input delivery systems and other support services along with constrained market access have also contributed their mite to increased yield variablity (Nadkarni & Deshpande, 1983; Rao et al, 1988; Ninan & Chandrashekar, 1991).

Resources, both off and at the margin have been subjected to intense pressures due to demographic and economic factors resulting in environmental degradation such as land degradation, decline in the water-table and CPRs, deforestation, etc. All these have affected household and farm productivity. A study in Nepal, covering 120 farm households noted that deforestation had affected women's time allocation patterns with an additional one hour per day being needed for fuel and forage gathering. This consequently resulted in a 30 per cent reduction of the time they spent on the fields, and also affected their household activities and nutrition (Kumar & Hotchkiss, vide IFPRI Report, 1988).

Governmental interventions which distort markets and send wrong price signals or policies such as provision of free or subsidised inputs, either explicit or hidden, may also have played a role in aggravating yield instability. Since these inputs are available at less than their real costs, farmers are tempted to use them intensively beyond economic or efficient levels with adverse user costs and negative externalities. The uneconomic water rates in many parts of India have not only provided the impetus for their excessive use in agriculture at immense environmental costs but also made further irrigation investments which could have spurred agricultural growth unattractive, Similar is the case of fertiliser subsidies in India and Indonesia encouraging their intensive use beyond economic and efficiency considerations (Conway & Barbier, 1990; Ninan & Chandrashekar, 1991).

Governmental interventions which distort markets and send wrong price signals or policies such as provision of free or subsidised inputs, either explicit or hidden, may also have played a role in aggravating yield instability.

Mismanagement of resources has also contributed to inefficiencies and uncertainty in agriculture. Even a dependable irrigation source like tubewells, public or private, if badly managed may fail to protect farming from the ravages of a drought notwithstanding their water availability being plentiful during droughts (Dhawan, 1987). traditional resource maintenance techniques and crop practices evolved locally over centuries have been discarded after the advent of modern imputs and technology. The decline of irrigation tanks-an important irrigation source in rural South India — due to siltation, neglect and other factors vividly illustrates this.

Mismanagement of resources has also contributed to inefficiencies and uncertainty in agriculture.

Conclusions

Is increased instability an inevitable price to be paid for attaining higher agricultural growth rates? This issue has puzzled researchers and policy-makers for long, more so in the light of diverse cross-country experiences. While some countries have reported instability to rise with growth, others have been able to combine high growth with low instability. Moreover, yield risk is but one of several risks faced by farmers amongst which there could be trade-offs. Increased yield risks, for instance, does not imply increased income risks as well. There are evidences of high yield risks being associated with low income risks in India for instance (Anderson et. al, 1987).

The appropriate policy response for coping with risks in farming will vary from country to country depending upon their risk preferences, perceptions and development priorities.

The strategies for promoting sustained agricultural growth will have to keep in view the diverse environments and constraints under which agricultural growth in Asia has been taking place. While in the irrigated regions or those with assured moisture availability emphasis has to be on improving water-use efficiency through proper regulation and management, in the dry or semi-arid and hilly regions where water, apart from land is an over-riding constraint, the policy emphasis should aim at moisture and soil conservation and encouraging income-enhancing crops such as fruit trees and economic activities like pastoral, and agro-forestry which are less water and land intensive and more conducive to the environment of these high stress zones (Ninan & Chandrashekar, 1991). Development and research priorities for reducing risks in farming should emphasis among others crop, and economic diversification; development of crop varieties and technologies that can withstand environmental stresses and shocks; development of infrastructure; and stabilisation policies that will help insulate procedures and consumers from the vagaries of weather and market (Ninan & Chandrashekar, 1991).

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To understand is hard. Once one understands, action is easy.

— Sun Yat Sen

Inter-district Variation in Agricultural Productivity in Gujarat

Arti Nanavati & B.C. Patel

In Gujarat the process of regionalisation of agriculture has been marked by significant inter crop and intra crop differences in agricultural production in the last two decades. Along with the same the inter district agricultural productivity has varied. It is possible that the complex inter-play of compositional changes in agricultural production along with technological, institutional, organizational and social factors, might have led to inter district variation in agricultural productivity. The present paper studies the nature of the agricultural scene in various districts so as to examine the relative position of districts after the green revolution.

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On the agricultural scene of India. Gujarat occupies a significant position with respect to the production of nonfood crops. However, the process of regionalisation of agriculture has been marked by significant inter crop and intra crop differences in agricultural production in the last two decades. Along with the same the inter district agricultural productivity has varied. It is possible that the complex inter play of compositional changes in agricultural production along with technological, institutional, organizational and social factors, might have led to inter district variations in agricultural productivity. For analysing these factors, a study of the agricultural scene in various districts was undertaken so as to examine the relative position of districts after the green revolution.

The complex inter play of compositional changes in agricultural production along with technological, institutional, organizational and social factors, might have led to inter district variations in agricultural productivity.

Methodology

The study pertains to the period between 1970-71 and 1984-85. Where ever necessary, the time series information is used. The main sources of data are the Statistical Abstracts of Gujarat State (1969-76; 1977-79; 1980-82; 1985 & 1986) and the Farm (Harvest) Prices of Principal Crops in India. For estimating the real increase in agricultural production, the figures are expressed at 1970-71 prices. The period under analysis is divided into two parts 1970-71 – 1980-81 and 1980-81 – 1984-85 as the last four years were of low rainfall which led to drought condition in Gujarat.

To analyse the relative position of various districts, the study has drawn heavily on the research by Bhalla Alagh (1979). The process of regionalisation is almost continuous, hence the results of the present study which analyses the information till 1984-85, the latest year for which the data are available, does not lay claim about the permanent position of a given district. Between 1980-81 to 1984-85, one finds some abnormal years of low rainfall which affected the agricultural production and the area under cultivation declined in all the districts of Gujarat. Though one does not find much compositional change in the total agriculture production, there have been significant inter district variations (table 1). The coefficient of variation continued to increase in the case of cereals and pulses. In nonfood crops it declined. This led to the decline of the overall coefficient of variation in 1984-85 as compared to its value in 1980-81. However unless the data on time series basis of the subsequent years is available one can't be sure whether the observed phenomenon remained the same. Nevertheless the analysis would be extremely useful for administrators, planners and researchers who want to know about the districtwise situation of Agriculture in Gujarat for different reasons.

Districtwise Characteristics

In Gujarat in 1984-85, the percentage share of cereal (paddy, wheat, Jowar, Bajara, Maize etc.) and pulses (gram and tur), other food crops (sugarcane, chillies and potatoes) and nonfood crops (groundnut, tobacco, cotton, seasum etc.) was respectively 34.27, 4.02., 10.70 and 51.0 of the total (table 1). On comparing the figures of 1980-81 with 1970-71, one finds that the share of cereal and non food crops declined and that of pulses and other food crops increased. There was not much change between 1980-81 and 1984-85. Thus over the years the production did tilt towards food crops other than cereals. The coefficient of variation for total agriculture production, increased from 55 to 60 per cent during 1970-71 to 1980-81. However, it declined in 1984-85. It can be seen from the table that variation in the production of all types of crops increased substantially between 1970-71 and 1980-81. Between 1980-81 and 1984-85, the variation continued to increase except in the case of other food crops where the coefficient of variation remained almost constant and in the case of non-food crops where it declined. Thus the decline in the overall coefficient of variation, is mainly due to narrowing down in the production of non-food crops.

Further on examination of the percentage shares of each district (table 2) in the total production of various crops one finds that there have been changes in the ranks of the districts between 1970-71 and 1984-85. The compositional changes in the production of various crops within a district is accompanied by structural changes in the relative positions of different districts in the total agricultural production. In 1984-85, among the various districts, Kheda, Bharuch, Surat, Junagadh, turned out to be dominant in the production of cereal, pulses, other food and total food crops, non food crops, respectively. The largest share in the total agricultural production of Gujarat was that of Kheda district. The coefficient of correlation of percentage share of districts in total agricultural production was estimated for the periods 1970-71 – 1980-81, 1980-81 – 1984-85 and 1970-71 – 1984-85 (Table 2). It was found that in the case of pulses and other food crops the value of correlation coefficient was less than that of cereal for the period 1970-71 – 1980-81. However for the period 1980-81 to 1984-85, for each type of crop, the correlation coefficient was very high. The values were in the range of 0.89 to 0.94. Taking the whole period of 1970-71 to 1984-85 revealed that between food and non food crops, it was in the former that the relative position of districts underwent a change as compared to the latter. Within food crops it was pulses and other food crops where relative shares of districts change as compared to cereal where correlation of coefficient was as high as 0.87.

In order to examine whether agricultural productivity in the various districts in Gujarat tended to converge or diverge in the post green revolution phase, the agricultural production (in value terms) per hectare of gross cropped area was examined (table 3). It can be seen from the table that the agricultural productivity increased between 1970-71 and 1984-85. The inter district variation between 1970-71 and 1980-81 also increased. Though the coefficient of variation in 1984-85 declined, it was still higher than that of 1970-71. Thus the relative position of different districts changed over the period in terms of productivity. To confirm this the correlation coefficient was calculated for 1970-71 – 1980-81, 1980-81 – 1984-85 and 1970-71 – 1984-85 of various districts and

The relative position of districts did undergo a change in terms of agricultural productivity during the period under study.

Table 1. Production of Principal Crops (Rs. in lakh at 1970—71 prices)

Districts	Cereals			Pulses			Total Cereals and Pulses			Other Food Crops		
	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-75	1970-71	1980-81	1984-85
1. Jamnagar	1106	1004	930	12	22	42	1117	1026	1072	248	652	462
	(20.85)	(20.07)	(19.89)	(0.22)	(0.45)	(3.04)	(21.07)	(21.04)	(22.92)	(4.67)	(13.36)	(9.88)
2. Rajkot	1523	1683	1719	99	144	243	1533	1697	1744	258	739	867
	(19.19)	(24.68)	(23.28)	(0.12)	(0.21)	(0.33)	(19.32)	(24.89)	(23.61)	(3.24)	(10.85)	(11.74)
3. Surendranagar	858	373	1211	299	411	336	887	414	1245	7	39	41
	(36.61)	(18.94)	(37.52)	(1.27)	(2.08)	(1.04)	(37.89)	(21.03)	(38.56)	(0.28)	(1.97)	(1.27)
4. Bhavnagar	1453	2109	2032	5	3	6	1458	2112	2037	238	231	117
	(30.74)	(34.79)	(45.04)	(0.10)	(0.04)	(0.12)	(30.84)	(34.83)	(45.17)	(50.3)	(3.81)	(2.59)
5. Amreli	1446	1192	2268	3	7	31	1450	1199	1199	424	680	534
	(25.78)	(21.32)	(23.09)	(0.06)	(0.11)	(0.61)	(25.84)	(21.44)	(23.70)	(7.56)	(12.16)	(10.56)
6. Junagadh	1629	1390	1519	55	71	28	1684	1461	1547	465	1080	748
	(18.28)	(13.55)	(15.62)	(0.61)	(0.68)	(0.28)	(18.90)	(14.23)	(15.91)	(5.22)	(10.53)	(7.69)
7. Kachhch	1948	825	1102	1	5	1	1949	830	1103	22	30	25
	(50.49)	(40.45)	(34.93)	(0.02)	(0.24)	(0.03)	(50.52)	(40.69)	(34.96)	(0.56)	(1.49)	(0.79)
8. Banaskantha	2655	1884	2880	17	78	88	2671	1962	2968	176	496	1461
	(80.99)	(50.15)	(37.88)	(0.51)	(2.07)	(1.15)	(81.49)	(52.22)	(39.03)	(5.37)	(13.19)	(19.21)
9. Sabarkantha	1991	1847	1965	88	138	154	2079	1985	2119	52	152	138
	(45.57)	(45.94)	(41.45)	(2.01)	(3.44)	(3.25)	(47.58)	(49.39)	(44.71)	(1.20)	(3.78)	(2.90)
10. Mehasana	2856	2256	2738	47	150	96	2903	2406	2834	120	342	248
	(63.78)	(35.57)	(49.71)	(1.05)	(2.37)	(1.75)	(64.83)	(37.93)	(51.46)	(2.68)	(5.40)	(4.50)
11. Gandhinagar	226	317	374	4	9	9	230	326	383	58	9	52
	(57.91)	(58.97)	(54.99)	(1.02)	(1.67)	(1.29)	(58.93)	(60.64)	(56.29)	(14.72)	(1.78)	(0.77)
12. Ahmedabad	1909	1481	1193	37	115	133	1946	1596	133	37	88	45
	(66.50)	(58.40)	(44.21)	(1.28)	(4.53)	(4.96)	(67.78)	(62.94)	(49.17)	(1.30)	(3.45)	(1.66)
13. Kheda	2813	3288	3665	75	118	124	2888	3406	3788	247	611	425
	(43.32)	(34.92)	(37.65)	(1.16)	(1.25)	(1.27)	(44.48)	(36.18)	(38.93)	(3.80)	(6.49)	(4.36)
14. Panchmahal	2770	2678	3058	312	274	358	3082	2952	3416	60	76	128
	(68.71)	(76.63)	(71.50)	(7.75)	(7.84)	(8.37)	(76.46)	(84.48)	(79.87)	(1.48)	(2.18)	(2.99)
15. Vadodara	1208	1349	316	86	924	613	1294	2272	929	68	173	118
	(33.74)	(26.05)	(6.96)	(2.42)	(17.84)	(13.49)	(36.15)	(43.89)	(20.44)	(1.89)	(3.34)	(2.60)
16. Bharuch	1009	1050	947	56	615	1151	1065	1664	2099	28	40	61
	(38.60)	(44.01)	(34.60)	(2.13)	(25.76)	(42.06)	(40.73)	(69.78)	(76.66)	(1.08)	(1.66)	(2.21)
17. Surat	1370	1837	1825	135	404	490	1505	2242	2315	485	3467	3247
	(46.18)	(29.41)	(29.05)	(4.45)	(6.47)	(7.80)	(50.73)	(35.88)	(36.86)	(16.36)	(55.49)	(51.71)
18. Valsad	1256	1656	1913	50	104	81	1307	1761	1994	203	591	872
	(73.40)	(68.88)	(66.16)	(2.93)	(4.34)	(2.81)	(76.33)	(73.23)	(68.97)	(11.87)	(24.60)	(30.15)
19. Dang	155	130	183	19	26	42	174	156	225	0	8	9
	(82.01)	(74.25)	(73.13)	(10.04)	(14.92)	(16.66)	(92.05)	(89.17)	(89.79)	(0.00)	(4.84)	(3.63)
Gujarat	30181	28349	31838	1400	3618	4026	31222	31467	33150	3196	9504	9598
	(39.89)	(33.71)	(34.27)	(1.38)	(3.71)	(4.02)	(41.27)	(37.41)	(38.29)	(4.22)	(11.30)	(10.70)
Cof. vari. %	48.75	52.241	59.34	127.971	143.313	151.71	48.995	50.592	53.27	90.819	152.608	152.75

(contd.)

turned out to be 0.27, 0.48 and 0.29 respectively. This implies that the relative position of districts did under go a change in terms of agricultural productivity during the period under study.

In order to know whether there was any convergence or divergence of inter district agricultural productivity inequalities, the district agriculture productivity relatives as compared to Gujarat average productivity, and their changes between 1970-71, 1980-81 and 1984-85 and between, 1970-71 and 1984-85 were estimated. The relatives were obtained by expressing each of the district's agricultural productivity as a ratio of state agricultural productivity for the same year.

Table 1. (contd.)

Districts	Total food Crops			Non Food Crops			Total Production		
	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85
1. Jamnagar	1365 (25.74)	1678 (34.40)	1534 (32.80)	3936 (74.25)	3198 (65.59)	3144 (67.20)	5301 (100)	4876 (100)	4678 (100)
2. Rajkot	1791 (22.59)	2436 (34.74)	2611 (35.35)	6144 (0.077431)	4380 (64.26)	4774 (64.65)	7935 (100)	6816 (100)	7385 (100)
3. Surendranagar	894 (38.17)	453 (23.00)	1286 (39.84)	1448 (61.83)	1516 (77.00)	1942 (60.16)	2342 (100)	1969 (100)	3228 (100)
4. Bhavnagar	1696 (35.87)	2343 (38.64)	2154 (47.76)	3032 (64.12)	3719 (61.36)	2356 (52.24)	4728 (100)	6062 (100)	4510 (100)
5. Amreli	1874 (33.41)	1879 (33.60)	1733 (34.26)	3736 (66.59)	3713 (66.40)	3326 (65.74)	5610 (100)	5592 (100)	5059 (100)
6. Junagadh	2149 (24.12)	2541 (24.76)	2295 (23.60)	6761 (75.88)	7721 (75.23)	7427 (74.40)	8910 (100)	10262 (100)	9722 (100)
7. Kachhch	1971 (51.08)	860 (42.18)	1128 (35.75)	1887 (48.92)	1180 (57.82)	2028 (64.25)	3858 (100)	2040 (100)	3156 (100)
8. Banaskantha	2847 (86.87)	2458 (65.42)	4429 (58.25)	430 (13.13)	1299 (37.58)	3174 (41.75)	3277 (100)	3757 (100)	7603 (100)
9. Sabarkantha	2131 (48.77)	2137 (53.17)	2257 (47.61)	2238 (51.21)	1882 (46.83)	2483 (52.39)	4369 (100)	4019 (100)	4740 (100)
10. Mehasana	3023 (67.51)	2748 (43.33)	3082 (55.96)	1455 (32.49)	3594 (56.67)	2425 (44.03)	4478 (100)	6342 (100)	5507 (100)
11. Gandhinagar	288 (73.65)	335 (62.42)	435 (64.06)	103 (26.35)	202 (937.58)	244 (35.94)	391 (100)	537 (100)	679 (100)
12. Ahmedabad	1983 (69.08)	1684 (66.39)	178 (50.83)	888 (30.92)	852 (933.61)	1327 (49.17)	2871 (100)	2536 (100)	1505 (100)
13. Kheda	3135 (48.29)	4017 (42.67)	4213 (43.30)	3357 (51.71)	5399 (57.33)	5518 (56.70)	6492 (100)	9416 (100)	9731 (100)
14. Panchmahal	3142 (77.94)	3028 (86.65)	3544 (82.86)	889 (22.06)	466 (13.34)	733 (17.14)	4031 (100)	3494 (100)	4277 (100)
15. Vadodara	1362 (38.05)	2445 (47.23)	1047 (23.04)	2217 (61.95)	2732 (52.77)	3498 (76.96)	3579 (100)	5177 (100)	4545 (100)
16. Bharuch	1093 (41.81)	1704 (71.44)	2160 (78.87)	152 (58.19)	681 (28.56)	578 (21.13)	1245 (100)	2385 (100)	2738 (100)
17. Surat	1990 (67.09)	5709 (91.38)	5562 (88.58)	976 (32.90)	539 (8.62)	717 (11.42)	2966 (100)	6248 (100)	6279 (100)
18. Valsad	1510 (88.19)	2352 (97.83)	2866 (99.11)	202 (11.81)	52 (2.71)	25 (0.88)	1712 (100)	2404 (100)	2891 (100)
19. Dang	174 (92.05)	164 (94.01)	234 (93.41)	15 (7.95)	11 (5.99)	17 (6.58)	189 (100)	175 (100)	251 (100)
Gujarat	34418 (45.49)	40971 (48.71)	42748 (49.00)	39866 (54.51)	43136 (51.26)	45736 (51.00)	74284 (100)	84107 (100)	88484 (100)
Cof. Vari. %	47.34	60.13	60.23	86.302	89.754	82.06	55.109	60.141	54.98

Note: (1) Cereals include paddy, wheat, barely, jowar, bajari, maize and ragi.

(2) Pulses include gram and tur.

(3) Other food crops include sugarcane, chillies and potatoes.

(4) Non food crops includes cotton, groundnut, seasum, rape and mustered, castore and tobacco.

(5) Figures in bracket indicate % share of differents crops in total agricultural production of a district.

It was observed that agricultural productivity relatives improved between 1970-71 and 1980-81 for nine districts out of 19, as the changes in the relatives were positive. The coefficient of correlation between the agriculture productivity relative in 1970-71 and its change in 1980-81, turned out to be 0.089. (divergent but statistically non

Table 2. Percentage Share of Different Districts in the Total Production

	Cereals			Pulses			Other Food Crops			Total Food Crops			Non Food Crops			Total Production		
	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85	1970-71	1980-81	1984-85
Jamnagar	3.66 (15)	3.54 (15)	30.3 (16)	1.12 (14)	0.71 (14)	3.94 (6)	7.75 (6)	6.85 (5)	4.81 (7)	3.97 (15)	4.09 (15)	3.49 (13)	9.54 (3)	7.41 (7)	6.87 (7)	7.01 (5)	5.8 (9)	5.22 (9)
Rajkot	5.05 (9)	5.93 (8)	5.59 (9)	9.95 (15)	0.46 (15)	0.67 (16)	8.06 (4)	7.78 (3)	9.03 (4)	5.2 (11)	5.94 (8)	5.94 (7)	14.9 (2)	10.15 (3)	10.44 (3)	10.49 (2)	8.1 (3)	8.23 (4)
Surendranagar	2.84 (17)	1.32 (17)	3.94 (11)	2.87 (11)	1.32 (12)	0.93 (13)	0.21 (18)	0.41 (16)	0.43 (17)	2.6 (17)	1.11 (17)	2.93 (15)	3.51 (12)	3.51 (10)	4.25 (12)	3.09 (16)	2.34 (17)	3.6 (13)
Bhavnagar	4.81 (10)	7.44 (4)	6.61 (5)	0.46 (16)	0.09 (19)	0.16 (18)	7.45 (7)	2.43 (10)	1.22 (13)	4.93 (12)	5.72 (10)	4.9 (11)	7.35 (6)	8.62 (4)	5.15 (10)	6.25 (6)	7.21 (6)	5.03 (11)
Amreli	4.79 (11)	4.21 (13)	3.8 (13)	0.32 (18)	0.21 (17)	0.85 (14)	13.28 (3)	7.16 (4)	5.57 (6)	5.45 (10)	4.59 (12)	3.94 (12)	9.06 (4)	8.61 (5)	7.27 (5)	7.42 (4)	6.65 (7)	5.64 (7)
Junagadh	5.4 (8)	4.9 (11)	4.94 (10)	5.3 (7)	2.27 (11)	0.77 (15)	14.56 (2)	11.37 (2)	7.79 (5)	6.24 (5)	6.2 (5)	5.22 (8)	16.39 (1)	17.9 (1)	16.24 (1)	11.78 (1)	12.2 (1)	10.84 (2)
Kachhch	6.45 (6)	2.91 (16)	3.57 (14)	0.09 (19)	0.15 (18)	0.03 (19)	0.68 (17)	0.32 (17)	0.26 (18)	5.72 (9)	2.1 (16)	2.57 (17)	4.58 (9)	2.74 (12)	4.43 (11)	5.1 (10)	2.43 (16)	3.52 (14)
Banaskantha	8.8 (4)	6.65 (5)	9.37 (2)	1.59 (13)	2.5 (10)	2.43 (10)	5.61 (9)	5.22 (8)	15.22 (2)	8.27 (4)	6 (6)	10.08 (2)	1.04 (16)	3.01 (11)	6.94 (5)	4.33 (12)	4.47 (11)	8.48 (3)
Sabarkantha	6.6 (5)	6.51 (6)	6.39 (6)	8.45 (3)	4.44 (6)	4.28 (5)	1.64 (14)	1.6 (12)	1.43 (10)	6.19 (6)	5.22 (11)	5.14 (9)	5.43 (7)	4.36 (9)	5.43 (7)	4.36 (9)	5.43 (8)	5.77 (8)
Mehsana	9.46 (1)	7.96 (3)	8.91 (4)	4.5 (9)	4.81 (5)	2.68 (9)	3.76 (10)	3.6 (9)	2.58 (9)	8.78 (3)	6.71 (4)	7.01 (5)	3.53 (11)	8.33 (6)	5.3 (9)	5.92 (7)	7.54 (4)	6.14 (6)
Gandhinagar	0.75 (18)	1.12 (18)	1.22 (18)	0.38 (17)	0.29 (16)	0.24 (17)	1.8 (13)	0.1 (18)	0.55 (15)	0.84 (18)	0.82 (18)	0.99 (18)	0.25 (18)	0.47 (17)	0.53 (17)	0.52 (18)	0.64 (18)	0.76 (18)
Ahmedabad	6.33 (7)	5.23 (10)	3.88 (12)	3.53 (12)	3.69 (8)	3.71 (7)	1.17 (15)	0.092 (13)	0.47 (16)	5.76 (8)	4.11 (14)	3.12 (14)	2.15 (15)	1.98 (13)	2.9 (13)	3.8 (14)	3.02 (13)	3.01 (17)
Kheda	9.32 (2)	11.59 (1)	11.92 (1)	7.22 (5)	3.79 (7)	3.43 (8)	7.73 (5)	6.42 (6)	4.45 (8)	9.11 (2)	9.8 (2)	9.59 (3)	8.14 (5)	12.53 (2)	12.07 (2)	8.57 (3)	11.17 (2)	10.85 (1)
Panchmahal	9.18 (3)	9.45 (2)	9.05 (3)	9.97 (1)	8.79 (4)	9.93 (4)	1.87 (12)	0.8 (14)	1.33 (11)	9.13 (1)	7.39 (3)	8.06 (4)	2.16 (14)	1.08 (16)	1.6 (14)	5.33 (9)	4.15 (12)	4.77 (12)
Vadodara	4.01 (14)	4.76 (12)	1.94 (17)	8.31 (4)	29.61 (1)	17 (2)	2.12 (11)	1.82 (11)	1.23 (12)	3.96 (14)	5.97 (7)	2.38 (16)	5.38 (8)	6.33 (8)	7.65 (4)	4.73 (110)	6.16 (80)	5.07 (10)
Bharuch	3.34 (16)	3.7 (14)	3.08 (15)	5.35 (6)	19.72 (2)	31.95 (1)	0.88 (16)	0.42 (15)	0.63 (14)	3.18 (16)	4.16 (13)	4.93 (10)	3.69 (10)	1.58 (14)	1.26 (16)	3.46 (15)	2.84 (15)	3.05 (16)
Surat	4.54 (12)	6.48 (7)	5.94 (8)	12.96 (2)	12.96 (3)	13.59 (3)	15.18 (1)	36.47 (1)	33.83 (1)	5.78 (7)	13.93 (1)	12.66 (1)	2.37 (13)	1.25 (15)	1.57 (15)	3.92 (13)	7.43 (5)	7 (5)
Valsad	4.16 (13)	5.84 (9)	6.22 (7)	4.81 (8)	3.35 (9)	2.25 (11)	6.35 (8)	6.22 (7)	9.08 (3)	4.39 (13)	5.74 (9)	6.52 (6)	0.49 (17)	0.12 (18)	0.06 (18)	2.26 (17)	2.86 (14)	3.22 (15)
Dang	0.51 (19)	0.46 (19)	0.6 (19)	1.82 (12)	0.84 (13)	1.16 (12)	0 (19)	0.09 (19)	0.09 (19)	0.5 (19)	0.4 (19)	0.53 (19)	0.04 (19)	0.02 (19)	0.04 (19)	0.25 (19)	0.21 (19)	0.28 (19)
Gujarat	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Coeff. of corr.	Cereals	Pulses	Other food crops	Total food crops	Non food crops	Total Production
1970-71 1980-81	0.84	0.68	0.77	0.65	0.89	0.88
1980-81 1984-85	0.91	0.94	0.94	0.89	0.94	0.91
1970-71 1984-85	0.87	0.66	0.69	0.72	0.86	0.84

significant). When one examined the period between 1980-81 and 1984-85 the coefficient correlation turned out to be –0.44 (statistically significant at 1% level), implying some convergence in the agriculture productivity. Thus the agricultural productivity disparities narrowed down between 1980-81 – 1984-85.

This analysis shows that the agricultural scene was dynamic in nature. In order to identify the districts in

Table 3. Agricultural Productivity in Gujarat (at 1970-71 Prices)

Districts	1970-71			1980-81				1984-85			
	Agricultural Productivity	Rank	Agri. Productivity relative	Agricultural Productivity	Rank	Agricultural Productivity relative	Change between 1970-71 and 1980-81	Agricultural Productivity	Rank	Agri. Productivity relative	Change between 1980-81 and 1984-85
Jamnagar	879.03	8	1.04	750.22	12	0.81	–0.22	760.86	17	0.72	–0.09
Rajkot	1039.26	5	1.23	890.07	10	0.97	–0.26	976.06	10	0.93	–0.04
Surendranagar	350.95	19	0.41	317.49	19	0.34	–0.07	1995	3	1.9	1.55
Bhavnagar	803.95	12	0.95	940.39	8	1.02	0.07	769.5	16	0.73	–0.29
Amreli	1135.79	3	1.34	1075.25	6	1.17	–0.18	1069.56	9	1.02	–0.15
Junagadh	1471.41	1	1.74	1637.36	3	1.78	0.04	1612.28	5	1.53	–0.24
Kachhch	898.64	7	1.86	488	16	0.53	–0.53	759.31	18	0.72	0.19
Banaskantha	472.69	18	0.56	554.8	15	0.6	0.04	1135.69	7	1.08	0.48
Sabarkantha	959.45	6	1.13	907.99	9	0.98	–0.15	1089.11	8	1.04	0.05
Mehsana	672.48	15	0.8	851.41	11	0.92	0.13	957.8	12	0.91	–0.01
Gandhinagar	815.24	11	0.96	1169.36	5	1.27	0.3	1549.22	6	1.47	0.21
Ahmedabad	503.46	17	0.6	467.08	18	0.51	–0.09	560.25	19	0.53	0.03
Kheda	1297.13	2	1.53	1753.82	2	1.9	0.37	1951.34	4	1.86	–0.05
Panchmahal	831.71	10	0.98	713.26	13	0.77	–0.21	948	13	0.9	0.13
Vadodara	745.52	14	0.88	1066.57	7	1.16	0.28	962.85	11	0.95	–0.24
Bharuch	660.3	16	0.78	633.95	14	0.69	–0.09	787.22	15	0.75	0.06
Surat	868.4	9	1.03	1901.27	1	2.06	1.04	2150.53	1	2.05	–0.02
Valsad	1086.93	4	1.29	1409.5	4	1.53	0.24	2058.1	2	1.96	0.43
Dang	763.91	13	0.9	484.09	17	0.53	–0.38	898.15	14	0.85	0.33
Gujarat	845.87		1.00	921.94		1.00		1053.96		1.00	
Cof. Var. %	31.45			46.82				40.8			

Coefficient of correlation with columns 2 & 5 = 0.2734, 2 & 9 = 0.2852, 5 & 9 = 0.4804, 4 & 8 = 0.0890 and 7 & 12 = –0.4407

terms of their performance and resultant changes in their position, the growth rates in area, output and yield were calculated and were (table 4) 0.34, 3.86 and 3.51 between 1970-71 and 1980-81. This implies that the increase in yield was mainly the result of intensive cultivation of land. It was found that except in Surendranagar, Sabarkantha, Panchmahal, and Dang, the growth rate in yield was positive. In almost all the districts the rate of growth of area was less than that of output. However between 1980-81 and 1984-85, the rates of growth in area and output were negative and the yield had a very low growth rate of 1.61 per cent.

In order to capture the changes which took place on the agricultural scene of Gujarat between 1970-71 and 1984-85, the movements of districts among varying productivity levels as a result of differential rates of growth in yield were examined. According to the growth rates, above 4.5 per cent between 1.5 and 4.5 per cent and less than 1.5 per cent the districts were classified as high, medium and low productivity growth regions. The yield levels were also classified into three categories, above Rs. 1300 as high, between Rs. 700 and Rs. 1300 as medium and less than Rs. 700 as low. The relative changes between 1970-71 and 1980-81, are shown in tables 5 and 6. It can be seen from table 5 that in 1970-71, Junagadh was the only district with the yield above Rs. 1300 per hectare. Thirteen districts had their yield level between Rs. 700 and Rs. 1300, the remaining five had yield levels less than Rs. 700 per hectare. Most of the districts had varying growth rates in yield during 1970-71 – 1980-81. The relative movements in the position of the districts between 1970-71 and 1980-81 hence changed (table 6). Surat moved up in the category of high yield level above Rs. 1300, so was the case of Mehasana, which moved from less than Rs. 700 yield to medium yield category. Kheda and Valsad also improved their position. However, Jamnagar, Gandhinagar and Vadodara, witnessed no changes in their positions. There was deterioration in the position of Kachhch and Dang. If variation in growth rates is ignored, it was

Table 4. Average Annual Continuous Rate of Growth (in percentages)

Districts	1970-71-1980-81			1970-71-1984-85			1980-81-1984-85		
	Area	Output	Yield	Area	Output	Yield	Area	Output	Yield
Jamnagar	2.64	6.49	3.86	2.69	5.66	2.98	–1.58	–4.61	–3.03
Rajkot	0.63	6.35	5.71	0.79	4.67	3.88	–0.48	0.28	0.77
Surendranagar	–0.68	–1.55	–0.87	–0.16	3.96	4.13	0.58	7.97	7.39
Bhavnagar	1.15	4.66	5.85	1.16	6.55	5.09	–1.80	–3.98	–2.18
Amreli	0.38	6.84	5.68	0.54	5.54	4.08	–1.71	–2.58	–0.79
Junagadh	0.52	5.47	4.93	2.68	4.58	3.63	–1.53	–3.41	–1.88
Kachhch	2.04	2.09	0.06	0.95	3.47	0.79	–0.10	8.74	8.84
Banaskantha	0.38	5.03	4.64	0.83	5.88	5.05	–1.32	4.94	6.26
Sabarkantha	–0.14	–0.64	–0.49	–0.43	1.17	1.60	–0.31	3.36	3.67
Mehasana	1.08	4.55	4.59	4.03	4.99	0.49	–7.14	–3.41	3.73
Gandhinagar	–0.99	2.98	3.98	–0.84	5.29	6.12	–0.31	5.48	5.79
Ahmedabad	–2.45	–0.68	1.78	–0.78	2.52	3.30	–3.39	–6.33	9.72
Kheda	0.68	4.14	3.45	0.44	–0.71	–1.14	–2.36	–9.69	–7.34
Panchmahal	0.40	–1.93	–2.33	–0.19	1.60	1.87	–1.37	6.67	8.05
Vadodara	0.10	2.22	2.21	–0.11	3.80	3.91	–0.06	2.07	2.69
Bharuch	–0.69	–0.37	3.94	–0.56	4.05	4.61	–1.97	2.63	4.61
Surat	–0.45	8.71	9.16	–0.75	7.32	8.06	–2.82	–0.23	2.59
Valsad	0.47	4.61	4.14	–0.24	5.33	5.57	–5.02	1.62	6.65
Dang	3.85	2.72	–1.13	1.23	4.33	3.10	–5.57	6.86	12.44
Gujarat	0.36	3.96	3.51	0.44	3.81	3.31	–1.82	–0.21	1.61

Table 5. Cross Classification of districts by 1970-71 Yield Level and Growth Rate between 1970-71 to 1980-81

Yield level	Growth Rate Per Hectare				Total dist.
	Above 4.5%	1.5 to 4.5%	0 to 1.5%	Negative	
Above Rs. 1300 (High)	Junagadh (6)				
Rs. 700 to 1300 (Medium)	Rajkot (2) Amreli (5) Surat (17) Bhavnagar (4)	Jamnagar (1) Gandhinagar (11) Kheda (13) Vadodra (15) Valsad(18)	Kachhch (7)	Sabarkantha (9) Panchmahal (14) Dang (19)	13
Less than Rs. 700 (Low)	Banaskantha (8) Mehsana (10)	Ahmedabad (12) Bharuch (16)		Surendranagar (3)	5
Total Dist.	7	7	1	4	19

Note: Figures in brackets of the table 5 onwards are sr. no. of districts as per table 1.

Table 6. Cross Classification of Districts by 1980-81 Yield Level and Growth Rate between 1970-71 to 1980-81

Yield level	Growth Rate Per Hectare				Total dist.
	Above 4.5%	1.5 to 4.5%	0 to 1.5%	Negative	
Above Rs. 1300 (High)	Junagadh (6) Surat (17)	Kheda (13) Valsad (18)			4
Rs. 700 to 1300 (Medium)	Rajkot (2) Bhavnagar (4) Amreli (5) Mehsana (10)	Jamnagar (1) Gandhinagar (11) Vadodara (15)		Sabarkantha (9) Panchmahal (14)	9
Less than Rs. 700 (Low)	Banaskantha (8)	Ahmedabad (12) Bharuch (16)	Kachhch (7)	Surendranagar (3) Dang (19)	6
Total dist.	7	7	1	4	19

Table 7. Cross Classification of Districts by 1980-81 Yield Level and Growth Rate between 1980-81 to 1984-85

Yield level	Growth Rate Per Hectare				Total dist.
	Above 4.5%	1.5 to 4.5%	0 to 1.5%	Negative	
Above Rs. 1300 (High)	Valsad (18)	Surat (17)		Junagadh (6) Kheda (13)	4
Rs. 700 to 1300 (Medium)	Gandhinagar (11) Panchmahal (14)	Mehasana (10 Vadodara (15) Sabarkantha (9)	Rajkot (2)	Amreli (5) Bhavnagar (4) Jamnagar (1)	9
Less than Rs. 700 (Low)	Banaskantha (8) Ahmedabad (12) Bharuch (16) Surendranagar (3) Kachhch (7) Dang (19)				6
Total dist.	9	4	1	5	19

Table 8. Cross Classification of Districts by 1984-85 Yield Level and Growth Rate between 1980-81 to 1984-85

Yield Level	Growth Rate Per Hectare				Total dist.
	Above 4.5%	1.5 to 4.5%	0 to 1.5%	Negative	
Above Rs. 1300 (High)	Gandhinagar (11) Surendranagar (3) Banaskantha (8) Valsad (18)	Surat (17)		Junagadh (6) Kheda (13)	7
Rs. 700 to 1300 (Medium)	Kachhch (7) Bharuch (16) Panchmahal (14)	Sabarkantha (9) Mehsana (10) Vadodara (15)	Rajkot (2)	Jamnagar (1) Bhavnagar (4) Amreli (5)	10
Less than 700 (Low)	Ahmedabad (12) Dang (19)				2
Total dist.	9	4	1	5	19

found that between 1970-71 and 1980-81, the number of low productivity districts with less than Rs. 700 per hectare productivity increased from 5 to 6. However number of districts having productivity more than Rs. 1300, increased from one to four. Thus one finds that the weightage of high and low productivity districts increased and that of medium productivity districts declined.

As mentioned earlier, the years 1980-81 and 1984-85 were the periods of low rainfall in Gujarat. In order to study what happened to relative movements of the districts, they were classified on the basis of growth rates between 1980-81 and 1984-85. The results are shown in tables 7 and 8. If one analyses tables 7 and 8 together, one finds that relative position of districts in 1984-85, on the basis of growth rates in yields, was quite different. Districts which had negative growth rates between 1980-81 and 1984-85 such as Junagadh, Kheda, Jamnagar, Bhavanagar and Amreli, had their yield levels in the same category in 1984-85, as in 1980-81. The relative position of medium yield growth rates districts remained the same in 1984-85. However in case of districts such as Gandhinagar, Surendranagar, Banaskantha, Kachhch and Bharuch, one finds an improvement in their position in terms of yield levels. The number of districts having yield levels above Rs. 1300 increased from 4 in 1980-81 to 7 in 1984-85. In case of yield levels less than Rs 700, there were only two districts, Ahmedabad and Dang, the number of which was 6 in 1980-81. This implies that inspite of low growth rates in yield, the relative position of districts in 1984-85 was much better as compared to 1980-81. The negative yield growth rate districts could maintain the yield levels in 1984-84. Some of the districts improved their growth rate in yield, as compared to 1970-71 – 1980-81. These districts could also improve their yield levels in 1984-85. There were few districts such as Sabarkantha, Panchmahal, Mehsana, Ahmedabad and Dang which improved their yield growth rates more due to the low yield base in 1980-81. Thus their yield level in 1984-85 did not improve. On the whole in Gujarat the relative position of districts improved during the second period inspite of drought conditions.

Inspite of low growth rates in yield, the relative position of districts in 1984-85 was much better as compared to 1980-81.

Conclusions & Recommendations

On the basis of above analysis we can conclude the following:

- Between 1970-71 and 1984-85, the first decade was characterized by compositional changes in the total agricultural production in Gujarat. However between 1980-81 and 1984-85, inspite of negative growth in area and output, the composition remained the same. The share of food and non food crops being 50 per cent each.
- The compositional changes in the agricultural production was accompanied by inter district changes in the relative position of different districts in terms of their contribution to the production of various crops. In case of food crops, there was a relative change in the position of various districts between 1970-71 and 1980-81, as compared to non food crops. However between 1980-81 and 1984-85, the relative positions were maintained.
- Agricultural productivity in Gujarat increased between 1980-81 and 1984-85. However the productivity varied among districts. The variations increased between 1970-71 and 1980-81 and fell during 1980-81 – 1984-85. There was convergence in agricultural productivity in the second period. It was obvious that due to adverse monsoon conditions, the best of the land was put under cultivation and thus though yield growth rate was low, it led to geographical convergence of productivity levels. However, this is a rather simplistic observation and there is a need for an indepth study of factors affecting agricultural productivity especially during 1980-81 – 1984-85.

It was obvious that due to adverse monsoon conditions, the best of the land was put under cultivation and thus though yield growth rate was low.

- The comforting feature of agriculture in Gujarat is that inspite of adverse climatic conditions in some of the years, the period 1970-71 to 1984-85 is characterized by upward shift of various districts except for few high yield levels and disparities in yield levels narrowed down. However, whether this phenomena continued in the post 1984-85 one is not sure as regionalization of agriculture is continuous process depending upon various physical and organizational factors.
- The government's policy towards agriculture is on the basis of agro climatic zones, the present analysis thus should be treated as complementary as it gives some idea towards process of regionalization on the basis of districts as a unit.

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Farm Size & Capital Structure: Evidence from Drought Prone Agriculture

Sukhdeo Thorat

This paper examines the structure of capital assets and the use of capital services flowing out of them among the small, medium and large farmers in the scarcity-prone agricultural zone of Maharashtra. It attempts to acquire an insight into the quantitative and qualitative changes in the stock and structure of capital assets among the farms of various sizes due to the transformation of farming from dry to irrigated and the consequent modernisation of production process. Specifically, it examines the inter-regional variations in terms of farm size in: per acre investment in total fixed capital assets; various types of capital assets including traditional and modern; and in the use of capital services flowing from modern implements in the three regions.

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Since the mid-sixties, significant changes have occurred in the structure of the capital assets of Indian farmers. The trend has been towards the modernisation of fixed capital assets, particularly of agricultural implements and machinery and machines used for irrigation. The process of modernisation, however, has been quite uneven among the various regions of India (Dasgupta, 1980). Also, the large and medium farmers of the advanced regions have been able to replace their traditional capital assets with new ones much faster than the small farmers. This uneven pace of growth is causing concern, considering that differences in the use of capital services between large and small farmers have become more pronounced than before. Since investment in fixed capital assets by the farmer also determines his access to the capital services flowing from these assets, such investment also signifies his ability to use current inputs and enhance productivity and yield rates.

Methodology

A study of the scarcity zone of Maharashtra state was undertaken. The zone, which is the central and core part of the state, stands out quite distinctly from the rest of the state. It receives very low rainfall which is highly uncertain (Indian Meteorological Dept., 1971). According to the Fact Finding Committee of 1972, the zone comprises 90 taluks which are spread over western Maharashtra, Marathwada and Vidarbha region.[1] The region accounts for nearly 30 per cent of cropped area and 40 per cent of

1. The question of identifying the drought-prone areas in Maharashtra has been considered by several committees. The Fact Finding Commission of 1960 headed by N.S. Paradeshi identified 53 taluks of eight districts as drought prone, based on the criteria of normal rainfall, annewari and suspension of land revenue. The Central Irrigation Commission of 1972 included an additional 45 taluks of the same eight districts in drought prone area based on irrigation

(*Contd.*)

the population of the state. The constant pressure of scarcity conditions has led to the development of irrigation facilities in the region, but unevenly. While some taluks have both perennial irrigation through canals and seasonal irrigation through tanks, others totally lack either or both sources of irrigation. In rainfall the zone is fairly homogeneous, but in the matter of quantity and quality of irrigation facilities, and the consequent levels of agricultural development, it varies significantly.

For a meaningful study, therefore, it was necessary to bunch together taluks with similar irrigation level, so that an analysis would bring out the variations in land and water use pattern of dry and irrigated parts of the scarcity zone. Accordingly, the ninety taluks were classified into three sub-regions based on their irrigation level, the criterion for irrigation level being the percentage of net irrigated area to net sown area. The sub-regions thus classified are: Region I: Irrigated Region: Region II: Partially Irrigated Region; Region III: Dry Region.

In this scheme of regionalisation, 14 taluks come under Region I, 31 Region II and 45 Region III[2]. One Taluk each from these homogeneous regions was selected for field survey. In the second stage, a sample of ten villages was purposively chosen from each sample taluk. Finally, 15 cultivating households were randomly selected from each sample village. The sample design thus provides data of about 450 cultivating households, at the rate of fifteen households randomly selected from thirty villages purposively drawn up from three taluks, each being a sample of dry, irrigated and partially irrigated farming situation of the scarcity zone of Maharashtra state during the mid eighties. The percentages of net area irrigated on sample farms in irrigated, partially irrigated and dry region were 96.03, 52.06 and 8.54 respectively.

The variation in the quality and quantity of irrigation indicates that region I characterises the features of irrigated and technologically advanced farming, while region III represents dry farming typically found in the semi-arid areas of the country. Region II in its turn, indicates an intermediate type of farming situation, combining the features of both dry and irrigated farming.

Regional Variations in Structure of Capital Assets

Table 1 gives the per acre value of total assets and of their components grouped under agricultural implements and machinery, 'irrigation', 'draught cattle' and 'milch cattle'. It will be seen that the values of capital assets, both in aggregate and in terms of their components, per holding and per acre of net operated area are the highest in region I. The stock of total assets per acre in this region is nearly seven times that of region III and three times that of region II. Similarly, total assets per acre in region II are twice that in region III. The inter-regional differences are more pronounced in agricultural implements and machinery and irrigation structure and somewhat less for draught cattle and milch cattle. For instance, per acre investment in agricultural implements and machinery is Rs. 815 in region I, Rs. 42.00 in region II and Rs. 24.00 in region III. In the case of draught and milch cattle, the ratio between region I and III is about 1:4. A more or less similar pattern emerges with respect to investment in total assets and their components on per holding basis.

The relative importance or priority assigned by farmers to each group emerges from the percentage share in total capital assets. It is seen from the table that farmers in the irrigated region devote about 50 per cent of their total investment to agricultural implements and machinery, about 20 per cent to irrigation structure, and 17.34 per cent to milch cattle. The draught animal received the least priority. As against this, in the dry region, a major portion of the investment goes to draught and milch animals, about three times that in the irrigated region. Investment on agricultural implements and machinery constitutes a small proportion (10 per cent) of the total investment, about one-fifth that in the irrigated region. A similar pattern is noticed in the partially irrigated region. Thus, in the irrigationally developed region there is a clear shift in the farmers investment priorities from traditional implements to mechanical implements and machinery, including investment in improved irrigation machines, such as diesel engines and electric motors. In partially irrigated and dry regions, on the other hand, due to technological backwardness and resource constraints, the investment priorities are mostly confined to traditional items of capital investment.

1. *(contd.)*

level, rainfall and its variability. The Fact Finding Committee on Scarcity of 1972, headed by Sukhtankar, adopted a more elaborate procedure relating to rainfall and its variability, and identified 90 taluks of 12 districts as drought-prone. In 1933, a Development Group of Pune submitted a 'Memorandum of Recurring Drought in Maharashtra — A New Approach' to the Planning Commission and identified the drought-prone area based on the new methodology.

2. The regional classification is to be interpreted strictly in terms of scarcity conditions of Maharashtra agriculture. The three regions reflect only relative rankings among themselves.

Table 1. Value of Different Components of Capital Assets Per Acre of Net Operated Area (in Rs.)

Items	Region I	Region II	Region III	Total
Implements and machinery	815.29	42.42	24.87	248.91
	(49.54)	(8.74)	(10.00)	(35.24)
Irrigation structure	318.72	157.51	40.19	154.50
	(19.40)	(32.40)	(16.60)	(21.87)
Draught Cattle	212.01	132.55	75.73	131.74
	(12.96)	(27.33)	(31.28)	(18.65)
Milch animals (including young stock)	284.87	138.43	17.17	151.76
	(17.37)	(28.54)	(29.52)	(21.48)
Livestock (total)	508.24	285.00	177.00	302.91
Total Capital Assets	1642.4	484.90	242.00	706.30
	(100)	(100)	(100)	(100)
Total Capital Assets (per holding)	19960.63	6877.00	4403.05	10,469.65

Note: Figures in the brackets indicates the percentage shares of the four groups of capital assets in total capital stock.

Thus, in the irrigationally developed region there is a clear shift in the farmers investment priorities from traditional implements to mechanical implements and machinery, including investment in improved irrigation machines, such as diesel engines and electric motors.

A prominent feature of the new agricultural technology that emerged after the mid-sixties is the growing use of modern implements which were scarcely seen during the early fifties. This new trend is extremely important for its direct and indirect impact on productivity. The tractor with its accessories, for example, brings about a radical improvement in the production process, through timely, deep and frequent ploughing of the fields. The tractor thus becomes an effective instrument of a marked degree of positive change in agronomic practices, which is not possible with traditional implements and machinery. Therefore, the component 'implements and machinery' plays a more fundamental role in the modernisation of agriculture than other components of capital assets.

Table 2 indicates the per acre value of implements and machinery in the three regions. The total capital stock is divided into two broad groups, viz. ordinary and improved. The 'improved implements' are further subdivided into three categories. 'Ordinary' items are traditional implements that have been in use since long and include the wooden plough (small and big), iron plough, carts, mote and similar implements. Category I of improved items includes electric motor and diesel engine with its attachments; category II includes thrasher, winnower, sprayer and other items; and category III, the tractor and its attachments — this being considered the most modern and up-to-date level of mechanisation.

Table 2 shows that per acre investment both on the 'ordinary' and 'improved' implements and machinery is the highest in region I, and becomes more sharply marked in terms of improved implements and machinery. In regions II and III per acre investment is almost negligible in the category 'improved II' and virtually nil in category 'improved III'. Since the two categories include investment on tractor, its attachments, thrasher, winnower and sprayer, investment in the new agricultural implements and machinery is confined to the irrigated region (region I).

Table 2. Value of Improved and Traditional Implements and Machinery Per Acre of Net Operated Area

(in Rupees)

Implements	Region I	Region II	Region III
Ordinary	67.31	43.15	25.15
Improved (I)	318.65	155.01	38.17
Improved (II)	54.77	1.76	1.74
Improved (III)	693.28	–	–
All Improved	1068.70	156.78	39.91
Total	1642.42	484.92	242.05

Another distinguishing feature of the irrigated region is the rise of market in the hire and purchase of services of modern implements and machinery. The hiring of these modern implements has opened up new possibilities for farmers who do not own them, while at the same time it encourages the optimum use of these implements and machinery. Table 3 provides useful in-

Table 3. Percentage of Owner User Hirer of Implements

Items	Region I	Region II	Region III
Tractors			
Owners	17.88	—	—
User	70.20	3.35	—
Hirer	52.32	3.35	—
Thresher			
Owners	10.60	—	—
User	56.95	0.06	—
Hirer	46.36	0.06	—
Winnower			
Owners	9.27	—	—
User	44.37	—	—
Hirer	35.10	—	—
Sprayers			
Owners	29.13	—	—
User	70.19	—	—
Hirer	41.05	—	—
% of Area under Tractors Use	59.95	—	—
Tractor Hours user Per Acre	3.00	—	—
Expenditure on Improved Capital Services (In Rupees)	129.20	1.56	0.4

formation on the percentage of owners, users and hirers of tractors, threshers, winnowers and sprayers in the three regions. In region I, while only 17.88 per cent of the farmers owned tractors, 70.20 per cent of them were users. The proportion of those who did not own but hired them was as high as 52.00 per cent. Hiring was also common for threshers and winnowers. Only 10.60 and 9.27 per cent of the sample farms respectively owned threshers and winnowers but as much as 56.93 and 44.37 per cent used them. A Similar pattern was observed in the use of sprayers also.

Farm Size and Capital Structure

It thus becomes clear that investment on capital assets both as an aggregate and in terms of their components per acre of net operated area has increased significantly in the irrigated region. An unmistakable shift has taken place in the structure of capital assets from traditional to modern machines and implements. Uneven ownership of these assets created a market in the hiring of their services, thus benefiting both the non-owner and the owner of these assets.

In view of variation in the capital investment of farms of small, medium and large size categories[3] an analysis was conducted on the changes in the relationship of farm size and investment on fixed capital assets and their use in the dry and irrigated regions of the study.

Table 4 provides information regarding investment on fixed capital assets, both aggregate and broken into their components for small, medium and large size categories of farms in the three regions. It shows that while per holding value of total assets varies directly with farm size, the value per acre of net operated area varies inversely in the relatively less developed regions II and III. This is true of all groups capital assets as well as these two regions. An inverse relationship is partly on account of the indivisibility normally associated with some fixed capital assets including draught cattle. This obviously cannot be interpreted as a relative advantage of the small cultivators. Higher investment per acre by small farmers is not a new development and has been repeatedly pointed out in several farm management studies of various states including Maharashtra.[4]

What is new, however, is that the inverse relationship noticed in the relatively less advanced regions II and III tends to become positive as soon as we move on to the technologically advanced region I. In this region, the total investment per acre on fixed capital assets of middle and large farms is, respectively, about 25 and 22 per cent higher than in the small farms. More interestingly, the change in relationship has occurred mainly owing to heavy investment in agricultural implements and machinery by large farms. The large and medium sized farms of this region invest nearly four and three times more on agricultural implements and machinery, respectively, than the small farms. In fact, in the ownership of modern capital assets small farms stand nowhere near the large farms, because the former simply cannot afford them. Large and medium farms in the irrigated region, therefore, have a monopoly of the ownership of these new implements.

3. Farm size has been defined with reference to operational holdings. The farm holdings are classified into three groups. viz., small, medium and large farms. Operational holdings less than or equal to 10.00 acres are defined as small farms, those greater than 10.00 acres but less than or equl to 20.00 acres as medium farms and those operating land of 20.00 acres and above as large farms. The upper limit of small farms was kept at 10 acres in view of the fact that farms are predominantly dry and of low productivity. To ensure the comparability of results the same farm-size groups are retained for the three regions under study

4. The studies conducted in the late sixties have also observed a similar trend. Among others see, Government of India, *Studies in the Economics* of *Farm Management in Ahmadnagar District (Maharashtra) 1967-68*, New Delhi, Ministry of Agriculture and Irrigation 1975, P. 100; Chadha G.K., *Production Gains of New Agricultural Technology* Chandigarh: Punjab University, 1979, p. 37; Bhardwaj K. *Production Conditions in Indian Agriculture*, Cambridge University Press, 1974, p. 38.

Table 4. Value of Different Components of Capital Assets Per Acre of Net Operated Area

(in Rupees)

Region/Farm Size	Implements and machinery	Irrigation structure	Draught cattle	Milch Animals (including young stock)	Live Stock (total)	Total	Total (per holding)
Region I							
Small	261.79	444.08	277.24	319.96	614.04	1319.9	7653.83
Medium	945.76	322.69	210.42	276.34	496.30	1764.7	24515.62
Large	1015.52	227.86	172.63	272.55	454.32	1695.7	48772.00
Total	815.29	318.72	212.01	284.87	508.24	1642.4	19960.63
Region II							
Small	45.01	205.39	172.90	163.14	362.29	612.6	3449.67
Medium	51.58	174.58	133.29	115.32	256.31	482.6	6833.78
Large	35.25	130.04	118.81	146.25	279.31	444.6	12587.62
Total	42.42	157.51	132.55	138.43	285.00	484.9	6877.00
Region III							
Small	29.13	91.849	107.26	136.01	304.25	425.2	2499.82
Medium	23.28	29.608	83.86	88.03	216.19	269.0	3762.82
Large	24.79	36.03	67.87	53.14	142.35	203.1	6616.79
Total	24.87	40.19	75.73	71.17	177.00	242.0	4403.05
All Regions							
Small	127.29	270.25	196.97	218.46	447.23	844.7	4867.84
Medium	376.41	186.45	147.21	167.18	333.83	896.6	12559.22
Large	203.48	98.89	102.04	121.63	239.33	541.6	16493.40
Total	248.91	154.5	131.74	151.76	302.91	706.3	10469.65

In the ownership of other assets such as irrigation and draught and milch cattle, small farms continue to show an edge, on per acre basis, over large farms. This may be explained in terms of the indivisibility of the bullock and well irrigation as fixed capital assets. Small farmers may or may not use these assets to the optimum extent, but if they decided to own them, they have to maintain them as full technical units. It is often argued that since bullocks provide the traction power on small farms against the tractor on large ones, the lower per acre investment in implements and machinery in the former is adequately compensated by higher investment on bullock power. It may be noted, however, that although investment on draught cattle is relatively higher on small farms on per acre basis, this does not conclusively prove that they are better off in the availability of bullock power. The ownership figures show that the proportion of cultivating households without bullocks is much higher among the smaller farms. Thus, the percentage of farms without their own bullocks among small and large farmers is, respectively, 17 and zero in region I, 36.07 and 2.71 in region II, and 55.32 and 7.42 in region III. In other words, the incidence of farmers without bullock is very high among the small farms and reaches 55 per cent in the dry region. Since the small farmers depend more on hired bullock, to that extent they are in a relatively disadvantageous position with regard to the application of bullock power in the production process. This handicap, which is not reflected in investment on bullock on per acre basis, would be seen in the expenditure on hired bullock and in its proportion in the total bullock days employed (Thorat, 1993).

Large farms also display a greater switch than small farms from investment in traditional implements to modern implements. The percentage share of these items in total capital investment reflects this fact. Large farmers in region I devote about 60 per cent of their total investment on agricultural implements and machinery and accord a low priority to draught and milch cattle. Small farms, on the other hand, assign priority to crucial items such as machines used for lift irrigation, followed by draught and milch cattle, with implements and machinery getting the least priority. In the dry region (region III) the picture is somewhat different. Here, agricultural implements and draught cattle get priority in the investment pattern of large farmers. Draught cattle being the only source of traction power, this category occupies a prominent position in their investment portfolio. Small

Table 5. Relative Share of Assets in Total Capital Stock (Percentage to total capital stock)

Region/Farm Size	Implements and machinery	Irrigation structure	Draught Animals	Milch Animals
Region I				
Small	19.87	33.64	21.00	24.24
Medium	53.59	18.28	11.89	15.65
Large	59.88	13.43	10.18	16.07
Total	49.64	19.40	12.96	17.34
Region II				
Small	7.34	33.52	28.22	26.62
Medium	10.59	35.28	25.98	21.09
Large	7.99	29.91	27.94	34.98
Total	8.74	32.48	27.33	28.54
Region III				
Small	6.85	21.599	25.22	31.98
Medium	8.65	11.008	31.09	32.72
Large	12.20	17.73	33.37	27.13
Total	10.00	16.60	31.28	29.52
All Regions				
Small	15.06	31.99	23.31	25.86
Medium	41.96	20.63	16.12	18.15
Large	37.58	18.42	19.14	22.98
Total	35.24	21.87	18.65	21.48

farmers, on the other hand, cannot apportion similar amounts on draught animals. Their priority goes to milch cattle, probably owing to their importance as alternative source of income. They give the lowest priority to agricultural implements and machinery.

Composition of Traditional and Modern Implements

On per acre basis, the small farms in regions II and III invest more than the larger farms on all component groups of capital assets. The opposite was true in region I. The change in the relationship between farm size and per acre investment occurred mainly due to greater per acre capital investment by the larger farms on agricultural implements and machinery. Consideration of per acre investment on modern and traditional implements separately shows this clearly (table 6). Without exception, small farms show higher investment per acre on ordinary (traditional) items in the three regions. The investment of small farms in traditional implements is, respectively, 71, 32 and 28 per cent higher than that of large farms in regions I, II and III, the difference being widest in region I. Small farms also display higher proportionate investment in the category 'Improved I', which includes diesel engine and electric motor and its attachments, but invest proportionately far less in categories 'improved II' and 'Improved III'. In fact in regions II and III per acre investment is almost negligible in 'improved Category II' which includes threshers, winnowers and sprayers and virtualy nothing in 'Improved category III' which covers investment on tractor and its attachments. In region I, the expenditure by large farms on implements of 'Improved Category III' and 'Category II' is about eight times and four times respectively, of that by the small farms. The emergence of a positive relationship viz. greater investment by large farms on per acre basis on implements and machinery is mainly due to higher per acre investment on modern implements and machinery. After the introduction of new technology, small farms have thus lagged far behind in the ownership of modern implements and machinery.

Ownership Vs Use

Though small farms do not invest much in improved implements and machinery in general and hardly anything in items such as tractor, thresher and winnower, the emergence of a market in hire and purchase of capital services of modern implements has given them some access to these. Table 4 provides an interesting picture of the number of households of each farm-size group owning such items and the number of households actually using and hiring them in the three regions.

Since the use of modern implements and machinery of category II and category III is confined to the irrigated region (region I), our analysis of farm-size variations relates to this region only. Whether in the use of tractors, threshers and winnowers or sprayers, similar trends are seen, showing an increasing preference for hiring capital services. Thus, while only 1.41 per cent of small farms in this region owned tractors, nearly 57.04 per cent are users. Around 24 per cent of the medium farms own tractors and as many as 78 per cent use them. Use of

Table 6. Value of Improved and Traditional Implements/Machinery

(Per Acre of Net Operated Area)

Region/Farm Size	Ordinary	Improved (I)	Improved (II)	Improved (II)	All Improved	Total
Region I						
Small	127.26	443.78	19.86	114.97	576.62	1319.91
Medium	60.27	322.69	60.50	824.93	1208.18	1764.74
Large	36.00	227.88	70.69	908.62	1207.40	1695.71
Total	67.31	318.65	54.77	693.28	1068.70	1642.42
Region II						
Small	50.29	199.37	0.75	—	200.12	612.69
Medium	51.96	172.66	1.55	—	174.20	482.65
Large	34.75	128.30	2.55	—	130.55	444.60
Total	43.15	155.01	1.76	—	156.77	484.92
Region III						
Small	31.20	88.87	—	—	88.77	425.21
Medium	25.47	27.41	—	—	27.41	169.07
Large	23.92	34.25	2.66	—	36.90	203.17
Total	25.15	38.17	1.74	—	39.91	242.05
All Regions						
Small	76.17	217.30	8.18	45.89	321.37	844.75
Medium	47.14	185.16	23.08	307.47	515.72	896.88
Large	29.39	97.43	14.38	160.97	272.99	541.69
Total	42.53	152.87	16.46	191.61	360.88	706.32

hired tractors is also common among large farms: nearly 95 per cent of them used tractors although only 57 per cent own them. As regards threshers and winnowers, only 2.82 per cent of small farms owned threshers but as many as 40.95 per cent used them. The proportion of owners and users is 11.84 and 67.80 per cent respectively in the case of medium farms. Among large farms the percentage of users is as high as 81 per cent although only 33.33 per cent own them. Only one per cent of the small farms owned sprayers but as many 49.29 per cent used them. About 41 per cent of the medium farms owned sprayers but 78 per cent used them. The proportion of owners and users is 74.21 and 95.23 per cent respectively in respect of large farms.

The hiring of the services of tractors and threshers by small farms clearly indicates their eagerness to avail the new mechanical technology as much as possible. However, the proportion of users of these implements among them is quite low as compared to large farms presumably because they lack resources. The proportion of tractor users as an indicator of the adoption of modern implements, however, has some limitations. The percentage of farms using tractors may be relatively high, but the actual area put to tractor use may be low; what really matters is the extent of area covered by the tractor and its use per acre of area.. Table 7 indicates that the percentage of area put to tractor use is 38.82, 56.75 and 81.80 for small, medium and large farms respectively in region I. The difference between the figure for large farms and small farms is striking. Although 56 per cent of the small farms make use of the tractor, only 38.82 per cent of their total cropped area is put to tractor use. Even in the intensity of tractor use in terms of hours employed, the small farms show much less use of tractor hours per acre than the large farms, the figures being 1.40, 2.80 and 4.50 hours for small, medium and large farms respectively. Taking the three attributes together, we observe that 56 per cent of small farms make use of tractors on 32 per cent of their cropped area, with 1.40 tractor hours per acre, while 95 per cent of large farms use the tractors and

The hiring of the services of tractors and threshers by small farms clearly indicates their eagerness to avail the new mechanical technology as much as possible

Table 7. Percentage of Farms Owning, Using, Hiring Tractors, Threshers, Winnowers and Sprayers

Items	Region I				Region II				Region III			
	S	M	L	T	S	M	L	T	S	M	L	T
Tractor												
Owner	1.41	23.73	57.14	17.88	—	—	—	—	—	—	—	—
User	56.34	77.97	95.24	70.20	3.21	1.96	5.40	3.35	—	—	—	—
Hirer	54.93	54.24	38.10	52.32	3.21	1.96	5.40	3.35	—	—	—	—
Thrasher												
Owner	2.82	11.86	33.33	10.60	—	—	—	—	—	—	—	—
User	40.85	67.80	80.95	56.95	—	—	2.70	0.06	—	—	—	—
Hirer	38.03	55.93	47.62	46.36	—	—	2.70	0.06	—	—	—	—
Winnower												
Owner	2.82	5.09	42.86	9.27	—	—	—	—	—	—	—	—
User	21.13	61.02	76.19	44.37	—	—	—	—	—	—	—	—
Hirer	18.31	55.93	33.33	35.10	—	—	—	—	—	—	—	—
% of Area												
under Tractor use	38.82	56.75	81.80	59.95	1.51	1.17	1.85	1.09	—	—	—	—
Tractor												
hours used per acre	1.40	2.80	4.50	3.00	—	—	—	—	—	—	—	—
Sprayer												
Owner	0.70	40.67	74.21	29.13	—	—	—	—	—	—	—	—
User	56.33	77.96	98.23	70.19	—	—	—	—	—	—	—	—
Hirer	49.29	37.28	23.80	41.05	—	—	—	—	—	—	—	—
Per acre expenditure on improved capital services (viz, tractor, threshers,winnower, sprayers)	71.21	118.36	188.36	129.20	0.37	0.52	2.61	1.55	—	—	—	—

Note: S = Small Farms, M = Medium, L = Large, T = Total

cover about 91 per cent of their cropped area with 4.50 tractor hours per acre. This is also reflected in the per acre expenditure on improved capital services (viz. expenditure on tractor, its accessories, thresher, winnower and sprayers). The per acre expenditure of small, medium and large farms on improved capital services in region I was Rs. 71.21, Rs. 118.36 and Rs. 188.34 respectively. Thus, compared to the small farms, the large farms spend two and a half times more on the use of improved component of capital services. Though the small farms have gained some access to modern implements, in the level and intensity of their use they lag far behind the large farms. This being so, in the new context, small farms are at a disadvantage with regard to the use of improved implements and machinery. To that extent, the capital service input of the small farm is relatively less improved.

Though the small farms have gained some access to modern implements, in the level and intensity of their use they lag far behind the large farms.

Conclusion

The analysis reveals a significant variation in the level and structure of fixed capital assets in the irrigated agriculture of the scarcity-prone area of Maharashtra. While in the dry region the per acre and per holding investment on fixed capital assets continue to be low and traditional, in the irrigated and technologically advanced region the per acre investment has increased manifold. The differences between the dry, partially irrigated and irrigated regions are more pronounced in the case of modern agricultural implements and machinery. In the case of investment on irrigation and draught and milch cattle, these differences are much less pronounced. Further, there is a definite shift in the farmers investment priorities in the irrigated region from traditional imple-

ments and draught cattle to modern implements and machinery such as tractor, thresher/winnower and machine for well irrigation. In the partially irrigated and dry regions there is a trend toward the mechanisation of well irrigation but the rest of the capital assets are traditional in nature.

This change in the structure of the capital assets brought about a shift in the ownership and pattern of investment in fixed capital assets of small and large farmers as well. In the dry and partially irrigated regions the per acre value of capital assets, both total and of components, continues to be higher on the small-sized farms in the irrigated region. The small farms however, have no relative advantage over the larger farms since the latter manage to invest much higher amounts on total as well as on various components of capital assets, particularly in modern implements such as tractors, threshers/winnowers and sprayers. The small farmer simply cannot afford the extremely expensive modern capital assets. Some opportunity for the use of these implements has been provided to the small farmers by the rise of the market in the hiring of the services of these implements, but the intensity of their use is quite low compared to the large farmers. In terms of the number of households using the tractor, the extent of the area covered under the tractor, the number of hours per acre for which the tractor is used and the per acre expenditure on improved capital services, the small farmer lag far too behind the large ones.

The implications of these findings are self-evident. With the rapid increase of capital intensity in agriculture in the future, small farms will be pushed further down to a position of absolute disadvantage due to lack of resources, unless some institutional arrangement is evolved to give them access to capital services.

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Kind words can be short and easy to speak, but their echoes are truly endless.

— *Mother Teresa*

Foreign Trade: Marketing, Agricultural & Allied Products

H.G. Hanumappa & M.J. Bhende

In India, agricultural development took place under autarkic conditions with rampant government intervention through subsidies, procurement, support prices, quota restrictions etc. The share of agro-exports in the total merchandise trade has been decreasing over the years. This article reviews the current agricultural scenerio and presents various measures to upgrade the production and exports.

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The recent changes in the macro economic policy frame of the country have opened up India' economy linking it with the global market. The market friendly approach being pursued by the Government of India necessitates a careful examination and restructuring of our domestic as well as foreign trade policies which are financially not sustainable. The benefits of the new economic policy are expected to percolate to the agricultural sector also in view of which the latter has to formulate both short and long term strategies (Hanumappa, 1992). There is a pressing need to explore and identify potential areas in different segments of agricultural sector — both internal and external — which would promote development. One of the potential areas which could be exploited for the benefit of the country is in the field of agricultural exports.

One of the potential areas which could be exploited for the benefit of the country is in the field of agricultural exports.

Before one looks at the performance of agriculture and allied sectors in foreign trade, it is worthwhile to outline the fact that more than 70 per cent of Indian population survives on agricultural and allied activities. Even though the percentage contribution of GDP from agriculture sector is declining over a period of time, in absolute terms, it is increasing. While declining share of agriculture in GDP is consistent with the expected patterns of development, there is no indication of any positive benefit from such a trend. If we restrict our analysis of foreign trade to agriculture and allied activities, we find that nearly one-third of our foreign exchange earnings used to come from agricultural sector in 1970-71 and it

has gradually declined to 20 per cent by 1990-91 (Sing et al 1992). Given this situation, an analysis of the performance of agricultural exports *vis-a-vis* imports (which include direct imports of agricultural commodities and imports made for direct consumption by agricultural sector) is necessitated to suggest future strategy to accelerate the pace of agricultural exports.

India's Merchandise & Agricultural Trade

India's share in the international trade had been all along negligible. The total merchandise imports were around one per cent of the total world imports whereas exports accounted for merely half per cent of the world exports. During the last decade (1980's) India's exports increased by 117 per cent i.e., from $ 8378 million in 1980 to $ 18215 million in 1990 indicating a compound growth rate of 8 per cent per annum. Interestingly, much of this increase came through expansion in the world trade (Sachdev, 1992). As far as imports are concerned, they also grew along with exports (by 34 per cent) but at a slower pace of 5 per cent per annum. However, the overall trade balance was negative throughout the decade (table 1).

The share of agricultural exports which stood at 32.71 per cent of the total exports during 1980 declined to 20.2 per cent in 1990. The agro-exports were almost stagnant around $2700 million during 1980 through 1988 and crossed $ 3000 million mark only in 1981 and touched $3678 million in 1990. Agricultural imports (inclusive of agricultural requisites/inputs such as fertilizers, pesticides etc.) which represented 16.1 per cent of the total imports in 1980 decelerated to 9.7 per cent in 1990. The balance of trade related to agricultural imports and exports was positive throughout the decade except in 1984 and 1985. It should be noted here, that heavy imports of manufactured fertilizers during these years resulted in negative trade balance in the agriculture sector.

Composition of Agricultural Trade

There has not been many changes in the composition of agro-exports as well as agro-imports from 1980 through 1990. The agro-exports increased by 1 per cent per anunum as against negligible growth in Agricultural imports (.06 per cent). The proportionate share of different commodities in the imports and exports remained more or less constant except for marginal changes in the share of a few commodity groups. The feeding stuff, fruits and vegetables and fish and fish products have indicated increase in their export over the years (table 2). The share of feeding stuff mainly consisting of oil cakes and soyafeed increased from 5.8 per cent in 1980 to 13.37 per cent of the total agro-exports in 1990. This

Table 1. Trends in India's Total Merchandise and Agricultural Trade.

(Value in US Million dollars)

Year	Exports		Imports		Balance of Trade	
	Total	Agricultural	Total	Agricultural	Total	Agricultural
1980	8378	2740.1 (32.71)*	14090	2267.81 (16.09)	–5712	472.29
1981	8373	3015.66 (36.02)	15667	2416.00 (15.42)	–7294	3015.66
1982	8807	2665.62 (30.27)	14365	1822.53 (12.69)	–5558	843.09
1983	8713	2757.15 (31.64)	13434	2316.28 (17.24)	–4721	440.87
1984	8793	2712.59 (30.85)	13953	3649.27 (26.15)	–5160	–936.68
1985	8963	2563.38 (28.60)	16075	2887.86 (17.96)	–7112	–324.48
1986	9291	2738.37 (29.47)	15032	1920.23 (12.77)	–5741	818.14
1987	12069	2760.76 (22.87)	17128	1964.35 (11.47)	–5059	796.41
1988	13960	2606.01 (18.67)	20329	2483.24 (12.21)	–6369	122.77
1989	16609	3047.63 (18.35)	21247	2373.27 (11.17)	–4638	674.36
1990	18215	3678.11 (20.19)	24176	2351.70 (9.72)	–5961	1326.41

Source: Calculated from various issues of FAO Trade Year Book.

* Figures in paranthesis are percentages to respective total.

Table 2. Contribution of Different Commodities to Total Agricultural Exports.

(Per cent)

Commodities	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Livestock & dairy	2.75	2.92	3.86	3.45	3.39	3.23	2.83	3.08	3.05	3.00	2.44
Cereals & cereal products	8.16	15.14	10.64	2.63	2.55	9.74	6.40	11.02	9.39	8.87	7.90
Fruits & Vegetables	8.56	11.12	11.65	8.89	8.06	13.53	15.13	12.85	13.32	12.90	11.97
Sugar & honey	2.18	1.83	3.69	7.63	3.60	0.68	0.12	0.35	0.29	0.64	0.57
Coffee, tea, cocoa & spices	38.04	26.88	25.04	33.52	39.22	36.78	35.37	32.63	30.47	29.48	23.82
Feeding stuff	5.80	6.34	6.32	6.55	7.31	4.27	6.78	6.00	10.85	13.37	9.44
Miscellaneous foods	0.43	0.66	0.32	0.37	0.41	0.43	0.32	0.41	0.35	0.35	0.29
Tobacco & beverages	6.30	8.82	9.58	6.98	6.45	5.14	6.16	3.82	3.40	3.49	4.07
Textile fibres	6.77	4.24	4.34	5.94	2.60	2.00	4.56	3.34	1.22	3.06	13.27
Other crude material	8.49	9.71	8.93	7.92	9.00	9.05	7.27	11.49	9.51	9.02	9.12
Animal fat & veg. oil	2.72	1.80	2.27	3.29	5.13	3.49	1.85	1.34	1.62	2.97	3.37
Fish & fish products	9.80	10.53	13.36	12.83	12.29	11.66	13.23	13.68	16.52	12.85	13.72
Total agri. exports (Value in US million $)	2740.10	3015.66	2665.62	2757.15	2712.59	2563.38	2738.37	2760.76	2606.01	3047.63	3678.11

Source: Calculated from various issues of FAO Trade Year Book.

increase in export share can be attributed to the increase in both area and production of oilseeds in recent years. Similarly, the share of fruits and vegetables on the total agro-export basket has increased from 8.56 per cent in 1980 to 12.9 per cent in 1990.

However, plantation crops like tea, coffee, cocoa and spices in which India enjoyed almost a monopoly in the world export market in 1960's contributing a bulk to the foreign exchange earnings has been declining over the years. The share of tobacco in the total agro-exports has also been decelerating over the years. This may be due to slackened demand for tobacco in the world market caused by the anti-smoking campaign being in full swing in the developed/western countries.

As far as imports are concerned, agricultural inputs and more specifically the imports of fertilizers and related raw materials have caused a heavy drain on the foreign exchange. The agricultural requisites/inputs on an average accounted for one third of the total agro-imports. Import of edible oils also shared a sizable proportion in the total agro-imports (table 3). However, the share of edible oils in the total imports has been on the decline since mid 80s. This may be the reflection of the government policy to boost oilseed production in the country.

While increases in the import of textile fibres after mid 80's would be due to the import of raw silk in large quantities to meet domestic demand, the increasing trend in the imports of fruits and vegetables from 1986 to 1990 is rather surprising. The imports of cereals and cereal products do not show any definite trend. However, the sudden rise in the proportionate share of cereal component during 1983 and 1988 can be attributed to the import of 3.74 and 2.01 million tonnes of wheat during 1983 and 1988 respectively. This is likely to occur again due to wheat imports resorted to by the government recently.

Current Policy & Future Strategies

India's agricultural development has taken place within a policy framework guided primarily by considerations of self sufficiency. The policies were and are being formulated to maintain balance between demand and supply with efforts made to accelerate the production of those crops which are not keeping pace with the growth in demand, ignoring cost and efficiency considerations. The over-emphasis in food self sufficiency may result in inefficient resource allocation at the national level.

The over-emphasis in food self sufficiency may result in inefficient resource allocation at the national level.

Agriculture is being supported and subsidised in many industrial countries. This has created major distortions in the world markets thereby undermining the ability of developing countries to develop in their areas of comparative advantage. Despite this, the empirical evidence illustrates the fact that the countries which changed the structure of exports, based on the theory of shifting com-

Table 3. Contribution of Different Commodities in Total Agricultural Imports

(per cent)

Commodities	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Livestock & dairy	6.00	6.81	11.10	3.07	3.61	2.52	2.02	6.33	3.39	2.80	1.37
Cereals & Cereal products	6.29	8.62	21.46	36.02	15.34	2.65	4.25	2.65	20.94	12.44	7.17
Fruits & vegetables	2.72	4.59	3.48	3.65	3.62	6.28	14.45	16.16	15.24	9.59	15.25
Sugar & honey	4.74	3.79	0.75	0.08	2.74	10.29	10.39	7.73	0.14	2.61	1.77
Coffee, tea, cocoa & spices	0.95	0.94	1.50	0.67	0.44	0.97	1.57	0.48	1.26	0.89	0.88
Feeding stuff	0.06	0.07	0.16	0.01	0.00	0.13	0.30	0.23	0.11	0.24	0.14
Miscellaneous	0.23	0.08	0.35	0.22	0.08	0.17	0.25	0.68	0.06	0.06	0.06
Tobacco & Beverages	0.04	0.04	0.08	0.09	0.06	0.10	0.17	0.22	0.28	0.41	0.45
Textile fibres	2.92	3.16	5.05	2.37	2.03	4.02	6.87	8.06	9.45	7.93	7.51
Other crude material	0.90	2.23	3.55	2.11	1.89	1.97	3.29	4.31	4.56	4.13	4.13
Animal fat & veg. oil	39.33	29.64	30.81	31.19	32.15	28.06	24.64	39.17	21.20	12.07	12.72
Fish & fish products	0.26	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agricultural inputs	35.58	39.76	21.71	20.52	38.04	42.85	31.78	13.98	23.39	46.83	48.563
Total agri. imports (Value in US Million $)	2267.81	2416.00	1822.53	2316.28	3649.24	2887.86	1920.23	1964.35	2483.24	2373.27	2351.70

Source: Calculated from various issues of FAO Trade Year Book.

parative advantage with major emphasis not on subsidies but on productivity and infrastructure, performed better in international trade in comparison with India, (Sachdev, 1992; Bhagwati & Srinivasan, 1976; Srinivasan, 1974). An outward orientation is indispensable, not only to register well known gains from trade, but also because it imposes on domestic producers the valuable discipline of international competition (Camdessus, 1991). In India, the government intervention in agriculture sector through imposing quantity and price controls over exports/imports of agricultural commodities and canalising the exports and imports though public corporations have delinked domestic and international markets.

An outward orientation is indispensable, not only to register well known gains from trade, but also because it imposes on domestic producers the valuable discipline of international competition.

Table 4 presents the Nominal Protection Coefficient (NPC) defined as the ratio of domestic price to the world reference price of the commodity under consideration. If the NPC is greater than one, then the commodity is protected. On the other hand, when NPC is less than one, the commodity is disprotected or in effect taxed compared to the situation what would prevail under free trade. The results reveal that NPCs for wheat, rice and cotton were below unity in almost all the years in 80s and hence are efficient import substitutes. In contrast, groundnut is substantially protected. On the basis of exportable hypothesis, rice and cotton seem to be efficient exportable commodities. The devaluation of Indian rupee against major currencies during 1991 may further improve the export potential and competitiveness of rice and cotton in the international markets.

The increase in the output of export products has to be brought about without disrupting the growth of food and other essential items for domestic consumption. The share of agro-exports can be increased by coordinating production and export policies which in turn needs incen-

Table 4. Nominal Protection Coefficients for Selected Crops

	Importable Hypothesis				Exportable Hypothesis			
Year	Wheat	Rice	Cotton	G.Nut	Wheat	Rice	Cotton	G.Nut
1980-81	0.72	0.45	0.77	1.06	1.15	0.50	0.89	1.25
1981-82	0.73	0.51	0.94	1.37	1.09	0.60	1.13	1.72
1982-83	0.84	0.75	0.82	1.66	1.24	0.94	0.92	2.03
1983-84	0.84	0.70	0.68	1.41	1.29	0.89	0.74	1.69
1984-85	0.76	0.72	0.73	1.40	1.27	0.94	0.83	1.76
1985-86	0.76	0.78	0.86	1.53	1.33	1.09	1.01	2.03
1986-87	0.91	0.80	0.83	2.05	1.99	1.16	0.93	2.87
Average	0.80	0.67	0.80	1.50	1.34	0.87	0.92	1.91

Source: Gulati, *et. al*, 1990.

tive price policy, profitable technology and above all input and service support.

As has been noted earlier, greater attention is needed to upgrade the production and productivity in plantation crops so as to keep their prices competitive in the world market. There is vast scope for export of fruits and vegetables; however trading margins *vis-a-vis* prices received by the producer dampen the production, for example, a recent study for export of fresh vegetable shows that wholesale margins represent 60-80 per cent of the f.o.b Bombay price ad farmgate price only 20-40 per cent (Bombay Chamber of Commerce, 1987). Similarly, most of the fruits are exported as fresh fruits whereas small countries like Malaysia, Philippines, Singapore etc., export processed fruits. Hence there is the need to have a comprehensive agro-export policy and a suitable strategy to establish the necessary facilities (Planning Commission, 1992). This involves linkages for marketing, quality control, storage and services. The producers should be equipped with modern and cost effective techniques of production, processing, packing etc. The setting up of an agro-business consortium for different regions will not only help in the development of agriculture but also improve the agro-exports. The consortium is expected to identify the products in which an area has comparative advantage and develop both backward linkages (supply of credit, inputs and services) as well as forward linkages (processing, marketing etc.). The consortium will take comprehensive view of agricultural production rather than considering each commodity separately. The cost of production of agricultural produce can be reduced significantly to make them competitive in the internal market by adopting modern technologies in the processing of the main products as well as by products. This will not only create value added products but also create employment in rural areas and open up avenues for export of numerous agro-based products (Swaminathan, 1992). The recent GATT talks held by Indian officials with major trading partners like EEC and USA seems to provide better opportunities for agro-exports.

There is the need to have a comprehensive agro-export policy and a suitable strategy to establish the necessary facilities.

Conclusion

The varied agro-climatic conditions and diverse soil profiles provide India an opportunity of producing a variety of agro products. Similarly, the long coast line as well as inland water bodies (rivers and lakes) offer facilities for increasing fish production through development of acquaculture and brakish water fisheries. However, while attending to the development of export oriented crops, care should be taken not to neglect the growth of crops required for domestic consumption. It may not pay for India to opt for complete free trade in case where it affects the international price significantly due to the volume of its purchases or sales. Production of crops where India has comparative advantage such as cotton, rice and wheat should be encouraged. Efforts are also needed to upgrade and modernize production and processing technologies so also the infrasructural facilities and support services to enhance export from agriculture and allied sectors.

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Tea Export: An Assessment

Sib Ranjan Misra

In this paper an attempt is made to examine some of the definite trends that have emerged recently in India's tea industry and also the effect of these factors on the export of tea. The empirical findings reveal that basically the real constraints are internal. Infrastructural bottlenecks (via shortage of inputs like petroleum and power etc.) limit the growth of output. In order to increase export, our policy should be directed towards promoting production at reasonable cost, adopting intensive advertisement and improved working in the auction system, states the author.

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Tea industry, one of the oldest and well-organized in India, has been of considerable importance in the national economy. India remains one of the largest producers, consumers and exporters of this commodity. Tea ranks third among foreign exchange sources and in view of its significant contribution has been identified under the present export-import policy as the thrust product with high potential in the overseas market. Tea industry, being labour intensive, provides direct and indirect employment for more than a million. Besides, it has backward and forward linkages influencing the growth of many other industries. It provides stimulus to the development of forestry, transport and communication too and hence its sustained development is imperative for the country.

A perusal of table 1 reveals that over the period 1971-1991, production has evinced a significant move upwards from 435 million kg. in 1971 to 714 million kg. in 1991; i.e. about 58.9 per cent increase at an average linear rate of 3.2 per cent per annum. The general trend of domestic consumption, measured in terms of retention, has been one of increase — from 221 million kg. in 1971

Table 1: Production, Domestic Consumption and Exports of tea
(in million kg.)

Year	Production	Domestic Consumption	Export
1971	435	221	202
1975	487	272	218
1981	565	346	224
1982	560	372	189
1984	639	400	217
1986	620	431	203
1987	674	446	209
1990	710	460	211
1991	714	470	217

Source: Various issues of 'Tea Statistics' published by Tea Board (India).

to 470 million kg. in 1991. The linear rate of growth is about 6 per cent per annum. But in the face of wide swings in production and rising domestic consumption, India's tea exports have remained stagnant at around 200 million kg. Exports have trailed behind the target.

Emerging Trends

A study of the empirical data reveals that India, though continuing to be the largest producer of tea in the world, has been fast losing its primacy in the global production. As table 2 shows, India's share in world production over the period dived from 38.9 per cent in 1971 to 27.65 per cent in 1991; while the shares of China and East African countries increased from 14.68 per cent in 1976 and 7.4 per cent in 1971 to 20.51 per cent and 9.92 per cent in 1991 respectively. India is not keeping pace with the world rate of growth of production. The world production scenario has seen a dramatic change (Tripathy, 1989)-production is no longer confined to a few traditional countries like India and Sri Lanka. Many new entrants (notable among them being East African countries, China and Argentina) have joined the competition and threaten the dominance of India in international production.

India, though continuing to be the largest producer of tea in the world, has been fast losing its primacy in the global production.

Table 2: Share of Major Countries in World Tea Production

(in percentage)

Country	1971	1976	1981	1991
India	38.9	32.24	29.98	27.65
Sri Lanka	—	12.38	11.24	9.47
East African Countries*	7.4	7.53	7.41	9.92
China	—	14.68	18.32	20.51

Source: Various Issues of 'Tea Statistics' published by Tea Board (India)

* East African countries include Kenya, Uganda, Tanzania and Malawi.

Like in the world production, India's share in the world export has also declined. Between 1961 and 1991, the volume of world trade demonstrated an upward trend from 531 million kg. to 973 million kg. But unfortunately, quantity of export from India hovered only around 200 million kg. during the period. India's share in global export has been dwindling from 37.9 per cent in 1961 to 32.8 per cent in 1971, to 28.31 per cent in 1981 and 21.53 per cent in 1991. The situation in countries like Sri Lanka, East African countries, Argentina reveals a contrasting picture[1]. Share of East African countries increased from 5.9 per cent in 1961 to 10.86 per cent in 1991. China's share in global trade increased from 7.77 per cent in 1976 to 16.98 in 1991. India has lost her share over the period by 16.37 per cent (table 3) and the fall in share in export is more prominent than that in production. Sri Lanka has also suffered a fall in share. As a matter of fact, the impressive gain in share by other countries has resulted in inevitable decline in India's share.

Table 3: Share of Tea Export from Various Countries in World Export

(in percentage)

	1961	1971	1976	1981	1991
India	37.9	32.8	29.67	28.31	21.53
Sri Lanka	35.5	31.2	25.37	21.45	20.67
East African Countries	5.9	11.8	14.27	14.23	10.86
China	—	—	7.77	10.78	16.98

Source: Various Issues of 'Tea Statistics' Published by Tea Board (India).

As is evident from table 4, although India's volume-wise share in the international market during the year 1986 was 21.53, its share in terms of value was 36.1; whereas, Sri Lanka could earn only 25.75 per cent in value though volume-wise, it was 20.67 per cent. Unit value realization of India's tea in the export market is found to be higher.

Table 4: Value of Exports of Tea in 1986

Country	(US$1,000)	Percentage
India	460.59	36.1
Indonesia	99.02	8.75
Kenya	212.97	19.5
Sri Lanka	328.97	25.75
Argentina	21.64	2.7
Zimbawe	12.718	1.5
Other Countries	24.850	3.01

Source: International Tea Committee, Annual Bulletin of Statistics: 1987.

1. These new entrants in the world trade, because of ready availability of land, excellent growing conditions, coupled with installation of modern machinery and other ancillary facilities have made rapid strides and emerged as the new forces in the international tea market.

An important characteristic of India's trade today is that her export of tea has been diversified substantially[2]. Till 1970, India's export of tea was highly concentrated on a few markets like U.K., U.S.A. and Australia. Ever since India entered into Rupee payment agreement with East European and other countries, bilateral trade agreements with Afghanistan, UAR, Sudan, Iraq and Jordan and trilateral trade agreements with Tunisia and Bulgaria, there has been a big spurt in the exports of Indian tea to these countries. The percentage of exports trade under these trade Agreements was as high as 45 per cent of India's total exports in 1971; it rose to 55.4 per cent in 1990 (table 5). In the traditional markets, exports to U.K. showed a marginal decline. Non-bilateral countries are, by and large, losing their ranks of importance.

Table 5: Percentage of Exports under Bilateral Agreements to Total Indian Exports

1961	19.92
1968	45.47
1971	45.47
1982	41.58
1983	42.31
1984	43.32
1984	53.27
1986	53.20
1987	53.30
1988	54.70
1989	53.90
1990	55.40

Source: Various issues of 'Tea Statistics', Tea Board (India).

An important characteristic of India's trade today is that her export of tea has been diversified substantially.

2. To find out the degree of concentration of exports of tea from India, the Hirschman Index may be used (see Hirschman, 1945,). The Hirschman Index is written as follows:

$$I = \sqrt{P_1^2 + P_2^2 + \ldots + P_n^2}$$

or,
$$I = \sum_{i=1}^{n} P_i^2$$

where P_i represents the percentage share of the i-th country in the total exports and a total of n importing countries accounts for all tea trade. The Index may vary between the limits of zero and 100. In the case of exports of tea, the Hirschman Index calculated reveals that the concentration has been reduced since 1971 from 46.4 to 35.8 in 1990. The fall in index implies dispersal of markets. This suggests hedging against risk of random fluctuations.

Why Exports Stagnate?

The level of production of tea in any given period determined the volume of exports. Again, the flow of tea into the export market depends upon the export price relative to the domestic price. The larger this ratio, the more will be exported and vice-versa. Another influencing factor is the domestic consumption of tea. Furthermore, there are different policies adopted by the Government in order to influence exports. The following log-linear equation can be used to analyse the factors responsible for stagnation in exports:

$$\text{Log } E_t = a_0 + a_1 \log Q_t + a_2 \log C_t + a_3 \log R_t + a_4 t + U_t$$

where log E_t: log of the quantity of tea exported (in million kg.) in period t

log Q_t: log of production of tea (in million kg.) in period t

Log C_t: log of consumption of tea in period t

log R_t: log of ratio of export price per unit realized at auction and domestic wholesale price Index in t-th year

t: trend variable measured in squential year and as a proxy to capture the effects of different measures adopted for sales promotion.

U_t: Stochastic term.

The estimated linear regression equation (obtained by employing OLS method) for the export is presented as follows:

$$\text{Log } E_t = \underset{}{-180.4} + \underset{(28.1)}{0.42 \log Q_t^*} - \underset{(0.26)}{0.74 \log C_t^*} + \underset{(0.31)}{0.38 \log R_t^*} + \underset{(0.15)}{0.7 t^{**}} \quad \underset{(0.05)}{}$$

** Significant at 10 per cent level

* Significant at 5 per cent level

(Figures in parentheses indicate standard error of estimate)

$R^2 = 0.54$, D.W. = 2.27

period: 1974-1990.

The data concerning production, prices in auction centres, domestic consumption and exports have been gathered from 'Tea Statistics' published by Tea Board, Calcutta.

It is evident that the co-efficient of multiple determination (R^2) is 0.54, suggesting that nearly 54 per cent of the total variation in export of tea can be explained by the explanatory variables specified. As the standard error test statistics suggests, the variables included in the equation like export price relative to domestic price (R_t),

domestic consumtpion (C_t) (used to reflect the domestic demand) and trend variable (t) except the level of production (Q_t) are found to be statistically significant. The negative elasticity co-efficient of domestic consumption (C_t) states that increase in demand at home would tend to reduce the quantity of tea exported. The elasticity co-efficient of relative export price (R_t) shows that increase in relative price will exert a positive influence. Export of tea could be increased only at higher real price. And the statistical significance of t, a catch-all proxy variable, suggests that export-oriented strategies adopted over time like setting up of advertising agencies, concessions for exports etc. have an important bearing on export promotion.

It should also be stated that the negative intercept term (–180.4) which captures (retarding) influences of omitted variables like inventory operations, variations in domestic demand which could not be specified for want of reliable data implies that tea export from India is not responsive to the influence of specified variables until it exceeds the quantum of 180.4 million kg. per annum. And beyond this level all the relevant variables are effective in determining the level of exports.

It is evident from table 1 that between 1971 and 1981, tea production rose by 130 million kg.; and during 1981-91, the output growth is about 149 million kg. While, over the period 1971-81, domestic consumption rose by 125 million kg. and by 124 million kg. during the period 1981-91. It indicates clearly that almost all the additional output was swallowed up by domestic consumers, leaving little exportable surplus. The share of export has shrunk in step with it. A broad and ever-expanding consumption base at home has tended to blunt the edge of export efforts[3]. What governs the growth of exports of a country is primarily the relative profitability of its products in the international and domestic markets. Tea plantations in India have to labour under high internal cost structure, predominantly because of old stock vintages, high taxation and duties and welfare dominated establishments;

A broad and ever-expanding consumption base at home has tended to blunt the edge of export efforts.

3. In kenya and Sri Lanka, the shares of domestic consumption in production changed from 5.6 per cent and 12.2 per cent in 1962 to 10.09 per cent and 11.14 per cent in 1991 respectively. These shares constitute a relatively small proportion of total production.

while, the newly emergent tea producing countries like East African countries inherited vintage benefits. Price of tea in the auction markets suffered a setback, mainly because of oilgopsonistic buying behaviour at the auction centres and intensive competition in the foreign markets from the producing countries[4,5]. It is also observed that the differences between Calcutta and London auction prices sometime did not even cover the cost of export and in some instances, the London prices were below the Calcutta prices[6]. On the face of significant increase in price and remarkable increase in cost of production of tea in India, profitability of exporting is almost reduced to nought. India had to curtail its volume of exports, braving a great loss in the exchange earnings. In sum, the real constraints are actually imposed clearly by lower profitability of exports compared to domestic sales and the strong pull of the domestic markets itself so as to act as disincentives for any serious export efforts.

On the face of significant increase in price and remarkable increase in cost of production of tea in India, profitability of exporting is almost reduced to nought.

Conclusions and Policy Implications

The tea industry needs an integrated, all-embracing economic strategy to place it on a sound and firm footing and also to achieve a long-term objective. More than 70 per cent of production is being consumed at home. However, the way to increase export does not lie in curtailing

4. There has been a high concentration of buying power in a few hands at the auction centres. The price behaviour is isolated from market forces. It nestles around an artificial level.

5. Of course, for want of adequate data, this hypothesis can not be proved with a reasonable degree of certainty. Yet, it has a viable base for further exploration.

6. The British buyers normally evinced a clear preference for East African tea. East African tea estates are predominantly owned by the Britishers. There was a pilgrimage of capital from India to East Africa for quite sometime. Again, climatic conditions in Kenya allow them to produce even quality of tea round the year. Overseas buyers prefer to operate from a source supplying an even standard of tea throughout the year. They do not want to lock up finance in maintaining stocks of varying quality of tea for the purpose of blending. K.G. Sivaswamy in his minutes of dissent to the Report of the Plantation Inquiry Committee cited instances of teas having been sold on forward contract at prices lower than that of tea of the same gardens sold at the Calcutta auctions. It is sometimes alleged that under-invoicing is indulged.

home consumption but in increasing production[7]. The constraints which inhibit the growth of production should be removed. A well-knit rehabilitation programme should be launched. Annual rate of planting and replantation should be enhanced. In this connection, it should also be noted that the rising trends in costs have caused grave concern. Rationalization in different estates should be adopted which may increase productivity and reduce average cost of production.

It is also argued that the failure of Indian salesmanship is responsible for the stagnation of tea export. Under present conditions, it is better to conceive of international competitiveness as a function of comparative 'marketing' advantage instead of the traditional comparative production cost advantage. India should adopt both generic and uninational promotional schemes. Of course, the latter is more appropriate in the present circumstances. In fact, India's rival in the world tea market is not rival beverages, but rival producers. Exploration of new markets is also essential. Again, be it Calcutta, London or Colombo, the price is subject to oligopsonistic buying manoeuvres. In order to ensure fair price to the producers, auction system should be properly regulated. Unless the basic problem of lower profitability of tea export is solved, no self-sustaining momentum can be imparted to Indian exports of tea in the highly competitive international markets.

Unless the basic problem of lower profitability of tea export is solved, no self-sustaining momentum can be imparted to Indian exports of tea in the highly competitive international markets.

7. Abid Hussain Committee (Government of India — Report of the Committee on Trade Policies, 1984) in its Report has rightly emphasised this point.

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The best way to predict the future is to invent it.

— *Alan Kay*

Utilization of Byproducts of Pulse Processing: Trends & Prospects

S.D. Kulkarni

Byproducts of pulse milling industry in India have a potential to improve the per capita availability of edible portion of pulses by about 4 g/day. Little extra efforts are needed to separate the edible fraction from the byproducts and also to divert the already separated fraction for human consumption. This edible fraction can be made available at a relatively lower cost to the poor as it has lower asthetic value compared to the main product—the dal/splits—but is nutritionally at par with them.

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Pulses are processed in different ways for the production of a variety of products viz. whole pulses, roasted pulses and dal (splits). Green gram, lentil, moth, Bental gram, peas, beans etc. are cleaned and polished for use as whole grains. Bengal gram and peas are roasted and puffed. Though the roasted pulses are used all over India, their consumption, either in whole or split form, is more common in South India. Most of the pulses are processed for production of dehusked splits (Dal). Mainly, pigeon pea, Bengal gram, lentil, green gram and black gram are processed for dal production. Dal is consumed in the form of gruel after cooking. These pulse based products serve as a chief and cheap source of protein for the majority of our countrymen who mostly depend on plant protein. The per capita availability of pulses is estimated at 24 g/day (Kulkarni, 1991) as against the moderately recommended intake of 45 g/day (ICMR, 1984). Pulse grains contain 11-14 per cent husk, 2-5 per cent germ and the cotyledons comprise the rest. Mostly pulses are processed for the effective separation of cotyledons. Pulse production being stagnant at around 12 million tonnes during the last 15-20 years, emphasis is on the adoption of improved processing techniques, in addition to enhancement in production, for making available additional quantity of edible portion to the ever rising population of India.

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End Product and Byproducts

The type and quality of the byproduct depend on the end product and the basic processes adopted.

Whole pulses: Whole pulse grains are consumed throughout India either after sprouting and cooking or soaking and direct cooking. Processing steps mainly involve cleaning and grading wherein foreign matter— dirt, dust, light impurities— and immature grains are separated by sieving and aspiration. Good quality grain lots are then dry polished by rubbing action for removal of surface dust from Bengal gram, cowpea, pea and beans and oil polished by mixing edible oil and grains in a worm mixer after dry polish for lusture and improved product appeal for pulses like black gram and green gram (Kulkarni, 1988). Immature grains are obtained as primary usable byproduct in this processing route and account for 3-5 per cent in the form of mixture of foreign matter and immature grains of the grain lot processed. The husk removed during polishing of whole grains forms the secondary byproduct in negligible quantity.

Roasted and puffed pulses: The unit operations involved are mainly cleaning, primary heating in hot sand bed, cooling, water application (3-5%), roasting in sand bed, puffing and splitting (optional) under roller and a hot plate, husk separation and grading of splits (Kulkarni, 1987). Useful byproducts of cleaning i.e. immature grains are obtained. Also, the husk, germ and brokens are separated in the process of the production of roasted-puffed Bengal gram splits. One-eighth to threefourth of a whole split are normally termed as brokens whereas, particles less than one-eighth size are categorised as fines. These constitute about 15 per cent of grain mass processed and have a prevalent roasted flavour.

Dal/splits: Pulses can be processed for production of dal by following different processing routes i.e. conventional and modern. The latter is reported to give improved dal yield (Kurien, 1979) compared to the former. However, most of the dal millers follow conventional approaches (Kulkarni, 1991). Ordinarily, unit operations in dal making include cleaning and grading, premilling treatment for loosening of husk, drying, dehusking, aspiration, conditioning of dehusked grains, splitting, dal grading and dal polishing. In addition to the byproducts obtained during cleaning or primary processing, different byproducts are obtained during the milling of pulses for dal. Mainly the mixture of husk, germ and fines and brokens form the byproducts. The quantum of byproducts received varies and depends on the type of processing route — conventional or modern — and the processing machinery adapted. The Modern process gives improved dal yield by minimising the losses of edible portion into the byproduct channel whereas, adoption of conventional processes and traditional pulse milling machinery result in relatively higher milling losses. Since most of the pulse processors in India follow conventional processing pattern, due to various reasons, the loss of edible portion in the byproducts is on the higher side. However, variations exist due to the adoption of the modern method by few millers, refinements done by individual millers in conventional processing techniques, the type of grain processed and the overall quality of raw material.

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Byproducts of pulse processing industry mainly consist of impurities and immature grains (3-5%), husk (8-14%), brokens (6-13%) and mixture of germ and powder (7-12%). Some fines left in the husk lot constitute about 5 per cent.

Trends in Byproducts Utilization

The utilization depends on the type of byproduct. Immature grains — the byproduct of primary cleaning and grading of pulses- are normally separated in the form of mixture alongwith sand/stone/soil particles. Depending on the quantity of the edible portion in the lot, further separation is attempted. However, it mostly forms a waste. Immature grains in waste are either picked up by birds or consumed by stray cattle/animals. Ordinarily, separation of immature grains is considered uneconomical as it has to be done either manually or by employing costly machines. Even if it is separated, the value addition is meagre as it can at best go as a cattle feed- not very nutritious due to the presence of mostly immature grains. Mixture of husk, small brokens and germ obtained during the process of production of roasted pulses or splits/dal is usually used as cattle feed and brokens are either used for human consumption or as an ingredient in cattle feed. In some states, brokens of pulses are typically used in the feed of swan, poultry, horse and elephant (table 1). Brokens obtained during home scale processing of green gram and black gram are milled to flour and

used in Papad preparation. Bengal gram brokens are milled for use as flour (Besan).

Table 1. Pattern of byproducts utilization

State	Byproduct		Use
	of pulse	form	
Andhra Pradesh	Pigeon pea, Black gram, Green gram	Brokens	Feeding to swan and elephant
Karnataka	Green gram Black gram	Brokens	In Papad making
Maharashtra	Bengal gram	Brokens	Besan
Uttar Pradesh	Lentil Bengal Gram	Husk Brokens	Poultry feed Horse feed

Potential for Human Consumption

The edible portion suitable for human consumption can be attempted for proper separation. In pulses, considering the average value of 12 per cent husk content, 3 per cent germ and 10 per cent milling loss, the byproduct potential of 25 per cent of total pulse production is estimated at 3 million tonnes. It includes 1.2 million tonnes of edible portion in the form of milling loss which can be put to human consumption by proper processing. Such an attempt would improve the per capita availability of edible portion of pulses by about 4 g/day thus raising the present per capita availability of 24 g/day by over 15 per cent to 28 g/day. Although, some portion of brokens is put to human use (table 1) there is scope for improvement. In view of the shortage of pulses in India, the separation of edible portion and its diversion for human consumption should be treated as a priority. However, most of the processing units for dal do not have the facility for separation of fines from the mixture of husk and fines. Some processing machinery manufacturers advocate the use of specific gravity separators for the purpose of separation of brokens, fines and husk particles. The unit enables the separation of edible portion of cotyledons from byproducts. However, the majority of pulse processors believe that separation of fractions would not appreciably add to profit but only to their work load and labour requirements. The almost negligible competition existing in dal marketing allows them to earn the desired levels of profit without additional effort. Thus the major portion of edible fraction of dal which can be available for human consumption is automatically diverted to be used the same way as husk.

Brokens fetch more than half the price of dal whereas the mixture of husk, germ and fines commonly known as BHUSI is sold at 30 per cent of dal price. Since fines and brokens, have the same nutritional value as dal, they can be a cheaper source of protein to those who can not afford the product in the form of dal due to its relatively higher price.

Conclusion

Apart from efforts at reducing the milling loss, installation of suitable units in dal mills for efficient separation of the edible portion from byproducts with the cooperation of pulse processors would significantly contribute in improving the availability of pulses at reasonable cost to the needy population. If diverted for human consumption, it has the capacity to provide atleast 3 g pulses per person per day and increase the productivity through improved nutrition.

Apart from efforts at reducing the milling loss, installation of suitable units in dal mills for efficient separation of the edible portion from byproducts with the cooperation of pulse processors would significantly contribute in improving the availability of pulses at reasonable cost to the needy population.

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Export Competitiveness of Indian Textile Industry

NPC Research Division

To take advantage of the recently concluded GATT negotiations a major policy initiative is called for to improve the competitiveness of Indian Textile Industry. Experience shows that low factor cost alone cannot guarantee a fair share of the world textile market to India. Thrust has to be on the non-price factors. This study suggests technology upgradation as the only route for the mill sector to improve factor productivity and product quality.

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With the formal signing of an agreement at the Uruguay Round of Multi-lateral Trade Negotiations the scope of textile export widens to the low cost producers such as India. It was agreed to phase out the present Multi Fibre Agreement (MFA) within a finite time frame of ten years. There are increasing pressures to open the Indian market on a reciprocal basis. In the changed global business environment, the inter-country and inter-sectoral differences in export performance requires a fresh enquiry in order to evolve a sustainable competitive business strategy for the textile sector in the coming years. In this paper we analyse the export competitiveness of the Indian Cotton Textile Industry since 1977[1]. The domestic performance is analysed in the background of policy induced shifts in production and consumption patterns. The inter-country performance analysis has been carried out in terms of competitive advantage of nations and the resultant export growth in different countries. Econometric estimation procedures have been resorted to with a view to identifying the major determining factors of export competitiveness of the Indian textile industry.

In the changed global business environment, the inter-country and inter-sectoral differences in export performance requires a fresh enquiry in order to evolve a sustainable competitive business strategy.

1. Some of the similar studies carried out earlier can be arranged as: for external factors (Patel, 1959), labour cost (Singh, 1964), profitability (Paul & Mote, 1967 & 1970), automation (Nayyar, 1973 & 1976), domestic demand and productivity (Sastry, 1984), internal and external factors (Rao, 1980 and Jain, 1988), exchange rate movement (Rajaraman, 1990) structure of industry (Khanna, 1991), and policy aspects (Misra, 1993).

Structure of Cotton Textile Industry

Cotton textile industry is the oldest and the largest industry in India and has been treated as the backbone of the economy (Goswami, 1990). It consists mainly of the organised mill sector and the unorganised powerloom & handloom sectors (table 1). Textile exports account for nearly 30 percent of the foreign exchange earnings. The textile Industry provides direct employment to about 11.5 million workers in the organised sector and accounts for nearly one fifth of the factory employment in the country. It enjoys a weightage of over 20 percent of the industrial production and accounts for ten percent of the total collection in terms of taxes and duties[2]. The share of organised mill sector declined considerably since 1950 as compared to the unorganised sectors mainly because of the policies of the government such as freezing the capacity, reserving certain items for the handloom sector, constraints on modernisation, heavy import duty etc.[3] In 1951 the mill sector had been dominating the cloth production scene; with a share of 81 percent which as in 1991-92 declined to an abysmal 14 percent. On the other hand the decentralised sector (especially the powerloom) had shown significant improvements during the last four decades. The better performance of the powerloom sector as compared to other sectors stem mainly from the favourable government policies and successful cost reduction strategies such as hiring of daily labourers and subcontracting the work.

Though there has been considerable decline in mill sector production since 1950-51, its impact on the two segments of the mill sector viz. spinning and weaving, gives contrasting results.

Capacity Utilisation in Spinning & Weaving Mills

Factors such as changes in consumption pattern, regulation of plant modernisation, capacity freezing etc., have adversely affected many textile mills and resulted in underutilisation of the installed capacity. Many of them became sick and uneconomic over the years. Capacity utilisation declined considerably in the organised weaving sector where as the spinning sector noticed significant improvements (table 2). Fluctuation of raw cotton availability has been often cited as the *raison d'être* for low capacity utiilisation in the mill sector (Sastry, 1989).

Table 1. Sector-wise Production Share of Cotton Cloth in India (%)

Year	Mill Cotton cloth (Organised)	Handloom cotton cloth	Powerloom cotton cloth	Total cotton cloth	Cotton Cloth as a % to Total cloth Production
		(Unorganised)			
1950-51	80.69	29.31		100.00	
1960-61	68.99	31.01		100.00	
1970-71	53.34	46.66		100.00	
1980-81	41.04	58.96		100.00	
1981-82	36.62	31.82	31.57	100.00	72.70
1982-83	31.80	33.48	34.71	100.00	74.93
1983-84	30.93	33.05	36.01	100.00	74.34
1984-85	28.97	33.99	37.04	100.00	75.25
1985-86	26.15	35.36	38.49	100.00	73.44
1986-87	24.55	36.13	39.31	100.00	71.40
1987-88	22.49	37.12	40.39	100.00	70.61
1988-89	19.35	32.81	47.83	100.00	68.51
1989-90	17.99	32.11	49.90	100.00	67.94
1990-91	15.51	32.18	52.31	100.00	67.51
1991-92	14.79	33.15	52.06	100.00	65.02
1992-93(E)	13.84	33.77	52.39	100.00	64.64

Note: E = estimated
Source: Ministry of Textiles, Annual Reports

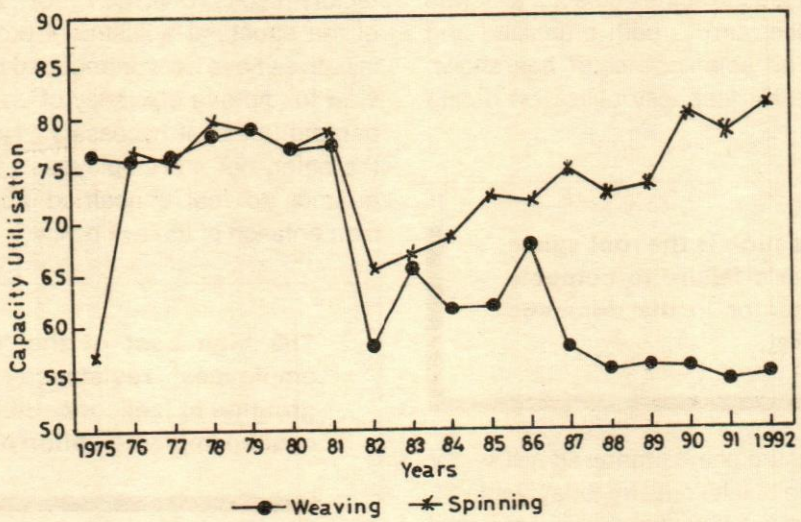
2. The import intensity of the textile industry is very low at around 20 percent. (PTI Economic service, Nov, 15, 1992, Economic Times 10.12. 1992).

3. Policy bias towards the decentralised sector is based on the findings of the Kanungo and Karve committees which were set up in mid 1950s to recommend the future course of growth of the textile industry. The committees suggested to achieve growth in the cloth production by the handloom sector. Hence capacity freezing was imposed on the weaving segment of the mill sector. (Report of the Expert Committee on Textiles, April 1985).

Table 2. Capacity Growth in the Organised Mill Sector

Year	No. of Mills		Installed Capacity		
	Spinning	Composite (weaving)	Spinning	Weaving	
			Spindles (IN MLN.)	Rotors (in '000)	Looms (in '000)
1951	103	275	11.00	—	195
1961	192	287	13.66	—	199
1971	373	291	17.88	—	208
1981*	400	291	21.08	—	208
1982	442	281**	21.78	—	210
1983	525	280	22.53	—	210
1984	595	280	23.82	—	210
1985	674	281	25.57	—	210
1986	702	282	26.02	—	208
1987	744	283	26.12	—	208
1988	752	283	26.25	—	199
1989	769	282	26.46	45	184
1990	770	281	26.59	60	181
1991	777	285	26.67	67	178
1992	846	271	27.82	113	169

Note: The figures are as on 31st March of every Year.
* Figures since 1981 excludes waste spinning units
** Reduction in the number of composite mills is due to reclassification of 10 composite mills into spinning mills.
Source: ICMF Journals and Ministry of Textiles, Annual Reports, (various years).



Source: ICMF Journal (Various Issues)
Fig. 1. Capacity Utilisation in theTextile Industry (in per centage)

This argument is not relevant as India reached self sufficiency in cotton during the eighties[4].

4. Almost till the beginning of the 1980s, cotton output even in the range of 100 lakh bales seemed to be impossible. But now even in the years of average monsoon, an output of 110 lakh bales is easily harvested. Hence, after meeting domestic requirements, it is now possible to export cotton (Perimi, 1993).

Figure 1 amply demonstrates that low capacity utilisaton is the root cause for the mills sector's failure to compete with the unregulated sector in the domestic cotton textile market.

Though capacity utilisation in the weaving sector has been hampered by the government policy and demand

Table 3. Closure of Textile Mills and Affected Capacity

Year	Number of closed Mills			Percentage of Affected Capacity		
	Spinning	Composite (Weaving)	Total	Spindles	Looms	Workers
1971-72	28	25	53	6.62	5.24	6.12
1975-76	10	4	14	3.47	0.43	4.47
1980-81	6	5	11	1.50	2.12	1.87
1981-82	21	37	58	9.27	15.57	13.47
1982-83	16	11	27	2.79	3.33	3.26
1983-84	22	26	48	5.81	9.00	7.02
1984-85	38	32	70	7.10	9.48	—
1985-86	43	29	72	6.78	8.51	—
1986-87	49	41	90	9.13	12.45	10.54
1987-88	81	52	133	12.79	16.69	13.08
1988-89	83	59	142	14.56	20.61	16.83
1989-90	66	55	121	12.76	19.26	14.37
1990-91	50	55	105	11.72	19.75	14.54
1991-92	68	62	130	14.38	22.60	—
1992-93	69	59	128	13.95	20.52	—

Note: 1. Closure position is based on the monthly report from Regional Offices of the Textile Commissioner and from the textile mills. During 1971-72, 1975-76 and 1992-93 position pertain to December end and in the rest it is on March end.

2. Percentage of affected capacity of spindles and looms are calculated with respect to the total installed capacity. The percentage of affected workers is with respect to the total workers on the roll of the mills.

Sources: Compendium of Textile Statistics, Textile Commissioner, Bombay, 1991; Ministry of Textiles, Annual Report (1992-93)

constraints, it hardly affected the spinning sector as it was the sole supplier of cotton yarn to both organised and unorganised sectors. The spinning sector has shown considerable improvement in capacity utilisation during this period.

Low capacity utilisation is the root cause for the mills sector's failure to compete the unregulated sector in the domestic cotton textile market.

The sickness and closure of the organised mill sector is the major problem of the textile industry today (table 3). Towards the end of 1988-89, 142 textile mills out of a total of 1048 were closed, and the trend continued unabated in the subsequent years as well (130 units closed in 1991-92 and 128 in 1992-93). According to a Reserve Bank of India estimate, these sick units accounted for nearly 40 percent of the total bank credit sunk in 1989[5]. The effort by the National Textile Corporation (NTC) to revive the sick units through takeovers also failed to yield any satisfactory results (UNIDO, 1990). With the commencement of the structural adjustment programme in 1991, fresh initiatives have been introduced by the government with a view to improve efficiency of unviable units and remove barriers to exit, if necessary. However, the high cost of the 'safety net' and employees' resistance are reasonable grounds to feel concerned about the successful implementation of the exit policy.

The high cost of the 'safety net' and employees' resistance are reasonable grounds to feel concerned about the successful implementation of the exit policy.

Trends in Domestic Demand

Considerable changes have occurred in domestic textile consumption pattern since 1973 which favour non-cotton and blended textile products (table 4). Per captia consumption of textile products stagnated around 13 to 15 metres per year during 1970-1990 period (Ministry of textiles, 1992-93). However, considerable shifts in consumption pattern became evident especially in the

5. PTI Economic Service, (May 15th, 1992).

Table 4. Consumption of Textile Products (Percentage)

Year	Cotton Cloth	Non-Cotton Cloth	Blended/ Mixed	Total
1973	89.10	5.24	5.66	100.00
1974	87.00	5.65	7.34	100.00
1975	88.05	4.66	7.29	100.00
1976	90.14	3.51	6.35	100.00
1977	87.55	5.36	7.09	100.00
1978	85.36	6.18	8.46	100.00
1979	83.96	6.74	9.30	100.00
1980	78.63	9.01	12.36	100.00
1981	77.74	8.20	14.05	100.00
1982	74.26	9.02	16.72	100.00
1983	73.87	10.51	15.62	100.00
1984	71.82	13.29	14.88	100.00
1985	74.91	8.15	16.93	100.00
1986	67.91	14.91	17.18	100.00
1987	65.75	14.68	19.57	100.00
1988	65.75	14.68	19.57	100.00
1989	55.74	18.71	25.55	100.00
1990	53.07	19.61	27.32	100.00

Source: Ministry of Textiles (Annual Reports)

eighties in favour of non-cotton and blended textiles. Consumption preference for polyster and blended textiles, especially among the top 30 percent of the income group, is mainly due to its natural advantages like durability, permanent press and other aesthetic characteristics (Nayyar, 1987).

It is generally found that domestic policy environment and production structure considerably influences the export performance of the country. Due to the paucity of data we limit the analysis to the export competitiveness of only cotton yarn and cotton fabric segments of textile industry. Domestic demand and supply plays a crucial role in determining the export competitiveness of cotton products. An increase in domestic demand reduces exportable surplus which in turn results in a hike in export prices. Many studies confirmed this hypothesis by establishing the fact that domestic demand pressures in India had restricted export potentials during 1960s and 1970s (Paul & Mote, 1967, Rao, 1980, Jain 1988)]. The fast growing domestic market for textile products resulted in higher domestic prices as compared to export prices. Hence, the increasing attractiveness of domestic market relative to export market induced the exporters to target on domestic market.

An increase in domestic demand reduces exportable surplus which in turn results in a hike in export prices.

However, against the conventional wisdom we observe that export price index has risen faster than the wholesale price index for cotton yarn and fabric. By taking 1975-76 as the base, export price index of cotton yarn rose to 418 points in 1990-91, where as the wholesale price index rose to 338 points during the same period. Cotton fabric export price index also has grown faster than the wholesale price index during the period. The domestic demand pressures expressed as a ratio of wholesale price index to export price index gives a declining trend in both the yarn as well as the fabric product groups. This implies that there existed higher profitability in the export market as compared to domestic market.

Export price index has risen faster than the wholesale price index for cotton yarn and fabric.

Cotton Yarn & Cotton Fabric Export Performance

India has been a major exporter in the world cotton textile market for many years. First decade of planned development witnessed significant growth in cotton textile exports (Singh, 1964), where as in the subsequent decades cotton textile exports stagnated in terms of both volume and value (Nayyar, 1973). As compared to the stagnation of cotton textile exports in the 1960s, seventies and eighties exhibited upward trends in exports and foreign exchange earnings. Some of the studies found that Indian share in the global textile market had declined considerably over the last three decades as compared with Hongkong, Taiwan, South Korea, Pakistan etc. (Jain, 1988). But in the last two years (1990 & 1991) there have been noticeable improvements in the cotton yarn and garment exports (Iyer, 1992). Volume of total cotton export increased at the rate of 5.52 percent per year whereas export earnings in dollars increased at the rate of 6.27 percent per annum (table 6). This indicates that there is a marginal gain for India in textile exports during the last 21 years.

Table 5. Domestic Demand Pressure for Cotton Yarn and Cotton Fabrics

Year	Wholesale Price Indices Base 1975–76 = 100		Export Price Indices Base 1975–76 = 100		Domestic Demand Pressure	
	Yarn	Fabric	Yarn	Fabric	Yarn	Fabric
1977-78	139.72	110.49	158.97	120.83	0.88	0.91
1978-79	141.84	113.58	178.68	123.18	0.79	0.92
1979-80	157.45	119.14	190.81	137.20	0.83	0.87
1980-81	168.01	129.01	197.43	155.59	0.85	0.83
1981-82	178.01	142.59	261.76	161.35	0.68	0.88
1982-83	180.14	150.62	321.91	191.65	0.56	0.79
1983-84	186.52	156.17	244.71	187.44	0.76	0.86
1984-85	209.93	159.26	296.03	196.19	0.71	0.81
1985-86	207.09	166.67	307.21	209.97	0.67	0.79
1986-87	182.27	168.52	265.81	211.02	0.69	0.80
1987-88	239.01	172.22	293.82	227.88	0.81	0.76
1988-89	279.43	177.78	427.50	251.46	0.65	0.71
1989-90	334.67	211.04	429.71	286.39	0.78	0.74
1990-91	338.23	226.72	418.82	324.64	0.81	0.70

Note: 1. Export price index is calculated on the basis of average unit value realisation from export.

2. Domestic demand pressure is computed by dividing Wholesale price index by export price index.

Source: Economic Survey, Ministry of Finance, New Delhi and Handbook of Statistics, ICMF

There is a marginal gain for India in textile exports during the last 21 years.

The export earnings in US Dollars exhibit about eight fold increase during 1970-'91 period whereas the volume of cotton textile exports have grown only three times during the same period. This period also witnessed considerable fluctuations in cotton textile exports from India. For example, during the late seventies and early eighties volume of textile exports declined even below 1970 level. But we may observe an improvement in export performance especially since 1984. Table 6 reveals that fabric export constitues the major portion of export earnings from India.

India's export share (in value terms) in the global cotton textile export was 5.03 percent in 1977 (table 7). However, in the subsequent years India gradually lost its market share and by 1982 it had only 1.37 percent of the market share. Post 1982 period witnessed considerable improvements in textile export from India and it reached 4 percent of global trade share by 1991. This indicates that cotton textile export performance is highly sensitive to internal policy regimes than outside factors[6]. Pakistan nearly doubled its export share during the period as is the case with Hongkong. Countries such as Germany, France, Japan and Korea maintained their export shares throughout the period whereas USA, UK, Brazil and Egypt lost their market shares considerably during 1977-'91 period.

Cotton textile export performance is highly sensitive to internal policy regimes than outside factors.

We may also analyse the export performance at a disaggregate level considering cotton yarn and cotton fabric shares during 1977-91 period. As observed in total cotton textile export, Indian cotton yarn export share also plummeted to the lowest level in 1982 (table 8). A substantial increase in yarn export share could be observed since 1987. Pakistan's yarn export share increased from 5.26 percent in 1977 to 23.05 percent in 1991. France, UK, Korea RP, Brazil and Egypt lost their global market shares in cotton yarn export considerably during the period.

Export share of cotton fabric also follows the pattern observed in the case of Cotton Yarn. The worst years for Indian cotton fabric export were 1982-85 period when its

6. We may notice that most of the policy restrictions have been removed only after 1982.

Table 6. Export Performance of Cotton Yarn and Fabric

Year	As a % Total Export Earnings		Total Volume of Export (Mln.KG)	Total Export Earning (Rs. Crore)	Total Export Earning (Min. Dollars)
	Fabric %	Yarn %			
1970	73.27	26.73	89.65	100.57	134.09
1971	85.50	14.50	68.61	88.84	118.45
1972	81.03	18.97	86.39	119.90	157.97
1973	92.77	7.23	106.21	180.85	233.66
1974	90.77	9.23	81.36	210.00	259.26
1975	95.54	4.46	55.33	140.16	167.26
1976	91.44	8.56	104.75	268.02	299.13
1977	88.76	11.24	79.80	260.46	298.01
1978	93.25	6.75	58.92	206.80	252.41
1979	93.90	6.10	76.38	282.42	347.55
1980	94.01	5.99	72.95	297.19	377.96
1981	91.91	8.09	60.37	278.21	321.30
1982	89.31	10.69	46.66	255.26	267.15
1983	92.11	7.89	57.99	275.95	273.24
1984	92.21	7.79	90.98	464.51	409.77
1985	90.75	9.25	82.48	476.39	385.15
1986	87.56	12.44	93.26	497.01	392.55
1987	64.71	35.29	189.14	929.37	717.00
1988	75.67	24.33	154.23	972.63	698.88
1989	73.55	26.45	174.02	1189.72	733.22
1990	69.97	30.03	215.44	1599.51	913.80
1991	64.58	35.42	277.16	2439.58	1072.72

Note: Where ever required cotton fabric in square metre is converted into kilogram by using the conversion factor 1 kg. = 7.5279 square metre following the ICAC, Cotton World Statistics.

Source: Handbook of Statistics, ICMF (Various years)

share declined below 3 percent of world trade (table 9). Though Pakistan exhibited considerable improvements in cotton yarn export, its cotton fabric export is not showing any dynamism. Only Hongkong doubled its export share of cotton fabric during 1977-91 period. As in the case of cotton yarn export USA and Egypt lost their market shares in cotton fabric too.

MFA did not restrict traditional exporting countries from maintaining their world market shares only if their exports proved to be competitive enough.

This inconsistant and poor export performance exhibited by Indian cotton textile industry needs to be analysed in the background of better performance achieved by other Asian competitors particularly Pakistan. Inspite of the implementation of Multi Fibre Arrangement (MFA) there have been considerable improvements in the market shares of its competitors. It is clear from tables 7, 8 & 9 that MFA did not restrict traditional exporting countries from maintaining their world market shares only if their exports proved to be competitive enough (Nayyar, 1973). Improvement in cotton textile exports in the latter years was mainly due to higher growth in the cotton yarn export. During this period cotton fabric export share of USA, Japan, UK, France etc., also exhibited

Hongkong, South Korea, Germany, Pakistan etc., have been able to expand their fabric market share, where as India failed even to maintain her existing market share.

Table 7. Global Export Share in Cotton Textile Export (in percent)

Year	Hongkong	Germany RP	France	Japan	India	Pakistan	USA	UK	Korea RP	Brazil	Egypt
1977	5.91	9.05	6.91	6.53	5.03	4.06	6.87	3.10	2.98	2.77	3.48
1978	5.48	9.52	7.66	5.00	3.35	4.64	5.92	3.25	3.82	2.38	3.83
1979	5.82	10.21	7.65	3.60	3.74	4.55	7.02	3.24	3.86	2.79	2.53
1980	6.31	9.51	7.08	5.30	2.99	4.42	6.20	3.31	4.08	2.90	2.43
1981	7.42	9.28	6.56	6.84	4.02	5.10	4.36	2.76	3.86	3.24	2.04
1982	6.38	10.38	6.55	6.50	1.37	5.31	3.27	2.43	3.87	2.80	1.58
1983	7.05	10.26	6.38	7.29	1.57	6.80	2.61	2.04	3.60	3.69	2.50
1984	7.82	10.22	5.86	6.81	2.39	5.03	2.12	1.79	3.59	3.96	2.53
1985	7.79	10.63	6.07	6.62	2.38	5.42	2.26	2.04	3.15	3.21	2.66
1986	9.19	11.70	6.42	6.29	3.34	5.46	2.68	2.07	2.94	2.08	2.51
1987	10.88	10.93	6.04	5.45	4.75	6.37	2.05	1.97	2.97	2.31	3.29
1988	10.40	10.71	6.09	5.31	3.99	6.29	2.18	2.10	3.20	2.19	2.96
1989	11.41	10.36	6.13	4.96	3.38	7.13	2.66	2.09	3.08	1.93	3.25
1990	10.68	11.36	6.78	5.03	4.56	8.57	3.28	2.66	2.74	1.63	1.69
1991	10.96	9.24	5.63	4.96	4.36	8.95	3.13	2.37	2.72	1.45	1.43

Source: Yearbook of International Trade Statistics, United Nations (various issues)

Table 8. Global Export Shares in Cotton Yarn Export (in percent)

Year	Hongkong	Germany RP	France	Japan	India	Pakistan	USA	UK	Korea RP	Brazil	Egypt
1977	3.58	3.47	5.06	1.81	2.37	5.26	1.61	2.60	5.94	6.56	9.57
1978	1.55	3.26	4.22	8.84	1.01	8.44	1.66	2.57	9.21	5.58	10.93
1979	1.44	3.66	4.58	0.64	0.94	8.54	2.05	2.34	10.11	6.38	7.65
1980	1.66	3.48	4.68	1.94	0.69	7.87	2.34	2.21	9.88	6.76	7.26
1981	1.52	3.70	4.79	1.55	1.42	8.50	2.30	1.36	9.27	7.95	6.71
1982	1.39	4.35	4.56	1.59	0.60	9.70	1.98	1.45	8.09	6.95	5.38
1983	1.70	4.73	4.67	1.77	0.79	11.05	1.69	1.14	5.79	7.74	7.71
1984	2.55	6.23	4.48	1.35	1.19	7.27	1.12	0.83	6.45	7.53	7.07
1985	2.34	5.98	4.62	1.18	1.07	9.51	1.15	0.94	5.71	7.27	7.72
1986	2.88	6.96	4.39	1.34	2.10	11.17	0.88	0.89	4.14	3.87	7.43
1987	7.02	7.06	3.94	1.00	6.01	12.53	0.73	0.88	4.33	4.81	9.46
1988	2.65	5.89	3.64	0.83	3.61	12.02	1.11	0.70	4.79	4.39	8.29
1989	3.42	6.41	3.44	1.04	3.78	15.63	1.31	0.54	4.54	3.84	10.49
1990	4.03	6.59	3.39	1.10	5.56	19.95	1.66	0.77	3.37	3.39	4.66
1991	4.71	5.70	3.08	1.03	5.25	23.05	1.69	1.06	3.27	2.50	3.82

Source: same as in table 7

considerable decline. Table 9 shows that Hongkong, South Korea, Germany, Pakistan etc., have been able to expand their fabric market share, where as India failed even to maintain her existing market share.

International Comparisons

World demand for cotton fabric grew at the rate of 6.6 percent per annum during 1977-'90 period (table 10), where as India's export of cotton fabrics grew only at the rate of 4 percent per annum. Moreover, Indian export growth and world import growth have been found to be highly correlated as compared to other Asian competitors such as Hongkong, South Korea and Pakistan. It is quite evident that Indian export of cotton textiles fluctuated very closely with the fall and rise in world imports where as the export behaviour of other Asian countries are less sensitive to the fall in world demand. This indicates higher competitiveness of their exports at the global market

Table 9. Global Export Share in Cotton Fabric Export (in percent)

Year	Hongkong	Germany RP	France	Japan	India	Pakistan	USA	UK	Korea RP	Brazil	Egypt
1977	6.76	11.09	7.59	8.26	6.01	3.63	8.79	3.29	1.90	1.39	1.25
1978	6.92	11.81	8.92	6.52	4.22	3.25	7.49	3.49	1.83	1.21	1.22
1979	7.29	12.41	8.67	4.59	4.68	3.21	8.68	3.54	1.76	1.58	0.81
1980	7.98	11.67	7.93	6.50	3.81	3.18	7.59	3.70	1.99	1.52	0.70
1981	9.39	11.14	7.16	8.59	4.89	3.97	5.05	3.23	2.06	1.68	0.48
1982	8.03	12.37	7.21	8.13	1.63	3.86	3.70	2.76	2.47	1.42	0.32
1983	9.01	12.29	7.01	9.31	1.86	5.24	2.95	2.36	2.79	2.21	0.59
1984	9.94	11.83	6.42	9.01	2.87	4.12	2.52	2.17	2.44	2.52	0.70
1985	9.81	12.35	6.61	8.63	2.87	3.90	2.67	2.45	2.20	1.70	0.78
1986	11.43	13.38	7.15	8.04	3.78	3.44	3.32	2.49	2.52	1.45	0.77
1987	14.02	12.48	6.87	7.23	4.24	3.90	2.58	2.40	2.43	1.31	0.82
1988	13.50	12.64	7.07	7.10	4.14	4.00	2.61	2.66	2.59	1.32	0.83
1989	14.26	11.77	7.09	6.35	3.23	4.10	3.14	2.64	2.56	1.25	0.67
1990	13.10	13.09	8.01	6.45	4.20	4.45	3.87	3.34	2.51	1.00	0.61
1991	13.25	10.53	6.56	6.40	4.04	3.80	3.66	2.85	2.51	1.06	0.56

Source: same as in table 7

Table 10. Annual Percentage growth of Exports During 1977-90 period (semi-log equation)

Countries	Cotton Textile	Cotton Yarn	Cotton Fabric
Hongkong	12.63	11.75	12.72
Germany	7.95	14.04	7.43
France	4.69	4.91	5.53
Japan	6.98	5.18	6.85
India	7.33	20.38	3.93
Pakistan	10.35	13.03	6.86
USA	–4.38	0.32	–2.56
UK	1.67	–6.03	4.39
Korea Rep.	4.79	0.41	9.43
Brazil	4.34	3.07	5.16
Egypt	6.79	7.43	2.75
World	6.56	7.07	6.63

Source: Estimated from Yearbook of International Trade Statistical, UN (various issues)

Indian export of cotton textiles fluctuated very closely with the fall and rise in world imports where as the export behaviour of other Asian countries are less sensitive to the fall in world demand.

which makes their exports inelastic downward. It may be noted that the lack of competitiveness of India's fabric production is the major constraint on India's export performance than the recession in world demand. But in the case of Indian cotton yarn export we observe higher growth rate as compared to world average which indicates considerable competitive edge of Indian yarn export especially in the latter years.

Competitive edge exhibited at the export front basically emanates from the price and non-price factors embodied in the product and the marketing strategies of the trading country. The price factors are primarily determined by the cost of production and the degree of domestic and external demand conditions. Similarly, non-price factors are mainly governed by the attributes such as product quality, marketing strategies, advertisement, delivery schedules and so on.

Cost & Price Competitiveness

Domestic cost structure and demand pressures generally explain the price competitiveness of firms. Unless there is a clear comparative cost advantage for the country no firm or industry can afford to export. It can be achieved either by lower factor cost or by higher factor productivity. The major elements of cost incurred in textile production are on raw materials, wages, energy and machinery and equipment. Table 11 Outlines the cost structure of the Indian textile industry. It shows that raw-material and labour costs constitute nearly 70 percent of the total cost of production. Hence, any saving on these

Table 11. Cost Break up in the Mill Sector (in percentage)

Item	Composite Mills (weaving)	Spinning Mills
Raw-material	44.3	58.3
Wages and Salaries	23.6	12.8
Accessories & Spare	3.8	1.9
Power, Fuel and Water	12.2	7.8
Depreciation	3.2	5.1
Interest	7.1	5.5
Other Expenses	15.8	8.6
Total	100.0	100.0

Source: Bhave (1990)

Table 12. Prices of Raw Cotton (Rs. per Quintal)

Year	India (1)	World (2)	(1) as a % of (2)
1980	1191.80	1633.70	72.95
1981	1471.40	1662.60	88.50
1982	1280.10	1546.70	82.76
1983	1471.40	1916.80	76.76
1984	1706.80	2120.70	80.48
1985	1397.80	1614.80	86.56
1986	1280.10	1350.80	94.77
1987	1956.90	2137.10	91.57
1988	2074.60	2026.30	102.38
1989	2162.90	2784.70	77.67
1990	2148.20	3267.20	65.75

Source: Nayyar & Sen (1994).

two items will substantially improve the competitiveness of the industry at the international level.

Raw cotton is the basic raw material used for the production of cotton yarn which in turn is used for cotton cloth (fabric) production. Cotton growing countries such as Pakistan, India, USA etc., should have natural advantage over other non-growing countries because of the easy availability of cotton at lower prices. But in reality, high degree of competition among the cotton growing nations enabled non-producing countries to acquire raw cotton at competitive prices (table 12). This adversely affects the cost competitiveness of the cotton growing countries as against non growers in textile production.

High degree of competition among the cotton growing nations enabled non-producing countries to acquire raw cotton at competitive prices.

Considering the labour intensive production techniques prevalent in the textile sector, it becomes a crucial factor to determine the relative competitiveness of the country. It may be noted that since 1960s western Europe closed nearly half of its textile production units on account of faster growth in labour cost. The bilateral textile export restriction called Multi Fibre Arrangement (MFA) was invented in order to insulate domestic industries from the vagaries of export penetration of low cost developing countries.

In order to analyse the cost competitiveness of the nations we have compared the labour cost per hour for the spinning and weaving processes separately for thirteen countries. Table 13 shows that labour cost in India is substantially lower than its competitors elsewhere.

Labour cost in India is substantially lower than its competitors elsewhere.

Relative prices in the global market determine the export competitiveness of a country. A comparison of export prices of India with its competing countries would indicate the competitiveness at the global export market. Greater price competitiveness provides a country an advantage over others by improving capability of supplying products at lower prices and to bear higher transport and insurance costs while exporting to distant places. A comparative analysis of India's export price movement against other countries' and also with its main competitors' weighted average price index for both yarn and fabric exports reveal the export competitiveness of India. The export price per kilogram of cotton yarn in major exporting countries during 1977-1990 period, remained non-competitive against Pakistan, the major cotton yarn exporter in the world (table 14). In comparison to the prices of the other important competitors such as South Korea, Turkey, Brazil etc., Indian price remained non-competitive for the whole study period except for a few years. However, India maintained marginal price advantage against Hongkong, Japan, Egypt and West Germany. A comparison with the weighted average price of all the nine countries together exhibits that Indian prices are competitive only for six years out of fourteen years under consideration. India's disadvantage became quite evident during the middle part of the study period i.e, the first half of 1980s. The later half of the 1980s India became relatively more price competitive.

Table 13. Labour Cost Per Hour in the Spinning and Weaving Sections in Selected Countries (in US Dollar)

Countries	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Hongkong	0.809	0.936	1.086	1.130	1.415	1.289	1.488	1.624	1.822	2.138	2.437	2.671	3.123	3.504
Germany RP	4.889	5.614	6.002	5.093	4.958	4.868	4.515	4.507	6.364	7.995	8.518	8.282	10.089	1.425
France	3.266	3.841	4.430	3.973	3.735	3.691	3.395	3.460	4.713	5.595	5.824	7.020	7.690	NA
Japan	4.267	4.495	4.660	5.127	4.591	4.966	5.067	5.287	7.660	9.225	10.556	10.321	10.296	11.268
India	0.294	0.316	0.395	0.363	0.376	0.359	0.371	0.242	0.397	0.363	0.385	0.297	0.308	0.246
Pakistan	0.291	0.294	0.228	0.250	0.252	0.228	0.243	0.229	0.239	0.247	0.252	0.274	0.297	0.285
USA	4.300	4.660	5.070	5.520	5.830	6.180	6.460	6.700	6.930	7.170	7.380	7.670	8.020	8.300
UK	1.592	1.938	2.180	2.046	1.965	1.943	2.298	2.308	2.419	2.591	2.708	2.846	3.134	3.182
KoreaRP	0.712	0.945	0.924	0.980	1.041	1.093	1.124	1.134	1.238	1.535	2.025	2.684	3.021	3.541
Australia	3.675	4.208	4.690	4.169	4.156	4.135	3.979	4.052	5.765	7.344	7.796	7.453	15.261	9.449
Turkey	1.101	0.986	0.720	0.642	0.576	0.568	0.474	0.562	0.569	0.618	0.586	0.594	0.631	NA
Canada	4.716	4.593	5.508	5.889	6.038	6.362	4.463	6.408	6.571	7.142	8.028	8.851	9.282	10.675
Mexico	1.243	1.435	1.637	2.129	1.702	1.149	1.341	1.261	0.938	1.032	1.260	1.399	1.450	1.633

Note: Labour earning per hour is taken as the proxy for labour cost per hour. Since labour cost are reported in the respective currencies for different countries. The conversion figure for US Dollar is based on the period average exchange rate as reported in the 'Yearbook of Financial Statistics', IMF.
Source: Yearbook of labour Statistics, ILO and Yearbook of Industrial statistics, UN.

Table 14. Export Price Per Kg. of Cotton Yarn in Selected Countries (in US $)

Year	India	Pakistan	Hongkong	Japan	Korea Rep	Germany	Egypt	Turkey	Brazil	Weighted Average
1977	2.485	1.850	2.827	3.101	2.414	3.294	5.507	2.638	2.256	3.143
1978	2.978	1.852	2.684	3.360	2.656	3.751	6.541	2.536	2.177	3.428
1979	3.065	2.087	3.110	4.145	3.151	4.305	4.170	2.395	2.778	3.063
1980	3.482	2.087	2.993	5.054	2.811	4.625	4.205	2.497	3.128	3.154
1981	4.060	2.215	4.361	4.998	2.470	3.998	4.288	2.494	2.523	3.004
1982	4.150	1.205	4.692	4.622	2.301	3.876	3.776	2.398	2.448	2.613
1983	3.228	1.193	3.818	4.636	2.170	3.817	3.268	2.776	2.380	2.570
1984	3.286	2.380	3.878	4.700	3.002	3.702	3.393	2.765	2.637	3.069
1985	3.470	1.859	3.723	4.140	2.761	3.742	3.460	2.636	2.400	2.842
1986	2.838	1.780	3.964	4.434	2.839	4.769	5.207	2.692	2.509	3.317
1987	3.082	2.361	3.823	4.926	2.839	4.849	3.300	3.361	3.030	3.267
1988	4.128	2.299	4.126	5.978	3.858	5.580	3.582	3.304	3.165	3.569
1989	3.603	2.052	3.985	6.062	4.020	5.139	3.511	2.950	3.238	3.327
1990	3.594	2.406	4.268	6.122	3.668	5.938	4.160	3.636	3.321	3.585

Note: 1. Based on the trade statistics reported on f.o.b. price.
2. Weight for the export price of a country is based on its global export share for the current price.
Source: Yearbook of International Trade Statistics and Commodity Trade Statistics, UN (various issues)

India's export price movement against other countries' reveal the export competitiveness of India.

Price competitiveness in the cotton fabric export can be discerned from table 15. India's export price remained considerably higher than that of Pakistan for the whole study period except for the years 1987, 1989 and 1990. Untill 1986 cotton fabric export price index of India had grown faster than that of Hongkong, South Korea, Pakistan, Japan, Germany, Italy, China, Turkey an Brazil. Nevertheless, from 1986 onwards a deceleration in India's export price index could be observed and it reached a very low level in 1990. It is worthwhile to mention that the price index of Hongkong exhibited a

Table 15. Export Price Per Kg. of Cotton Fabrics of selected Countries (in US $)

Year	India	Pakistan	Hongkong	Japan	Korea Rep	Germany	Egypt	Turkey	Brazil	China	Weighted Average
1977	2.962	2.328	5.727	7.226	3.718	7.688	7.665	4.782	3.268	3.815	5.397
1978	3.106	2.935	5.622	8.667	3.884	9.053	9.290	4.549	3.407	3.628	6.082
1979	3.257	3.260	7.059	10.004	4.174	10.197	10.770	4.231	3.698	3.497	6.694
1980	3.683	3.480	7.891	9.802	4.229	8.183	11.204	4.740	3.911	3.711	6.640
1981	3.764	3.681	7.204	10.249	4.306	7.360	9.984	4.766	3.504	3.940	6.427
1982	4.442	3.593	7.010	9.550	4.036	6.942	9.532	4.744	3.246	3.430	6.162
1983	5.209	3.428	6.524	9.002	3.813	8.051	9.410	4.629	3.172	3.372	6.166
1984	5.633	3.319	7.333	10.580	4.339	7.576	9.063	4.557	3.492	3.651	6.517
1985	5.849	3.223	7.525	10.066	4.133	7.947	10.566	3.763	3.620	3.863	6.773
1986	4.950	3.938	7.110	11.117	4.528	9.856	13.092	4.097	3.738	3.843	7.462
1987	3.817	4.175	7.501	12.391	5.464	10.678	12.869	4.356	4.259	4.312	7.791
1988	4.695	4.169	7.269	14.743	6.621	11.278	14.847	4.555	3.702	4.028	8.302
1989	4.019	4.112	7.354	13.901	6.956	10.436	14.450	4.668	3.365	3.630	7.836
1990	3.887	4.430	7.764	12.542	7.566	12.510	17.132	6.069	4.030	4.185	8.719

Note: 1. Unit value are the f.o.b. export value

2. Wherever required units in square meter is converted into kilogram using the conversion factor 1Kg. = 7.5249 square metres following ICAC, Cotton World Statistics.

3. Weight for the export price of a country is based on its global export share for the current year.

Source: Same as in table 14

Table 16. Relative Price Elasticity of Yarn and Fabric Exports from India

Variable	Constant	Elasticity Co-efficient	R^2	t Statistic
Cotton Yarn	2.68	–1.37*	0.08	–1.61
Cotton Fabrics	5.92	—0.67*	0.20	—1.73

* Significant at 1 percent probability level

declining trend during the period 1980 to 1990. Faster growth in India's export prices compared to other countries' may have contributed to the dismal performance of Indian cotton fabric export, especially till the first half of 1980s.

Faster growth in India's export prices compared to other countries' may have contributed to the dismal performance of Indian cotton fabric export, especially till the first half of 1980s.

Export Price Elasticities

Relative price elasticity of exports represent the sensitivity of exports to relative price movements. It has been estimated from a double logarithmic functional form:

$$\ln X_{ijt} = a + b \ln(P_{ijt}/P_{wjt}) + u_t \quad (1)$$

Where X = volume of India's export, P = export price, i = India, t = time, w = the weighted world average and j = 1 & 2 (cotton yarn & cotton fabric respectively).

Cotton yarn export is more sensitive to it's relative price changes than that of cotton fabric export. In other words fabric export market responds less than proportionate to relative price variations as against cotton yarn export market (table 16).

Fabric export market responds less than proportionate to relative price variations as against cotton yarn export market.

We have also estimated the cross price elasticities of Indian cotton yarn and cotton fabric exports to the export prices of other exporting countries in the world. Cross

Table 17. Price Elasticity of Indian Exports and Growth rates in Prices (1977-'90)

Countries	Cotton Yarn		Cotton Fabrics	
	Elasticity	Growth	Elasticity	Growth
India	0.41	1.41	0.12	3.90
HongKong	2.55	2.81	1.78	1.56
Korea Rep.	1.19	2.96	1.44	4.84
Pakistan	–0.42	1.58	–0.76	3.42
Japan	–4.20	3.85	–0.17	4.00
Germany	–0.29	3.19	1.37	2.34
Egypt	0.52	–2.81	—	—
Turkey	5.73	2.52	–0.95	0.44
Brazil	5.59	2.28	–0.65	0.87
Italy	—	—	–0.95	4.57
China	—	—	1.09	0.85

Note: Growth rates are calculated from a semi log equation.
Source: Same as in table 14.

price elasticities are estimated from a double logarithmic regression procedure as in the earlier case. The functional form can be linearly specified as:

$$\ln X_{i\,t} = a + \sum b_j \ln(P_{i\,j\,t}) + u_t \qquad (2)$$

Where $X_{i\,t}$ = volume of export of India at time t, $P_{i\,j\,t}$ = export price of i^{th} product from the j^{th} country at time t.

If the coefficient 'bj' is positive for a country it indicates that the country is a competitor to India. The degree of responsiveness will be determined by the value of the coefficient. If the coefficient is negative, it implies the country is not an effective competitor to India. Depending on the sign and value of the coefficient we can determine the impact of price changes in the competing country to India's export. If it is less than one the impact on Indian export as a result of a rise/fall of export price in the competiting country would be less than proportionate.

The estimates of the elasticity results are given in table 17. It shows that Turkey, Brazil, Hongkong, Korea Rep., are the major competitors in the case of cotton yarn export as their coefficients are positive and more than one. If they reduce price of cotton yarn that will adversely affect the Indian export significantly depending on the magnitude of the co-efficient. Only in the case of Pakistan, Japan and Germany we notice negative cross price elasticities with Indian export. Major competitors in cotton fabric export can be identified as Hongkong, Korean Rep., Germany and China. Hence, any decline in relative export prices of these countries would significantly affect Indian fabric export performance. Here we may notice that fabric cross price elasticities are less sensitive as compared to yarn cross price elasticities.

Turkey, Brazil, Hongkong, Korea Rep., are the major competitors in the case of cotton yarn export as their coefficients are positive and more than one. Major competitors in cotton fabric export can be identified as Hongkong, Korean Rep., Germany and China.

The higher growth of cotton yarn export observed in India at the annual rate of 20 percent (table 10) may be because of a more than proportionate price rise in the competing countries. The Indian cotton yarn export price grew at an average annual rate of 1.41 percent over the period 1977 to 1990, where as Hongkong, Korea Republic, Turkey and Brazil exhibited higher growth rates. Similarly, a less than proportionate impact on Indian fabric export from an annual price increase of 3.9 percent partly explains the specialisation of Indian exports over other countries. However, countries with positive elasticity coefficients such as China, Hongkong and Germany exhibited lower growth rates in export prices than India. This implies that they substituted Indian Fabric Products in the global market. The cross price elasticities of cotton fabric for Germany, Hongkong, Korea Rep. and China were positive and more than one.

Determinants of Export Competitiveness

In order to determine the relative impact of internal and external factors on India's cotton yarn and fabrics export, we have considered a step-wise multiple regres-

sion analysis. Functional relationship has been specified as:

$$X_{i\,t} = f\,(DP_{i\,t}, DD_{i\,t}, ED_{i\,t}, GP_{i\,t}, T) \qquad (3)$$

Where i = 1 & 2 (cotton yarn and cotton fabric)

X = India's export

DP = Domestic production

DD = Domestic demand

ED = External demand

GP = Global price per unit

T = Time as a proxy for technology, efficiency in delivery and so on, which represents the unspecified variables in the function.

Results achieved through the step-wise regression procedure for cotton yarn are:

$$X_{i\,t} = -158.54 - 0.81\ DD_{i\,t}{}^{**} + 0.14\ ED_{i\,t}{}^{*} + 32.97\ GP_{i\,t}{}^{**}$$
$$(-1.72) \qquad (3.71) \qquad (2.75)$$

where R^2 = 0.86, figures in brackets are t statistics and * & ** are significant at 1 percent and 5 percent probability levels respectively.

The inclusion of other variables such as DP and T, separately as well as simultaneously, gives estimates which are statistically not significant, although it marginally improve the degree of determination.

In the case of cotton fabric, the estimated function takes the form as:

$$X_{i\,t} = -704.82 + 0.78\ DP_{i\,t}{}^{*} - 0.69\ DD_{i\,t}{}^{*} - 29.05\ T^{*}$$
$$(10.34) \qquad (-12.18) \qquad (3.24)$$

where R^2 = 0.98, * significant at 1 percent probability level and figures in brackets represent t statistics.

In order to ascertain the relative impact of different variables on India's export performance we have estimated elasticities of these variables with respect to India's volume of export. The elasticity results for cotton yarn can be seen as:

$$\ln X_{i\,t} = -19.75 - 0.74 \ln DD_{i\,t} + 3.18 \ln ED_{i\,t}{}^{**} + 4.80 \ln GP_{i\,t}{}^{*}$$
$$(-0.54) \qquad (2.05) \qquad (3.50)$$

where R^2 = 0.82, * & ** are significant at 1 percent and 5 percent probability levels respectively, figures in brackets are t statistics.

External factors such as global price of cotton yarn and the volume of external demand are the major influencing factors of cotton yarn export. Domestic demand is found to be acting as a depressant.

The elasticity results show that external factors such as global price of cotton yarn (GP) and the volume of external demand (ED) are the major influencing factors of cotton yarn export. Domestic demand (DD) is found to be acting as a depressant though at a lesser degree as compared to external factors to yarn export from India.

Similarly, the elasticity results for cotton fabric is estimated as:

$$\ln X_{i\,t} = -27.39 + 14.25 \ln DP_{i\,t} - 10.61 \ln DDi_{\,t}{}^{*} - 0.91\ T^{*}$$
$$(8.89) \qquad (-9.83) \qquad (-4.08)$$

where R^2 = 0.96, * significant at 1 percent probability level, figures in brackets are *t* statistics.

In the case of cotton fabrics export, the determining variables are domestic production and domestic demand. domestic production of cotton fabric becomes the major determining factor of fabric export and it is very much positively associated. Whereas domestic demand exhibits a negative coefficient value indicating the depressing role of domestic demand on the export performance of fabric industry. The significance of the proxy variable (time) revealed the influencing role of other variables like, technology, product quality,, efficiency in distribution etc.

In the case of cotton fabrics export, the determining variables are domestic production and domestic demand.

Impact of Structural Factors

It has been identified that the export performance of a country is primarily determined by the structural factors within the country. Here some of the structural factors such as relative export price, domestic demand pressure, domestic production structure etc., have been analysed for discerning their influence on the export performance of cotton yarn and cotton fabric export from India.

In the case of cotton yarn we have analysed the structural factors in terms of relative export price of cotton yarn and domestic consumption pressures with other unobserved factors. In the case of cotton fabric, apart from these variables we have also considered the share of mill sector in total production. The functional relationship for cotton yarn can be specified as:

$$Xs_{y\,t} = f(RP_{y\,t}, DDP_{y\,t}, T) \qquad (4)$$

Where $Xs_{y\,t}$ = Cotton Yarn Export of India as a share of global trade

RP = Relative Export Price of cotton yarn

DDP = Domestic Demand Pressure for cotton yarn

T = Time as a proxy for the unspecified variables.

The linear regression results for yarn exports are:

$$Xs_y = -3.90 - 0.20\ RP_y + 0.07\ DDP_y + 0.34\ T\ *$$
$$(-0.6) \qquad (1.24) \qquad (4.16)$$

where $R^2 = 0.71$, * significant at 1 percent probability level, figures in brackets are t statistics.

Similarly, the functional relationship for cotton fabric can be specified as follows:

$$Xs_{f\,t} = f\ (DPS_{f\,t},\ RP_{f\,t},\ DDP_{f\,t},\ T) \qquad (5)$$

Where DPS = Domestic Production Structure of cotton fabrics (mill sector's share in the total production)

RP = Relative Export Price for cotton fabrics

DDP = Domestic Demand Pressure for cotton fabrics

$$Xs_f = 21.04 - 0.28\ DPS_f\ ** - 0.03\ RP_f\ ** + 0.52\ T\ ***$$
$$(-2.09) \qquad (-1.81) \qquad (1.76)$$

where $R^2 = 0.69$, ** & *** significant at 5 percent and 10 percent probability levels respectively, figures in brackets are t statistics.

The elasticity of textile exports to the specified structural variables can be estimated log-linearly for both yarn and fabric exports. The elasticity estimates for cotton yarn exports are:

$$\ln Xs_y = 6.72 - 2.08\ \ln RP_y\ ** + 0.60\ \ln DDP_y + 0.13\ T\ *$$
$$(1.81) \qquad (0.38) \qquad (3.95)$$

where $R^2 = 0.73$, * significant at 1 percent probability level, ** significant at 5 percent probability level, figures in brackets are t statistics.

The elasticity estimates for cotton fabric exports are:

$$\ln Xs_f = 31.39 - 7.20\ \ln DPS_f\ * - 0.35\ \ln RP_f + 0.21\ T\ **$$
$$(-2.96) \qquad (-1.03) \qquad (2.67)$$

where $R^2 = 0.74$, * & ** are significant at 1 percent and 5 percent probability levels respectively, figures in brackets are t statistics.

The results reveal that the most important determining factor in the case of cotton yarn export is the relative export price whereas it is the production structure in the case of cotton fabric. The positive and significant relationship between domestic consumption pressure and export share of yarn dismisses the argument that it is the domestic consumption demand which restrains the cotton export because of the higher probability in the domestic market as against the export market. In the case of fabric exports the appearance of inverse relationship between the domestic production structure and export share exhibits the negative effect of the policy regimes on fabric export performance. The regression results reinforce the observations that it is primarily the domestic factors that determine the export competitiveness of fabrics and external factors in the case of yarn.

The most important determining factor in the case of cotton yarn export is the relative export price whereas it is the production structure in the case of cotton fabric. It is primarily the domestic factors that determine the export competitiveness of fabrics and external factors in the case of yarn.

The empirical findings of the present study supports the argument of 'large country phenomenon' where a country having large world export share would be affected by the world export demand and global export price movements significantly from making further breakthrough in export. This is found to be the case with India's cotton yarn exports which has established a vital place in the global trade with annual average growth of 20 percent as against 7 percent growth of world import over the period 1977 to 1990 (table 8). Contrary to this, marginalisation of India's cotton fabric exports in the global trade reveals the impact of domestic factors such as policy-induced structural factors in production and growth in domestic demand. Furthermore, the faster growth in domestic demand in a closed economy frame work would restrict the urge to improve product quality, modernise technology, reorient product channelisation in tune with international standards as is being evidenced in the case of Indian cotton fabrics export.

The significance of the proxy variable, time, in determining India's export of both cotton yarn and fabric could be explained better if the technological base in the textile industry in India vis-a vis other countries is explored.

Technological Developments in the Textile Industry

The last three decades witnessed rapid improvements in the technological base of global textile industry[7]. Major innovations have taken place in the Western Europe and North America primarily targetted towards attaining competitive edge against low cost developing countries. Major features of the new technology can be identified as reduced number of processing stages, faster machines, larger packages in the spinning sector and automatic looms in the weaving sector (Khanna, 1989).

7. Technological development has been attained mainly through constant improvement in factor productivity and product quality which assumed the role of dynamic determinant of competitiveness.

Table 18. Percentage diffusion of Open End Rotor (OER) and Shuttleless Loom (SLL) as percentage to the total installed capacity

Country	1980		1988	
	OER	SLL	OER	SLL
Hongkong	81.63	33.26	84.61	71.61
GermanyRP	50.97	51.30	58.88	86.99
France	64.00	62.90	68.92	88.65
Japan	51.23	19.00	28.41	24.76
Italy	52.57	56.29	50.03	86.44
India	0.08	0.96	2.08	1.17
Pakistan	15.90	9.02	19.28	43.27
USA	37.05	62.74	47.70	75.87
UK	49.20	64.57	54.54	65.52
KoreaRP	20.53	13.06	18.59	29.69
Austria	6.49	62.13	39.75	89.29
Brazil	27.18	5.86	22.52	15.78
Indonesia	9.93	12.03	16.42	21.38
Turkey	14.78	17.51	32.11	13.89
Thailand	7.23	2.74	19.33	9.46
Singapore	74.67	28.69	73.27	54.26
Spain	48.78	51.17	47.31	61.04
Egypt	38.88	5.98	22.21	10.68
Malaysia	15.73	0.00	11.44	24.32
Canada	21.54	44.13	46.52	49.37
Mexico	17.38	66.60	19.76	46.19

Source: Kell & Richtering (1991)

In the earlier decades new technology was region specific as a result of high skilled labour requirements. As the manufacturing processes standardised, new technology could be deployed with less skilled worker. This facilitated countries like Hongkong, South Korea, Pakistan and Taiwan etc., to introduce new global technology and reap the benefits of cheap labour and better technology.

The popular theme in the later part of the 1980s was "from low cost to high tech competition". Even though other factors like firm's strategies in product design and marketing, new entrants from low labour cost countries, enforcement of non-tariff barriers etc., have its specific impact on competitiveness, many of them appears to be closely related to technology (Kell & Richtering, 1991). The slow technological progress in Indian cotton textile industry rendered the existing technology obsolete. In view of the large quantum of age old machinery and equipment, the textile mills in India has been regarded as "Technological dinosaur's museums", or as worse as "grave yard of machinery" in the world (Sastry, 1989).

Perceptible differences in productivity can be observed with differences in available technologies in the weaving and spinning processes. The Open-End-Rotor and Shuttle-less-Loom can be taken as the latest technologies available for the spinning and weaving processes respectively (Kell & Richtering, 1991; Khanna, 1989). In the present study we have used percentage diffusion of Open-End-Rotor and Shuttle-less Loom to total installed capacity as the level of technological improvement for the spinning and weaving processes respectively[8].

Table 18 gives percentages of open-end rotor and shuttle-less loom to the total installed capacity of spinning and weaving sectors respectively for different countries. The percentage diffusion of open-end rotor in India is very low at 0.08 percent and 2.08 percent in 1980 and 1988 respectively as compared 15.9 percent and 19.28 percent in Pakistan, 80.63 percent and 84.61 percent in Hongkong and 20.53 percent and 18.59 percent in Korea

8. Certain limitations of this method can be cited as it overlooks incremental improvement in technology and within the same technology there may be differences in efficiency while implementing it. In the absence of adequate cross-country data, the present approach may be used as the second best measure to ascertain the relationship between technological base and export competitiveness.

Republic during these two periods. Similarly the percentage diffusion of shuttle-less loom in India is also very low at 0.96 percent and 1.17 percent in 1980 and 1988 respectively compared to its major competitors.

In the domestic sector handloom achieved higher export performance with low level of technology. The products which are exported mostly by the handloom sector enjoys a kind of product specialisation, hence, commands premium price with relatively less substitutes available from other countries. Since, the degree of substitution is very high for the mill sector products, any change in export price or non-price factors would immediately affect its export competitiveness. However, this study suggests technological upgradation as the only route for the mill sector to improve factor productivity and product quality. The fear of employment reduction as a result of modernisation has lost its logical validity due to the rising employment potential in the garment sector.

This study suggests technological upgradation as the only route for the mill sector to improve factor productivity and product quality.

Conclusion

In this study we analysed the textile production of India in cotton, non cotton and blended fibres. Production structure was analysed at both organised and unorganised segments of the sector. It was found that government policy has been tilted towards the unorganised sector which resulted in the decline of mill sector in the later years.

Textile industry emerged as the single most dominant industry in India in both domestic as well as export fronts with 20 percent export earnings for the country. India's cotton textile exports have more than doubled in terms of volume where as export earnings have gone up by sixteen times in Rupee and seven times in Dollar terms during the last two decades, The sector-wise analysis revealed that the mill sector has lost against the powerloom sector in both the domestic as well as export markets.

Notwithstanding the growth in the cotton textile exports in volume and value, India's export performance, however, was not satisfactory because of its declining market share as against its major Asian competitors. India's export performance was particularly disappointing considering its advantages over others in terms of installed capacity, large area under cotton cultivation and availability of cheap labour in the domestic economy.

An analysis of the sources of competitiveness shows that India's cotton textile export primarily relies on abundant supply of raw cotton and cheap labour. For sustainable advantage in the long run, India needs to strengthen the dynamic determinants of competitiveness such as technological upgradation and productivity improvement. This is important because of the fact that many countries are depending on global sourcing of raw-material. Moreover, there exists almost perfect competition in the cotton export market which led to the standardisation of raw cotton price among different countries. Secondly, there is every possibility that the labour costs might go up in coming years. Thus the country which enjoys low factor cost may not be able to sustain it in the long run. Technological improvements through increase in scale of operation and managerial efficiency is the only solution to sustain long term advantage. Efforts should be made to improve productivity and thereby neutralise a fall in its export competitiveness due to the marginalisation of labour cost across countries.

For sustainable advantage in the long run, India needs to strengthen the dynamic determinants of competitiveness such as technological upgradation and productivity improvement.

A sector-wise analysis reveals that Indian cotton yarn was relatively more competitive as compared to those from its competitors in the global textile market. Consequently India's cotton yarn export grew at a rate of 20 percent during the period 1977 — 1990. With external factors like world demand and global price movements acting as controlling variables, yarn export may not grow fast in future. Hence, India's cotton textile export performance will primarily depend on the success in the cotton fabric export front. But the export experience in the cotton fabric shows its margnalisation in the global trade due to lack of competitiveness.

The policy-induced structural transformation towards higher production share for the unregulated (decentralised) sector, in spite of improving overall exports, may be inferred as the major reason for a decline in India's export share in world market. This calls for the creation of a level playing field in the textile industry for

the regulated (Mills) sector as well as for the unregulated sector in order to achieve further break-through in textile exports in the coming years.

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"The most beautiful thing we can experience is the mysterious.
It is the source of all true art and science."

— Albert Einstein

Pesticide Formulation & Environmental Pollution

NPC Pollution Control Division

In pesticide formulation sector generally three type of products, viz. dust powder & wettable powder, granules and liquid formulations are made. The industry is seasonal in nature and production is market dependent. The Insecticide Board has registered 125 different types of formulations for manufacture in India, of which 30-40 types are commonly made.

In pesticide formulation sector the main raw materials are; basic pesticide, fillers (solvents, soap stone powder, clay, granules etc.) and additives (stabiliser, emulsifier etc.). The basic pesticide constitutes only a small percentage of total mass of the formulated product.

The principal process step is mixing (blending) of basic pesticide with inert/solvent materials. No chemical reaction is involved in formulation. The basic pesticides are highly toxic. National and International toxicity ratings of different pesticides are available in literature.

Pollution Control Norms

No pollution control norms have been prescribed by the concerned agencies, however, safety norms are applicable as per Company's Act.

Type of Pollution

In pesticide formulation mainly fugitive emissions (air) occur which are difficult to quantify. However, the process being batch type, the losses can be worked out by input and output material balance. The losses take place because of fugitive emissions and minor spillages (due to manual handling of materials). The type of pollution and pollutants generated in different formulation plants are given in Table 1.

The level of pollution from different types of formulation plants are given below:

Granule Formulation Plant

In granules formulation mostly 10 % Phorate is made. The main raw materials used are:

- — Bentonite Clay Granules
- — Basic Pesticide (Phorate)
- — Di Ethyl Glycol (DEG)
- — Rosin
- — Solvent — Mineral Turpentine Oil (MTO) or O-Xylene

Fugitive Emissions & Losses

The fugitive emissions occur during raw material weighing, charging to blender, blending, unloading of blender and packing operations. Empty drums of basic pesticide containing residual material also cause fume generation and emissions.

Both Phorate (basic pesticide) and solvent (MTO & O-Xylene) contain volatile organic compounds (VOC). During blending, the vapors are generated due to natural evaporation. The normal evaporation rate measured for basic pesticide and MTO is 1.3 gms/hr.m^2 & 12 gms/hr.m^2 respectively from stationary surface at normal temperature. The actual evaporation rate might be different due to slightly higher temperature in blender and availability of large surface area in liquid spray. The phorate concentration in fugitive emissions from blender are given in Table 2.

As mentioned earlier, direct quantification of overall pollution level from different sources is not feasible but losses can be worked out by material balance. Typical losses from different capacity blenders are given in Table 3.

Table 1. Types of Pollution in Pesticide Formulation

S. No..	Type of pollution	Pollutant	Plant
1.	Air Pollution-Fugitive	i. Dust-Soap Stone, China Clay, Granule	Dust Plant, Granule Plant
		ii. Fumes-Basic Pesticide, Solvents	Dust Plant Liquid Plant Granule Plant
2.	Water Pollution	None except container washing wherever practiced	—
3.	Hazardous Waste	Blender Cleansing Waste	Granule Plant

Table 2. Phorate Concentration Levels in Fugitive Emissions from Blender

S. No.	Stage of Operation	Phorate Conc. (mgs/m^3)	Time Min
1.	Before material loading	182	12
2.	Phorate spray & mixing	300	40
3.	DEG spray & mixing	264	20
4.	Rosin & MTO spray and mixing	210	40
	Weighted Time Average	249 mg/m^3	
	Total Flow	250 m^3/hr	
	Total Phorate emissions	156 gm/batch	

Table 3. Typical Losses in Granule Formulation Plant

S. No.	Capacity of Blender-Kgs	Inputs-Raw Material Kgs	Output-Product Kgs	Losses Kgs	Losses %
1.	800	822.4	812.5	9.9	1.2
2.	1000	1010.0	998.0	12.0	1.2
3.	1200	1202.4	1152.5	49.9	4.2

Table 4. Typical Losses in Manufacture of Dust Powder Formulation

S. No..	Capacity of Blender-Kgs	Inputs-Raw Material Kgs	Output-Product Kgs	Losses Kgs	Losses %
2.	1000	816.2	753-803	13-63	1-2.6
3.	2000	2023-2040	2000-2010	23-40	1-2

Table 5. Typical Losses in Liquid Formulation

S. No..	Product	Batch Size Kgs	Inputs-Raw Materials Kgs	Output-Product Kgs	Losses Kgs	%
2.	Endosulfan	2000	2020.4	2005.85	14.55	0.72
3.	DDVP	1300	1325.4	1312.58	12.82	0.97

Dust/wettables Formulation Plants

In dust powder formulation, the basic raw materials used are:

— Pulverised soap stone

— Respective basic pesticide

In wettable powder formulations, main raw materials are:

— Pulverised China clay

— Respective basic pesticide

Fugitive Emissions & Losses

The fugitive emissions occur during raw material weighing, charging to pulveriser, pulverising, blending, unloading of blender and packing operations. Empty drums of basic pesticide containing residual material also cause fume generation and emissions. Typical losses during formulation of 2% Methyl Parathion dust powder are given in Table 4.

Liquid Formulation Plant

In liquid formulation, main raw materials are:

— Respective basic pesticide

— Solvents

— Emulsifier/stabiliser

Fugitive Emissions & Losses

Fumes are generated during raw material weighing and charging into blender due to natural evaporation and spillages. Although the blender remains closed while carrying out the operation, the churning of liquid in the blender increases the temperature which accelerates the natural evaporation rate. The losses for a typical batch of 35% Endosulfan EC and 76% DDVP EC formulation are given in Table 5.

Apparently, the losses and hence the pollution from Pesticide Formulation Industry is low ranging from 1% to 3%. However, the basic pesticide being highly toxic, even at this level the impact of pollution could be very severe specially in and around the factory premises.

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"Some men see things as they are and ask, 'Why?'
Others dream things that never were, and ask 'Why not?' "

— *Robert F. Kennedy*

Competitiveness Ranking of Indian States

NPC Research Division

In the earlier studies [Productivity 33(2) & Productivity 33(3)], we reported the ranking of Indian states in terms of Human Development Index (HDI) and Infrastructure Development Index (IDI) based on the methodology adopted by the Human Development Report (1990) of the UNDP. In the latest Human Development Report (1994) it has been suggested that the HDI can be improved through disaggregation. In the present study, we combine all the variables included in HDI and IDI along with some other crucial state variables for arriving at a more comprehensive State level Competitiveness Index (SCI) with a view to depicting the relative ranking of major fifteen states in India.

Competitiveness of a state can be broadly considered as the overall health of the economy in terms of various observable economic and social indicators which adequately demonstrate the level of development attained by the states. In a liberalised economic environment, the relative competitiveness of the states become the guiding factor for the private corporate sector while evolving their future investment strategies. In this context it becomes imperative to analyze the relative competitiveness of states on various performance indicators.

Various definitions on competitiveness have been put forward by many experts considering its multi-faceted characteristics. Michael Porter (1985) tried to develop a new paradigm of trade theory stressing productivity based on innovation as key to internal competitiveness. He suggested to strengthen competitive edge strategies based on market segmentation, product differentiation, technology upgradation and economies of scale. Michael Porter's (1990) Ten Nation Study found that local competition and rivalry was imperative for both small and large countries. The recent report on World Competitiveness by IMD/World Economic Forum based their competitiveness (Fiona Jebb, 1992) rankings upon a mixture of hard and soft data. Hard data covered eight variables such as Domestic Economic Growth, Internationalisation, Government, Finance, Infra-structure, Management, Science & technology and people.

When we consider the competitiveness among Indian states, some of the crucial variables relevant at the international level become irrelevant at the national level. It is perhaps due to the fact that states are not separate entities on their own but only an integral part of the whole nation. We have identified a list of eleven variables for estimating the overall competitiveness of the states.

1. Transport infrastructure (Road, Rail & Waterways)
2. Telephone availability
3. Installed Electricity Generation Capacity
4. Distribution of Commercial Banks
5. Life Expectancy
6. Literacy rate
7. Population below poverty line
8. Size of the Market (consumption + savings)
9. Labour Elimate (Mandays lost)
10. Political stability
11. Taxes levied by state government

Among these eleven variables four of them are negatively contributing to the overall competitiveness of the State, viz., 7th, 9th, 10th and 11th.

Methodology of Computation

The first step is to define the measure of deprivation that a state suffers in the case of each of the eleven

variables. Maximum and minimum values are determined for each of the six variables, given the actual values. The deprivation measure then places a state in the range of zero to one as defined by the difference between the maximum and the minimum. Thus I_{ij} is the deprivation indicator for the jth state with respect to the ith variable and it is measured as:

$$I_{ij} = \frac{\left[\underset{j}{\text{Max}}\ X_{ij} - X_{ij}\right]}{\left[\underset{j}{\text{Max}}\ X_{ij} - \underset{j}{\text{Min}}\ X_{ij}\right]}$$

For the four negative variables adjustments have been made to capture the reverse impact of these variables on the state's competitive potential.

$$I_{ij} = \frac{\left[X_{ij} - \underset{j}{\text{Min}}\ X_{ij}\right]}{\left[\underset{j}{\text{Max}}\ X_{ij} - \underset{j}{\text{Min}}\ X_{ij}\right]}$$

The second step is to define an average deprivation indicator (I_j). This is done by taking a simple average of the eleven indicators.

$$I_j = \sum_{i=1}^{11} I_{ij}$$

The third step is to measure the State Competitive Index (SCI) as one minus the average deprivation index:

$$SCI = [1 - I_j] \times 100$$

Results of our computations are given in table 1.

Table 1. Competitiveness Ranking of Indian States

Indian States	Physical Infrastructure Indicators				Human & Social Development Indicators	
	Transport Infrastructure (road+rail+waterways per lakh of pop, Kms.) (1990-91)	Telephone per 1000 population (1990-91) (Nos.)	Electricity Installed Generation Capacity (Pub. Utilities) per lakh of pop. (1992-93) (MW)	Commercial banks per lakh population (1990-91) (Nos)	Life expectancy (1990-91) (Years)	Literacy rate (1990-91) (percentage)
	(1)	(2)	(3)	(4)	(5)	(6)
Punjab	296	31.20	17.23	10.59	65.45	57.14
Kerala	393	11.90	5.07	9.75	68.67	90.59
Haryana	203	26.90	10.80	7.73	62.69	55.33
Gujarat	208	30.30	11.80	8.17	59.91	60.91
Karnataka	318	17.20	6.80	9.52	62.75	55.98
Tamil Nadu	304	17.70	7.70	7.58	60.82	63.72
Maharashtra	301	15.40	11.50	6.97	62.40	63.05
Andhra Pradesh	257	14.00	6.40	6.91	60.66	45.11
Orissa	473	17.90	5.50	6.59	56.14	48.55
Assam	322	20.50	2.40	5.42	55.48	53.42
Rajasthan	257	16.90	3.90	6.94	58.24	38.81
Madhya Pradesh	232	12.50	5.30	6.54	55.47	43.45
West Bengal	114	8.10	4.90	6.16	59.79	57.72
Uttar Pradesh	156	13.00	3.60	6.07	51.89	41.71
Bihar	127	9.70	1.80	5.61	57.60	38.54

(*Contd.*)

Table 1 (*Contd.*)

Indian States	Other Indicators					
	Population below Poverty line 1991 (Percentage)	Market Indicator (per capita consmp.+ deposits (1988) (Rs.)	Labour Climate (Mandays lost to total Mandays) (1990) (Percentage)	Political Stability (Governments during last 30 years) (Nos)	Taxes levied by State Govt. (Per Capita) (average for 1989-1992) (Rs.)	States Competitiveness Index
	(7)	(8)	(9)	(10)	(11)	
Punjab	14.30	6361	0.29	16	203	82.80
Kerala	28.50	3995	0.48	16	212	67.71
Haryana	17.30	4204	0.68	13	164	63.25
Gujarat	22.00	4081	0.34	18	373	60.63
Karnataka	39.50	3273	0.13	13	359	56.19
Tamil Nadu	40.70	3444	1.09	12	468	49.10
Maharashtra	35.80	4885	1.36	13	775	48.77
Andhra Pradesh	26.10	3098	0.19	14	405	46.69
Orissa	57.90	2163	0.17	13	93	46.61
Assam	29.60	2642	0.53	13	63	46.41
Rajasthan	32.00	2938	1.75	13	192	39.80
Madhya Pradesh	46.20	2610	0.13	16	273	36.80
West Bengal	33.50	3782	2.58	10	326	34.18
Uttar Pradesh	47.60	2832	0.73	19	456	25.27
Bihar	53.00	2377	0.22	30	169	22.36

Source:

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News & Notes

Patents & Drug Prices

The most persistent myth of the projected aftermath of pharmaceutical patent protection in India is that of a price explosion. It can be stated categorically that this cannot happen as a result of patent protection, either immediately or eventually.

Of course, patented drugs will be sold at higher prices than drugs that are not so covered. It is the purpose of patenting to shield the inventor from copying during a limited period of years in order to reward and encourage innovation. But a patentbased price explosion will not occur, for two reasons.

Firstly, the prospects for market penetration by patented drugs are limited. Only a small proportion of the Indian market will eventually be affected by product patents and none before about 2003, because of the transitional delay and the number of years required for product development and regulatory control. After 2005, patent cover can be expected to rise gradually towards 10-15% of the Indian drug market by value.

A product-by-product analysis of the top 500 pharmaceutical brands on the Indian pharmacy market in June 1993 demonstrates that, if European patent protection had then been available, only 10.9% by value of the market would have been covered by patents. The second reason is that three major 'checks and balances' are operative in India:

Limited purchasing power by patients. With less than 4% of the Indian population covered by health insurance, approximately four-fifths of drug purchases are paid 'out-of-pocket' by patients. 'Affordability' is a major factor in drug consumption. By value, India ranks 14th among world markets (including China and Russia). By volume, however, it is probably among the top six. The difference is due primarily to the low average level of purchasing power of the Indian population whose numbers slightly exceed those of all industrialised countries combined.

Price competition between different drug substances for most therapeutic indications.

Drug price control. Prices are government-controlled and very low. Usage - though substantial in terms of world rank is a fraction of real and potential demand.

Under Indian conditions, the first factor will confront patentees with a strategic marketing choice between low price/high volume and high price/low volume for all protected drug substances.

This - together with the second factor - means that the Indian market is in effect largely self-regulating between price and volume, except for medically unique products, of which there are relatively few at any one time. For these, government has reserve powers to control the price of all drugs that are not formally subject to price regulation under the existing system.

For 'essential' drugs (i.e. those required for India's National Health Programmes) patents are all but irrelevant. Analysis of the 143 listed drug substances whose prices are controlled reveals that only one is still patent-protected in Europe today.

Yet these 143 drugs are responsible for approximately 72% of audited market value in India.

Whether pharmaceutical patent protection produces 'disaster' or 'sunrise' is not pre-ordained. It is largely in the hands of those who shape events. Above all, it depends on how Indian pharmaceutical companies, multinational groups, and the Indian authorities decide to interact over this issue.

If it is government policy to promote a strong and eventually research-based pharmaceutical industry in India, then watertight patent protection is the first prerequisite. Ground rules permitting reasonably high levels of profitability to encourage risk-taking research is the

second. India already possesses the necessary technological infrastructure for original pharmaceutical R & D. It is not scientific genius that is in short supply, but cash flow.

An examination of the profit ratios of Indian-owned and multinational drug subsidiaries in India demonstrates clearly that today's levels of profitability are inadequate for investment in innovative R & D.

Taking the sum of pre-tax profit and R & D expenditure as an indicator of 'available' revenue, the level in India (as a percentage of sales) is about one-third that being achieved in Japan, and one-fifth that of the global pharmaceutical activities of multinational groups.

For this, the Indian system of price regulation is largely responsible. Some degree of relaxation of its severity and its inbuilt profit-eroding delays would be necessary in order to lift Indian companies out of their historic 'copying' culture and at the same time attract foreign investment.

Indian companies will not be knocked out by patent protection if they adapt their corporate strategy to it. Multinational companies will not find bonanza conditions on their Indian doorstep, but opportunities are arising at the very time when a severe squeeze in Europe and North America is prompting radical policy reviews. The scene is set for developmental and marketing cooperation between Indian and foreign companies on an unprecedented scale if past habits of confrontation can be overcome. Already, several such pioneer agreements are pointing the way.

The Indian government faces politically difficult choices: it can accept pharmaceutical patent protection on paper and, at the same time, maintain rigid control systems under which patentees will reap few benefits from it in practice.

Alternatively, it can encourage both Indian and foreign industry by changing the ground rules sufficiently to provide the necessary incentive for pharmaceutical investment and innovation under patent protection, and thus open the way for a decisive move towards new horizons in India.

Source: SCRIP MAGAZINE, June 1994.

Online Data Access: Key to Competitive Advantage

In the dynamically changing and more competitive environment, the threat of obsolescence necessitates that enterprises be geared towards reengineering, product differentiation and quick response. Better decisions require that the information be wider and more focussed at the same time. A host of activities have come up to provide quality databases; online services as an intermediary between the database providers and end-users; and specialised information/data broking.

Competitive Forces

The competitive forces covered by Michael Porter's model include New Entrants; Buyers; Suppliers; Substitutes; and Traditional Rivals. Whether you are researching the competition, restructuring your business on a global scale, or evaluating new opportunities, specialised online databases are a powerful tool for gathering competitive intelligence. These may comprise research reports by world's leading investment banks, consultants and research firms on companies, products and industries, as well as independent analytical opinions and forecasts. One could also monitor oil, commodity, chemicals and other prices or look for side-effects of drugs or for information on computer-related products.

Online Databases

Some trade periodicals, directories and reports offer the same market information as online databases at a lower cost but after some delay. Online databases are not merely a substitute for library facilities, but have now become a complementary research tool. This is because most computerized databases are updated every week which is useful in the case of trade opportunities. Broad coverage of information is valuable for exploring new markets and products as well as other specific trade subjects. Information can be retrieved instantaneously.

A number of different databases are available online and they differ in subject, scope, coverage (geographical or chronological) and periodicity of release of new information by the producer. Depending on one's needs, statistical directory or descriptive information may be retrieved.

Gateways

The Online services provide a common interface to the database providers thus enabling the user ease of accessing information. A few such hosts include.

- DIALOG Information Services, Inc. USA
- Radio-Suisse Services, Switzerland
- Pergamon Financial Data Services, UK
- Questel, Inc. France
- BRS Information Technologies USA

Some gateways allow access to multiple hosts. The EASYNET gateway provided by VSNL allows access to about 1000 databases offered by 12 on-line hosts.

Some Focus Areas

To take an example, the major focus areas of information available from DIALOG Information Retrieval Services range from Agriculture, Food, and Nutrition; Biosciences and Technology; Business News and Information; Company Information and Financial Data; Computers and Software; Industry Analysis; Law; News and Complete-Text Publications; Patents, Trademarks, and Copyrights; to Social Sciences and Humanities; and Travel.

Official import and export figures of 23 countries worldwide are available through TRADSTAT Plus. This database can be used to identify trade for any commercially traded product classified by the Harmonised System.

The list is illustrative and not exhaustive. Combined, these databases help potential users to

- Gain competitive intelligence
- Investigate a company, a product, or an industry
- Assess risk and analyze credit worthiness
- Make sound decisions on investments
- Broaden market and product research
- Research new business opportunities and emerging markets.

Source: Export Advantage June 1994.

Japanese Firms Still Favor Lifetime Employment System

A survey conducted by the Productivity Research Institute of the JPC-SED has confirmed that Japanese companies overwhelmingly want to continue offering guaranteed lifetime employment. Among the respondents, which included union representatives, 89.3% answered in favor.

The Productivity Research Institute sent a questionnaire to board directors, personnel managers and union representatives of major listed companies from May to June last year. The institute analyzed the replies received from 308 companies and published a report entitled "Future Outlook and Choices for Japan's Employment System".

According to the survey, 56.2% of the respondents plan "to ensure continued employment until retirement so long as circumstances permit," while 33.1% plan "to guarantee continued employment, but possibly with some adjustments under special circumstances." Combining these two groups, 89.3% of the corporations surveyed hope to offer guaranteed employment until retirement.

Asked about the effect of the system on companies, 81.8% said it is advantageous and 17.5% said disadvantageous. The advantages cited most frequently were the orderly development and maintenance of employees (83.3%), stability and high morale among employees (79.0%), loyalty (71.4%), and smooth labor-management relations. Disadvantages that were mentioned included inflexible labor costs (63.0%) gaps between positions and capabilities (53.7%), and excessive mid-level managers (50.0%).

Notably, no service industry respondent expressed the belief that lifetime employment improves loyalty or leads to smooth labor/management relations.

As to the outlook for lifetime employment in ten years, about 80% of the respondents believe that the system will still exist in some form.

Source: Productivity in Japan, Summer 1994 Special Issue.

TQM: Setting World Class Standards

With globalisation and the new economic climate in India it has become crucial for indian enterprises to make their products and services competitive in an open market. In pursuing this many companies have adopted Total Quality Management (TQM) as a way to achieving entry to global markets. Attaining ISO 9000 certification is a common feature of marketing strategies and so far 250 companies have done so.

The bottom line in any commercial enterprise is profitability and unless this is increased a quality improvement process will not be viable. For most companies the incentive for initiating TQM is the need to attain competitive advantage or to maintain or establish a market position. TQM is a process rather than a programme with an end date. It is continuous and TQM needs to be incorporated into a company's work culture along with measurable outputs relating to increased profits and customer loyalty.

TQM depends on people, and unless staff at all levels are involved, the process will not get underway, the ex-

periences of several Indian companies stress. In this respect training programmes on the methods and benefits of TQM are essential to implementing TQM process. Ways of encouraging staff participation and improving the sense of quality and job ownership need to be developed. Several companies use vision statement cards to reinforce the TQM message and keep it upfront. Ultimately, of course the quality momentum can be sustained only if top management are committed to the process and staff are provided incentives to improve performance.

Within a company a TQM strategy comprises leadership and team work. Extending the scope of team work it is important that Indian industry also team together to establish a leading edge in world markets. Increasingly, the interactions between the public and private sector are being encouraged and visits to each other's organisations have resulted in the recognition of much common ground in the achieving of business goals. Increasing use of benchmarking, which is a comparison of products and processes with market leaders to achieve improvement and to measure progress as a quality improvement tool requires this interaction and is of mutual interest to the public and private sector.

Source: British Commercial News, July/Aug 1994.

Teamwork in the Car Assembly

The car industry regards "teamwork" as one of the answers to its current crisis. Assembly plants all over the world are introducing teamwork to improve productivity and to make better use of their employee's knowledge. It looks like a great overhaul for the car industry. After all, car assembly is always bracketed with Taylorism and Fordism, two concepts not known for their labour-friendliness. The publication of *The machine that changed the world,* the book that gave the world "lean production", was a watershed for the industry. This book pleaded for a more efficient car assembly. Lean producing companies aim at, amongst other things, well thought-out subcontracting, just-in-time delivery, and continuous improvement in production. But by eliminating most of its stock, reducing non-productive labour and bringing down control spans, car assembly also becomes more fragile. Companies need employee involvement and communication between its members to keep things on the right track. And this is the root of the call for teamwork. But teamwork does not have to be put on a par with lean production. Several car assemblers are experimenting with their own flavour of teamwork. Well-known experiments include volvo Uddevalla and the GM subsidiary SATURN, but other companies and plants are also developing their own teamwork. A recent survey among the five Belgian car assembly plants shows that all of them are actively engaged in designing their own particular form of teamwork. Each relies on elements developed elsewhere in the company. General Motors Antwerp stresses union involvement, just like General Motors USA is doing. Volkswagen Vorst follows the German concept of "Gruppenarbeit". Teamwork at the Volvo plant in Gent works in line with the Swedish tradition of human-centred production. All in all, teamwork is conceptualised in surprisingly different ways in the car industry. Some companies see it almost solely as a channel to communicate suggestions for improvement, without any further implications on production or personnel. In other assembly plants, teamwork brings real changes to management and the way work is carried out.

In cooperation with researchers of the ECWS, the Belgian metal workers' union CMB published a booklet on teamwork in the car industry, describing the main teamwork concepts in the automobile industry (lean production SATURN, Volvo Uddevalla). It also presents the state of affairs of teamwork in the five Belgian car assembly plants. Other chapters discuss German and English experiences with teamwork, analyse why the Volvo plant in Uddevalla had to close, and explains "the learning organisation" as a possible future orientation for car companies. The point of view of the union - positive but pressing for unicn involvement - completes the booklet.

Source: European Centre for Work & Society News, Feb. 1994.

Policies for European Growth

Policy makers in the European Union drew two simple ideas from the recession of the early 1980s; (i) that an initiative was needed if Europe wanted to escape self-fulfilling 'Europessimism'; (ii) that French-style, one-country reflation *cum* devaluation was both costly and inefficient. The results were the launching of the Single Market programme, together with the consensus in favour of nominal convergence within the European Monetary System.

Since lessons painfully learned during recessions tend to shape policy in subsequent years, it is worth considering the lessons that are being drawn from the present one. The first lesson is surely that much more is needed on the supply-side, if Europe wants to regain competitiveness. The European Commission's recent

White Book on growth, employment and competitiveness proposes complementing the Single Market's strategy with measures like the fostering of R & D, as well as the development of transport and communication networks. Yet the potential benefits of such policies are only apparent in the very long run. As regards Western Europe's most immediate problems, the Community can give good advice, but has little to offer.

Meanwhile, a second lesson is being drawn from the experiences of Britain and Italy: non-cooperative, one-country policies can work.

This is hardly surprising. Asymmetric shocks like German reunification call for differentiated policies. Thus, as non-German EU members face an adverse demand shock, rather than a supply shock as in the 1980s, there is a reward for those who undertake uncoordinated monetary expansions, albeit partly at the expense of their neighbours. As inflation has receded and as high unemployment has facilitated the redefinition of wage indexation clauses — witness the Italian *scala mobile* conditions for the success of such strategies have been exceptionally favourable. The inability of nominal exchange rate changes to have lasting effects on the real exchange rate became conventional wisdom in the 1980s. The opposite might become conventional wisdom in the 1990s.

At the same time, the cooperative alternative has remained elusive. As illustrated by simulations of the CEPII-OFCE modelling team[1], a European reflation based on monetary or fiscal instruments could have brought results. But the Bundesbank's policy is bound to give priority to domestic objectives, leaving fiscal policy as the only available instrument. Yet, any attempt at a coordinated fiscal reflation would have conflicted with national budgetary consolidation and convergence objectives. There have been suggestions that the Community itself, as opposed to the member states, could pursue a fiscal expansion. But as the constraint on further state borrowing in the EU depends in most countries on the sustainability of the debt-deficit path, there is no rationale for replacing national borrowers by a Community borrower, because the very same taxpayers will have to pay the bill, at the end of the day. Nor does it make much sense to attempt a short-run reflation through the launching of infrastructure projects that need to be studied and selected. On efficiency grounds, there is a rationale for extending the Community role in infrastructure, but this has little to do with short term macroeconomic management.

In its present shape, the Community may therefore be able to foster long run growth, but is bound to play secondary role in recessions. Should this be considered a problem? From a purely economic angle, the issue boils down to that of coordination. In today's circumstances of low inflation and high unemployment, the normal bias of uncoordinated monetary policies is towards overly expansionary, beggar-thy-neighbour stimulations (the opposite of the 1980s). The role of the community is therefore to foster monetary discipline - a role the ERM has been fulfilling, albeit in a partial and excessive manner. An already-existing European Central Bank would certainly pursue a less restrictive policy than the Bundesbank (because the economic situation throughout the Union differs from that of Germany), But, it would still represent a constraint on the individual member states' temptations. As regards fiscal policy, in theory non-coordination could lead fiscal policies to be excessively restrictive, and the EC could have a role in organising a coordinated expansion. But it is hardly the case at present. There is therefore no real economic case for a Brussels-led fiscal reflation.

The inability of 'Brussels' to do something for growth and employment may, however, give rise to a problem of political economy. The EU's institutions give the Community a major role in allocative policies, but no ability to address the major problems of the day, i.e. growth and employment. This is only viable in so far as informed and sophisticated citizens are able to make institutions accountable for their specific areas of responsibility. The coming years will tell us whether the citizens of the EU consider they have got a European economic policy-making system they can live with.

CEPII News Letter. First Semister 1994.

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Book Review

Indian Economy: Problems of Development & Planning by A.N. Agarwal. Wiley Eastern Ltd., New Delhi, 1993, 671 p, Rs. 120

In the undergraduate and post graduate courses in Economics and Commerce in Indian universities students face a curriculum on the economic problems of India which demand a lot of economic information on almost all aspects of Indian Economy. Since economic planning has been on for the last four decades, the major course of economic activities are controlled by the Government. Thus the planning process adds a new dimension to the discussions of the economic problems and any book trying to cover all this information is subjected to revision almost every year. The above book under review is of this nature.

The book is divided into 55 chapters. First 14 chapters deal with the main problems of development economics like underdevelopment, natural resources, population, urbanisation, saving and capital formation, national income, unemployment etc. The discussion in this part is a blend of information and theories of development with an emphasis on the former. In the subsequent 12 chapters the author deals with the problems of Indian agriculture. The areas covered are land reforms, land tenure, agricultural labour and productivity, cooperative movement, food problem etc. Perhaps old habits die hard, otherwise the last issue could be tackled in a new way in the recent context. India is exporting both high and medium quality rice and the agricultural sector is poised for exploring export market in the coming years. A thorough discussion on the marketable surplus of agricultural commodities including even floriculture should find a place in a volume like this.

The next section deals with the industrial sector of India and related topics like public sector, industrial finance, small scale industries, etc. The new technological changes sweeping through the industrial sector should be incorporated into this section in a better way. The discussion on the Indian money market and monetary institutions. This is a weak area of the book requiring improvement, as the students in the post graduate classes may find these inadequate.

Indian public finance including fiscal policy have been discussed covering topics like central finance, agricultural income tax, centre-state financial relations etc. But a discussion on black money within five pages cannot do justice to the topic. The chapter on central finance includes a discussion on the new fiscal policy of the Government which is fairly good.

The external sector of the economy has been covered in and the topics included are balance of payment, new trade policy, convertibility of rupee, foreign capital. In the discussion of Indian planning, Only the Eighth Five Year Plan has been taken up in detail and the rest of discussion barely covers the other aspects of economic plans.

An understanding of any sector of an economy like India where the planning process has been on for a very long time will help in the understanding of the development dynamics of other sectors. This requires an integrated approach in a book like this. For example, the chapter on strategy of development explains the planning strategy followed in India since the Second Five Year Plan. But this chapter should be linked with the discussion on Capital formation (chapter 13), domestic saving (chapter 14), and income distribution (chapter 12). This is one example how a slight rearrangement can improve the standard of the book. Of course, the discussion in the chapter on the strategy is lucid and self contained.

As suggested in the beginning, it is the curriculum of the universities rather than pure academic exercises which dictate the coverage of this type of book. A few suggestions for future edition are in order. A subject index at the end and through annotations will improve the value of the book. Second, by pruning some chapters and by deleting others, which are not relevant today, and

adding some analysis of Indian data along with charts and tables whenever necessary, it is possible data to reduce the boredom which is a persistent complaint of the student for whom this type of book is mainly addressed. The quality of production is good and the printing is largely free from errors. The price of the book is reasonable and well within the reach of students.

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India's Textile Sector — A Policy Analysis by Sanjiv Misra, Sage Publications, New Delhi, 1993, 228 p., Rs. 275.

Historically, the industry was once the pride of India. Even during the early 20th century, India was the first among developing countries to establish a textile industry, but later it lost out in competition to other developing countries where the industry started much later. The importance of textile industry to national economy can not be overstressed, as it is next only to agriculture sector, in terms of value added, employment and export. In fact, India has the largest area under cotton cultivation in the world. Inspite of such a crucial role, performance in this sector is marked by stagnant growth, high incidence of sickness, low levels of modernization and dismal performance on the export front. In this the government policy has decidedly played a fundamental role; it is seen as biased in favour of small scale hand operated labour intensive manufacture from that of sophisticated technologies as adopted by other developing countries. The textile sector in India has been subject to high degree of state regulation ad controls presumably formulated to reconcile opposing interests and conflicting objectives. It is against such a backdrop, the book under review provides a policy analysis of the textile sector in India.

Misra provides in this book a ring side view of the textile policy in India. He tries to find an answer as to why India's textile experience has been so different from that of other developing countries. A large number of policy pronouncements have been made by the Government since independence. There have been three such public policy statements in 1978, 1981 and 1985 on textiles in eight years. Besides numerous special studies and working group reports have been brought out on this subject. The present study is a singular contribution by way of empirical evaluative and preserptive research in India's textile policy. Much of the book is devoted to identifying, analysing and interpreting the main issues confronting this industry.

The book examines the evolution of India's textile policy, various concerns which have motivated the policy and their outcomes. Among them, the issue of ideology, equity, operation of pressure groups and the framework under which policies are formulated are found to be significant. The fundamental dilemma that policy makers are invariably confronted with, viz; the fact that the policy that is technically and economically sound is often not politically so, has however been addressed in passing in his analysis. A few case examples would have added to the value of the book on this important issue of political dimension in policy making in a liberal democratic framework such as India's since independence.

The demand conditions, which one widely believed to be stagnant are well covered. The supply side is analysed using regression analysis; and an evaluation of weaving technologies is presented with a cost benefit perspective. Nationalisation of textile industry and the incidence of sickness are dealt with an open ended question on exit policy. The modernisation options are also assessed along with the demand and supply aspects of the main fibre and the dynamics of inter-fibre competition. An excellent overview of India's textile and garment exports has been provided in the context of a constrained world trade environment. Chapter 10 though coming at the end, is the core of the study. It examines the various policy options before the government, makes a strong case for liberalisation in this sector and argues for a market friendly approach for the future to regain the lost competitiveness. In other words it sets the direction for future reforms in this sector.

The book contains an exhaustive bibliography and notes. Some of the references included, viz; the Government of India Reports (Annex. 1952-90) published monograph, special reports, UN and World Bank studies on India's textile sector would be of particular interest to researchers and policy analysts in this area.

In a study of this nature, which has taken an integrated view of the policy area, focussing on macro-economic issues, perhaps at the cost of sectoral issues, some literature could have been included on the policy science itself which could have further added to the utility of this book.

All in all this book is a useful addition to the existing literature on industrial economics. It would be of great use to the scholars and textile policy makers in their search for new reform measures.

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Business Policy: Strategic Planning and Management by P.K. Ghosh, Sultan Chand & sons, New Delhi, 1993, 545p, Rs. 65.

This is a text book on business policy which was first written by the author in 1986. The book under review is the fifth revised edition published in 1993. The fact that a book on such a specialized subject has gone through so many editions within a span of seven years, is enough evidence of how popular this book is.

After four decades of our working through somewhat controlled economy, it is only in 1991 when individual business organizations have been made to think by themselves on serious business issues affecting various kinds of stakeholders. The new environment calls for rethinking on the part of the entrepreneurs and the top management. Business policy has, therefore, assumed a very significant role in helping top management for making strategic decisions. A large number of management institutes which have sprang up during the last decade are reworking their course contents to place business as the top of the agenda, Under the circumstances a text book on business policy especially written by an Indian author is a great service to Indian student community and management practitioners.

Hundreds of management personnel working in Indian organizations are essentially specialized in narrow functional disciplines. It is very difficult for many of them to work out action plans with a perspective of total business. Even top management in many Indian organizations are found to be involved in making operational decisions which are often interpreted as "interventions" by managers down the ladder. The subject of business policy is the need of the hour for making corrections in our existing style of working and merits great attention.

Business policy essentially rates to general management issues both at corporate and individual business level. Appropriate policy decisions are to be made for positioning organizations based on the environmental requirements and internal capabilities. Visioning, setting up short and long term objectives, identifying issues for focussing and formulation of functional policies are some of the critical items which come under the realm of a business policy. This is also sometimes called strategic planning. Considering the fact that planning is not enough, strategic planning is now gradually changing over to strategic management where implementation of a strategic plan is given an equal emphasis.

The book under review has 14 chapters in all which can be grouped under two heads — strategic planning — concept, and formulation and issues for implementation — functional policies in terms of production, marketing, finance, personnel etc.

The section on strategic planning deals with the process involved in formulation of strategies, the different issues involved and the various methods adopted by organizations to formulate strategic plan. It also enumerates different kinds of strategies which an organization can adopt in a given competitive environment. The book has meticulously spelled out reference sources of many observations cited while explaining the concept.

The second part mainly deals with various key issues involved in the establishment of appropriate functional policies. With emphasis on policy issues for 4 functions namely production, marketing, financial and personnel.

One of the striking features of the book is that the author has enriched the discussion on every important issue with a number of Indian cases. In fact, this is the key factor differentiating this book from many others especially written by foreign authors.

However, the book has been written in more or less descriptive perspective. Though this kind of representation has been dominating till now in strategic management literature, of late, there have been attempts to evolve a normative approach like industry structure analysis, value chain analysis, value mapping etc. which have been found to be useful in stimulating strategic thinking in executives. Further, recently there is emphasis on critical performance issues which a business as a whole should emphasize to become competitive. Development of these kinds of approaches may inject a more prescriptive rational framework for strategic management. The author may include these aspects in the future edition of this book which can serve as an essential text book for the student community.

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Environmental Challenges Ed. by C.K. Varshney & D.R. Sardesai. Wiley Eastern Ltd., New Delhi, 1993, 131p, Rs. 350

Environmental problems had been a focal issue in developed countries in the early seventies. By the end of eighties, environmental degradation became the subject of concern for both the developed and developing countries. The increasing population and industrialisation have led to the overuse of natural resources resulting

in their depletion and environmental degradation. Considerable work has been carried out throughout the world to contain the environmental degradation in the present day contest of global warming, ozone depletion, loss of biodiversity and environmental pollution.

These environmental problems and their probable solutions were discussed in the seminar on the "Management of Environmental challenges", organised by the Indo-European Research Foundation in Bombay in November, 1991. The book under review is the compilation of the above seminar proceedings. A wide range of topics, highlighting the environmental problems and sustainable development, have been covered in 12 chapters. Indian and European experiences on environmental management have been presented.

The policy issues pertaining to sustainable development are highlighted with suggestions to formulate environmental policies on the optimum utilisation of resources and taxation based on environmental damage. The need to integrate environmental safeguards with liberal fiscal and industrial policies is well brought out. The conservation of land and water by adopting the principle of watershed has been discussed with examples of environmental management through watershed programmes in different states. Resources conservation has a great role to play in industrial activities. It would have been appreciated of resource conservation at the industrial level had been discussed separately.

"Environmental aspects of land disposal of organic waste" deals with the use of agro-based industrial effluents for agriculture and emphasis has been given to the problems and solutions if deforestation. Very little attention has been given to the subject of environmental and industrial pollution.

European experiences of environmental management have been presented in two chapters. "Polluter Pays" principle applicable in the Federal Republic of Germany is an instrument worth considering for pollution prevention, resource conservation and sustainable development.

The book is a compilation of the seminar proceedings dealing mostly with the problems of deforestation and silting. It would have been pertinent to discuss the problems of vehicular pollution and solid waste management which is a matter of concern in most of the big cities and towns. It is believed that the editors will include such aspects in the future edition.

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Patron — Client Politics & Business in Bangladesh by Stanley A. Kochanel. Sage Publications, New Delhi, 1993, 387p, Rs 350

The basic approach on Pluralism since prehistoric period focussed mainly on political party affiliated influences on the country's economic changes. But this work lays heavy emphasis on how the groups or the society could influence the State Economy and thereby the bureaucracy, government policies and state control over the masses. Primarily an attempt has been made by the author to study the relevance of business associations in Bangladesh to the political system prevailing in that state.

Part 1 of the book describes the process of modernization, the impact of political culture, political systems on the state's decision-making people, and the patterns of public policy in relevance to today's economy vs the past political history of the state. The description about the process of modernisation in Bangladesh, the development of Muslim Capital, i.e., Muslims engaged in Trade and Industry, the prevailing simation of Muslims business venture both West and East Pakistan, and the development of Bengali Muslim Capital have been analysed elaborately with ample references to both Govt. and non-govt. agencies and books. According to the author, a new entrepreneurial culture has been emerging in Bangladesh. The culture of the State is mostly governed by the religion of Islam which dominates the parallel system on state's politics. The author concludes that despite the state's religious, linguistic and ethnic homogeneity, the culture remains divided between the urban elite and the mass of peasantry. Hence his emphasis on developing patron client relationships.

The development and administration of the regimes of Zia, Ershad and the consequent privatization, which might have been a response of the business people to State tyranny are elaboratory discussed.

Part II concentrates mainly on the group structure, business associations, the business climate and the significant changes taking place on these forums. The clear-cut figures explain the development of industry in Pakistan and the concentration of power during that period. An interesting chapter, indeed, this part traces out the origins of business associations and deals with today's state of affairs relating it to the bureaucratic attitudes towards business community. The data for this work explains the complete spectrum of business development over the period in the state. The post-1975 industrial policy of the Govt. of Bangladesh, which laid the foundation for the development of the Bangladesh,

which laid the foundation for the development of the Bangladesh Industrial Elite and the successive amendments with business conditions are examined by the author with supportive evidences taken from the major business houses of the state. The relative comparison of Indian and Bangladeshi Business Associations is exhaustive and informative for the students of business schools of India.

Part III explains the general laws of the State, Court Procedures, Public opinions, lobbying, foreign influences and the resultant political system, the influence of the state owned Radio and TV, press restrictions (Press Advice System), pressures on courts and indirect measures on business etc. The author's reference of rapid growth and govt. policy which created a large class of 'briefcase' businessmen who make huge profits by taking undue advantage of the system without producing anything, is worth a study for the future researchers in Bangladesh. The absence of strong entrepreneurial behaviour among the Bangladeshi businessmen is a matter of concern. The traditions and social values of a patron-client dominate the entire political system in Bangladesh. The author's findings and remarks on the corruption and patronage, the influence of donor countries on the state politics are very significant. The work also elucidates the systematic impact of group development, and institutional interests on the political system. The study offers suggestions like the development of effective interest groups, professional competencies, consultative mechanisms, effective legal systems, administrative reform and inservice training and govt role in recognising NGOs and organised associations for improving the current state of affairs.

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An Analytical Approach to Problems of Indian Agriculture: A Theoretical and System Approach by B.H. Joshi. B.R. Publishing Corporation, Delhi, 1993, 495 p, Rs. 995.

There is no dearth of information in Indian agriculture; voluminous data pertaining to various facets of agricultural development are available. Nevertheless, an integrated, in-depth analysis is found wanting. The book under review vividly analyzes the changes that Indian agriculture has undergone since independence, in a more systematic way. All the important issues confronted by the agricultural sector are succinctly described and critically analyzed by the author. The book comprises 14 well-organized chapters which discuss in detail the gamut of agricultural development in the country.

Chapter one sets the stage by focusing on the nature, structure and characteristics of agriculture in India. The process of development of agrarian system and agricultural policy is outlined next with a historical account of the evolution of Indian agrarian system. The land being an important factor of production, its utilization pattern greatly influence the agricultural development. In addition to the classification of land into different regions based on geography, climate, agricultural and economic use, the author makes valuable suggestions for more optimal use of land. Over the years, the country has experienced significant changes in the cropping pattern, agricultural production and productivity. The author highlights the influence of technological, institutional and economic factors on these three parameters leading to variations across the states and the commodities. After a critical analysis of the low productivity of Indian agriculture, the book summarizes the measures needed to increase productivity.

Judicious use of agricultural inputs is necessary to realize the potential of modern agricultural technologies. The impact of agricultural inputs such as irrigation, manures and chemical fertilizers, plant protection materials, and implements on the agricultural production of different states over the years are critically examined in the book. The size of the agricultural holdings has a tremendous influence on the performance. Its influence, in terms of resource use efficiency and income generation, from the economic, social and political angles is discussed. The author advocates the need for consolidation of holdings through appropriate legislation in order to ensure efficient agriculture. A broad overview of land reforms with particular reference to its role in the overall agricultural development is given later. Inspite of the increased emphasis on farm mechanization, labour in agriculture will continue to be one of the most important factors of agricultural production. The book elaborates on agricultural labour with respect to categorization, distribution, productivity, and the government policy needed to improve their economic condition. The contribution of green revolution in Indian agriculture is internationally well recognized. It has totally transformed the production system and helped the nation achieve self-sufficiency in food production. Its impact, both positive and negative, on agricultural production and productivity is critically analysed in the book.

The role of credit as a vital input for reaping the benefits of modern agriculture is discussed. The author

emphatically argues for revamping the credit system so that it becomes more result-oriented. Agricultural marketing is one of the most serious concerns of Indian agriculture, as it helps maintain an equilibrium between demand and supply. The inherent problems associated with the existing marketing system and the corrective measures that are needed to improve its efficiency are highlighted. The pricing policy has a direct bearing on the agricultural production. The minimum support and procurement prices announced by the government and their influence on the production of various commodities are examined in greater detail. The problems associated with the agricultural pricing policy of the post-independent era in protecting the interests of the small, resource-poor farmers have also been highlighted by the author. Taxing of agricultural income is a very controversial issue. Taking the clue from the recommendations made by various expert committees that examined the proposal to tax agricultural income, the author supports the idea of introducing agricultural tax. The last chapter deals with the progress of agriculture from the First to the Seventh Five Year Plans. The author highlights the limitation of our planning process which failed to bring about a significant impact on the well-being of marginal and small farmers in the country. In addition to references at the end of each chapter, the book contains a bibliography in the end which will be very much useful to the readers.

The value of the book would have been increased had the author taken steps to reorganize its content. For instance, the maps presented in the beginning of the book should have been included in the chapter on production and productivity. Similarly, the chapters on agricultural holdings and land reforms should have been combined as they are closely related. But for these minor shortcomings, the content of the book is eminently readable and informative. What makes the book under review stand out among similar books that have appeared on the subject is the way in which the author has treated the available data and come out with interesting interpretations after critical analysis. On the whole, despite its massive size, the book will be a very useful guide to students, researchers, policy-makers, and all others interested in the study of Indian agriculture.

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Strategic Planning for Corporate Success in the Context of New Economic Policies — A pathfinder for Indian Corporate Sector by V.S. Ramaswamy & S. Namakumari. Macmillan India Ltd., New Delhi, 1994. 279 p, Rs. 138.

In recent years, the world has witnessed dazzling changes both in the socio-political arena and in science, technology and commerce, resulting in a 'high-tech multirevolution'. India does not remain unaffected. We are knocking at the door of 21st century. And, when this door opens, it will present an altogether different scenario which will overwhelm us if we do not prepare overselves to face the challenge. Of late, wisdom has dawned upon our policy makers, resulting in the new policy of across-the-board economic liberalisation with major thrust on decontrol and globalisation. These are sweeping reforms, unprecedented and overwhelming, touching every aspect of our economic life. The present work by Ramaswamy and Namakumari deals precisely with this subject of economic reform on the one hand and the required strategic responses of the Indian Corporate Sector in this fast changing and highly competitive domestic and global environment, on the other.

The book has come at a very appropriate time. So much has been written and spoken on one or the other aspects of the new economic policies. But most of these were either too specific or too general. There was a need to give an exhaustive exposition of the new economic policies with contextual setting and to deal with the new challenges for corporate management and their strategic responses. The book fills up this long-felt gap. The book is virtually divided into two equal parts, the first six chapters dealing with the details of economic reforms and the last six with the different aspects of strategic management.

The economic reforms introduced since July 1991 have already brought about a metamorphosis of Indian economy in terms of the emergence of intense and vibrant competition, entry and consolidation of multinationals, alteration in the industry structure, and vulnerability of many Indian Corporations. These will intensify further and may result in, what the authors describe, 'trauma of transition' for Indian companies who suddenly find themselves vulnerable. To what extent the corporate sector in India will withstand this trauma of transition will depend on their strategic management, the authors rightly maintain.

The authors have dealt in detail with the strategic management process and devoted separate chapters to

strategic Planning, Competitive Advantage, Developing Strategies, Global Strategies, and Strategic Organisation. Beginning with strategic planning that consists of a stream of decisions and actions leading the firm to the development of effective strategies, the authors appropriately provide a detailed discussion on the competitive advantage and core competence which a firm must acquire in its fight for survival and growth in a highly competitive market. It is rightly pointed out that some of the highly imaginative and well-written strategies fail in the market as the companies have not been able to acquire the competitive advantage required to make the strategy work. After briefly analysing the competitive advantage factors and their components, the authors finally subscribe to the Porter's prescription that in the ultimate analysis competitive advantage manifests itself in either cost advantage or differentiation advantage to the firm. Beyond a certain point, however, product-price-differentiation attributes may reach saturation, then the companies which enjoy core competencies in root technology or process such as Sony has in miniaturisation, Honda in engines, Canons in optics, and JVC in video tape technology, can build long-term competitive advantage. According to the authors, the battle for global leadership is being waged on the strength of core competence and not on some brands alone, as perceived by many.

While dealing with different types of strategies, the authors have gone into the details of diversification strategies and advocated Porter's famous three pre-testing measures for the diversifying firms, viz, the attractiveness test, the cost of entry test, and the better-off test, to avoid the pitfalls of especially unrelated diversification. Finally the core competence and competitive advantage as pre-requisites of successful domestic or global strategies would depend to a large extent on creating and sustaining a strategic organisation. Because, to be meaningful and complete, strategic planning must take care of implementation as well. Behind a vibrant strategy, there is a vibrant team, a vibrant organisation, a vibrant structure.

One important feature of the book is the liberal use of practical examples of various strategic moves/prescriptions both from Indian companies and multinationals. This has not only made the text more interesting but also more meaningful. Moreover, it clarifies and gives practical bias to the various concepts and theories of strategic management presented in the book. Despite the fact that the text on strategic management is more perspective than analytical, the authors have made a very useful contribution in this important area of management at a time in Indian economic and corporate history when it was needed most. The book should be a compulsory reading for academics/students of management and practising managers/top executives alike.

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My Economic Affair by Ashok V. Desai, Wiley Eastern Limited, New Delhi, 1993.

Dr. Ashok Desai had been closely involved in the economic affairs of India for two years when he joined the Government of India in the Ministry of Finance as a member of Dr. Manmohan Singh's team trying to revitalize the economy. The reviewer expected the book to contain his experience in the Government, and his involvement in the connundrum of policy making. Such hopes are belied and what we get is the author's prescriptions for many economic ills the nation is facing. Although there are many new ideas in the book, some quite provocative, his treatment is often sketchy and merits greater detail.

The book is divided into two parts. Part-I is called 'A View from the Foothills'. This is written before the author became the Chief Economic Consultant in the Ministry of Finance and is a review of the reforms in the first few months after the new government took over in June 1991. Part II is given a weighty title 'A View from the North Col'. It consists of twelve chapters giving his views on subjects ranging from public finance, external finance, banking, capital market, savings and risk capital, research and development, industry, infrastructure, labour and agriculture. We will deal later with a few of his reflections given in the light of his experience within the government. Meanwhile the author left the government, as he became dissatisfied with the pace of reforms. His honestly and uprightness have to be appreciated as he writes in the Introduction:

> ".....The career of an economic advisor is always precarious. His job is to tell it as it is and advise as he sees right. But the basic instinct of the government is political survival. To tell it as it is would be treason if the facts gave ammunition to the opposition; to advise what the government should do but cannot do would point to its impotence. So an economic advisor must not do his job too well. I did not either, but I never quite got the hang of when to do it well and when to mess it up. Finally I decided that the game of snakes and ladders, which those

around played with such ferocity, such guile, such subtlety, such flair, was not the game for which I had joined the government, and left."

His six page introduction is a piece of gem. At another place he writes: "In the government I had much occasion to observe this indecision, this penchant for pseudo-solutions; I had much time to reflect on its causes, Political opposition has a good deal to do with it.... the seething mass of communications aimed at the government, consisting of the press, parties, lobbies, industrial associates, trade unions, public interest groups and other busybodies. And below this tower of Babel are the power of factors: the classes, masses, movements and mobs. They are the people whose invisible threats twist the decision-makers into the postures we see but often do not understand, the people whose bogy the bureaucrats use to coerce idealistic ministers into submission."

The author had liked his stay in the Government. He told Dr. Manmohan Singh once when he was under terrible strain, "These are the days about which you will tell stories to your grand children". In order not to embarrass the government and particularly Dr. Manmohan Singh who overcame the resistance of the bureaucracy with determination and inducted Dr. Desai into the government, the author did not tell us any stories but gave us a blueprint of reforms yet to be carried out.

We agree generally with his approach to economic reforms and his observations on the Indian economic scene. He points out that India is simply not an attractive destination for foreign investment.(p. 52) He feels that the Government measures for public sector improvement are so naive that they can hardly be dignified by the name of policy. The BIFR's record of reviving sick units is extremely poor. This is not surprising, for most sick units are not revivable in any form: all too often there are irremediable, fundamental factors behind sickness, such as overmanning, aged plant, wrong location or strong competition.

According to the author, the ills of the public sector are systemic. They arise from the multiplicity of participants in decision-making—ministers, bureaucrats, Parliament, apex trade unions and members of the ruling party. The multiple decision-makers bring in multiple and conflicting criteria of judging the managers. The cure for those ills is to be found in the unity and continuity of management, and its insulation from political forces.

The regime of controls and licensing has not succeeded. This is being replaced by a programmes of reforms which is still evolving — an excruciating and long transition creating many twists in the economy. The author pleads for speed, sense of direction and clear vision. The perspective of the government reflects a combination of the old style of heavy-handed but ineffective economic management and a new style of less interfering, more sophisticated guidance.

The book is full of impressive ideas. On the stabilisation issue, the author spiritedly rejoined with the off-repeated plea that inflation is a result of cost push and therefore a reduction in fiscal deficit will fail to control it, "often the same people who believed in cost inflation also argued that inflation invariably harmed the poor — in other words, that workers could not push up their wages when their cost of living went up". From 8.5% of GDP in 1990-91, the fiscal deficit was brought down to 5.3% in 1992-93; simultaneously, inflation came down from 16.7% in August 1991 to about 6% in August 1993. The author has dealt with taxation issues and has his doubt about the utility of a full-scale value added tax (VAT). He would opt for an excise duty on the basic inputs, together with the conversion of all taxes on business profits into a value added tax. Unfortunately the author has not developed such a powerful suggestion.

Repeatedly the author has made many passing remarks on the evolving economic scenario, 'one of the most striking features of the industrial scene after liberalization is the restructuring that is going on; firms are selling off parts of business and beginning to specialize. This can only, increase technological concentration and depth' (p. 217). "cooperation (between business houses and the Government) must not mean the kind of cosiness that has existed hitherto. Large firms, private or public, must not be shielded from foreign competition; and they should be induced to compete vigorously amongst themselves" (p. 224). In both the places, he did not amplify his observations in detail.

On the financial sector, the author has pleaded for permitting and encouraging the growth of small banks along with large banks. He is not in favour of replacing the village money lender, because his costs are lower and his local knowledge is much superior. The author advocates for bringing the money lender under the discipline of the market. We must encourage the emergence of small and rural banks. The author has sharply deprecated the over-regulation of the capital markets by SEBI. "SEBI essentially looks upon its role as that of a policeman, and not one of a system reformer.....All the institutions SEBI is expected to supervise, regard it with fear and loathing. The style is familiar in the government.

Parliamentary committees follow it, so does CAG. The intention is to reform through public enquiry. But despite 45 years of parliamentary committees and CAG, the working of the institutions they inspect has actually worsened. Nothing better should be expected of SEBI". (pp. 168-69). The author has pleaded for cautious regulation of the capital market.

The author has given many practical suggestions which our government may hesitate to implement. On the vexatious exit policy, he recommended an insurance scheme along with a voluntary agreement among workers and employers not to avail of their rights under the Industrial Disputes Act. Unfortunately, as in other places, here also he did not elaborate his points.

In the last chapter of the book, the author dealt with how to redesign government. He offered many radical ideas such as no separate electoral machinery, instead the post offices keeping the relevant records. He is, of course, not in favour of abolishing the election commissioner, "He is a gem". The author pleads for imparting the entire education through the medium of television. While discussing legislatures, he wants to change its entire concept. There should not be more than one hundred members in a legislature. The author feels that the basic unit of government should be much smaller than the present states. Instead of the present states, he prescribes 50 or 100 provinces centred on major cities, below which may be local authorities centred on smaller cities.

Dr. Desai's book is a welcome addition to the current spate of publications on the Indian economic scene. We earnestly hope that it would be widely read and discussed by our intelligents. The book is lucidly written. Let us hope we would get a detailed volume from the author elaborating all his radical reforms.

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"Have you feared the future would be nothing to you?

Is today nothing? Is the beginningless past nothing? If the future is nothing they are just as surely nothing..."

— *Walt Whiteman, "To Think of Time"*