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## **JOURNAL OF SOCIAL AND ECONOMIC DEVELOPMENT**

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Vol. III

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No.1

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## Articles

- Restructuring the Indian Power Sector: Some Issues** 1  
*T. R. Satish Chandran*
- Impact of Financial Integration in Developing Countries: A Study of Growth, Volatility and Efficiency in the Indian Stock Market** 24  
*R. N. Agarwal*
- On Stock Market Development, Banks and Economic Growth in India** 44  
*Pratap Chandra Biswal, B. Kamaiah*
- Climatic Change — Implications for India's Water Resources** 57  
*Murari Lal*
- Environment-Related Global Issues: Global and Regional Conventions and the Role of the Third World** 88  
*Bhaskar Majumder*
- Conflicts over Canal Water for Irrigation in Mandya District, South India** 106  
*Steen Folke*
- Rural Indebtedness and Usurious Interest Rates in Eastern India: Some Micro Evidence** 121  
*Mamata Swain*
- M. N. Srinivas: Ace Interpreter of Indian Society** 144  
*Victor S. D'Souza*

## Book Reviews

- Imtiaz Ahmad, Partha S. Ghosh and Helmut Reifeld (eds.). *Pluralism and Equality: Values in Indian Society and Politics* — N. Jayaram** 152

<b>Paul Cook and Colin Kirkpatrick (eds.). <i>Privatisation in Developing Countries, Volume I</i> — Anil Mascarenhas</b>	<b>154</b>
<b>Leela Fernandes. <i>Producing Workers: The Politics of Gender, Class and Culture in the Calcutta Jute Mills</i> — K. G. Gayathri Devi</b>	<b>157</b>
<b>Roger Jeffery and Nandini Sundar (eds.). <i>A New Moral Economy for India's Forests? Discourses of Community and Participation</i> — S. Jyothis</b>	<b>161</b>
<b>Renana Jhabvala and R. K. A. Subrahmanya (eds.). <i>The Unorganised Sector: Work Security and Social Protection</i> — S. Nagaraju</b>	<b>162</b>
<b>T. S. Papola and Alakh N. Sharma (eds.). <i>Gender and Employment in India</i> — N. Manimekalai</b>	<b>164</b>
<b>Bhikhu Parekh. <i>Colonialism, Tradition and Reform: An Analysis of Gandhi's Political Discourse</i> — Muzaffar Assadi</b>	<b>167</b>
<b>Jonathan P. Parry, Jan Breman and Karin Kapadia (eds.). <i>The Worlds of Industrial Labour</i> — Janaki Nair</b>	<b>169</b>
<b>Syed Ajmal Pasha. <i>Economic and Ecological Dimensions of Live-Stock Economy: An Indian Case Study of Small Ruminants</i> — R. K. Sharma</b>	<b>172</b>
<b>B. R. Virmani and Kala Rao. <i>Economic Restructuring, Technology Transfer and Human Resource Development</i> — K. Gayithri</b>	<b>174</b>
<b>Books Received</b>	<b>177</b>

# **Restructuring the Indian Power Sector: Some Issues \***

**T. R. Satish Chandran \*\***

## **Abstract**

The power sector is undergoing a structural change in many parts of the world, involving dismantling of public monopolies. In India, power policy has changed since 1991, but the progress has been slow and uneven. The response of the private sector has been disappointing, mainly because of the financial weakness of the State Electricity Boards. Public investment on power development should not be scaled down. Corporatisation of SEBs will not bring about any improvement without tariff rationalisation and a change in the style of their functioning. Large-scale privatisation is neither feasible nor desirable. The credibility of the regulatory authorities is important, but the state governments must play a supportive role. It is unrealistic to expect the emergence of an electricity market in India in the near future. Serious thought should be given to the creation of a new legal framework for future power development in India.

## **Introduction**

Power sector reform has been under way in many countries though the pattern varies from one country to another. India has also made a start in restructuring its power sector. This figures prominently in current public discourse as well as in the media, and rightly so, as it concerns every citizen of the country. Electricity plays a ubiquitous role in the modern world; it touches every segment of the economy and the life of every individual. It is a crucial component of infrastructure; at the same time, it is highly capital-intensive. Over the years, massive investments have been made the world over to attain high levels of economic advancement. For a developing country like India, a healthy, vibrant and expanding power sector is an imperative need. As estimated by the Planning Commission in the Ninth Five Year Plan document, the Electricity-GDP elasticity was as high as 1.36 during 1990-96, indicating that GDP growth rate of 7-8 per cent

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\* This is a slightly revised version of the keynote address delivered on December 20, 2000, at the Eleventh National Power Systems Conference held in Bangalore. I am thankful to the anonymous referee for the constructive comments, which have helped to improve the quality of the paper.

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per annum cannot be achieved without an increase of close to 10 per cent a year in electricity consumption. There is another aspect. The Indian economy is getting integrated rapidly with the global economy. The Indian consumer must benefit from competition following the process of liberalisation instituted since the nineties. At the same time, the domestic economy has to grow stronger and bigger. For this, adequacy of supply is not enough; energy must be available at a reasonable price, which can happen only if the electricity industry displays high efficiency and productivity. It is equally important that, even in a market economy, underprivileged sections of society are enabled to have some access to the benefits of electricity. These must be the criteria by which to assess the outcome of the restructuring process taking place in the Indian power sector.

The process of reform of the power sector is still in its initial stages and it would be premature to assess the outcome. The steps taken in the last few years have, however, brought to light several problem areas that need to be resolved before the sector is fully restructured and the expected impact is felt. The paper attempts to highlight the more important among them and suggest how they should be dealt with. The next section begins by tracing the genesis of reform of the power sector worldwide and proceeds to set out the developments in this sector in India since 1991, when there was a marked shift in the country's economic ideology. The progress so far is briefly reviewed. This is followed by a section in which the major issues and problems having a bearing on the content and direction of reform are discussed. The concluding remarks are presented in the last section of the paper.

## **Reform: Process and Progress**

### **Paradigm Shift**

India, as mentioned earlier, is not the only country in which power sector reforms are being carried out. Indeed, it was in the industrialised West that impulses for change originated. If we look across different countries, we see a paradigm shift taking place in varying degrees from the United States at one end to Australia at the other. In order to appreciate the underlying reasons, it is useful to take a quick look at the evolution of the power sector in the last sixty years or so. We see that during the first four decades after the end of the Second World War, in industrialised and developing countries alike, power development took place almost wholly in the public sector. USA was a notable exception, but the industry was subject to strict regulation. Broadly, one can identify four reasons (Chandran 1998) for the development of the power industry in the public sector:

First, power systems provide a classic example of a natural monopoly. Unlike other commodities, electricity cannot be stored and, at all times, supply must match demand. Consequently, it is desirable that the three components of a

power system, namely, generation, transmission and distribution are vertically integrated. Having regard to the diurnal and seasonal variations of demand, system efficiency and reliability can be optimised through grid operation, preferably under single ownership. Every consumer must have a dedicated delivery system. Therefore, the industry is characterised by high sunk cost, making it difficult for an existing operator to exit and setting up a high entry barrier to new players. The larger the operational network of a power system, the smaller the marginal cost of service to a new consumer—another characteristic of a natural monopoly. If an important component of infrastructure like power is inherently monopolistic, it was argued, a public monopoly is preferable to a private monopoly.

Second, power development requires large and lumpy investment. Among all the components of infrastructure, the power industry has the highest incremental capital-output ratio. At the same time, as it mostly provides an intermediate good, electricity tariff must be kept low in order that the final product is not priced out. As a result, capital amortisation requires a relatively long time. These make it difficult to mobilise requisite investments from the private sector.

Third, the socialist ethos held sway over most countries of Europe in the aftermath of the Second World War. It was believed that public interest would be maximised by public ownership of the vital means of production. This philosophy spread to colonial countries newly securing independence.

Lastly, in the developing countries, there was another policy angle, namely, the role of electricity as an instrument to enhance the welfare of the poorer sections of society and accelerate the development of backward areas.

Public monopoly of infrastructure development began to be questioned seriously around the seventies. Economists and political scientists put forward different theories like Public Choice theory, Contestability theory and Principal-Agent theory; while the arguments advanced were different, the net conclusion was that under exclusive public ownership of infrastructure, the citizen could not get economic and responsive service and that only market competition could ensure efficiency and optimal allocation of resources. This perception was strengthened by the global recession of the early 80's. There was a growing feeling in western countries that public monopolies were inefficient, unresponsive to citizens' needs and not accountable, whereas the private sector was perceived as being capable of providing better service. The growing importance of international financial markets, which could help the private sector to mobilise large funds, was a supportive factor. Some technical developments occurred in parallel favouring demonopolisation. These were spectacular in telecommunications where satellite communication made a dedicated delivery system unnecessary. In the power sector, the discovery of abundant reserves of natural gas made it possible to add capacity in smaller increments. This meant less lumpy investment, which made it easier

for private players to step in. The lead in dismantling public monopolies was taken by UK in 1989 when Prime Minister Margaret Thatcher launched an aggressive programme of privatisation of electricity, coal, gas and telecommunications. Since then, a large number of countries are pursuing a similar course. The arguments in favour of a greater role for the private sector in infrastructure mentioned earlier, no doubt, have relevance to developing countries also; but the major compulsion of these countries is the acute scarcity of investment funds in the public sector and the priority to be given to social development in the utilisation of available resources. They have no option except to welcome private investment. As domestic capital markets are small and weak, this means, in effect, attracting foreign investment, especially into power and telecommunications, which need and have the potential to absorb funds on a large scale.

### **Policy Changes in India**

Policy changes in India have followed a similar two-stage pattern. When we attained Independence in 1947, socialist beliefs were widespread in the country. The Industrial Policy Resolution of 1948 (reiterated in 1956) placed power, among others, in the list of areas reserved for the public sector. The Electricity (Supply) Act was enacted in 1948 to provide the legal framework for power development, including the establishment of State Electricity Boards (SEBs) and Central Electricity Authority (CEA). Without question, there has been a large expansion since then. Creditable as this may be, the fact remains that capacity and energy shortages have become rampant. The utilities are in financial disarray: on the one hand, their costs tend to be high because of inadequacies in operating efficiency, overstaffing and poor management. On the other hand, they operate under an irrational tariff regime characterised by distortions in the charges borne by different categories of consumers and, overall, under-recovery of cost. The tables below present a quick picture.

We have a situation in which the higher the energy production of a power utility, the higher the loss. Also, certain categories of consumers are overcharged while others are subsidised indiscriminately. The distortions appear even more pronounced when the figures are examined statewise.

For their part, the Central and state governments, which have been the main source of investment funds, are themselves under financial strain and are required to reduce the fiscal deficit. The fact that in the Eighth Five Year Plan period, the actual addition to generation capacity was only 17,600 MW against the target of 30,500 MW is a clear indicator that, without harnessing private funds, expansion of the sector commensurate with ambitious economic growth targets will not take place. It was against this background that under the new economic policy initiated in 1991, the power sector was thrown open to private investment, domestic as well as foreign. This was a part of a range of measures

**Table 1: Consumer Categorywise Average Tariff**

Category	1996–97	1997–98	1998–99
Domestic	118.5	133.9	131.1
Commercial	291.5	333.3	345.3
Agriculture	21.1	27.7	29.7
Industry	282.4	284.8	297.5
Traction	352.9	374.8	398.9
Outside State	148.1	146.9	156.7
Overall	163.0	184.5	197.9

**Table 2: Recovery of Cost through Tariff**

Year	Average Cost (paise/kwh)	Average Revenue (paise/kwh)	Revenue as a Percentage of Cost
1996–97	207.1	163.0	77.4
1997–98	225.2	184.5	80.1
1998–99	242.9	197.9	78.8

*Source:* (Tables 1&2) Planning Commission (1999)

marking a major shift in India's economic philosophy—from a command economy to a competitive market economy. Since then, further steps have been taken to break up the public sector monopoly of the power industry and to facilitate an increasingly larger role for the private sector.

Broadly, reform of the power sector has four components: unbundling, establishment of regulatory mechanisms, corporatisation of SEBs with a redefined role and privatisation. Let us examine what these imply.

**Unbundling.** Unbundling of the power system means segregating the monopolistic and the non-monopolistic components of the system. Clearly, generation is an activity, which permits multiple players, is amenable to market competition and can be opened for private investment. Distribution in a given area does partake of a monopoly, but the element of competition can be brought in two ways—first, the right to distribute power to consumers in the area may be allotted to private parties through competitive bidding ensuring at the same time that the consumer gets supply at minimum price. Second, yardstick competition, i.e., comparison of the performance of different distribution agencies, can be used to drive efficiency improvement and, where possible, bring down the tariff. As for transmission, private parties can own individual lines but, operationally, there is room for only

one player in a given region and it remains a monopoly. What is needed in the case of transmission is to establish institutional arrangements, which guarantee equal access to power producers and fairness in load dispatch during periods of congestion.

**Regulatory Mechanism.** The primary function of the regulator is to balance the interests of the consumer in getting energy at as low a price as possible with the interests of the producer in earning a reasonable return on his investment. The regulatory authority has also to lay down the guidelines for a smooth technical and financial interface between the monopolistic and the non-monopolistic elements of the power system. Where, as in India, both public and private entities are engaged in a similar activity such as generation, the regulator must see to it that there is a level playing field. For regulation to be credible, the regulatory body should be independent, should give opportunity to all the stakeholders to present their views and function in a transparent manner (Expert Group 1996).

**Corporatisation of SEBs.** While generation and distribution may be taken over by separate entities, the SEB will be the appropriate agency to look after transmission. It will be the intermediary between producers and distributors of power, purchasing power from the former and selling to the latter (or to consumers until the distribution entities come into existence). Load forecasting and system planning will be their other functions. In order that SEBs perform their role effectively in the new environment, they will be corporatised, which will, hopefully, give them greater functional and financial autonomy.

**Privatisation.** This does not require any elaboration. The idea is that over a period, government will divest itself of ownership of public enterprises in favour of the private sector. However, there is as yet no official policy on privatisation, except in respect of distribution. The advantages perceived in placing distribution under private ownership are – first, pilferage of power will be brought under control through elimination of unauthorised connections, metering, regular billing and rigorous collection of dues. Second, the private operator will be more consumer-friendly and responsive to their needs.

The measures listed above could lead eventually to the development of a market in electricity in which a consumer can choose his supplier and there will be all round improvement of efficiency as a result of competition.

While appraising the reform strategy, we should bear in mind that the overall goal is to make the power sector technically and financially sound. The consumer must get good quality service at a reasonable price. Competition-driven price of electricity should help our export industries to hold their own in the global markets. The reforms should provide an environment conducive to a large inflow of private funds for investment in the power sector, so that the growing

demand can be met.

What has been presented above is the framework of reform. We will now briefly review how far we have actually moved ahead in the last ten years. It should be borne in mind that under our Constitution, electricity is a concurrent subject and the Central and state governments share responsibility for implementation. The important developments since 1991 were as follows:

- (a) In 1991, Electricity (Supply) Act was amended to permit private sector entry into power generation.
- (b) In 1992, the policy for thermal power generation was announced. It allowed licence for thirty years with possible further extension, 100 per cent foreign equity, tax holiday for five years plus tax rebate of 30 per cent for the next five years and protection against rupee depreciation. The two unique features were guarantee of a return of 16 per cent on equity at 68.5 per cent PLF, with incentive for better performance and inclusion of 'take or pay' clause<sup>1</sup> in the power purchase agreement. Initially, the Memorandum of Understanding (MOU) route was permitted so that there could be a quick start on new power stations, but as there were apprehensions of cost-padding, competitive bidding was made mandatory (except for small projects).
- (c) In 1995, Orissa passed legislation for restructuring the State's power sector. The State Regulatory Commission started functioning in 1996. Power distribution was subsequently privatised.
- (d) In 1996, at a Conference of Chief Ministers, the Common Minimum National Action for Power was agreed upon, which included setting up of State Regulatory Commissions, rationalisation of tariff and private sector participation in distribution.
- (e) In 1998, Parliament passed laws enabling private sector entry into transmission, designating the Central Transmission Utility (Powergrid Corporation) and State Transmission Utilities (SEBs or their successor bodies) and for setting up Regulatory Commissions at the Centre and in the states. Modified guidelines for hydropower projects were issued to make investments in such projects more attractive to the private sector. Government recast its policy on mega power projects, which would cater to the power needs of more than one state. These projects would enjoy additional tax concessions; the sharing of power by a state would be conditional on its implementing reforms.
- (f) Some states have passed their own reform laws, set up Regulatory Commissions and converted their SEBs into companies. A few states have set up regulatory bodies under the Central law. The rest of the states have not moved at all.
- (g) In order to persuade state governments to implement reforms, an incentive has been held out in the form of World Bank assistance and facilitation of private investment. Power Finance Corporation and Infrastructure Development Finance

Corporation have started linking their assistance with milestones in the completion of the reform process.

Two facts stand out from the foregoing account. The first is that Central initiatives have been fitful and piecemeal. One does not see a grand design and the time lags have been excessive. The second is that progress in the states is uneven. Apparently, to give a push to implementation of reforms at the state level, the Union Cabinet gave approval, in December, 2000, to the Accelerated Power Development Programme to fund projects aimed at reform and restructure of the power sector. An outlay of Rs.1,000 crores was provided in the financial year 2000-01; in the budget for 2001-02, the provision has been raised to Rs.1,500 crores.

In the ten years that have passed since the new policy was adopted, the contribution of the private sector to power development in India has remained limited. Soon after the policy announcement in 1991-92, a large number of private parties from within the country and outside showed interest and state governments signed dozens of MOUs. If all of them had been implemented, the installed generation capacity in the country would have almost doubled! In actuality, capacity addition in the last ten years in the private sector was only about 5,500 MW. This apart, other issues have cropped up in the course of implementation of reforms. The more important among them are examined in the next section.

## **Some Issues**

### **Role of Private Sector**

If one may repeat, an attractive package of terms and conditions was offered to private investors. India has a well-established legal system and an independent judiciary. India should therefore be a preferred destination for foreign investment. International capital markets are flush with funds and heavy electrical equipment manufacturers look upon the developing world as their main market. Yet, there has been only a trickle of foreign direct investment (FDI). The most important reason is the extremely weak financial position of the SEBs (in the rest of the paper, the term SEB should be taken to include its successor bodies). If the sole purchaser of power is on the verge of bankruptcy and already has large outstandings towards purchase of power and coal, investor confidence is bound to be weak. Investment in power means a long-term commitment and the investor must have reasonable assurance of regular cash inflow during the licence period. This will not be forthcoming unless tariffs are rationalised so as to make the SEB operation commercially viable.

As restoration of the financial health of power utilities will take some time whereas the need for investment is immediate, a solution would be to offer sovereign guarantee; in the Indian context, it translates into state government

guarantee backed by counter guarantee by the Central Government. At first, there was an inclination to give such a guarantee. But it was soon realised that this was not a sustainable arrangement, as it shifted the burden to government and therefore indirectly to the non-consumer also. Moreover, governments are themselves required to reduce their deficit. Government of India restricted the facility of counter guarantee to a small number of fast-track projects (which are in fact still lingering) and, as an alternative, asked SEBs to offer escrow cover to independent power producers (IPPs). Even this has proved unworkable for two reasons: first, the proportion of energy consumed by large industrial consumers who are regular in payment is relatively small, thereby restricting the escrow capability of an SEB. Second, the escrow arrangement will further weaken the SEB, as it creams away its best customers.

It is clear that there are no soft options. No industry can run indefinitely at heavy loss, nor can (or should) government prop up such an industry diverting funds, which are badly needed elsewhere. Rationalisation of tariff based on normative performance standards is the only solution. The determination of tariff will hereafter be with the regulatory authorities. But this will have to be backed by strong political commitment and the willingness to deal firmly with vested interests, which have been enjoying undeserved benefits.

Among other factors inhibiting the inflow of FDI in the power sector is the lack of coherence in policy. The power sector is open for private investment, but coal and railways continue to be in the public sector. Captive coalmines can be under private ownership, but private investors desiring to set up a power station do not want to go into a business in which they have no expertise and which means raising additional capital, besides having to deal with a host of other problems. This asymmetry creates a serious problem for investors in thermal power generation based on domestic coal. The IPP has to achieve the specified normative level of generation if it is to recover fixed costs and get a return on investment. The IPP therefore needs a fuel supply guarantee from the coal company, which produces coal and from the railways, which transport coal from the pithead to the power station. But, neither the coal company nor the railways are willing to enter into a legally enforceable agreement with the IPP. The result is that the project is non-bankable and remains a non-starter. This is not a hypothetical example, but is the case of one of the 'fast-track' projects. We have a situation in which our country has fairly abundant reserves of coal, but IPPs opt for coastal locations so that they can import LNG or Australian coal – a clear distortion of energy policy, not to mention the outgo of foreign exchange. It is high time that the coal industry was thrown open to private merchant producers.

In our federal set-up, several agencies at the Central and state levels are involved in the processing of IPP proposals. Examination by each agency tends to

be sequential and time consuming. Some clearances are mandatory and necessary, such as those from safety and environmental angles. But, in general, as there is no appreciation that time costs money, negotiations drag on interminably. A power project involving large investment has many technical, financial and legal ramifications and the power purchase agreement has to cover all kinds of eventualities, which could arise over a thirty-year period. Having had no experience of negotiating such complex agreements, officials have had to pass through a learning curve. There is also the problem that, more often than not, negotiators on the government side are drawn from the very same organisations whose monopoly is being taken away. It is perhaps too much to expect that their mindset will be proactive to the devising of arrangements for the curtailment of their own powers and functions. An IFC-World Bank document (Sader 2000) says, 'India's electricity sector is by now infamous for the difficulty it presents to those interested in developing private power generation projects'. It is significant that of the projects initially identified by Government of India as fast-track projects, not one of the major projects has got off the ground. It is imperative that deadlines be set at both Central and state levels for processing by the different agencies.

Among the public, there is a feeling that the tariff of private power producers is higher than that of their public sector counterparts. Therefore, there is lack of enthusiasm for the concept of IPPs. Factually, it is true that private power is generally costlier. Primarily, this is because the private investor evaluates his risk and tries to minimise it. An investor is expected to bear the 'commercial risk' (e.g. non-performance of equipment according to specifications, shortcomings in maintenance, etc.), but it is mainly the 'country risk' that accounts for higher cost. Country risk includes foreign exchange variation, changes in taxation and labour laws, and civil unrest. This is partly covered by host country guarantee. For the rest, the investor protects himself to the extent possible by insurance, which adds to the cost. Even the rate of interest on foreign borrowing depends on the credit rating of the host country, which in turn takes into account the prospects of policy consistency. The World Development Report 2000/2001 has some interesting data on Institutional Investor Credit Rating of different countries. India's rating is 45.3 while that of Singapore is 80.4; the figures speak for themselves. In contrast, in the case of a public sector project, there is no such 'add on', as all risks are absorbed by the exchequer. Therefore, a one-to-one comparison of cost between 'public' and 'private' power will not be strictly correct. Whatever be the explanation, it must be noted that the fervour for IPPs has abated a little in some developing countries. We in India do need large private investment, at least in generation, to ensure adequate availability of power. To allay public misgivings regarding the purchase price and to enable consumers to understand the basis for pricing, the Power Purchase Agreement entered into by the SEB with the IPP,

should be placed in the public domain, with all supporting documents. This will be taken care of when the Regulatory Commission steps in, as their approval of the purchase price is mandatory and the procedures of the Commission provide for public hearings.

What does this add up to? It means that we should not put all our eggs in the private sector basket. We should not act on the assumption that private finance can substitute for public investment; it can only be a supplement. We should remember that neither has nuclear power generation been opened to the private sector nor would international financial markets support nuclear power projects. Hydropower does not attract private capital, because of hydrological and geological uncertainties inherent to such projects. Private investment in transmission lines has not been forthcoming even in western countries, as there is little room for the investor to improve profitability through higher efficiency. Thermal generation and distribution do provide avenues for private capital, but there are hurdles, as explained earlier. Both the Central and the state governments must move quickly to minimise these hurdles.

### **Role of Public Sector**

The limitations of private investment referred to above mean that the primary responsibility for power development remains with the public sector. The World Development Report 1994 (its theme is 'Infrastructure') estimated that 90 per cent of annual investment on infrastructure in developing countries is derived from government revenues or intermediated by governments. Besides, the point merits repetition that in a country like India where poverty is pervasive, electric power plays a dual role—while, in the main, it is a vital infrastructure for productive economic activity, it can be harnessed through appropriate policies, to alleviate poverty and enhance the welfare of those living at the subsistence level. Electricity can help to improve farm productivity and stimulate growth of non-farm employment. Electrification of households makes a significant difference to the quality of life, facilitates the spread of education of the growing generation and reduces human drudgery. In the words of the World Development Report referred to above, 'The lack of access to infrastructure is a real welfare issue'. This is a responsibility that the private sector will not take over. Therefore, public sector investment on power development must be maintained at a high level. This does not mean that investment funds must be mobilised solely by government through revenue or borrowing. The power industry under the public sector, which will continue to be large, must generate a surplus that will at least partially meet investment requirements; this takes us once again to the key issue of properly designed tariffs. The financial aspect apart, the style of functioning has to change. Public sector entities can no longer be treated as subordinate agencies of government. We will revert to this aspect while dealing with the question of

corporatisation. The point to be underscored is that there should not be any abdication of responsibility on the part of the Central and state governments in ensuring adequate resource availability to public sector power entities even after corporatisation. In the words of A.A. Churchill, 'International capital flows, both private and official, can support domestic effort to raise resources, but they are seldom substitutes. The energy sector and, in particular, the requirements of electric power are far too large relative to the overall size of the national economies to be dependent exclusively on external savings' (Churchill 1999). Latterly, there is some improvement in the Plan outlay on power in the Central sector, but viewed across states, the picture is not encouraging. This needs to be rectified.

### **Subsidies in the Power Sector**

It is well known that the financial difficulties of the power sector emanate mainly from subsidies to the agriculture and domestic sectors. The projections for the year 2001–02 as given in the Economic Survey 2000–01 (Government of India 2001) are revealing:

**Table 3: Subsidies in the Power Sector – 2001-02 (AP)<sup>2</sup>**

	Amount in Rs. Crs.
Subsidy on Agriculture	29,461
Subsidy on Domestic Sector	11,267
Subsidy on Inter-State Sales	510
Gross Subsidy	41,238
Subventions received from State Govts.	8,370
Net Subsidy	32,868
Surplus generated by sale to other sectors	5,526
Uncovered Subsidy	27,342
Commercial Losses	28,445

The losses on agricultural supply are, clearly, very heavy. What is also significant is that in spite of overcharging industry, the extent of cross-subsidisation that can be achieved is limited. The need to reduce the subsidy burden has been recognised for many years, but competitive populism hindered remedial action in most states. Under the Electricity Regulatory Commissions Act passed by Parliament, cross-subsidisation is not ruled out, but within three years, no category of consumers should be required to pay less than fifty per cent of the average cost of supply. For agricultural consumption, a minimum of 50 paise per unit has been prescribed. There are no corresponding explicit provisions in the Karnataka Electricity Reform Act, where the only requirement, as in the Central Act, is that in case the State

Government requires the grant of subsidy to any class of consumers, it must bear the consequential financial burden. Possibly, the position is similar under the reform laws of other states. The legal position is thus somewhat tenuous and will have to be clarified soon.

The basic question is, can we do away with subsidies? The answer is, by no means, simple. Looking first at subsidy to domestic consumers, there is no case for a general subsidy to this category of consumers. The poor, we all agree, must have access to electricity, since, as stated earlier, electric lighting makes a difference to the quality of life and confers other benefits. Then again, merely because the cost of delivery of power to rural areas is high, the rural domestic consumer should not be placed at a disadvantage. We should bear in mind that the hard core of poverty lies in the rural areas. However, losses on this account could be made up through a well-designed reverse block tariff, as consumption by poor households accounts for only a small fraction of total domestic consumption. Subsidy for agricultural consumption is a more complex issue. In the first place, losses on agriculture as reported by SEBs are generally inflated; as the supply is unmetered, losses arising from theft of power are also ascribed to agriculture. This is clearly borne out by the fact that, in the proceedings of the Regulatory Commissions which have issued tariff orders, the SEBs' filings before their respective Commissions disclosed altogether higher transmission and distribution losses than what they had been reporting in their Annual Reports. For instance, the losses declared by Karnataka Power Transmission Corporation were — 18.56 per cent in 1997–98, 30.19 per cent in 1998–99, 38.00 per cent in 1999–2000 and 36.50 per cent in 2000–01 (projected) (Karnataka Electricity Regulatory Commission 2000). The sudden jump in 1998–99 is significant. Second, the subsidy accrues, in the main, to relatively better off farmers. The fact that many of them have diesel backup indicates that capacity to pay is not a real issue. On the other hand, the cost of cultivation has a link with the minimum support price paid by government to maintain buffer stocks of food grains and run the Public Distribution System, which caters to the essential needs of low-income consumers. This is not to suggest that there is no scope for reduction of subsidy to agriculture. It should be possible to keep the quantum of subsidy within limits by imposing tariff in the manner envisaged in the Electricity Regulatory Commissions Act, metering of supply and institution of programmes to encourage installation of high-efficiency pump sets. This apart, there is scope for increasing revenue by controlling theft and reducing technical losses in transmission and distribution. But this will take time, as there is a large backlog of investment on these components of the power system. However, it will not be possible to eliminate subsidy altogether for quite some time. Meanwhile, the subsidy burden should be borne squarely and clearly by the state government, as the subsidy subserves public policy.

### **SEBs as Corporate Bodies**

Corporatisation is not a panacea for the basic problems of SEBs. The main purpose of moving over to the corporate form of organisation is to professionalise the management, endow it with functional and financial autonomy free from political interference and introduce commercial orientation. But will this happen once the SEB puts on a new garb? The manner in which public sector companies are run even today, whether at the central or state levels, does not inspire confidence. They continue to be treated as agencies on a par with field departments. There have been several high-level committee recommendations to change the nature of the interface between public sector enterprises and government, as also of control by Parliament (or State Legislature), audit, etc. But the substantive recommendations remain unimplemented. A determined effort needs to be made by the political leadership and the bureaucracy to develop a new model of relationship with public sector enterprises.

Merely because an SEB ceases to be a statutory body and becomes a company, its financial position will not alter. No purpose will be served by replacing one loss-making organisation by several such organisations (as has already happened in Orissa). If annual losses continue, government will have to bail them out as in the past. How the balance sheet will turn out will depend on the decisions of the Regulatory Commission. Ultimately, the balance sheet can be cleaned up only through higher efficiency and proper pricing of power. There is also the question of the outstanding liabilities of the SEB, which are quite large. Securitisation appears to be the best way as it provides immediate relief, but the State government must shoulder the burden of discharging the liability. Otherwise, tariff increases will reach unacceptable levels.

### **The Privatisation Question**

There is a view that as the Central and state governments are heavily indebted and interest payments take away a large proportion of current revenues, existing assets should be sold to the private sector and the proceeds used to retire public debt. Without any doubt, privatisation can attract FDI on a large scale. Out of a global FDI inflow of \$138 billion for infrastructure between 1990 and 1998, Latin America was the largest recipient with \$79 billion; of this, \$67 billion was towards privatisation (Sader 2000). Do we want to follow the same route? This is an issue that calls for debate on a wide scale, as its implications are serious and sensitive. In my view, wholesale privatisation is neither desirable nor feasible. Given the limited scale on which capital can be raised domestically, privatisation will inevitably mean sale to foreign private parties. One cannot be comfortable with a situation in which a vital segment of the country's infrastructure is under foreign ownership. As mentioned earlier, investment in transmission is not

interesting to private investors. In relative terms, distribution is manpower-intensive and the scale of investment is not large; Indian parties will be willing to enter when there is a resolution of the tariff issue. It is the generation sector which can attract a large inflow. What Government of India has done so far is to effect piecemeal disinvestments in Central power undertakings. Such an approach does not fetch the best price for the shares, nor is there any benefit in terms of change in the style of management. On their part, the states have not moved at all. India has a number of thermal power stations of old vintage, which could be hived off to parties who are willing to undertake renovation and modernisation. Our focus should be on greenfield projects that add to capacity, and it is here that we should create an environment that makes it possible to secure private investment on a substantial scale.

### **The Regulatory Regime**

As already stated, the Centre and several states have set up Electricity Regulatory Commissions. With the exception of Orissa, other Commissions have been in existence for only a short period. According to information available, the Orissa Commission had passed three tariff orders, and the Andhra Pradesh, Uttar Pradesh and Maharashtra Commissions one order each by June 2000. The Karnataka Commission passed its first order in December of that year. It will be premature to judge performance, but comments may not be out of order on two aspects, viz., functions entrusted and credibility. Referring to functions first, the main task assigned to the Regulatory Commissions at both national and state level is the determination of tariff. The Central Act contains enabling provisions for a state to entrust other functions to the State Commission, notably, licensing of generation. But, to the best of our knowledge, no state has done so. The Commission comes into the picture only for determination of the purchase price of energy by the Transmission Utility. This must be regarded as a lacuna, as it leaves the coverage of regulation incomplete.

When we look at countries where the power sector is being deregulated or restructured, we see two broad approaches to tariff regulation—cost-plus approach and price cap approach. The cost-plus approach has been followed in USA for a long time. It involves a detailed scrutiny of costs and the monitoring is close and continuous, but has the merit of ensuring financial viability and minimising market risk. The complaint of some American utilities has been that it does not permit generation of financial surpluses of the order needed for fresh investment. Under the price cap approach which originated in UK, the regulation is light-handed and lays down only an upper limit for the tariff for a specified period (three to five years). After initial benchmarking, indexation is allowed on the basis of the formula 'RPI-X', where RPI is the Retail Price Index and X is a factor that represents improvement in efficiency. The price cap approach is closer

to market competition and allows higher profit to those who achieve better levels of efficiency. Consumers in UK have benefited from lower tariffs, but in the initial stages, the regulator was apparently too liberal, with the result that the biggest beneficiaries were the shareholders in the privatised companies (Newberry 1998). In the literature on regulation, one finds reference to a third approach to regulation, namely, the Performance-based approach. In my view, the distinction is semantic rather than substantive, as under both cost plus and price cap approaches, performance norms are built in.

In India, there was hardly any debate on the choice of methodology of tariff determination, which is the main function of the regulatory authorities. Under both the Electricity Regulatory Commissions Act and state reform laws, the State Commissions are required to follow Sections 57 and 57A and the Sixth Schedule of Electricity (Supply) Act. If the Commission wants to make a deviation, it has to give reasons to justify it. This means that we have implicitly adopted the cost-plus approach. As it happens, this is the right choice in our context. It gives greater comfort to the private investor. Also, fixing a price cap in a situation where new capacity is being added all the time is difficult.

The more important question is, does the experience so far confirm that the regulatory bodies in India enjoy the requisite measure of independence? This question is important, as the experience of the first regulatory body constituted under the new economic policy, namely, Telecom Regulatory Authority of India (TRAI) was not happy. When certain recommendations of the Authority were not to their liking, Government of India had the law amended to dilute the powers of TRAI. Judging by the brief experience of the State Electricity Regulatory Commissions which have passed orders, it is encouraging that they have affirmed their autonomy, as evidenced by the fact that all the five State Commissions scaled down the T & D loss projected by the Transmission Utility and exercised their own judgment for purposes of tariff determination. Assertion of independence is all right, but it has to be blended with pragmatism. There have been critical comments on the Orissa Commission's orders on the ground that unachievable efficiency improvements were assumed while deciding the tariff. If the tariff is pitched too low and there is under-recovery, private parties that take over distribution will be unable to function, as they cannot finance losses indefinitely. A quotation each from two recent studies will give a flavour of the observations. 'The regulatory commission is limiting itself to regulation and appears to consider that the development of the sector is beyond its responsibilities. In Orissa, the state government too has absolved itself of all its responsibilities leaving the power sector in a lurch' (Sankar T.L. and Usha Ramachandra 2000). 'Where governments are co-operative as in the case of A.P., the allowed revenue requirement is much closer to a real level. In contrast, in Orissa, where the government has not actively assisted in the process of transition, the efficiency improvements required are

much more dramatic' (Ahluwalia 2000). In Karnataka, the pattern of events has been a little different. In the first order issued by the Karnataka Electricity Regulatory Commission towards the end of last year, the Commission raised the tariff by about 17 per cent on an average. The increase in the agricultural tariff was modest; it was set at 50 paise per unit for most farmers. The Commission introduced an innovation by distinguishing affluent farmers and imposing a tariff of Rs.1.35 per unit on them. The Commission also issued several directives intended to improve the operational efficiency of the power utility. Karnataka Government went along with all the tariff increases, except for the agricultural consumers (including rich farmers), but committed itself to providing additional subsidy. Karnataka Electricity Board's successor, Karnataka Power Transmission Corporation, has gone up in appeal to the High Court questioning the jurisdiction of the Regulator to issue those directives. In Maharashtra, the State Government has responded to the Regulatory Commission's order on tariff for agriculture (and powerlooms) on the same lines as in Karnataka. These are not encouraging signs; they signify lack of readiness to put in place a credible regulatory regime. What is more, as a truly independent regulatory body enjoying the confidence of both the power suppliers and consumers is a cornerstone in the rebuilding of the power sector, it raises the question whether at all there is political commitment to set right the technical and financial ills of the sector.

### **Electricity Market**

In industrial countries that have embarked on deregulation of the power sector, the emergence of an electricity market in which electricity is traded like any other commodity with competition among suppliers is regarded as the ultimate goal. The UK has been the pioneer in this respect. It introduced a pool system, with half-hourly price bids offered by different power producers; the highest accepted price would be paid to all the suppliers during the particular time period. As explained earlier, the UK adopted a soft regulatory system. It will be interesting to look at a couple of other models. New Zealand restructured its power sector as a part of a changeover (which began in 1986) in the pattern of governance to conform to the principles of New Public Management. The new regime only mandated disclosure of operational and financial information; reliance on market competition was total and regulation was considered unnecessary. California passed a law in 1996 making elaborate provisions to make the power industry market-based. These included the Power Exchange for wholesale trading in electricity and the Independent System Operator (ISO), who not only looked after load dispatch, but also operated the balancing market for emergent purchases of electricity in case of mismatch between supply and demand (Sioshansi and Morgan 2000). A new class of electricity traders who mediate between merchant generators and distributors (or large consumers) came into being. As in other states of USA,

the California Public Utilities Commission had been in existence for several decades, the style of regulation being hands-on; inter-state electricity trade came under the purview of the Federal Energy Regulatory Commission (FERC). In all the countries referred to above, consumers were given the freedom to choose their suppliers.

In all the three countries, the functioning of the electricity market has not been without problems. We may take a quick look at them:

- 1) UK – When UK denationalised the power industry, generation was taken over by two large companies (National Power and Powergen). Though a number of merchant generators came up later and nuclear power was under another company, these two large players dominated the electricity market and dictated prices. There was even criticism of manipulation of the market. The UK has decided to give up the pool arrangement and let suppliers and consumers enter into direct arrangements. But, according to Richard Green, ‘Abolishing the pool in favour of a less transparent market, at greater risk of manipulation by the dominant generators, does not seem a rational policy’ (Green 1999).
- 2) New Zealand – The market was, no doubt, competitive, but it led to a situation in which investments were not made to maintain adequate reserves. Some time ago, a part of Auckland, the capital city of New Zealand, went without electricity for some weeks; a power cable had developed a fault, but there was no redundant capacity. Lack of a proper arrangement for system planning was evident.
- 3) California – Since around May 2000, California has been facing a power shortage and the problem has reached crisis proportions<sup>3</sup>. When reform measures were introduced, there were three investor-owned utilities, two of which, namely, Southern California Edison (SCE) and Pacific Gas and Electric (PGE) were large and served the major part of the State. Under the law of 1996, the utility tariff was frozen till March 31, 2002, before which the utilities were required to sell their own plants and convert themselves into distribution companies buying power in the wholesale market. The new system worked well to begin with. But the demand forecast had underestimated the rate of growth and no new major plant had been built in California for the last ten years. When the demand started rising sharply last year, the utilities had to buy wholesale power from outside sources. As the power shortage grew, electricity traders jacked up the prices, while the income of the utilities remained frozen. The suppliers even resorted to gaming – withholding offers to the Power Exchange and selling power at higher rates in the balancing market. FERC refused to intervene. By the end of the year, the two utilities together had lost \$13 billion and the banks were unwilling to lend them any

more money. Large parts of California suffered rolling blackouts in January this year. In order to retrieve the situation, Government of California had to start funding the utilities to the tune of \$50 million per day to enable them to buy wholesale power. Towards the end of March, California Public Utilities Commission finally allowed a tariff increase of 46 per cent for PGE and 42 per cent for SCE in respect of non-domestic consumers; the increase in the case of households was less sharp. Government is planning to recover its money by floating bonds to the tune of \$12.4 billion<sup>4</sup>. The situation is expected to ease fully only by 2003, when new capacity is expected to be commissioned in California.

The experiences mentioned above offer important lessons to countries embarking on restructuring of the power sector. These are:

- 1) There must be institutional arrangements for system planning and ensuring that the required capacity additions take place.
- 2) Regulatory mechanisms are necessary. Tariff determination should not lose sight of the need to generate funds required for maintaining sufficient reserves. The Regulator should respond quickly to evolving situations.
- 3) The Electricity Market will work well only if supply exceeds demand at all times and there is a multiplicity of players. Otherwise, the ugly side of market power will show up (This is the most important lesson).

What is the prospect for an electricity market in India? No doubt, this may benefit the consumer, but is it feasible in our situation? As rightly observed by Central Electricity Regulatory Commission (CERC 1999), the conditions are unfavourable. Unlike many western countries that have excess capacity, we have and will continue to have supply shortages for many years to come. We do not have a multiplicity of generators. There are transmission constraints. The 'take or pay' clause insisted upon by IPPs cannot fit into a market situation. There are many old power stations which may have to exit in case the market is wholly competition-driven; this could mean loading 'stranded costs' on the consumers. For all these reasons, it is unrealistic to talk of an electricity market in India.

We may not have an electricity market in the real sense, but some limited inter-state trade has been taking place for many years. Recently, the Power Trading Corporation promoted by public sector entities has been set up to buy power from mega projects and sell it to state utilities. It is clear that it can survive only if it can keep its receivables under control; this will depend, once again, on tariff rationalisation in the states. It is not surprising that the Corporation has not been successful in reaching financial closure on even the first mega project that it has proposed to take up.

### **Negative Fallout of Reform**

Markets operate on a short time horizon, which means that energy sources that are not cost-competitive cannot survive. The development of renewable sources of energy, which have long-term potential will suffer unless it receives special support. It is reported that in California where a big push had been given to renewables under the Public Utility Regulatory Policies Act (PURPA) enacted in 1978, 26 per cent of biomass capacity and 11 per cent of wind capacity closed down after deregulation (Wiser *et al.* 1998). A distribution surcharge had therefore to be imposed. In the UK, renewables are supported by Non-Fossil Fuel Obligation Orders issued from time to time under which electricity suppliers are required to purchase electricity at specified rates from generators using renewable sources of energy. We in India need to give sufficient thought to this aspect. To encourage development of renewable energy resources, Ministry of Non-Conventional Energy Sources (MNES) has issued guidelines indicating the rate of payment to be made by SEBs to producers of electricity from renewable sources. The period covered is ten years from commencement of purchase; appropriate escalations are allowed during this period. The purchase price is no doubt higher than the price of power from conventional sources, but the share of renewables in the total generation is small and therefore not burdensome to the SEBs. The Regulatory Commissions, which have so far passed tariff orders, have not all accepted the MNES guidelines. It is necessary that they do so in order that investment in renewables does not suffer an immediate setback. The long-term solution lies in the imposition of a statutory levy.

Most industrial countries have reduced their national (public and private) investments on energy R&D after the deregulation of their energy sectors. To give an example, total R&D investment in USA has come down from \$7.6 billion in 1976 to \$4.3 billion in 1996. The cuts have been sharper in several European countries (Dooley 1998, Margolis and Kammen 1999). This is unfortunate, since the bulk of technology generation takes place in the developed countries. The scale of investment on energy R&D is quite low in India; there is an imperative need to step it up.

### **The Electricity Bill 2000**

The power sector developed in India entirely under the aegis of the states, to begin with, and the Centre stepped in later. The legal framework, starting with the Act of 1948, has been subject to modifications from time to time, but it remains in its essence a law designed for operating the power industry in the public sector. As the economic environment has changed radically, it is time to think of a new statute appropriate to the present time. At the request of Ministry of Power, National Council of Applied Economic Research has prepared The Electricity Bill 2000

'for evolving a framework for enabling the restructuring and modernisation of the electricity industry in India'. It visualises the unbundling of SEBs into horizontally separated entities, whether public or private. It aims at insulating the industry from government intervention in day-to-day functioning, but leaves room for policy directives. CEA's role in national planning and technical development is sought to be restored. Strong regulatory mechanisms are provided. Provision is made for levy of a cess by the Union Government to promote non-fossil fuel sources. In brief, it takes care of many of the issues referred to earlier and provides a coherent framework for the development of the sector. Undoubtedly, there are political sensitivities, as there will be some curtailment of the extent to which a state government can influence operational decisions. It is desirable that the need and content of fresh legislation is debated widely and the ground prepared for its being considered seriously.

### **Conclusion**

The power sector has many dimensions and complexities. Reshaping it is by no means an easy exercise, all the more so in a federal set-up where the Centre and the states share responsibility. There is no universally applicable model of reform; each country has to evolve a pattern to suit its circumstances. The reform process in India has made some headway, but the movement is slow and not orchestrated. The private sector has yet to become a significant presence and foreign capital seems shy of entering India. Policy and procedural hurdles need to be removed quickly. The role of the public sector in terms of investment and otherwise will continue to be important and the tendency to play it down should be resisted. Regulatory Commissions should be allowed to play their part, as tariff rationalisation linked with performance standards will play a crucial role in making the industry efficient and viable. Power shortages are presently crippling the economy. The sector has to expand rapidly if the country's economic growth is to be accelerated and the lot of the masses at a subsistence level is to be improved. Reform of the power sector has therefore become imperative. The need of the hour is sustained political commitment to push through a coherent and effective programme of restructuring the sector.

### **Notes**

1. The independent power producer (IPP) must achieve a Plant Load Factor (PLF) of 68.5 per cent to cover its fixed costs and get the guaranteed return of 16 per cent on equity. In terms of energy, this translates into 6000 kWh per year per kW of installed capacity. Under the 'take or pay' clause, the SEB is obliged to purchase at least this quantum of energy from the IPP. If the SEB fails to do so, notwithstanding the fact that the IPP was ready to

supply, the SEB has to pay fixed charges (including profit) for the shortfall, which is treated as deemed generation.

2. The figures in this table are based on the Annual Plan discussions held by the Planning Commission with the Central and state governments.

3. A lot of material on the California power crisis has been available on the Internet. This includes extensive reports in the American press, especially the regional newspapers. According to some reports, when the deregulation legislation was under discussion, the three California utilities spent millions of dollars on lobbyists and political contributions to get the new law passed. Some issues of *The Economist* have carried reports of recent developments.

4. PGE has, however, filed for bankruptcy.

### References

- Ahluwalia, Sanjeev S. (2000). Power Tariff Reform in India. *Economic and Political Weekly*, 35-38, Sep 16-22, pp 3407-19.
- CERC (Central Electricity Regulatory Commission) (1999). *Consultation Paper on Bulk Electricity Tariffs*. New Delhi, Sep 15.
- Chandran, T.R. Satish (1998). Infrastructure for India's Development. *Journal of Social and Economic Development*, 1(2), Jul-Dec, pp 211-33.
- Churchill, A.A. (1999). Financing the Global Energy Sector: The Task Ahead. In Pradeep Chaturvedi (ed), *Financing of Energy Sector in Developing Countries*. New Delhi: Concept Publishing Co.
- Dooley, J.J. (1998). Unintended Consequences: Energy R&D in a Deregulated Energy Market. *Energy Policy*, 26(7), Jun, pp 547-55.
- Expert Group on the Commercialisation of Infrastructure Projects (1996). *The India Infrastructure Report*. New Delhi: Ministry of Finance.
- Government of India (2001). *Economic Survey 2000 - 01*. New Delhi, Ministry of Finance.
- Green, Richard (1999). Draining the Pool: The Reform of Electricity Trading in England and Wales. *Energy Policy*, 27(9), Sep, pp 515-25.
- Karnataka Electricity Regulatory Commission (2000). Tariff Order – 2000 dated 18<sup>th</sup> December 2000. Bangalore. (Mimeo).
- Margolis, Robert M., Daniel M. Kammen (1999). Evidence of Under Investment in Energy R&D in the United States and the Impact of Federal Policy. *Energy Policy*, 27(10), Oct, pp 651-62.
- Newberry, David M. (1998). Freer Electricity Markets in the UK: A Progress Report. *Energy Policy*, 26(10), Aug, pp 743-49.
- Planning Commission (1999). Annual Report on the Working of State Electricity Boards and Electricity Departments. New Delhi.
- Sader, Frank (2000). *Attracting Foreign Direct Investment into Infrastructure*. Foreign Investment Advisory Service, Occasional Paper 12, Washington D.C., IFC and World Bank.

- Sankar, T.L., Usha Ramachandra (2000). Electricity Tariff Regulators—The Orissa Experience. *Economic and Political Weekly*, 35-20/21, May 27-Jun 2, pp1825–34.
- Sioshansi, F.R., Cheryl Morgan (2000). What Can Be Learned from California's Restructured Market Thus Far? *Energy Policy*, 28(2), Feb, pp 81-88.
- Wiser, Ryan, Steven Pickle, Charles Goodman (1998). Renewable Energy Policy and Electricity Restructuring: A California Case Study. *Energy Policy*, 26(6), May, pp 465-75.
- World Bank (1994). *World Development Report 1994*. New York: Oxford University Press.

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# **Impact of Financial Integration in Developing Countries: A Study of Growth, Volatility and Efficiency in the Indian Stock Market**

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## **Abstract**

The objective of the present study is to examine, for India, the impact of financial integration on its capital market in terms of growth, volatility, and market efficiency. The results show that the primary stock market has grown significantly since the beginning of capital market reforms in 1992–93. The secondary capital market has also grown in terms of size and liquidity. The annual volatility in stock prices is found to have declined. Industry-wise volatility, as measured by 'beta', is found to be greater than unity after reforms mainly in metals and metal products, and finance and investment industries. The regression results do not support the random walk model of market efficiency.

## **Financial Integration and Portfolio Diversification**

Developing countries have become increasingly attractive destinations for international investors seeking higher returns than what are available in the developed economies while diversifying their risks. A correlation between the returns for different asset classes is the core variable that influences portfolio risk. According to portfolio theory, ownership of assets with low correlation significantly enhances the risk-adjusted return of the portfolio. Diversifying into emerging markets provides scope for accentuating this benefit further, if the correlation of emerging markets with developed markets is lower than what is known in the context of developed markets. Based on the correlation of returns during 1987–1996, the financial markets of developed countries are highly integrated (Appendix, Table 1). The average correlation coefficient across all developed markets is 0.53. The correlation of emerging markets with one another is presented in Appendix, Table 2. It is seen that except for some of the Southeast Asian economies, which exhibit a high correlation, the overall correlation between emerging markets is low (0.21). The lack of correlation amongst emerging markets is one of the first pieces of evidence of the lack of integration of these markets with one another. Further, the correlation of returns of most of the emerging markets with the developed markets is very low (Appendix, Table 3). India has an average correlation coefficient of 0.01 with the developed

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markets. The average correlation coefficient of emerging markets with developed markets is 0.19. Thus, developing countries have become increasingly attractive destinations for international investors, seeking higher returns than what are available in the developed economies while diversifying new risk.

The share of global FDI flows is more than 50 per cent, compared with 15 per cent in 1990, and their share of global portfolio equity flows is about 30 per cent, compared with around 2 per cent in 1990. Institutional investors are found to be the driving force behind the large portfolio flows of the 1990s. Among institutional investors, mutual funds have led the surge in investments in emerging markets. International and global funds as well as pension funds are also allocating an increasing proportion of their portfolios to emerging markets. Consequently, net private capital flows to developing countries have exceeded US \$295 billion in 1997, nearly six times as much as at the start of the decade. Another interesting observation is that as a result of financial integration, private capital flows now exceed official flows. The flow of private capital has also shifted away from the governments to the private sector, and has been sustained, rather grown, in spite of increases in the US interest rates in 1994 and the Mexican crisis in 1995.<sup>1</sup>

The experiences of some of the Latin American and Southeast Asian nations that have successfully managed financial integration also suggest that the benefits of this process are likely to be large for developing countries. The benefits can be direct as well as indirect. The direct advantages are twofold: these countries can tap the growing pool of global capital to raise investment, diversify risk, lower the cost of funds, and smoothen the growth of investment. The indirect benefits include knowledge spillover effects, improved resource allocation through the financial markets, increasing safety of financial operations, and strengthening of domestic financial markets through financial sector reforms. These benefits of financial integration result in the development and growth of the primary and secondary capital markets. For instance, the number of foreign institutional investors has increased from 1 in 1993 to 481 in January 1998; a large number of companies have started floating their shares in the global market and getting finances through the GDR route as well as getting their scrips listed on NASDAQ. The market capitalisation of all emerging markets has increased from US \$745 billion in 1989 to around US \$2,000 billion in 1998; the number of listed domestic companies has increased from 8,709 in 1989 to 26,354 in 1998, and the value traded in all the emerging markets has increased from US \$1,169 billion to US \$1,956 billion over the same period.<sup>2</sup>

However, there are large potential costs if financial integration is not carefully managed. There is widespread concern among policy makers that growing financial integration and the herding behaviour of foreign institutional investors might render emerging markets more susceptible to volatility—including large

reversals to capital flows. These actions of foreign investors can adversely affect the foreign exchange market, the stock market and macroeconomic management in a developing country. The impact of financial integration on exchange rate management and macroeconomic management has been analysed elsewhere.<sup>3</sup>

The objective of the present study is to analyse for India the impact of financial integration on its stock market in terms of its growth, volatility, and efficiency.

### **Trends in the Growth / Development of Capital Market in India**

The Capital Issues (Control) Act, enacted in 1947, formalised and continued initial controls on the issue of securities that were introduced during the Second World War. The act was administered by the office of the Controller of Capital Issues (CCI), which formed a part of the Ministry of Finance. In 1956, The Securities Contracts (Regulation) Act, 1956, which was enacted, brought stock exchanges, their numbers, as well as contracts in securities which could be traded under the regulation of the Central Government, through the Ministry of Finance. The Companies Act, 1956, besides governing the incorporation and management of companies, also specified certain aspects of the issue of capital and trading in securities. This act also governed the merger and amalgamation of companies and their winding up.<sup>4</sup> From 1947 to 1973, the infrastructure for a capital market was strengthened through the establishment of a network of development financial institutions. In this period the demand for long-term funds was not significant mainly because of a weak industrial base and the availability of cheap funds from alternative sources. Foreign companies depended mainly on the London capital market rather than on the Indian capital market for funds. Also, Indian industry depended less heavily on the capital market as it could get funds from banks and other development financial institutions at fairly low rates of interest. During 1973–80, the FERA legislation virtually ensured that many well-managed companies offered their equities to the public at regulated low prices.<sup>5</sup> In this period, the stock market showed an upward trend as share prices became highly buoyant. The Indian capital market really developed from the mid-1980s when the new economic policy was introduced by the then prime minister, the late Rajiv Gandhi. The thrust of the new policy was on productivity growth, efficiency and quality of products so as to make Indian industry competitive (Agarwal and Goldar 1991). At that time debentures and public sector bonds emerged as powerful instruments of resource mobilisation in the primary capital market. Consequently, the secondary market also began to grow fast from then on. The number of stock exchanges, the number of listed companies on stock exchanges, their market capitalisation and the value of traded shares increased significantly. However, until 1991–92, the securities market did not develop in consonance with the rest of the economy for various reasons. The trading and settlement infrastructure remained poor. Trading on all stock exchanges

was through open outcry. The settlement systems were paper-based. Market intermediaries were largely unregulated. Disclosure requirements were inadequate. The regulatory structure was fragmented and administered by different agencies. There was no apex authority for regulation and inspection of the securities markets. The stock exchanges were run as brokers' clubs. Insider trading and fraudulent and unfair trade practices were rampant. The practice of forward trading created unnecessary speculation. The large-scale irregularities in securities transactions in 1992 suggested that many loopholes existed in the system.

The ongoing economic reforms, which began in 1991–92, therefore focused on increasing the output, efficiency and competitiveness of Indian industry at home and abroad. The reform of the financial services sector, especially of the securities market, has been at the heart of this effort, which has aimed at the mobilisation and allocation of capital through market channels.

### Growth of Primary Market

Table 1 shows that the primary issues of the central government have registered more than a tenfold increase to Rs.93,953 crore during 1998–99 from Rs.8,989 crore in 1990–91. The investors' base for government securities has expanded during the 1990s. Besides banks and insurance corporations, finance companies, corporates and financial institutions have also begun to invest in government securities. Primary market borrowings of the central and state governments are given below.

**Table 1: Primary Market Borrowings of Central and State Governments  
(Rs. in crore)**

Year	Central Govt.	State Govt.	Total
1980–81	2,871	333	3,204
1985–86	5,764	1,414	7,178
1990–91	8,989	2,569	11,557
1991–92	8,919	3,364	12,283
1992–93	13,885	3,805	17,690
1993–94	50,368	4,145	54,513
1994–95	38,108	5,123	43,231
1995–96	40,509	6,274	46,783
1996–97	36,152	6,536	42,688
1997–98	59,637	7,749	67,386
1998–99	93,953	12,114	106,067

The aggregate amount of new capital issues by the private corporate sector also increased from Rs.992 crore in the 1970s to Rs.19,045 crore during the

1980s. Debentures played a significant role in mobilisation of funds during the 1980s, as a result of important policy initiatives. As a consequence of the capital market reforms, the funds raised through new capital issues reached a maximum of Rs.26,417 crore in 1994–95. Funds mobilised by mutual funds (public and private) also increased from Rs.52.1 crore in 1980–81 to Rs 6,787 crore in 1989–90, reaching a maximum of Rs.11,274 crore in 1994–95. Prolonged bearish conditions in the stock market since September 1994, mainly due to the impact of the Mexican peso crisis, adversely affected the primary market, and new capital issues by the private corporate sector declined to about Rs.3,000 crore in 1997–98. This subsequently increased to about Rs.5,000 crore in 1998–99. Mutual funds also suffered in the two years after 1994–95 and the net receipts were negative. The receipts recovered, reaching Rs.3,090 crore during 1998–99.

Besides, the public sector undertakings have been raising funds from the market since the mid-1980s through the issue of tax-free and taxable bonds. More than Rs.40,000 crore was raised through bonds until 1998–99. With the financial sector reforms and reduced concessional resource support from the government, the government companies, banks and other financial institutions have also been allowed to tap the capital market for funds to meet their capital adequacy norms and other requirements since 1992. Funds collected by these institutions increased from Rs.786 crore in 1992–93 to Rs.5,000 crore in 1996–97. The outstanding securities of the central and state governments as on 31 March 1998, amounted to Rs.4,000 billion, a significant part being held by commercial banks, which have statutory obligations to hold such securities in their portfolio.

During the 1990s, a new method of raising funds, called private placement method (PPM), has become popular. This is a cost and time-effective method by which companies sell their securities directly to a limited number of sophisticated investors. However, it is an unregulated sector in India. This method has gained importance in the current business environment, which is marked by corporate takeovers. Until 1991–92, the PPM, in terms of the quantum of capital raised, constituted as much as 36 per cent of the total capital raised in 1989–90, and 47 per cent in 1991–92. After 1992–93, its share fell until 1994–95 when foreign institutional investors (FIIs), registered with SEBI, were allowed to enter the domestic market through PPM. The funds raised through this method have gone up since then, crossing Rs.15,000 crore in 1996–97. Net FIIs investment in the stock market has increased from Rs.5,445 crore in 1993–94 to Rs.7,444 crore in 1996–97 but declined to Rs.807 crore in 1998–99. The outstanding corporate debt as of March 31, 1998, inclusive of private placement, was around Rs.1,100 billion. Resources have also been mobilised by the corporate sector (private and public) through global depository receipts (GDR), foreign currency convertible bonds (FCCB) and external commercial borrowings. The total funds mobilised through such sources increased from Rs.4,000 crore in 1990–91 to Rs.19,000 crore in 1998–99. The data are presented in Table 2.

**Table 2 : Resources Mobilised by the Domestic Capital Market  
from Various Sources ( Rs. in crore)**

Year	Through Mutual Funds	New Cap. Issues by NGPLC	Through Bonds by PSU	Through Private Placement	Through Equity and Debts by GCFI	Through Special Financial Devices
1980-81	52.1	598.4	N/A	-	-	-
1985-86	891.8	1745.3	353.7	-	-	-
1991-92	11252.9	6193.1	5710.8	4463.0	-	198.0
1992-93	13020.9	19803.4	1062.5	1634.6	786.0	4703.0
1993-94	11243.2	19330.3	5585.9	7465.9	4562.0	5460.0
1994-95	11274.6	26416.7	3070.1	11174.3	1313.0	3147.8
1995-96	-5832.9	16074.7	2291.2	13361.0	4465.0	4151.0
1996-97	-2036.7	10409.5	3394.3	15066.0	5002.0	N/A
1997-98	4001.8	3138.3	2982.5	30098.0	1518.0	N/A

*Notes:* NGPLC stands for non-government public limited companies; GCFI refers to government companies and financial institutions in the public sector. New financial instruments are basically hybrid and include special notes, warrants, and special type of debentures.

*Sources:* *Handbook of Statistics on Indian Economy*, RBI, 1999; *Report on Currency and Finance*, various issues.

### **Growth of Secondary Market**

The secondary market transactions in government securities (through SGL accounts), which started in September 1994, have witnessed sharp growth. The average annual growth in secondary market transactions was as high as 55 per cent for the period 1994-95 to 1998-99, with the annual transactions increasing from Rs.50,569 crore to Rs.2,27,228 crore over this period.

The secondary market in the private sector is an important constituent of the capital market. It provides facilities for trading in securities which have already been floated in the primary market. Thus, an organised and well-regulated secondary market (stock market) provides liquidity to shares, ensures safety and fair dealing in the buying and selling of securities and helps to monitor the process of collection and use of funds by firms. Data reveals that stock market activity in India grew significantly during the 1980s, particularly since 1985. The number of stock exchanges has increased from nine in 1980 to twenty-two at present. The growth of the stock market in India, in terms of size (the number of companies listed and their market capitalisation) and liquidity (turnover) is explained below.

**Stock Market Size:** The market capitalisation ratio is generally taken as a measure

of stock market size. (It is measured as a ratio of market value of stocks listed on a stock market to GDP.) Alternatively, size is measured by the number of listed companies on a stock market.

**Liquidity:** The term 'liquidity' refers to the ability of the market to buy or sell securities. Two measures are generally used to measure liquidity. They are turnover (total value traded) in the stock market as a ratio of: (i) GDP; and (ii) stock market capitalisation. The second measure is also called turnover ratio. A high turnover ratio is associated with a low transaction cost. It also denotes the degree of activity on a stock market. Thus, a small but active stock market has a small size but a high turnover ratio. Table 3 presents indicators of the growth of the stock market for one of the oldest and premier stock exchanges in India, namely, the Bombay Stock Exchange.

**Table 3: Growth of Secondary Capital Market (%)**

Financial Year	MCAP/ GDP	Turnover/ GDP	Turnover Ratio	Number of Listed Cos.
1981	9.64	5.2	59.5	1031
1988	8.6	4.4	59.2	2240
1991	36.2	9.6	57.0	2556
1992	39.0	8.3	37.0	2781
1993	50.3	8.4	27.5	3263
1994	51.3	9.0	24.0	4413
1995	45.4	4.1	10.5	5398
1996	50.2	7.4	17.0	5999
1997	52.6	—	42.0	5843

*Source: Emerging Stock Markets: Factbook, 1999; Bombay Stock Exchange -Official Directory.*

Data reveal that stock market size, as measured by the number of listed companies and market capitalisation, has increased over time. But liquidity on the stock exchange, as measured by the turnover ratio, has not increased. A comparative analysis of the development in the stock markets of some selected Asian economies for the period 1985 – 1996 is presented in Table 4.

From Table 4 it can be inferred that the Indian stock market is comparatively less active in terms of turnover ratio and foreign share in the turnover. The massive rise in the activities of the stock market, particularly in the 1990s, could be attributed to a larger participation by individuals and institutional investors in the capital market. According to an estimate, the number of shareholding individuals has gone up from about 2.4 million in 1980 to around 20 million in 1999 (March). However, as

a proportion of the total population, it is quite low (less than two per cent ) compared with around 25 per cent in developed markets such as Japan and the US. Similarly,

**Table 4: Stock Market Development in Asia (1985–96)**

Country	MCAP as % of GDP All India	MCAP as % of GDP All India	Turnover Ratio (in %)	Turnover Ratio (in %)	Foreign Share in Indian Stock Market Turnover (%)
Financial Year	1985	1996	1985	1996	1995
India	9.9	66.2	34.5	21.7	25
Indonesia	0.1	41.2	2.6	35.3	75
S.Korea	7.8	28.9	56.4	127.7	81
Malaysia	52.0	323.6	14.4	56.5	50
Philippines	2.2	97.5	16.6	31.6	50
Thailand	4.8	53.1	30.6	44.4	26
All Emerging Economies	7.2	40.5	38.8	51.4	

*Sources:* (1) Emerging Stock Markets Factbook, International Finance Corporation, various issues; (2) Indian Securities Market: A Review by National Stock Exchange of India, 1999; (3) Bombay Stock Exchange, Official Directory.

the institutional process has added a large number of domestic and foreign institutional investors to the capital market. The banks and financial institutions in the public sector were allowed to set up mutual funds as subsidiaries in 1987. Subsequently, the private sector was allowed to enter the mutual funds industry in 1992–93. The foreign institutional investors (FIIs) have been allowed to invest in the Indian capital market since September 1992. The number of registered FIIs has increased from one in 1992 to 438 in March 1997. This number has gone up to 526. The number and value of Euro issues (GDRs) by Indian companies abroad have also contributed to the growth of the capital market.

### **Volatility in Stock Market**

From the above discussion it is clear that the capital market reforms since 1992–93 have contributed greatly to boosting the size and liquidity in the capital market. Further, infrastructure improvements in the stock market like the introduction of a screen-based on-line trading system by several stock exchanges, the commencement of on-line trading on the National Stock Exchange (NSE) in 1994, the setting up of National Securities Clearing Corporation (NSCC) in 1996 or the re-

introduction of the carry-forward system in a modified form on the Bombay Stock Exchange (BSE) in 1996, the setting up of depositories in India, and the introduction of trading in financial derivatives in 1998–99, have all contributed significantly to restructuring the functioning of the stock market and to reducing speculation. On the other hand, investments by the FIIs since 1992 have affected stock market behaviour and increased the volatility of asset prices at least in the short run. The net annual impact on the volatility of stock prices is shown in Table 5.

**Table 5: Volatility in BSE Sensitive Index  
(Based on the monthly average of BSE Sensitive Index)**

Year	Range	Coefficient of Variation
1992–93	2242.2	15.37
1993–94	2249.4	23.61
1994–95	1397.2	9.06
1995–96	777.3	5.51
1996–97	1324.2	8.59
1997–98	863.0	7.10
1998–99	1248.0	11.70

From Table 5, it is clear that volatility in stock prices based on BSE SENSEX for the companies listed on the BSE declined in the first few years after economic reforms were initiated in 1991–92 until 1995–96, but has been on an upward trend since then. An industry-wise analysis of volatility has been done using the Capital Asset Pricing Model (CAPM).

### Capital Asset Pricing Model (CAPM)

The riskiness or volatility of share prices, as measured by the standard deviation of returns, is a crucial variable in financial decision making. According to Markowitz (1952, 1959), diversification by investors into a portfolio of assets hedges fluctuations in returns and hence reduces volatility. Thus, there is a close relationship between the mean and variance of returns in a portfolio of financial assets. The choice of an optimal portfolio in the mean-variance (M-V) approach aims at maximising returns for an overall risk level or vice-versa. But in a dynamic environment characterised by shifting risk profiles, the M-V approach loses much of its significance (Fama 1965b). As an extension/ modification of the M-V approach, the capital assets pricing model (CAPM) was proposed by Sharpe (1964). The Capital Asset Pricing Model is based on the 'two parameter' portfolio analysis model. The model is specified as under:

$$E(R_i) = R_f + \beta (E(R_m) - R_f),$$

Where  $E(R_i)$  is expected return on asset  $i$ ,  $R_f$  is the risk-free rate of return,  $E(R_m)$  is the expected return on market stock index, and  $\beta_i$  is a measure of risk specific to asset  $i$ . The above relationship is also called the security market line. The market line implies that return is a linear function of risk. The assumptions underlying this model are summarised as under:

- Investors are risk averse. They prefer expected return and dislike risk.
- Investors make investment decisions based on expected return and the variances of security returns.
- Investors behave in a normative sense and desire to hold a portfolio that lies along the efficient frontier.
- There exists a riskless asset, and investors can lend or invest at the riskless rate and also borrow at this rate.
- All investments are perfectly divisible.
- All investors have homogenous expectations with regard to investment horizons and holding periods.
- There are no imperfections in the capital market to impede investor buying and selling.
- All security prices fully reflect all changes in future inflation expectations.
- Capital markets are in equilibrium.

In recent times, CAPM has been applied extensively to explain the behaviour of stock markets and other financial assets markets. In Sharpe's model, for every security active in the market, there can be associated a 'beta' value. A beta value of one indicates movement of the given stock identical with the market; a value of less than one shows underperformance of the stock, while a value greater than one implies overvolatility of the stock return compared with the market. In terms of share prices it indicates elasticity of the stock price with respect to the share market price. Riskiness or volatility of returns of a stock in the market can be decomposed into two components. One part is due to the market as a whole, and this cannot be diversified away. This is called systematic risk. For instance, if the market is efficient and good, it will show variation in returns due to changes in the real world market. Investors holding diversified portfolios are exposed only to systematic risk and are rewarded with higher expected returns. Systematic risk is the relevant financial variable for investment considerations. The other component is stock specific and can be reduced through diversification into other stocks. This is known as unsystematic risk. This is measured by the residual standard deviation. There is no reward associated with it.

Major empirical studies on capital assets pricing model in the US market have been well documented by Friend and Blume (1972), Black *et al.* (1972), Miller and Scholes (1972), Fama and MacBeth (1973), Stanbaugh (1982) and Shanken (1985). Major studies analysing price behaviour on the Indian stock market include Yalawar (1988), Broca (1992, 1993a), Ramachandran, (1992), and Mohanty (1997).

The CAPM is a simple linear model that is expressed in terms of expected returns and expected risk. To test the CAPM empirically, the *ex ante* form of the model is transformed into a form that uses historical data. This is done by assuming that the capital markets are efficient and the rate of return on any asset is a fair game (it means that, on average, across a large number of samples, the expected rate of return on an asset equals its actual return). The *ex post* version of the CAPM model is given below.

$$R_{it} = R_{ft} + \beta_i (R_{mt} - R_{ft}) + U_{it}$$

**Limitations of CAPM model:** One of the important outcomes of the CAPM assumptions is that all investors hold a portfolio that is a combination of riskless portfolio and market portfolio. This implies that all investors hold the same combination of market portfolio which contains all risky assets. However, in practice it is impossible to construct a market proxy containing all assets. Again, the total risk of a portfolio can be decomposed as the sum of systematic plus unsystematic risk. If CAPM holds then the investors should hold diversified portfolios, and the systematic risk or non-diversifiable risk will be the only risk of importance to the investors. The other part of risk, known as unsystematic risk, can be reduced to nil by holding a diversified portfolio. Thus, beta is only important from the investors' point of view based on their utility function, and this decision is independent of other important ones like financing decision, and market conditions. Also, the assumption that the capital market is fully efficient is not realistic.

**Data and Variables:** The sample consists of monthly data for the period April 1994–March 1999 for nine major industries and the RBI monthly index of ordinary shares for the entire industrial sector as a representative of market behaviour. The implicit yield on 91 days, Government of India Treasury Bills has been used as a riskless rate of return. The rate of return an investor receives holding a common stock for a given period can be computed as the sum of dividend yield plus capital appreciation. But on account of the nature of monthly data and the fact that dividend is declared only once a year, we have used capital appreciation as a proxy for the rate of return and computed as under:

$$r(t) = [(P(t) - P(t-1))/P(t-1)] * 100$$

**Empirical Results:** We have considered the simplified version of the *ex post* CAPM model, usually known as the market model, as stated by Sharpe (1964). It is given below:

$$R_{it} = a_i + \beta_i R_{mt} + u_{it}$$

Table 6: Industry-wise Betas

Industry	Years											Average of	
	1988-89	1989-90	1990-91	1993-94	1994-95	1995-96	1996-97	1997-98	1988-90	1993-98			
Textiles	0.970	1.317	1.232	0.900	0.462	0.599	1.226	0.915	1.159	0.857			
Metals & prod.	0.874	1.073	0.988	0.974	1.222	1.270	1.058	1.329	1.002	1.108			
Automobiles	1.005	1.031	0.663	0.732	1.008	1.287	0.771	1.003	0.827	0.943			
Electricals & Electronics	0.879	0.756	0.809	1.141	1.126	0.652	0.962	1.048	0.860	1.052			
Chemicals	1.214	0.774	0.821	0.975	1.002	0.654	0.659	0.778	0.892	0.933			
Cement	0.620	0.674	1.901	1.548	1.527	1.135	0.728	0.889	1.392	1.052			
Elec.generation	1.251	1.704	1.829	0.972	1.126	0.652	0.962	1.048	1.507	1.053			
Hotels	0.411	0.357	0.403	0.611	0.696	1.015	1.070	0.389	0.410	0.789			
Finance & investment	0.105	0.265	0.143	0.404	1.417	1.548	1.198	0.339	0.151	1.420			

Note: All the beta values are found statistically significant in both the tables.

Regression results show that the beta values were significantly high in textiles, cement and electricity generation during 1988–89 to 1990–91 (Table 6). After the beginning of the economic reforms in 1992–93, the results are found to have changed significantly in many of these industries. Now, the beta values have been found to be high in metal and metal products as also finance and investment industries compared with the market performance of all the industries taken together for the entire period 1993–94 to 1997–98. This is attributed to the boost given to the economy in general and the services sector in particular by the economic reforms in the 1990s. However, the performance of finance and investment and hotels is found to be very poor in 1997–98. Similarly, the performance in the cement industry is found to be good in the first three years, 1993–94 to 1995–96, then deteriorating in the next two years. This is mainly explained by the impact of the Southeast Asian financial crises on other developing countries.

### **Market Efficiency and Random Walk Model**

The efficient market hypothesis is based on the seemingly simple premise that in this competitive world investors and analysts behave rationally and that this rational action on their part ensures that the stock market behaves efficiently. But fluctuations in stock prices in India during the last few years have raised serious doubts about the efficiency of the stock markets. The return on certain stocks had been much higher than one could expect on the basis of declared profits of these companies and publicly available information. The investors appear to have overreacted to information on future prospects, which later resulted in serious upturns in the market. In an efficient stock market the expected real return on stock should be equal to the real interest on riskless assets and the premium on risk taking. A market may be considered allocationally efficient when prices adjust so that the risk-adjusted rate of return is equal for all savers and investors. A securities market is operationally efficient (internal efficiency) when transaction costs are at a level where market makers earn no economic profits. The market is said to be informationally efficient (external efficiency) when its prices reflect all available information so that the prices are equivalent to their economic values. These concepts of market efficiency are interdependent. A capital market is said to be efficient with respect to an information if the prices of capital market securities fully impound the return implication of that information. It implies that an investor cannot use a publicly available information to earn abnormal profits. Three types of informational efficiency (weak, semi-strong and strong) have been identified in the field of capital markets.

The weak efficiency hypothesis postulates that current prices fully reflect all the information contained in the history of past prices and denies the utility of economic analysis in this regard. Several researchers have addressed this issue. Fama (1970) tested for serial correlation and also used the run test. Another type of

test of weak-form efficiency is to examine whether excess returns can be earned by following the mechanical investment strategies such as filter rules, moving averages, etc. Other major studies include Barua (1981, 1987) and Gupta, (1985). These studies have supported the weak efficiency hypothesis. The work of Srinivasan, Mohapatra, and Sahu (1988) shows that the Indian stock market is weak-form efficient. Some studies like Kulkarni (1978) and Choudhary (1991) do not support this hypothesis.

The semi-strong form of efficiency implies that share prices fully and instantaneously reflect all publicly available information. Semi-strong efficiency deals with the speed with which publicly available information is assimilated by the market and incorporated in market prices. The inefficiency is reflected in the share price residuals, measured as the difference between the actual share prices and the share prices that would have ruled in the absence of new information. Major studies include Ramachandran (1988), who found that the Indian stock market is semi-strong efficient, and Mohanty (1997), who found it semi-strong inefficient.

The third form of efficiency (strong form) asserts that even inside information which is not publicly available is instantaneously reflected in the share prices. Major studies include Yalawar (1988), Broca (1992) and Ramachandran (1992).

### **Testing for Efficient Market Hypothesis (EMH)**

From the above discussion it can be concluded that the three forms of EMH rule out the use of any systematic analysis. EMH is a rational outcome of the competitive market place. Further, we shall recall that assumptions underlying CAPM include rational investor behaviour, homogeneous expectations, no taxes and no transaction costs, and that these conditions are also sufficient conditions for market efficiency. Thus, tests of CAPM assumptions themselves constitute tests of EMH. Alternatively, EMH can be tested with the help of the Random Walk Model.

### **Random Walk Model**

The origin of the theory of efficient capital markets may be traced back to the theory of random walks, propounded to explain the empirical evidence that a series of numbers created by cumulating random numbers had the same visual appearance as that of a time series of stock prices (Roberts 1959). In an efficient market, where information is freely available, the price of a security can be expected to approximate its intrinsic value because of competition among investors. Also, intrinsic values can change as a result of new information. If there is gradual awareness of new information, then successive price changes will be dependent. But if the adjustment to information is virtually instantaneous, successive price changes will be random. The theory of the Random Walk model is considered as a sufficient condition for the weak form of efficient market hypothesis, which states that all information combined in historical prices gets fully reflected in current prices and future prices cannot be forecast on the

basis of the past. The random walk model implies that past prices should not contain information about subsequent changes in price. The early survey on this topic by Fama (1970) concluded that the US stock market was efficient. However, some recent studies, using US and UK data, indicate that stock returns are predictable up to a certain extent. That is, the markets are not efficient. In India, only a few studies are available on this topic. Major studies include Barua and Raghunathan (1987), Yalawar (1988), and Broca (1992). The model is explained below.

Assume that an investor can reasonably expect a mean return  $B$  between two successive time periods. Then the difference between returns in the two time periods can be expressed as  $r(t) - r(t-1) = B + u(t)$  where  $u(t)$ , is a stationary series with mean zero and constant variance. Summing  $r(t)$  over  $t = 1, 2, 3, 4, \dots$ , we get  $r(t) = r(0) + Bt + \sum(u(t))$ , where  $r(0)$  is the rate of return in the initial period. In this equation, the disturbance term is not stationary because its variance is not constant but changes over time, and hence returns follow a random walk. On the other hand, if we assume that stock returns follow a trend path, then we can write the return equation as:

$$r(t) = a + bt + u(t)$$

Hence, testing of the said hypothesis comes to testing of the validity of one of the above two equations. We shall regress the equation  $r(t) = a + bt + cr(t-1) + u(t)$  and obtain estimates of  $b$  and  $c$ .  $c=1$  and  $b=0$  implies that returns follow a random walk. If, however,  $c$  is less than one, then the returns may be classified as belonging to the trend stationary (TS) class. In this situation the series moves along a trend path and the deviation from the trend at any instant is only temporary. The regression results are presented in Table 7.

Results for the period 1988–89 to 1990–91 show that the coefficient of trend variable ( $b$ ) is close to zero and statistically insignificant in all the industries. However, the coefficient of lagged return variable ( $c$ ) is significantly lower than one in all the industries. This implies that the returns form a trend stationary class and do not support the random walk model in the pre-reform period. In the post-reform period, the trend coefficient is found different from zero and statistically significant in all the industries except chemicals and finance and investment. The coefficient of the lagged dependent variable is close to zero and insignificant in all the industries considered. Thus, the results do not support the random walk model.

**Table 7: Regression Results for the Random Walk Model**

Industry	1988–91		1993–98	
	Coefficient of trend (b)	Coefficient of lagged var (c)	Coefficient of trend (b)	Coefficient of lagged var (c)
Textiles	0.05 (0.23)	0.02 (0.99)	-0.16 (2.40)	0.005 (0.36)
Metals & metal prod.	-0.12 (0.70)	0.01 (0.56)	-0.13 (2.00)	-0.140 (0.60)
Automobiles	-0.20 (1.56)	0.00 (0.02)	-0.20 (3.68)	-0.043 (2.05)
Electricals & Electronics	-0.09 (0.56)	0.02 (1.38)	-0.17 (2.63)	0.008 (0.25)
Chemicals	-0.03 (0.17)	0.03 (1.77)	-0.07 (1.00)	0.005 (0.33)
Cement	0.36 (0.99)	0.01 (0.62)	-0.14 (1.87)	-0.043 (1.52)
Elec.-generation	0.27 (0.62)	0.02 (1.10)	-0.15 (2.39)	0.105 (1.09)
Hotels	-0.07 (0.94)	0.03 (1.12)	-0.19 (3.10)	0.036 (0.290)
Finance & investment	-0.06 (0.72)	-0.01 (1.91)	-0.06 (0.57)	-0.006 (0.16)

*Note:* Figures in parentheses denote 't' statistic.

### Major Conclusions

From the foregoing analysis, the following conclusions can be drawn: The Indian stock market is still poorly integrated with the developed international capital markets. Hence, there is plenty of scope for financial integration and for attracting foreign capital into the country. This requires further reforms in the Indian economy, especially in the trade and financial sectors. The Indian capital market (primary and secondary) has grown but the investor base in India is still very small compared with that of other emerging and developed economies; the turnover ratio is the lowest and has a declining trend. Therefore, the investor base should be increased by projecting the stock markets as centres of higher returns on investments and not merely as casinos. Equity culture among the masses should be developed. This requires that investors' interests be protected by the regulatory authorities. Again, the turnover is small and declining because only a small number of scrips are traded on a regular basis in the stock markets. Others are just dormant and therefore people's interest and liquidity get diminished. Such scrips and companies need to be activated.

Volatility, in terms of spread and coefficient of variation of security returns, has started rising again since 1996–97. Consequently, the ordinary or individual investors have suffered heavy losses and lost interest in the stock markets. Stock market activity is becoming increasingly centralised, concentrated and non-competitive,

serving the interests of big players only. The foreign institutional investors have been playing an important role in this respect. Their role should be reduced. This seems possible only by increasing the domestic investors' base (individual and corporates) and encouraging mutual funds and counteracting the profit-taking activities of FIIs. But, even after SEBI had provided operational freedom for mutual funds, the investor is not showing enough interest in them. Stock market efficiency has not improved significantly after the initiation of reforms, most of which are concerned with the big institutional investors. For ordinary investors, the earlier issues like insider trading, price rigging, manipulation /exploitation by brokers and sub-brokers, and speculation still exist. Other issues like price bands, clearing and settlement, and depository infrastructure need to be addressed for the proper implementation of the rolling settlement system.

Development of an active debt market is vital for financial market efficiency. The debt market in India is conventionally classified into three segments, namely, government securities market, public sector units (PSUs) bonds market, and corporate debt market. At present, India's debt market is one of the largest in Asia, next to that of Japan and Korea. Central to the development of the debt market in India is the development of the government securities market. Although private placements of corporate debt and the wholesale debt segment of the NSE have increased substantially, the daily trading volume in this segment is small compared to its size. The ratio of daily trading volume to total debt outstanding is less than one per cent in India compared with 6.5 per cent in USA. Hence, there is illiquidity in this segment. A high volume of government stock which yields a coupon of seven to eight per cent is not being traded at all. Improving liquidity in government securities would require the diversification of investor base to non-traditional investor groups like individuals, firms, trusts and corporate entities. Also, there is an immediate need to develop a rupee yield curve for a greater integration between the domestic foreign exchange and debt markets. The yield curve shows the direction and intensity of future interest movements.

**Appendix**  
**Correlation Matrix Based On Returns Between Financial Markets**

**Table 1: Developed Countries 1987–1996**

	HongKong	Japan	Singapore	UK	USA
HongKong	1.00				
Japan	0.282	1.00			
Singapore	0.741	0.285	1.00		
UK	0.649	0.363	0.578	1.00	
USA	0.609	0.372	0.354	0.764	1.00

**Table 2: Developing Countries 1987–96**

	India	Korea	Thailand	Philippines	Indonesia
India	1.00				
Korea	0.06	1.00			
Thailand	0.09	0.14	1.00		
Philippines	-0.05	0.08	0.42	1.00	
Indonesia	0.12	0.07	0.51	0.57	1.00

**Table 3: Developing and Developed Countries**

	India	Korea	Thailand	Philippines	Indonesia
HongKong	-0.03	0.20	0.60	0.47	0.58
Japan	-0.18	0.28	0.30	0.19	0.08
Singapore	0.29	0.33	0.69	0.74	0.67
UK	0.01	0.29	0.49	0.32	0.29
USA	-0.06	0.17	0.45	0.36	0.32

**Notes**

1. *World Bank Policy Research Report*, 1997, Oxford, New York: Oxford University Press, p.9.
2. *Emerging Stock Markets Factbook 1999*. International Finance Corporation (IFC) classifies a stock market as emerging if it meets at least one of the two general criteria: (1) it is located

in a low or middle-income economy as defined by the World Bank, and (2) its investible market capitalisation is low relative to its GDP. Presently there are 156 emerging markets and 54 developed markets.

3. IEG Discussion Paper Series, nos 12 & 13 (2000).
4. *Recent Developments and Reforms in Indian Securities Markets*, SEBI, 1996, pp.10–12.
5. Under FERA the shareholding of foreign firms in joint ventures was restricted to 40 per cent.

### References

- Agarwal, R.N. (2000a). Financial Integration, Financial Development, and Vulnerability to Crisis in Developing Countries: A Study of Indian Economy, *Discussion Paper Series No. 12*, Delhi: Institute of Economic Growth.
- (2000b). Exchange Rate Determination in India, Endogenising Foreign Capital Flows and Some Entities of the Monetary Sector. *Discussion Paper Series No. 13*, Delhi: Institute of Economic Growth.
- and Goldar, B.N. (1991). Liberalisation and Corporate Performance in India in the 1980s. *Asian Economic Review*, Vol.33(3): 407–26.
- Barua, S.K. (1981). Short-run Price Behaviour of Securities: Some Evidence of Indian Capital. *Vikalpa*, Vol.6(2): 93–100.
- Barua, S.K., and Raghunathan, V. (1987). Inefficiency and Speculation in the Indian Capital Markets. *Vikalpa*, Vol.12(3): 53–58.
- Black, F., Jensen, M., and Sholes, M. (1972). *The Capital Asset Pricing Model: Some Empirical Tests*. In Jensen M. (ed.), *Studies in the Theory of Capital Markets*. Praeger, pp.79–121.
- Bombay Stock Exchange, Official Directory*.
- Broca, D.S. (1992). Day of the Week Patterns in the Indian Stock Market. *Decision*, Vol.19(2): 57–64.
- (1993a). Variability Shifts in the Indian Stock Markets: An Empirical Investigation, *Prajnan*, Vol.22(2): 169–83.
- Choudhary, S.K. (1991). Short-run Behaviour of Industrial Share Prices: An Empirical Study of Returns, Volatility and Covariance Structure. *Prajnan*, Vol.20, pp.99–113.
- Fama, E., and Macbeth, J. (1973). Risk, Return and Equilibrium: Empirical Tests. *Journal of Political Economy*(81): 607–36.
- (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, Vol.25: 383–417.
- Fama, E.F. (1965b). Portfolio Analysis in a Stable Paretian Market. *Management Science*.
- Friend, I., and Blume, M. (1972). Measurement of Portfolio Performance under Uncertainty. *American Economic Review*, (60): 561–75.
- Gupta, O.P. (1985). *Behaviour of Share Prices in India: A Test of Market Efficiency*. New Delhi: National Publishing House.

- International Finance Corporation. *Emerging Stock Markets Factbook*, various issues.
- Kulkarni, N.S. (1978). Share Price Behaviour in India: A Spectral Analysis of Random Walk Hypothesis. *Sankhya*, Vol.40, Series D., pp.135–62.
- Markowitz, H. (1952). Portfolio Selection. *Journal of Finance*, Vol.7, pp.77–91.
- (1959). *Portfolio Selection: Efficient Diversification of Investments*. New York: John Wiley & Sons.
- Miller, M., and Scholes, M. (1972). Rate of Return in Relation to Risk: A Re-examination of Some Recent Findings. In Jensen M. (ed.) *Studies in the Theory of Capital Markets*. New York: Praeger, pp.47–48.
- Mohanty, P. (1997). On the Practical Impossibility of Market Efficiency. Unpublished Ph.D. Thesis, I.I.M. Bangalore.
- National Stock Exchange of India (1999). *Indian Securities Market: A Review*.
- Ramchandran, G. (1992). Information Content of Bonus Issues—An Empirical Analysis in the Indian Context. *Working Paper*, Unit Trust of India.
- Reserve Bank of India (1999). *Handbook of Statistics on Indian Economy*.
- . *Report on Currency and Finance*, various issues.
- Roberts, Harry (1959). Stock Market Patterns and Financial Analysis: Methodological Suggestions. *Journal of Finance*.
- Shanken, J. (1985). Multi-beta CAPM or Equilibrium APT: A Reply. *Journal of Finance*, (40), pp.1,189–96.
- Sharpe, W.F. (1964). Capital Assessment: A Theory of Market Equilibrium under Conditions of Risk. *Journal of Finance*, Vol.19: 425–42.
- Securities Exchange Board of India (SEBI), (1996). *Recent Developments and Reforms in the Indian Securities Market*.
- Srinivasan, S., Mohapatra P., and K. Sahu (1988). Weak-Form Efficiency in the Indian Stock Market: No Excess Returns for Investors. *Modern Management*.
- Stanbaugh, R. (1982). On the Exclusion of Assets from Tests of the Two Parameter Model: A Sensitivity Analysis. *Journal of Financial Economics* (9), pp.237–68.
- World Bank Policy Research Project (1997). *Private Capital Flows to Developing Countries: The Road to Financial Integration*. Oxford University Press.
- Yalawar, Y.B. (1988). Bombay Stock Exchange: Rates of Return and Efficiency. *Indian Economic Journal*, Vol.35(4): 68–121.

# On Stock Market Development, Banks and Economic Growth in India

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## Abstract

This paper examines the role of stock markets and banks in promoting economic growth in India. Using the stock market development indicators *viz.*, market size, liquidity, and volatility along with bank credit to GDP ratio as an indicator of banking sector development, and Industrial Production (IP) as the proxy for GDP, the present study shows that it is not the banking development but the stock market growth, which shares a relationship with economic growth in India during the period 1991:01–2000:05.

## Introduction

The debate as to whether financial development contributes to economic growth has persisted for quite a long time. Traditional economists have emphasized the banking sector as the most prominent contributor to economic growth. It has been maintained that banks activate future growth by identifying and financing productive investments (Bagehot 1873; Schumpeter 1912). There is also an alternative view that banks respond only passively to economic growth (Robinson 1952) and economists 'badly overstress' the role of the financial system (Lucas Jr 1988).

Economists have also focussed on the links between stock market development and long-run growth. Specifically, this view gained momentum in the 1980s, in the wake of an increase in stock market activities all over the world. Kyle (1984) and Holmstrom and Tirole (1993) argue that more liquid stock markets increase incentives for investors to get information about firms and improve corporate governance. Levine (1991) and Bencivenga *et al.* (1995) state that more liquid stock markets reduce disincentives to invest in projects of long duration because investors can easily sell their stake in the project if they need their savings before the project matures. Therefore, liquid stock markets facilitate investment in the longer run and higher return projects that boost productivity growth. Greenwood and Smith (1996) show that large stock markets can lower the cost of mobilizing savings and thereby

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facilitate investment in the most productive technologies. It is still debatable whether greater stock market liquidity actually encourages a shift to higher return projects, stimulating productivity growth. Since it is easier to sell shares in liquid stock markets, some argue that more liquidity reduces the incentives of shareholders to undertake the costly task of monitoring managers (Shleifer and Vishny 1986; Bhidé 1993). In turn, weaker corporate governance impedes effective resource allocation and slows productivity growth. The liquidity in stock markets allows speculators to alter their portfolios quickly and cheaply in response to changes in mood, rumours, fads and so on, and causes a departure of stock market asset values from underlying fundamentals; both these occurrences may impart excessive volatility to stock market returns. Further, volatility may hinder investment, and therefore growth, while exerting upward pressures on real interest rates because of the higher risk (Federer 1993; DeLong *et al.* 1989). Stiglitz (1994) says that stock market liquidity will not enhance incentives to acquire information about firms or exert corporate governance. Moreover, Shleifer and Summers (1988), and Morck *et al.* (1990) suggest that stock market development can hurt economic growth by easing counter-productive corporate takeovers. Finally, Mayer (1988) argues that the ever-large stock markets are unimportant sources of corporate finance.

The lack of consensus on the effect of stock market development on economic growth has found expression in the experience of various countries. A cross-country study of Atje and Jovanovic (1993) shows significant correlation between growth over the period 1980–88, and the value of stock market trading divided by GDP for forty countries. Levine and Zervos (1996, 1998), using a similar approach, also demonstrate that various measures of equity market activity are positively correlated with measures of real activity across different countries and that the association is particularly strong for developing countries. They evaluate the extent to which these measures are robustly correlated with current and future rates of economic growth, capital accumulation, and productivity investment. They also examine whether these effects are additional to those of a banking system development by including both stock market and bank base financial indicators in the same regressions. They conclude that after controlling for initial conditions and various economic and political factors, the measures of banking and stock market development are robustly correlated with current and future rates of economic growth, capital accumulation, and productivity improvements. They, therefore, conclude that stock markets provide different financial services from banks.

By contrast, Singh (1997a) argues that stock market development is unlikely to help in achieving quicker industrialization and faster long-run economic growth in most developing countries. He finds that the inherent volatility and arbitrariness of the stock market pricing process under the conditions that prevail in developing countries make it a poor guide to efficient investment allocation. The interaction

between the stock and currency markets in the wake of unfavourable economic shocks may exacerbate macroeconomic instability and reduce long-term growth. Stock market development is likely to undermine the existing group banking systems in developing countries, which, despite their many difficulties, have not been without merit in several countries. Moreover, the negative effects of stock market volatility on the real economy and the process of financial development are demonstrated by Arestis and Demetriades (1997) in the case of German and US economies. Applying the time series technique, they find a unidirectional causality from financial development to real GDP in Germany. Stock market capitalization affects real GDP only through the banking system. In contrast, they find insufficient evidence of financial development causing growth of real GDP in the case of the United States. On the other hand, there is abundant evidence of the reverse causality, i.e., real GDP contributing positively to both the banking system and capital market development.

Notwithstanding the divergent views, policies have been adopted to foster stock markets in most of the developing countries since the 1980s. The Indian stock market is no exception. The development of the stock market is remarkable in terms of market capitalization and value traded. It is pertinent to ask whether the Indian stock market plays a role in the process of economic growth. In this regard, the contribution of Nagaraj, Singh, and Nagaishi is significant. Nagaraj (1996) shows that the huge increase in stock market financing activity is not associated with either a rise in aggregate GDS, or equally significantly, with an increase in the proportion of financial saving. This is basically due to portfolio substitution by households and institutions from bank deposits towards stock market instruments. He also states that the increase in external finance through the capital markets replaced corporations' internal funds, which could be due, in part, to a decline in corporate profitability. Moreover, the small non-corporate firms, which had no access to stock market funds, grew at a faster rate than the larger corporate firms.

Singh (1997b), in his study of other developing countries, asserts that there is little or no evidence of an increase in aggregate savings in India as a result of the growth of the stock markets. Nagaishi (1999), supporting Singh and Nagaraj's argument, states that the functional relationship between stock market development and economic growth is dubious in the Indian context. However, Demetriades and Luintel (1997) state that financial development exhibits a long-run positive association with the level of GDP per capita, the number of bank branches and the real rate of interest in India. They also show that banking sector controls had overwhelmingly negative effects on financial development, both in the short run and in the long run. Moreover, Shah and Thomas (1997) argue that the stock market is more efficient than the banking system in India because it is relatively free of government policies. Therefore, stock market development plays a key role in strongly assisting the reforms in the banking system through the competition between them.

In connection with the major theoretical debates on the linkages between stock markets and long-run economic growth, this paper empirically investigates whether the measures of stock market size, liquidity and volatility are robustly related with economic growth in India. It also examines the linkages between the banking sector and economic growth. Since there are no studies pertaining to India on the above lines, the present study attempts to fill this gap.

### Stock Market Development, Bank and Growth Indicators

We begin with the market capitalization ratio (MCR), which is considered as a measure of stock market size. The MCR is defined as the value of listed shares divided by GDP. Economically speaking, market capitalization is positively related to the ability to mobilize capital and diversify risk.

Here, two measures are used for market liquidity: the value traded ratio and the turnover ratio. The value traded ratio is equal to the total value of traded shares in the stock market divided by GDP. The total value traded ratio measures the organized trading of the equities as a share of national output and should therefore positively reflect liquidity on an economy-wide basis. The second measure of liquidity is the turnover ratio, which equals the value of total shares traded divided by the market capitalization. High turnover is often used as an indicator of low transaction cost. Turnover complements the total value traded ratio. Although the total value traded ratio captures trading compared with the size of the economy, the turnover measures the trading relative to the size of the stock market. Thus, a small, liquid market will have a better turnover ratio but a small total value traded ratio. It is important to mention here that the price effect does not influence turnover because stock prices enter the numerator and the denominator, and hence it is held superior to value traded ratio as a liquidity measure.

Volatility is used as the third indicator of stock market development that conceptualizes the asset price movement in a stock market. We use the monthly volatility measure, which is computed as the 12-month rolling standard deviation estimate that is based on market returns (Schwert 1989). This involves the following two steps:

*Step I.* A twelfth order autoregression for the returns, including the dummy variable  $D_{jt}$  to allow for the different monthly mean returns is estimated as

$$R_t = \sum_{j=1}^{12} a_j D_{jt} + \sum_{i=1}^{12} p_i R_{t-i} + e_t \dots\dots\dots(1)$$

*Step II.* Then a twelfth order autoregression for the absolute value of the errors from equation (1) above, including the dummy variables to allow for different

monthly standard deviations,

$$|e_t| = \sum_{j=1}^{12} \mathbf{b}_j D_{jt} + \sum_{i=1}^{12} \mathbf{r}_i |e_{t-1}| + u_t \dots \dots \dots (2)$$

The regressand of the above equation is an estimate of the standard deviation of the stock market return for month t. The fitted values of this from equation (2) estimate the conditional standard deviation of  $R_t$  given information available before month t.

To examine the relationship between stock market, banks and economic growth, GDP is considered as a growth indicator in the present study. In view of the non-availability of monthly data on GDP, this study uses Industrial Production (IP) as a proxy for that (see also Fama 1981).

In the literature, the ties between banks and economic growth have been examined in detail (Levine and Zervos 1998; Arestis and Demetriades 1997). Traditional researchers use measures of the overall size of the banking sector as a proxy for ‘financial depth’ (e.g., Goldsmith 1969; McKinnon 1973 and Demetriades and Luintel 1997). Moreover, often researchers divide the stock of broad money by GDP to measure financial depth. However, as noted by King and Levine (1993), this type of financial depth indicator does not measure whether the liabilities are those of banks, the central bank, or other financial intermediaries, nor does this measure identify where the financial system allocates capital. Thus, we use the credit made by commercial banks and other deposit taking banks to the commercial sector divided by GDP, and call this measure the Bank Credit Ratio (BCR). This is different from the traditional banking development measures by isolating credit issued by commercial banks or other intermediaries, and by identifying credit to the commercial sector.

### **Empirical Analysis**

To investigate the empirical relationship between stock market development, banking sector and economic growth, we use monthly data (for the period 1991:01-2000:05) on six variables, *viz.*, market capitalization ratio (MCR), value traded ratio (VTR), turnover ratio (TOR), volatility (VOLT), bank credit ratio (BCR), and industrial production (IP). IP has been used as a proxy for GDP as the latter is not available on a monthly basis (see Data Appendix).

Since data are monthly in nature, empirical examination starts with deseasonalising all the data series by the X-11 method. Table 1 presents correlations on the four stock market development indicators and the bank development indicator. The correlations are worth highlighting. First, all the stock market development indicators are highly correlated among themselves except volatility, which suggests that it would not be easier to distinguish between the measure of the overall size

and liquidity of the equity market. Second, there are high correlations between BCR - MCR and BCR - VTR, which also suggest that it will be difficult to distinguish between measures of overall size and liquidity of the equity market and the banking development indicator. Third, the correlations between volatility and all other indicators are very low and negative.

**Table 1: Correlation**

VARIABLES	BCR	MCR	VTR	TOR	VOLT
<b>BCR</b>	1.00				
<b>MCR</b>	0.65	<b>1.00</b>			
<b>VTR</b>	0.62	0.91	<b>1.00</b>		
<b>TOR</b>	<b>0.65</b>	0.65	0.85	<b>1.00</b>	
<b>VOLT</b>	<b>-0.16</b>	-0.07	-0.03	-0.03	<b>1.00</b>

*Note:* BCR, MCR, VTR, TOR and VOLT denote monthly Bank Credit Ratio, Market Capitalization Ratio, Value Traded Ratio, Turnover Ratio, and Monthly Volatility respectively.

The empirical investigation is organized around the three stock market development indicators and the level of banking development. To examine the causal relation among stock market, banks and economic growth, we apply the Granger causality test (1969) and the cointegration technique of Johansen (1988) to show the long-run relationship. The first step is to establish the order of integration. Accordingly, we carry out unit root tests of Dickey-Fuller (DF), Augmented DF (ADF), and Phillips-Perron (PP) both without and with trend, which suggests that all variables except volatility are non-stationary in levels and stationary after first differencing at 5 per cent and 1 per cent levels of significance. Hence, at this point we conclude that monthly volatility series is integrated of order zero, that is, I (0) and others are of order I (1) as shown in Tables 2.a and 2.b. Since the volatility series is I (0), it has been dropped from further time series analysis of cointegration and error-correction, and the Granger causality test is employed by taking the log first difference of all the I (1) series.

**Table 2.a: Unit Root Test Results**

	On Levels					
	Without Trend			With Trend		
	DF	ADF	PP	DF	ADF	PP
<b>IP</b>	0.06	0.92(3)	0.65(3)	-3.85	-2.73(3)	-3.47(3)
<b>BCR</b>	-1.59	-1.55(3)	-1.57(3)	-2.62	-1.46(3)	-2.35(3)
<b>MCR</b>	-0.89	-1.37(3)	-1.17(3)	-1.84	-2.71(3)	-2.29(3)
<b>VTR</b>	-1.19	-0.08(3)	-0.77(3)	-2.65	-1.42(3)	-2.36(3)
<b>TOR</b>	-2.52	-0.67(4)	-2.03(4)	-3.80	-2.07(4)	-3.57(4)
<b>VOLT</b>	-9.47	-5.36(2)	-9.46(2)	-9.49	-5.37(2)	-9.48(2)

**Table 2.b: Unit Root Test Results**

	On First Differences					
	Without Trend			With Trend		
	DF	ADF	PP	DF	ADF	PP
<b>IP</b>	-16.78	-7.48(2)	-17.29(2)	-16.84	-7.63(2)	-17.49(2)
<b>BCR</b>	-13.37	-6.71(2)	-13.57(2)	-13.42	-6.82(2)	-13.67(2)
<b>MCR</b>	-07.33	-4.87(2)	-7.362(2)	-07.28	-4.79(2)	-07.31(2)
<b>VTR</b>	-14.31	-6.00(2)	-14.37(2)	-14.32	-6.14(2)	-14.42(2)
<b>TOR</b>	-14.82	-6.85(3)	-15.95(3)	-14.76	-6.92(3)	-15.90(3)

*Note:* IP, MCR, VTR, TOR, and VOLT denote monthly Industrial Production, Market Capitalization Ratio, Value Traded Ratio, Turnover Ratio, and Monthly Volatility respectively. The critical values for unit root tests at 1%, 5% and 10% levels are -3.51, -2.89, & -2.58 (without trend) and -4.04, -3.45, & -3.15 (with trend) respectively. The figures in parentheses are lag augmentation, which is on the basis of AIC.

To confirm causality among the variables, pairwise Granger causality test is applied on log first differences, as the variables are found to be I (1). We use six lagged values of two variables in each of the regressions on the basis of the LR test. These results, reported in Table 3, suggest that the direction of causality is from stock market development indicators to industrial production. There is no causal relationship between BCR and IP since the estimated value is not significant at the conventional levels. On the other hand, unidirectional causality from all the stock market development indicators towards economic growth is established. If variation

in significance is allowed up to 10 per cent level, then we find bi-directional causality between MCR and IP, suggesting that there is feedback between these two variables.

**Table 3: Granger Causality Test**

Direction of Causality	F-Statistic	p-value
BCR → IP	1.0904	0.37
IP → BCR	1.6433	0.14
MCR → IP	2.1832	0.05
IP → MCR	1.9494	0.08
VTR → IP	2.1102	0.06
IP → VTR	1.6550	0.14
TOR → IP	2.3127	0.03
IP → TOR	1.3190	0.25
VOLT → IP	3.1377	0.00
IP → VOLT	0.6570	0.68

The results from the Johansen maximum likelihood cointegration procedure for the IP, BCR, MCR, VTR and TOR are given in Tables 4 and 5. Since VTR and TOR, being the measures of stock market liquidity, are also highly correlated, we take one at a time for Johansen cointegration test. Table 4 shows the result of the cointegration tests for IP, BCR, MCR and VTR, and Table 5 shows the results for IP, BCR, MCR and TOR. In both the cases, the trace statistics show that the null hypothesis that the variables are not cointegrated ( $r = 0$ ) against the alternative of one or more cointegrating vectors ( $r > 0$ ) is rejected. Next, the null hypothesis of  $r \leq 1$  against the alternative of two or more cointegrating vectors is rejected at standard significance level at first case, whereas it is not the case in the second system. For the first case, the  $\lambda_{\max}$  statistics show the presence of two cointegrating vectors as the null hypothesis of  $r = 2$  is not rejected. And in the second system the presence of one cointegrating vector is confirmed from  $\lambda_{\max}$  statistics. At this point we conclude that there are two cointegrating vectors in the first case and one in the second case.

**Table 4: Johansen Cointegration Test Results (VTR as liquidity measure)**

Null Hypothesis I Trace tests	Alternative Hypothesis I Trace tests	I Trace Values	Critical Values	
			95%	99%
$r = 0$	$r > 0$	91.23	48.28	55.43
$r \leq 1$	$r > 1$	37.48	31.52	37.22
$r \leq 2$	$r > 2$	12.84	17.95	23.52
$r \leq 3$	$r > 3$	4.67	8.18	11.65
I Max tests	I Max tests	I Max values	95%	99%
$r = 0$	$r = 1$	53.76	27.14	32.14
$r = 1$	$r = 2$	26.64	21.07	25.75
$r = 2$	$r = 3$	8.17	14.90	19.19
$r = 3$	$r = 4$	4.67	8.18	11.65

Note: r refers to the number of cointegrating vectors.

**Table 5: Johansen Cointegration Test Results (TOR as liquidity measure)**

Null Hypothesis I Trace tests	Alternative Hypothesis I Trace tests	I Trace values	Critical Values	
			95%	99%
$r = 0$	$r > 0$	90.28	48.28	55.43
$r \leq 1$	$r > 1$	34.86	31.52	37.22
$r \leq 2$	$r > 2$	13.47	17.95	23.52
$r \leq 3$	$r > 3$	4.94	8.18	11.65
I Max tests	I Max tests	I Max values	95%	99%
$r = 0$	$r = 1$	55.43	27.14	32.14
$r = 1$	$r = 2$	21.38	21.07	25.75
$r = 2$	$r = 3$	8.54	14.90	19.19
$r = 3$	$r = 4$	4.94	8.18	11.65

Note: r refers to the number of cointegrating vectors.

The presence of cointegrating vectors shows that there exists a long-run relationship among the variables concerned. The respective cointegrating ranks of two and one are imposed and further tests are carried out in order to reduce the system to economically interpretable relationships. The next step is to test for the weak exogeneity of each of the variables to the system. The results of the weak exogeneity test are reported in Table 6. In both the cases the BCR is weakly exogenous to the system, which shows that this particular variable represents a

structural long-run relationship with other variables in the system, but its short-run behaviour is not modelled because it does not adjust to the short-run disequilibrium in the model. Turnover ratio as the liquidity measure in the second system is also weakly exogenous. The interpretation of the cointegrating vectors and weak exogeneity of the variables for each case, though not straightforward, does throw some light on the economic relationships in hand. Given that the bank development indicator is weakly exogenous to the system, the stock market development indicators, MCR and VTR and the IP, show strong evidence of error-correction. To conclude, there appear to be linkages between stock market development and economic growth but there is insufficient evidence to suggest that bank development shares a relationship with economic growth.

**Table 6: Weak Exogeneity Tests**

System with VTR as liquidity measure		
<b>System exogeneity tests : <math>\chi^2</math> (2)</b>	<b>LR test</b>	<b>P-value</b>
IP weakly exogenous to system	5.18	0.02
BCR weakly exogenous to system	0.46	0.50
MCR weakly exogenous to system	16.07	0.00
VTR weakly exogenous to system	5.01	0.03
System with TOR as liquidity measure		
IP weakly exogenous to system	4.46	0.03
BCR weakly exogenous to system	0.48	0.49
MCR weakly exogenous to system	17.77	0.00
VTR weakly exogenous to system	0.73	0.39

### Concluding Remarks

This paper has attempted to assess the empirical relationship between stock market development indicators, banking development and economic growth in India. It is shown from the cointegration analysis that stock market development and economic growth are correlated. That relationship is unidirectional from stock market development towards economic growth, as evidenced from the Granger Causality test. But there is insufficient evidence to suggest an association between bank development and economic growth. Hence, we conclude that it is not the banking sector but the stock market, which shares a relationship with economic growth in India. Finally, it is suggested that the empirical relationship among stock market development, banks and economic growth warrants further investigation, specifically by incorporating the impact of financial liberalization on firm financing choices and the relationship of the stock market and the banking sector with other macroeconomic variables.

## Data Appendix

The data used in this study are monthly in nature for the period 1991:01 to 2000:05. Stock market data are obtained from different issues of *The Stock Exchange Review*, published by Bombay Stock Exchange, Mumbai. Index of industrial production and bank credit data are obtained from various issues of *Reserve Bank of India Bulletin*. The index of industrial production has been used as a proxy for GDP, as the latter data are not available on a monthly basis. Since market capitalization is measured at current prices, the ratio of market capitalization to IIP is not proper. Therefore, there is a need to generate industrial production (IP) data at current prices to make the ratio compatible, given that market capitalization data at constant prices are not available. Since monthly industrial production data are not available, we estimate the monthly figures as follows: First, we consider the annual industrial production relating to the year 1980–81 and divide it by 12 to obtain the average monthly figure. This figure is treated as a benchmark and set equal to the monthly figure for January 1980–81 (since all the variables are in 1980–81 base). Equating the figure thus obtained with Index of Industrial Production (IIP) of that month, we generate industrial production figures for the subsequent months. BCR and VTR are calculated in the same manner.

## References

- Arestis, P. and P. Demetriades (1997). Financial Development and Economic Growth: Assessing the Evidence. *Economic Journal*, 107: 783-99.
- Atje, R. and B. Jovanovic (1993). Stock Markets and Development. *European Economic Review*, 37(2&3): 632-40.
- Bagehot, W. (1873). *Lombard Street*. Homewood, IL: Irwin.
- Bencivenga, V. R., B. D. Smith, and R. M. Starr (1995). Transactions Costs, Technological Choice, and Endogenous Growth. *Journal of Economic Theory*, 67(1): 53-177.
- Bhide, A. (1993). The Hidden Costs of Stock Market Liquidity. *Journal of Financial Economics*, 34(2): 31-51.
- DeLong, J. B., A. Shleifer, L. Summers, and R. J. Waldmann (1989). The Size and Incidence of the Losses from Noise Trading. *Journal of Finance*, 44(3): 681-96.
- Demetriades, P. and K. Luintel (1997). The Direct Cost of Financial Repression: Evidence from India. *Review of Economics and Statistics*, 79(2): 311-19.
- Dickey, D. A. and W. A. Fuller (1979). Distribution of the Estimation for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74(386): 427-31.
- Dickey, D. A. and W. A. Fuller (1981). Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica*, 49: 1057-72.
- Fama, E. F. (1981). Stock Return, Real Activity, Inflation and Money. *American Economic Review*, 71(4): 545-65.

- Federer, P. (1993). The Impact of Uncertainty on Aggregate Investment Spending. *Journal of Money, Credit and Banking*, 25(1):30-45.
- Goldsmith, R. W. (1969). *Financial Structure and Development*. New Haven, CT: Yale University Press.
- Granger, C. W. J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. *Econometrica*, 37: 424-438.
- Greenwood, J. and B. Smith (1996). Financial Markets in Development and the Development of Financial Markets. *Journal of Economic Dynamics and Control*, 23: 123-56.
- Holmstrom, B. and J. Tirole (1993). Market Liquidity and Performance Monitoring. *Journal of Political Economy*, 101(4): 678-709.
- Johansen, S. (1988). Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control*, 12:231-54.
- King, R. G. and R. Levine (1993). Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics*, 108,3:717-38.
- Kyle, A. S. (1984). Market Structure, Information, Future Markets and Price Formation. In G. G. Storey, A. Schmitz and A. H. Sarris (eds). *International Agricultural Trade: Advanced Readings in Price Formation, Market Structure, and Price Instability*. Boulder CO: Westview, pp.45-64.
- Levine, R. (1991). Stock Markets, Growth, and Tax Policy. *Journal of Finance*, 46(4), 1445-65.
- Levine, R. and S. Zervos (1996). Stock Market Development and Long Run Growth. *World Bank Economic Review*, 10(2):323-39.
- Levine, R. and S. Zervos (1998). Stock Markets, Banks and Economic Growth. *American Economic Review*, 88(3):537-58.
- Lucas, R. E. Jr. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22(1): 3-42.
- Mayer, C. (1988). New Issues in Corporate Finance. *European Economic Review*, 32(5): 1167-88.
- McKinnon, R. I. (1973). *Money and Capital in Economic Development*. Washington, DC: Brookings Institution.
- Morck, R. A. Shleifer, and R. W. Vishny (1990). The Stock Market and Investment: Is the Market a Sideshow? *Brookings Papers on Economic Activity* 2: 157-215.
- Nagaraj, R. (1996). Indian Capital Market Growth: Trends, Explanations and Evidences. *Economic and Political Weekly*, 31:2553-63.
- Nagaishi, M. (1999). Stock Market Development and Economic Growth: Dubious Relationship. *Economic and Political Weekly*, 34(29):2004-12.
- Phillips, P. C. B. and P. Perron (1988). Testing for Unit Root in Time Series Regression. *Biometrika*, 75: 335-46.
- Reserve Bank of India Bulletin*, Mumbai, various issues.
- Robinson, J. (1952). The Generalization of the General Theory. In *The Rate of Interest and Other Essays*. London: Macmillan, pp. 67-146.

- Schumpeter, J. A. (1912). *Theorie der wirtschaftlichen entwicklung*. Leipzig, Germany: Dunker and Humblot.
- Schwert, G. W. (1989). Why Does Stock Market Volatility Change over Time? *Journal of Finance*, 44(5): 1115-53.
- Shah, A. and S. Thomas (1997). Securities Market: Towards Greater Efficiency. In K. S. Parikh (ed). *India Development Report*. Oxford University Press.
- Shleifer, A. and R. W. Vishny (1986). Large Shareholders and Corporate Control. *Journal of Political Economy*, 96(3): 461-88.
- Shleifer, A. and L. Summers (1988). Breach of Trust in Hostile Takeovers. In A. Auerbach, (ed)., *Corporate Takeovers: Causes and Consequence*. Chicago: University of Chicago Press, pp. 33-56.
- Singh, A. (1997a). Financial Liberalization, Stock Markets and Economic Development. *Economic Journal*, 107(442):771-82.
- Singh, A. (1997b). Liberalization, the Stock Market and the Market for Corporate Control: A Bridge Too Far for the Indian Economy?, *Discussion Paper in Accounting and Finance*, Department of Applied Economics, Cambridge: Cambridge University.
- Stiglitz, J. E. (1994). The Role of the State in Financial Markets. In *Proceedings of the World Bank Annual Conference on Development Economics 1993*. Washington, D.C.: World Bank.
- The Stock Exchange Review*, Bombay Stock Exchange, Mumbai, several issues.

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# **Climatic Change — Implications for India's Water Resources**

**Murari Lal\***

## **Abstract**

Rapid industrialization and urbanization in India are responsible for the huge increase in the demand for water. The inefficient management of the resource has led to deterioration in water quality, posing new challenges for water management and conservation. Today, the hydrological cycle has altered in most of India's river basins due to land use change, inter-basin transfers, irrigation and drainage. Sustainable management of water has therefore gained considerable importance in recent years. An assessment of the availability of water resources, taking account of the multiplying demands and likely impacts of climate change and variability is critical for planning and sustainable development as a basis for economic and social development. This paper focuses on some aspects of water resources and the potential for water-related developments, keeping in view the impacts of climate change to meet the foreseeable demand in India.

## **Background**

Water is vital to all forms of life on earth, from the simplest of living organisms to the most complex of human systems. Lack of fresh water for drinking, for use in industry and agriculture, and for several other essential needs is a limiting factor — perhaps the most important factor — hindering development in many parts of the globe. In south Asia, increasing water shortage and declining water quality from pollution during the past few decades have drawn attention to the inherent scarcity of water and have led to concern about water availability to meet the requirements of the twenty-first century. Because of increasing population and changing patterns of water use in south Asia, additional demand is likely to be accompanied by a sharp decline in per capita water availability. While consumption of 1000 m<sup>3</sup> of water per year and per capita is considered a standard for 'well-being' in the developed world, annual water availability per capita by the year 2025 for south Asia is projected to be a mere 730 m<sup>3</sup>, and is on a declining trend in all parts of the world, including those that are considered to have ample water resources.

With the growing recognition of such issues as the possibility of global climate change, an increasing emphasis on the assessment of future availability of

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water on various spatial and temporal scales is needed. A warmer climate will enhance the hydrological cycle, which implies higher rates of evaporation, and a greater proportion of liquid precipitation compared with solid precipitation; these physical mechanisms, associated with potential changes in precipitation amount and seasonality, will affect soil moisture, groundwater reserves and the frequency of floods or droughts. The supply of water is limited and governed by the renewal processes associated with the global hydrological cycle.

Water resources will come under increasing pressure in south Asia due to the changing climate. Changes in climatic conditions will affect demand, supply and water quality. In regions that are currently sensitive to water stress (arid and semi-arid regions of India), any shortfall in water supply will enhance competition for water use for a wide range of economic, social and environmental applications. The growing population will heighten demand for irrigation and perhaps industrialization at the expense of drinking water. Disputes over water resources may well be a significant social consequence in an environment degraded by pollution and stressed by climate change.

### **Key Sources of Water in India**

India is home to a billion people, a figure that is projected to increase to 1.7 billion by 2050, assuming a fertility rate of 2.1 per cent. The surface water and groundwater resources in India play vital roles in agriculture, fisheries, livestock production, forestry and industrial activity. Water and agriculture sectors in India are largely dependent on monsoon rainfall. There have been considerable spatial and temporal variations in rainwater availability in recent years as a result of an observed swing in the onset, continuity and withdrawal patterns of the monsoon. Agricultural output is primarily governed by availability of water, making the country's agrarian economy sensitive to the status of water resources and the monsoon. The monsoons serve not only as a sole provider of water to large areas of rainfed cultivation but also remain the primary source of water to recharge the groundwater resources of the country. The demands on the water resources in the country by the several sectors are, not surprisingly, dominated by the agriculture sector. In 1999, agriculture consumed 85.3 per cent of the water, industry 1.2 per cent, energy sector 0.3 per cent, and other sectors 6.4 per cent, whereas domestic consumption was 6.6 per cent (GOI 2000). Besides being a source of irrigation supplies, large water reservoirs are also required to generate hydropower. But unlike irrigation the consumptive use of water in this sector is mainly limited to evaporative losses. Many of the large reservoirs like Bhakra, Hirakud, Nagarjunasagar, Koyna, Pong, Rihand, Srisaïlam and Idduki are excellent examples of providing hydropower to the nation and have brought economic growth and prosperity to the region.

The two key sources of fresh water are groundwater and surface water; of

these the river basins represent the main source of fresh water in the Indian subcontinent. India is endowed with a river system involving over twenty major rivers with many tributaries. The total annual discharge in the rivers flowing in various parts of the country amounts to  $1,880 \text{ km}^3\text{yr}^{-1}$  (CWC 1995). Many of these rivers are perennial, a few are seasonal. Large rivers such as the Indus, the Ganges and the Brahmaputra have their origin in the Himalayas and flow throughout the year though their flows significantly reduce during summer (March–May). The Himalayan snow and ice supports three main river systems, viz., Indus, Ganges and Brahmaputra, having their average annual stream flow of 206, 488 and  $510 \text{ km}^3$  respectively. Thus, more than 50 per cent of India's water resources are located in various tributaries of these three river systems. Average water yield per unit area of the Himalayan rivers is almost double that of the south peninsular river system, indicating the importance of snow and glacier melt contribution from high mountains. The average intensity of mountain glaciation varies from 3.4 per cent for Indus to 3.2 per cent for Ganges and 1.3 per cent for Brahmaputra. The tributaries of these river systems show maximum intensity of glaciation (2.5 – 10.8 per cent) for Indus followed by Ganges (0.4 – 10 per cent) and Brahmaputra (0.4 – 4 per cent); the average annual and seasonal flows of these systems give a different picture, thereby demonstrating that the rainfall contributions are greater in the eastern region while the snow and glacier melt contributions are more important in the western and central Himalayan region.

Most of the rivers in south peninsular India like the Cauvery, the Narmada and the Mahanadi are fed through groundwater discharges and are supplemented by the monsoon rains. Therefore, these rivers have very limited flow during the non-monsoon period. Their importance lies not just in the size of their basins but also on the quantity of water they can carry. The flow rate in these rivers is independent of the water source of the river and depends upon the precipitation rate in the region. Therefore, in spite of being smaller, the rivers flowing west have a higher flow rate due to higher precipitation over that region.

Apart from the rivers, the Indian subcontinent is covered by a number of reservoirs, lakes, wetlands, mangroves and ponds. During the lean season, these reservoirs are the key source of water. Even though various types of fresh water bodies are widely distributed across the Indian subcontinent, the availability of drinking water suggests skewed distribution of actual supply. These water bodies regulate both the quantity and quality of water in addition to supporting the biota of various species. The importance of these water bodies is apparent from the fact that in the thirteen states that experienced frequent floods and drought in the last few years, 50 per cent of the areas of those states are prone to periodic droughts possibly due to the shrinking or vanishing of these water bodies.

The groundwater resources of the country are also vast. Groundwater

acts as a regulating mechanism for storing water in the wet season and thus complements surface storage, which being location specific, may not be available. The groundwater level in the marshy and swampy Terai region of the Himalayas, the northernmost stretch of the Ganges basin, is only 2–3 metres below the ground surface, but drops drastically to 15–30 metres below the surface in certain parts of the river basin. The amount of fresh water in this unconfined aquifer is massive and has not been harnessed in any systematic manner. In fact, a good part of the dry season flow in the river system is augmented by the flowback of the groundwater from the unconfined aquifers in the area adjoining the Ganga and its tributaries. The deep artesian aquifers underlying millions of acres of alluvia and deltaic cropland in the Ganga basin are believed to be filled with fresh water to depths as great as 2,000 metres. The total replenishable groundwater resource available in India is currently estimated to be 45.22 million hectare metre/yr (Mha m/yr). Of this quantity, 6.933 Mha m/yr may be used for drinking and industrial purposes while the rest can be used for irrigation. Interestingly, almost 80 per cent of domestic water requirement in India today is met from groundwater sources. However, the groundwater resources in several states of India are fast getting depleted primarily due to over-extraction and poor recharging facility.

Despite the presence of substantial reserves of water in India, the actual utilizable quantity is limited and a water crisis is seen as inevitable in the future. The per capita availability of fresh water is currently estimated at about 2,000 m<sup>3</sup> i.e., 2x10<sup>9</sup> litres per person per year, and a further drop to 1480 m<sup>3</sup> is expected in the next decade due to increase in the population coupled with no further augmentation of water resources and also its consequent decrease over the same time due to consumption. India will reach a state of water stress before 2025 when the availability falls below 1000 m<sup>3</sup>. This clearly indicates the 'two-sided' effect on water resources — the rise in population will increase the demand for water, leading to its faster withdrawal, which in turn would reduce the recharging time of the water tables. As a result, availability of water is bound to reach critical levels. This makes it imperative to draw up appropriate plans and strategies to conserve our water resources and optimize utilization of water from the various water sources.

In India, the two monsoon seasons (the southwest monsoon from June to September and the northeast monsoon in November–December bring rains — many a time in intensities and amounts that can cause serious floods, creating hazardous (and often disastrous) situations. Moreover, cyclonic storms in the pre-monsoon months (April–May) and the post-monsoon months (October–November) cause large-scale inundation, destruction and deaths. In fact, floods and cyclones are the two major natural disasters that visit India quite often.

The long-term average annual rainfall for the country as a whole is 116 cm, the highest for a land of comparable size in the world. But this rainfall is highly

variable both in time and space. The maximum rainfall occurs in July and August during the four-month (June–September) southwest monsoon. There are considerable intra-seasonal and inter-seasonal variations as well. The summer monsoon rainfall oscillates between active spells with good monsoon (above normal) on an all-India basis and weak spells or breaks in the monsoon rains when deficient to scanty ( $\leq 20$  per cent) rains occur on an all-India basis for a few days at a stretch. India's average seasonal summer monsoon rainfall is about 85 cm with a standard deviation of about  $\pm 10$  per cent. Orissa, East Madhya Pradesh, West Bengal, and the Northeastern States, the Western coast and the Ghats receive more than 100 cm of rainfall during this season. The submontane region, extending from North Bihar to Jammu, also receives more than 100 cm of rainfall. The heavy rainfalls in the Northeastern States, West coast and the Ghats and the submontane regions are influenced by the orography. The peninsular India south of  $15^{\circ}\text{N}$  gets less than 50 cm rainfall. The lowest rainfall is received in the extreme southeast peninsula. The west and the northwest regions of the country receive about 50 cm of rain in the season. Rainfall decreases rapidly to less than 10 cm in west Rajasthan. Regions receiving above 50 cm in the season are classified as wet and those getting less than 50 per cent as dry parts of India.

### **Global Warming and India's Climate**

An annual mean global warming of  $0.4\text{--}0.8^{\circ}\text{C}$  has been reported since the late nineteenth century (IPCC 1998). Surface temperature records indicate that the 1990s have been the warmest decade of the millennium in the Northern Hemisphere and that 1998 is the warmest year. The observations also suggest that the atmospheric abundance of almost all greenhouse gases reached their highest values in recorded history during the 1990s (Nakicenovic *et al.* 2000). Anthropogenic  $\text{CO}_2$  emissions due to human activities are virtually certain to be the dominant factor, causing the observed global warming. Substantial increases in greenhouse gases are likely in the future, as a consequence of which global mean surface temperature is expected to increase by between  $1.4^{\circ}$  and  $3^{\circ}\text{C}$  for low emission scenarios and between  $2.5^{\circ}$  and  $5.8^{\circ}\text{C}$  for high emission scenarios by 2100 with respect to 1990 (IPCC 2001). Globally averaged precipitation is projected to increase, but at the regional scale both increases and decreases are projected. Global mean sea level is likely to rise by 0.14 – 0.80 metres between 1990 and 2100.

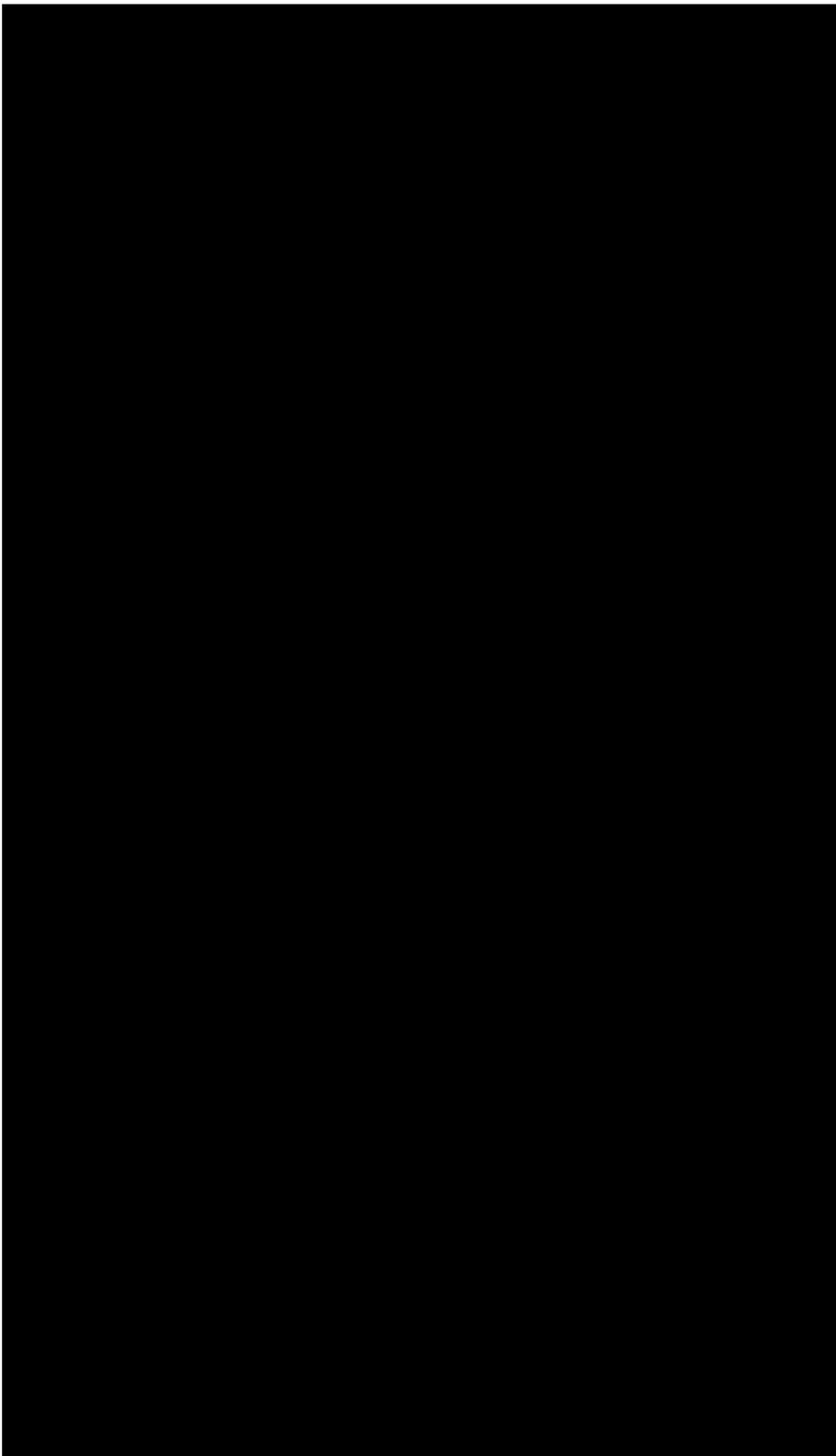
The global warming threat is real and the consequences of the climate change phenomena are many and alarming. The impact of future climatic change may be felt more severely in developing countries such as India whose economy is largely dependent on agriculture and is already under stress due to the current population increase and associated demands for energy, fresh water and food. In spite of the uncertainties about the precise magnitude of climate change and its

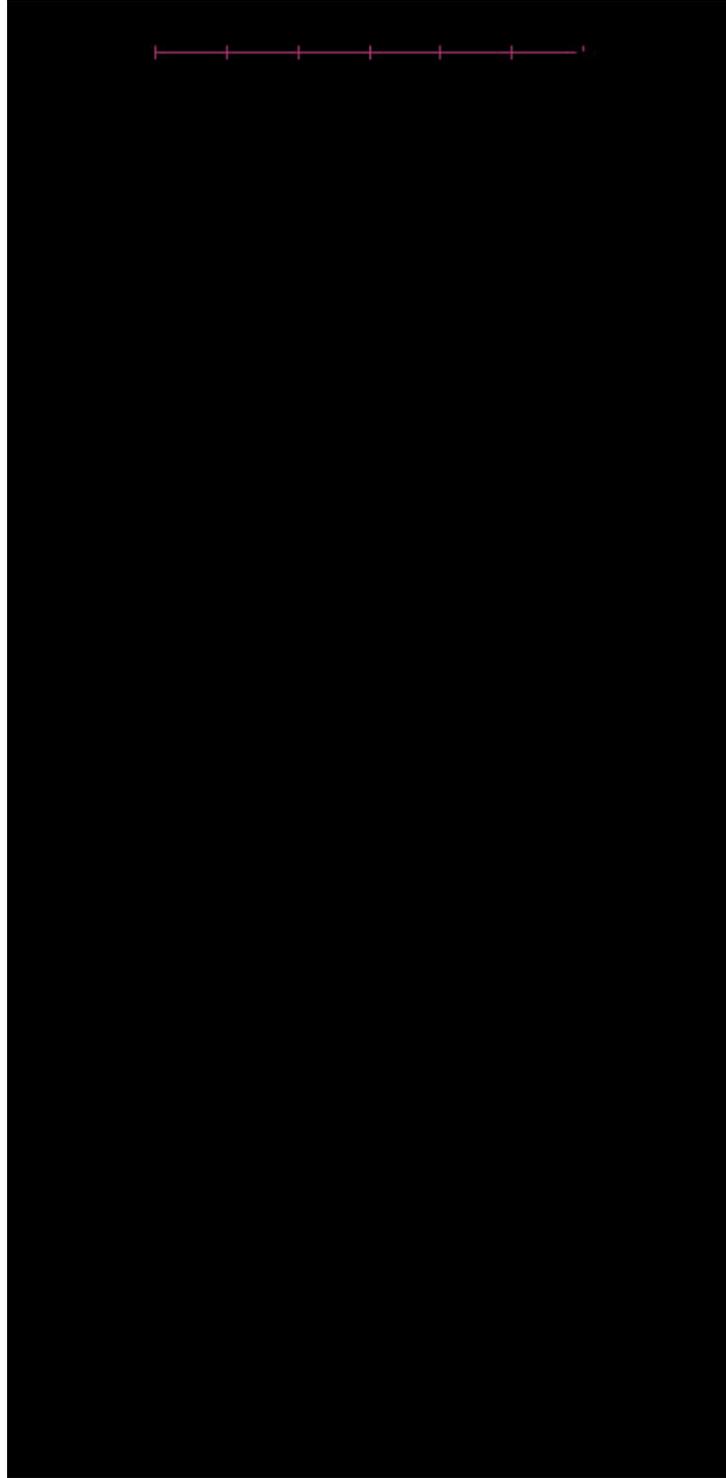
possible impacts, particularly on regional scales, measures must be taken to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.

In India, the analysis of seasonal and annual surface air temperatures (Pant and Kumar 1997), using the data for 1881–1997, has shown a significant warming trend of 0.57°C per hundred years (Fig. 1). The warming is found to be mainly contributed by the post-monsoon and winter seasons. The monsoon temperatures do not show a significant trend in any major part of the country except for a significant negative trend over Northwest India. Similar trends have also been noticed in Pakistan, Nepal, Sri Lanka, and Bangladesh. The rainfall fluctuations in India have been largely random over a century, with no systematic change detectable on either annual or seasonal scale (Fig. 2). However, areas of increasing trend in seasonal rainfall have been found along the West Coast, North Andhra Pradesh and Northwest India, and those of decreasing trend over East Madhya Pradesh, Orissa and Northeast India during recent years.

Besides being the chief determinant of economic welfare of the country, the summer monsoon is the predominant source of fresh water required for the rejuvenation of the water resources after the hot pre-monsoon spell. The prime concern today is the probable impacts that climate change and global warming might have on the annual cycle of the monsoon and the associated precipitation over south Asia.

In order to predict the changes in the temporal as well as spatial variability of monsoon rainfall in response to increases in radiative forcing of the atmosphere, climate change scenarios over the Indian subcontinent under the four new SRES 'Marker' emission scenarios (namely A1, A2, B1 and B2 scenarios) have been developed based on the data generated in numerical experiments with A-O GCM of the CCSR/NIES, Japan (Lal *et al.* 2001). These four emission scenarios cover a wide range of the main demographic, technological, and economic driving forces of future emissions; each describes a different world evolving through the twenty-first century and leads to different greenhouse gas emission/concentration trajectories (Fig. 3). The scenario B1 projects the most conservative future emission of greenhouse gases while the A2 scenario is characteristic of scenarios with higher rates of greenhouse gas emissions in combination with higher sulphur and other aerosol emissions. The A1 scenario family has been further divided into three groups that describe alternative directions of technological change in the energy system (Nakicenovic *et al.* 2000). The three A1 groups are distinguished by their technological emphasis: fossil intensive (A1FI), non-fossil energy sources (A1T), or a balance across all sources (A1B). The SRES scenarios exclude the effects of climate change and climate policies on society and the economy ('non-intervention'). Many of the recent numerical experiments with A-O GCMs, however, have not included all the SRES scenarios as yet. The projections of regional climate change



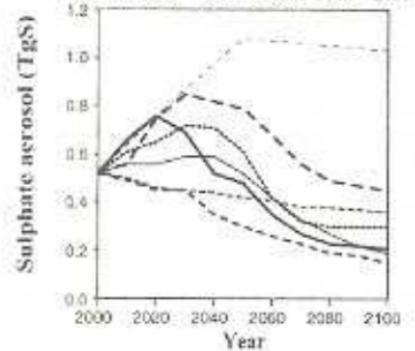
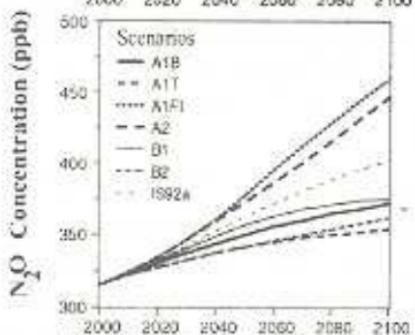
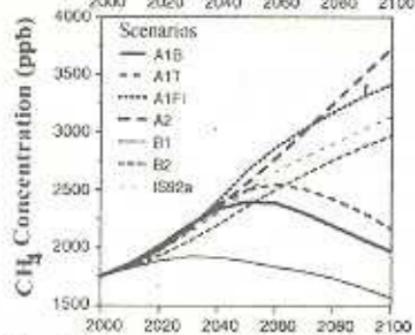
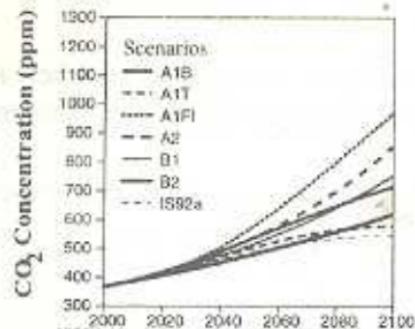


based on these newer sets of emission scenarios of greenhouse gases are likely to be more realistic than the *IS92a* emission scenario used earlier in transient experiments with A–O GCMs.

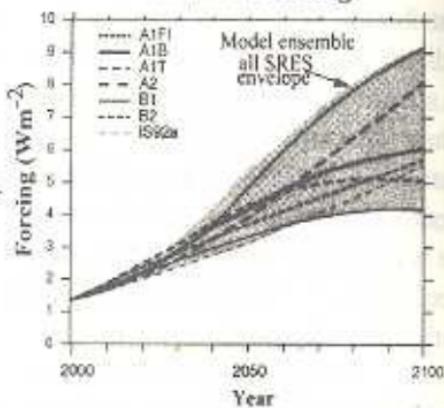
Over land regions of the Indian subcontinent, the area-averaged annual mean surface temperature rise by the 2080s is likely to range between 3.5°C and 5.5°C (least in B1 scenario and maximum in A2 scenario). The area-averaged surface temperature increase during winter over India by the 2080s would be at least 4°C (B1 scenario) and could reach even 6°C (A2 scenario). During summer monsoon, the warming may range between 2.9°C and 4.6°C (Table 1). The projected surface warming is more pronounced during winter than during summer monsoon. The spatial distribution of surface warming as a consequence of increase in anthropogenic radiative forcing (with respect to 1981–90) suggests that north India may experience an annual mean surface warming of 3°C or more by the 2050s, depending upon the future trajectory of anthropogenic forcing (Fig. 4). The spatial pattern of temperature change has a large seasonal dependency. The model simulates peak warming of about 3°C over north and central India in winter. Over much of the southern peninsula, the warming is likely to be under 2°C during winter. The surface temperature rise would be more pronounced over the northern and eastern regions of India (~2°C) during the monsoon.

A marginal increase of about 7 – 10 per cent in area-averaged annual mean precipitation is projected over the Indian subcontinent by the 2080s (Table 1). The spatial distribution of annual mean changes in precipitation by the 2050s as simulated by the model is depicted in Fig. 5. A decline of 5 – 25 per cent in area-averaged winter precipitation is likely. During the monsoon, an increase in area-averaged precipitation of about 10–15 per cent over the land regions is projected. The model results suggest an appreciable change in spatial pattern of winter as well as summer monsoon precipitation over land regions of the Indian subcontinent. This could be attributed to inclusion of more realistic estimates of regional aerosol concentrations as well as the indirect radiative forcing due to aerosols. A decrease of 10 – 20 per cent in winter precipitation over most parts of central India is simulated for the 2050s. During the monsoon, the results suggest an increase of 30 per cent or more in precipitation over northwest India by the 2050s. The western semi-arid margins of India could receive higher than normal rainfall in a warmer atmosphere.

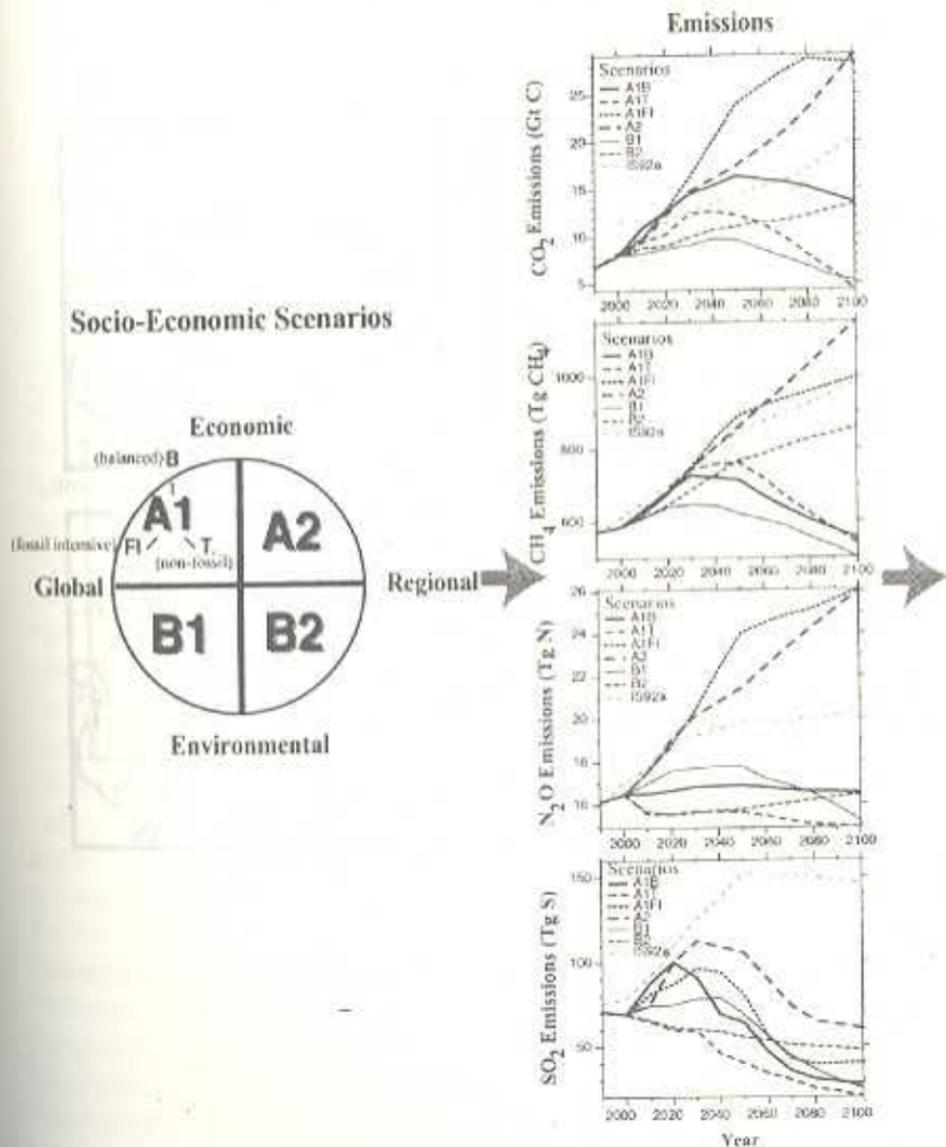
## Concentrations



## Radiative forcing

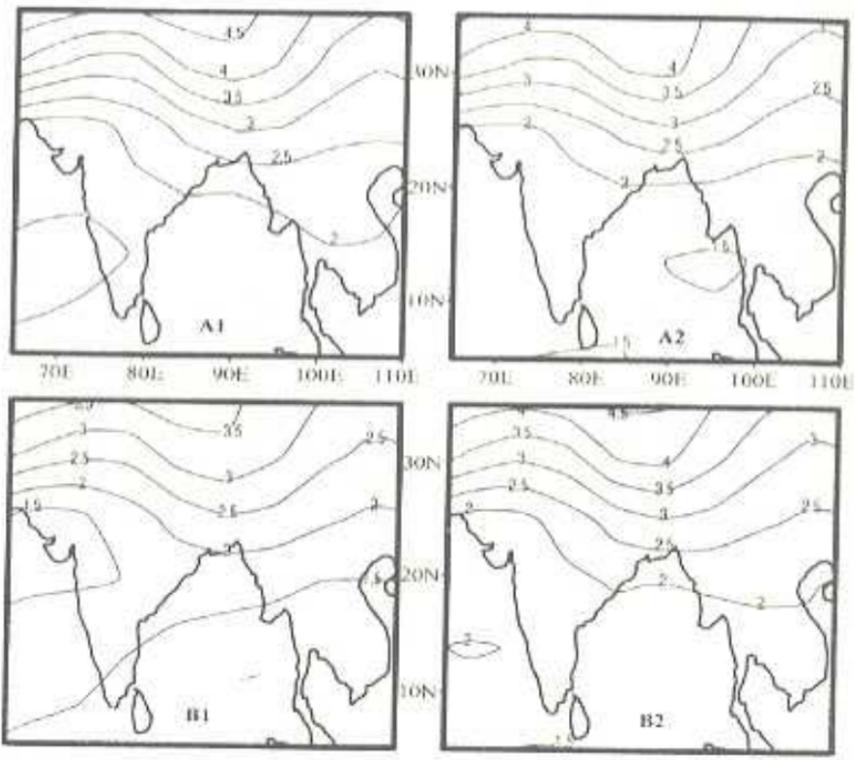


**Fig. 3: New SRES emission scenarios, concentration trajectories of greenhouse gases & aerosol and resultant radiative forcings**



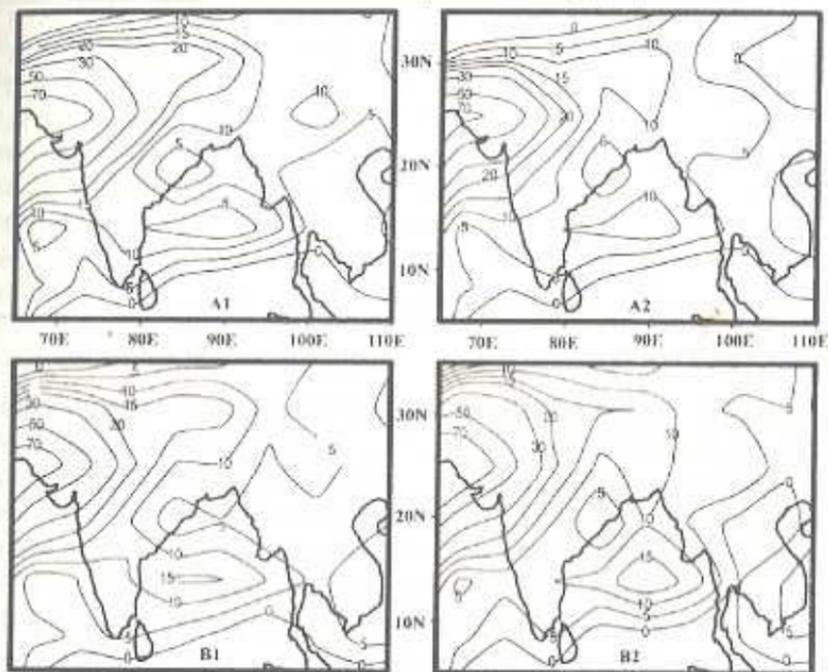
**Fig. 4: Spatial distribution of annual mean surface air temperature change (deg C) over Indian sub-continent in 2050s with respect to present-day under the four SRES emission scenarios**

Annual mean surface air temperature change (deg C)



**Fig. 5: Spatial distribution of annual mean precipitation change over Indian subcontinent in 2050s with respect to present-day under the four SRES emission scenarios**

Annual Mean Precipitation Change (%)



**Table 1: Climate Change Projections\* for Indian subcontinent under the New SRES Marker Emission Scenarios**

	Scenarios	Temperature Change (°C)				Rainfall Change (%)			
		A1	A2	B1	B2	A1	A2	B1	B2
2020s	Annual	1.18	1.00	1.32	1.41	2.29	2.16	4.15	5.97
	Winter	1.19	1.08	1.37	1.54	0.39	-1.95	4.36	3.64
	Monsoon	1.04	0.87	1.12	1.17	1.81	2.37	3.83	5.10
2050s	Annual	2.87	2.63	2.23	2.73	9.34	5.36	6.86	7.18
	Winter	3.18	2.83	2.54	3.00	3.22	-9.22	3.82	3.29
	Monsoon	2.37	2.23	1.81	2.25	10.52	7.18	7.20	8.03
2080s	Annual	5.09	5.55	3.53	4.16	9.90	9.07	7.48	7.62
	Winter	5.88	6.31	4.14	4.78	-19.97	-24.83	-4.50	-10.36
	Monsoon	4.23	4.62	2.91	3.47	14.96	15.18	11.12	10.10

\* Based on CCSR/NIES Model Experiments; Area-averaged for land regions only.

In order to examine the likely changes in intraseasonal and interannual variability in summer monsoon over central India in response to changes in anthropogenic forcing, we have performed detailed analysis of the simulated daily rainfall data for the monsoon season during each of the 30-year period corresponding to the 1990s and 2050s. It is observed that the standard deviation of future projections of area-averaged monsoon rainfall centred around the 2050s is not significantly different in each of the four scenarios relative to that simulated for the present-day atmosphere. This implies that the year-to-year variability in central India rainfall during the monsoon season may not significantly change in the future. More intense rainfall spells are, however, simulated over the land regions of the Indian subcontinent in the future (relative to that simulated for the present-day atmosphere), thus increasing the probability of extreme rainfall events in a warmer atmosphere.

Utility of precipitation primarily depends upon its spatial and temporal distribution. Uniform precipitation over a larger area is more useful than its occurrence concentrating over a smaller region; also precipitation occurring over a longer period would be more effectively utilized rather than when it occurs within a short time span. Therefore, the projected changes in the precipitation pattern over the Indian subcontinent, as presented above, spell bad news for the water resource sector. On the first count, the decrease in the winter precipitation would reduce the total seasonal precipitation being received during December, January and February, implying greater water stress during the lean summer period. On the second count, intense rain occurring over fewer days, which other than implying increased frequency of floods will also mean that much of the rain would be lost as direct run-off resulting in reduced groundwater recharging potential.

## Climate Change and Droughts, Floods and Cyclones

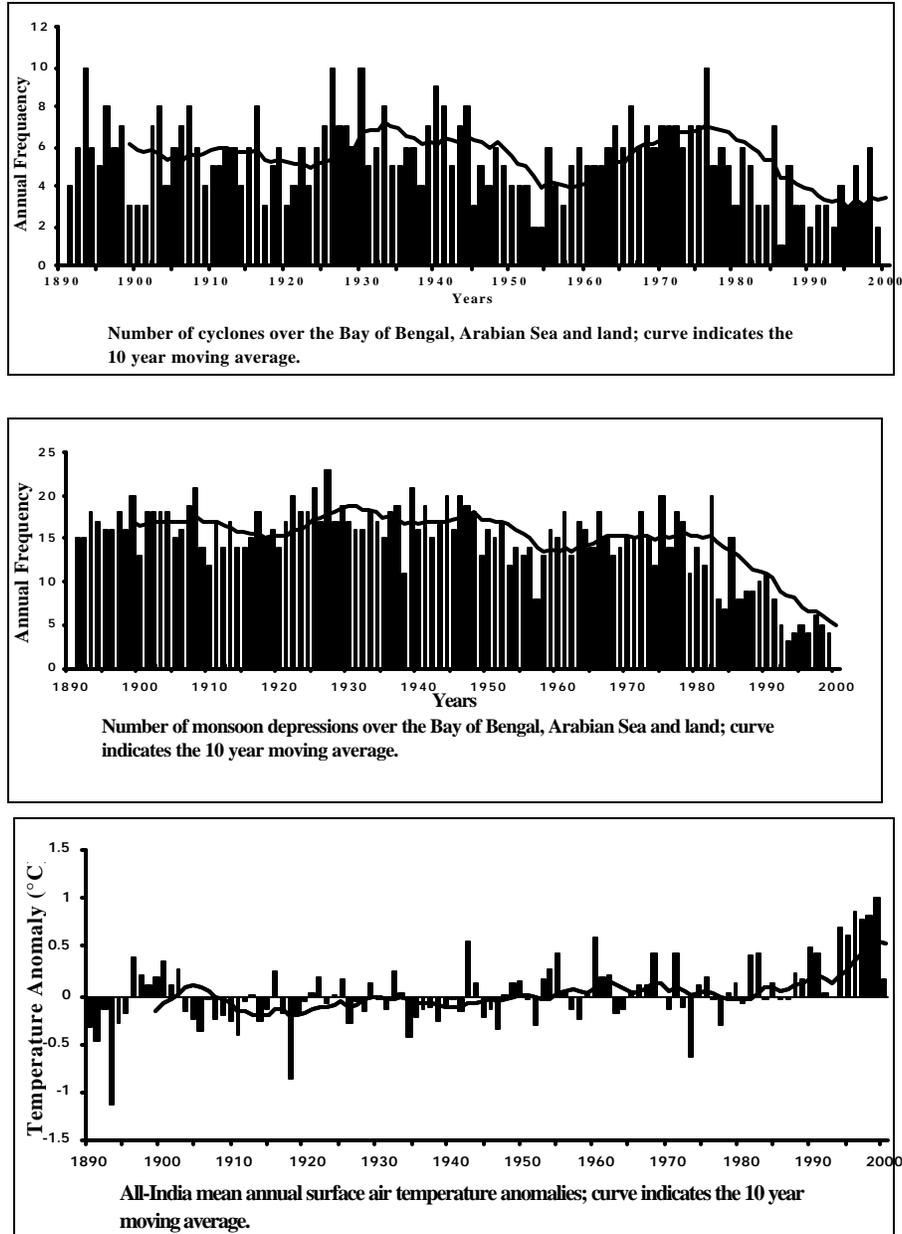
Some of the most pronounced year-to-year variability in climate features and extreme weather events such as droughts in many parts of Asia have been linked to El Niño events. At least half the severe failures of the Indian summer monsoon since 1871 have occurred during El Niño years (Webster *et al.* 1998). Collins (1999) finds an increased frequency of El Niño events and a shift in their seasonal cycle in a warmer atmosphere so that the maximum occurs between August and October rather than around January as currently observed. In the event of enhanced anomalous warming of the eastern equatorial Pacific Ocean such as that observed during the 1997–98 El Niño, higher frequency of drought conditions in some parts of India is possible.

Floods and cyclones are natural disasters where excess of water (rains) creates havoc in India. On the average, the area actually affected by floods every year in India is about 10 million hectares, of which about half is cropland. In fact, the area prone to floods in India has been estimated at 40 million hectares. Persistent rainfall over an area already soaked with rain or intense rainfall often results in flood. Excess water in a river, due to heavy and/or persistent rains in the catchment area or the upper regions of the river system also create flood downstream. Several recent studies (Kitoh *et al.* 1997, Lal *et al.* 2000) suggest an increase in the interannual variability of daily precipitation in the Asian summer monsoon with increasing greenhouse gas concentrations in the atmosphere. The intensity of extreme rainfall events over the Indian subcontinent is likely to be higher in future as a consequence of increased convective activity during the summer monsoon, suggesting the possibility of more frequent flash floods in parts of India, Nepal and Bangladesh.

Severe tropical cyclones generally develop during the pre-monsoon or post-monsoon season (generally defined cyclone seasons are October–November and March – June). The eastern coast of India along Bengal, Orissa and Andhra Pradesh is prone to such cyclones, which cause devastating coastal floods, often turning into national disasters. Many of the tropical cyclones move inland and may even reach as far inland as Nepal though at a much reduced intensity. Sometimes these cyclones stagnate over a region, as the Orissa super cyclone did (it was more or less stationary with slight southward drift over the region after making landfall), and cause the maximum damage to life and destruction to the infrastructure.

Observational records suggest that while there has been a rising trend in all-India mean surface air temperature, the number of monsoon depressions and tropical cyclones forming over the Bay of Bengal and Arabian Sea have exhibited declining trends since 1970 (Fig. 6). Studies, however, suggest that an increase in sea surface temperature will be accompanied by a corresponding increase in cyclone intensity (wind speed). A possible increase in cyclone intensity of 10–20 per cent for a rise in sea surface temperature of 2–4°C relative to the threshold temperature of

**Fig 6: Trends in all-India mean surface temperature anomaly and number of monsoon depressions and cyclones in Indian Seas**



28°C is very likely. Thus, while there is no evidence that tropical cyclone frequency may change, the available data strongly suggest that an increase in its intensity is most probable.

Storm surges are generated by the winds and the atmospheric pressure changes associated with cyclones. At low latitude land-locked locations such as the Bay of Bengal, tropical cyclones are a major cause of storm surges. Any increase in sea surface temperature is likely to cause greater convective activity, leading to an increase in wind speed. The stress exerted by wind on water underneath is proportional to the square of the wind velocity. Amplification in storm surge heights should result from the occurrence of stronger winds and low pressures associated with tropical storms. Thus, an increase in sea surface temperature due to climate change should lead to higher storm surges and an enhanced risk of coastal disasters along the east coast of India.

## **Climate Change and Water Resource Potentials in India**

### **(a) Surface Water**

India has a large and intricate network of river systems, the most prominent of which are the Himalayan river systems draining the major plains of the country. Apart from this, the numerous water bodies present in the subcontinent make it one of the wettest places in the world after South America. All the large Himalayan Rivers including Sutlej, Yamuna, and Indus are perennial sources of fresh water though the flow is reduced during non-monsoon periods. The primary sources of water for these rivers are either dry (snow) or wet (rain) precipitation. The potential for water withdrawal from these rivers for a variety of uses has not yet been fully achieved in spite of the many existing dams and diversion canals. The south peninsular rivers are however charged by groundwater and their flows are reinforced by the seasonal rainfall. Therefore, during the lean summer season their flows become limited. Many rivers such as the desert rivers of Luni and Mahi flowing through Rajasthan are totally fed by the monsoon rains and cease to exist during the rest of the year. Dams constructed across these rivers help to hold water in the reservoirs during lean seasons. Yet the construction of dams poses its own set of problems. Smaller check dams built in the upper reaches of the river reduce supply downstream and water problems get aggravated there. Due to poor monsoon rainfall in 1999, all the reservoirs in Gujarat contained only 50 per cent of the installed capacity in that year. The situation is further aggravated if a back-to-back drought occurs. The potentials of the non-glacier fed rivers are strongly associated with the health of the monsoons. A confident projection of and better understanding on the impacts of climate change on the monsoons is thus very crucial.

Wetlands in the form of inland lakes, coastal lagoons, and mangroves also form an important component of the fresh water resources and are often the main

source of water in areas where rivers are absent. They also serve as sources of livelihood for the local people such as fishing and aquaculture. Yet these water bodies are fast shrinking and degrading due to land use changes, siltation, over-exploitation and reduced recharging facilities, higher evaporation rates due to increased temperature and pollution. The coastal water bodies such as the backwaters of Kerala, the Sunderbans in Bengal and the Chilka in Orissa are saline as they receive influxes from the sea. Most of these water bodies are also located in areas of high human activity and receive nutrients in the form of run-offs, sewage and effluents. Inland lakes such as the ones in Rajasthan have small catchment drainage basins with minor rivers draining into them. These lakes are generally shallow and are sensitive to extreme temperatures, making them prone to evaporation as is evident in the lakes in Udaipur, some of which went totally dry in 1999 such that the bottoms of these lakes were visible for the first time in 300 years. This aspect of the inland lakes also makes them vulnerable to likely changes in the surface temperature and monsoon rainfall.

The existence of promising potentials of fresh water lies in our rivers. However, due to lack of proper management of rivers in India, the country is already on the brink of water stress. The reintroduction and recent emphasis being laid on the traditional ideas of rain water harvesting and augmenting recharging of groundwater using defunct borewells hold immense potential and will definitely assist in alleviating water stress. But sole reliance on these options may not completely solve the problem of water now or in future as these options too have their drawbacks such as availability of large land areas and also their dependence on precipitation, which is subject to large intraseasonal and interannual fluctuations. Despite environmental and social disturbances caused by big dams, we may not be able to ensure food security and a reliable water supply of the country without implementation of large hydrological projects. The fall-out of these projects can be managed, damages may be minimized and feasibility of such projects ascertained through cost-benefit analysis including environmental and social costs. The need for such projects is emphasized by the fact that the entire water supply of Mumbai, Pune, Hyderabad and Warangal cities is dependent on a series of dams like Vaitarana, Tansa, Bhatsa, Khadakwasla, Panset, Majira, Singur and Sriramsagar dams. The cluster of thermal and super thermal power stations in Uttar Pradesh is entirely dependent on the storage of Rihand Dam for their water supply.

The Himalayan river system holds immense potential as a future source of fresh water. The Himalayan snow and ice supports three major river systems *viz.*, Indus, Ganga and the Brahmaputra having an average annual stream flow of 206, 488 and 510 km<sup>3</sup> respectively. Thus, almost 50 per cent of our water resources are located in the various tributaries of these three river systems. In recent decades, the hydrological characteristics of the watersheds in this region seem to have changed substantially as a result of extensive land use (e.g., deforestation, agricultural

practices and urbanization), leading to more frequent hydrological disasters, enhanced variability in rainfall and run-off, and extensive reservoir sedimentation. Global warming and its impact on the hydrological cycle and nature of hydrological events have posed an additional threat to this mountainous region of the Indian subcontinent. Extreme precipitation events have geomorphological significance in the Himalayas where they may cause widespread slope failures (Ives and Messerli 1989). The issue of the response of hydrological systems, erosion processes and sedimentation in this region could change significantly due to climate change.

The Himalayas have nearly 1,500 glaciers, covering an estimated area of 33,000 km<sup>2</sup>. These glaciers provide the snow, and the glacial-melt waters keep our rivers perennial throughout the year. The most useful facet of glacial run-off is that glaciers release more water in a drought year and less water in a flood year, thus ensuring water supply even during the lean years. Almost 67 per cent of the glaciers in the Himalayan mountain ranges have retreated in the past decade (Ageta and Kadota, 1992; Yamada *et al.* 1996; Fushimi 2000). The mean equilibrium line altitude at which snow accumulation is equal to snow ablation for a glacier is estimated to be about 50–80 metres higher relative to the altitude during the first half of the nineteenth century (Pender 1995). Available records suggest that Gangotri glacier is retreating about 30 metres per year. Warming is likely to increase the melting far more rapidly than the accumulation. Glacial melt is expected to increase under changed climatic conditions, which would lead to increased summer flows in some river systems for a few decades, followed by a reduced flow as the glaciers disappear (IPCC 1998).

#### **(b) Groundwater**

Groundwater is the principal source of drinking water in the rural habitations and almost 85 per cent of the rural water supply in India is dependent on groundwater. India, on the whole, has a potential of 45.22 Mha metre/yr of replenishable groundwater. Unfortunately, due to rampant drawing of the subsurface water, the water table in many regions of the country has dropped significantly in recent years, threatening groundwater sustainability. These regions correspond mainly to the states of Gujarat, Punjab, Haryana, Tamil Nadu and Rajasthan that have registered groundwater development above the national average. The situation in Gujarat, in particular, is critical. The water table in Ahmedabad is reported to be falling at the rate of 4–5 metres every year. In some localities of Delhi, the water table has fallen by over 10 metres. Even in Kerala, where monsoon rain is intense, the water table has been falling systematically in all parts of the State.

The water quality of subsurface water is interlinked with quantity. Overexploitation of groundwater has resulted in a drop in its level, leading to ingress of sea water in coastal areas, making the subsurface water saline. India is especially susceptible to increasing salinity of its groundwater as well as its surface water

resources, especially along the coast, due to the rise in sea level. Increase in the sea level leads to intrusion of saline water far into the land mass through rivers draining into the sea, and also increases groundwater contamination by making water saline (Fig. 7). Saline water cannot be used for either agriculture or fishery development. Lower levels of water due to excess withdrawing have also led to deterioration in water quality. Several problems of arsenic and fluoride contamination in water have surfaced in certain parts of the country. High levels of fluoride in water have led to cases of acute fluorosis in many villages of Andhra Pradesh, Ajmer in Rajasthan, Gurgaon district in Haryana, Salem in Tamil Nadu, and some villages in Agra, Uttar Pradesh. The problem of arsenic is rampant in West Bengal and has given rise to acute health problems in the State. More than 7,000 wells in several districts in West Bengal have high dissolved arsenic, usually more than 50 mg/l today.

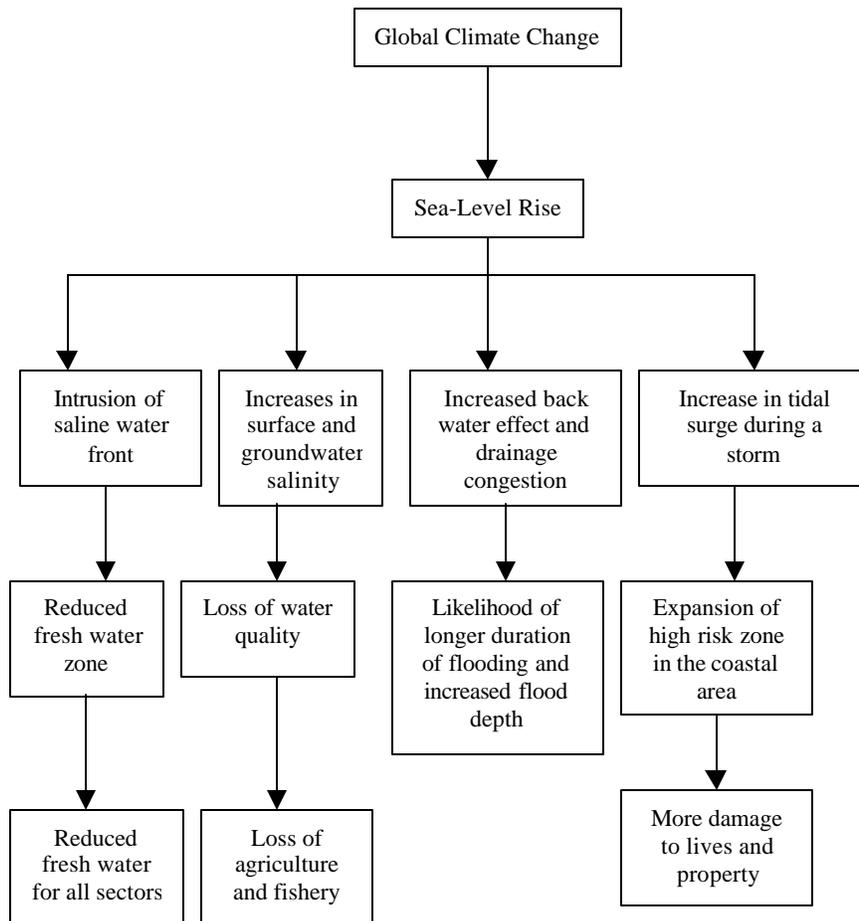
The groundwater level in the marshy and swampy Terai region of the Himalayas and the northern stretch of the Ganga basin is only 2–2.5 metres below the ground surface; it goes down drastically to 15–30 metres below the surface in certain parts of the river basin. The amount of water in this confined aquifer is massive and has not been harnessed in any systematic manner. In fact, a good part of the dry season flows in the river area adjoining the Ganga and its tributaries are augmented by the flow back of groundwater from this aquifer. In the Terai region, the aquifer never drains and has already become a huge deep aquifer. These artesian aquifers are filled with fresh water to a depth of about 2,500 metres (Chitale 1992).

These deep aquifers are artesian and often produce water through wells without pumping. This would decrease at least the direct operational cost and would also cost significantly less than the surface irrigation projects to supply water to the same area. Moreover, the drinking water of deep aquifers is less likely to be contaminated by agricultural chemicals and other pollutants as water in these aquifers has accumulated there after passing through a thick sediment column, which is perhaps the most effective filtering system. Therefore, sustainable use of this huge resource is a feasible option.

### **Water Resource Management in India**

Over the last one hundred years or so, two paradigmatic shifts in water management have taken place in India. One is that individuals and communities have steadily given over their role almost completely to the states. This dependence on the State has made the financial sustainability of water schemes poor; and repairs and maintenance is abysmal. With people having no interest in using water carefully, the sustainability of water resources has itself become uncertain. As a result, there are serious problems with the government's drinking water supply schemes. Despite all the government's efforts, the number of 'problem villages' does not seem to decrease. The second is that the simple technology of using

**Fig. 7: The Possible Chain Effect of Sea Level Rise on the Water Resources in Coastal Regions of India**



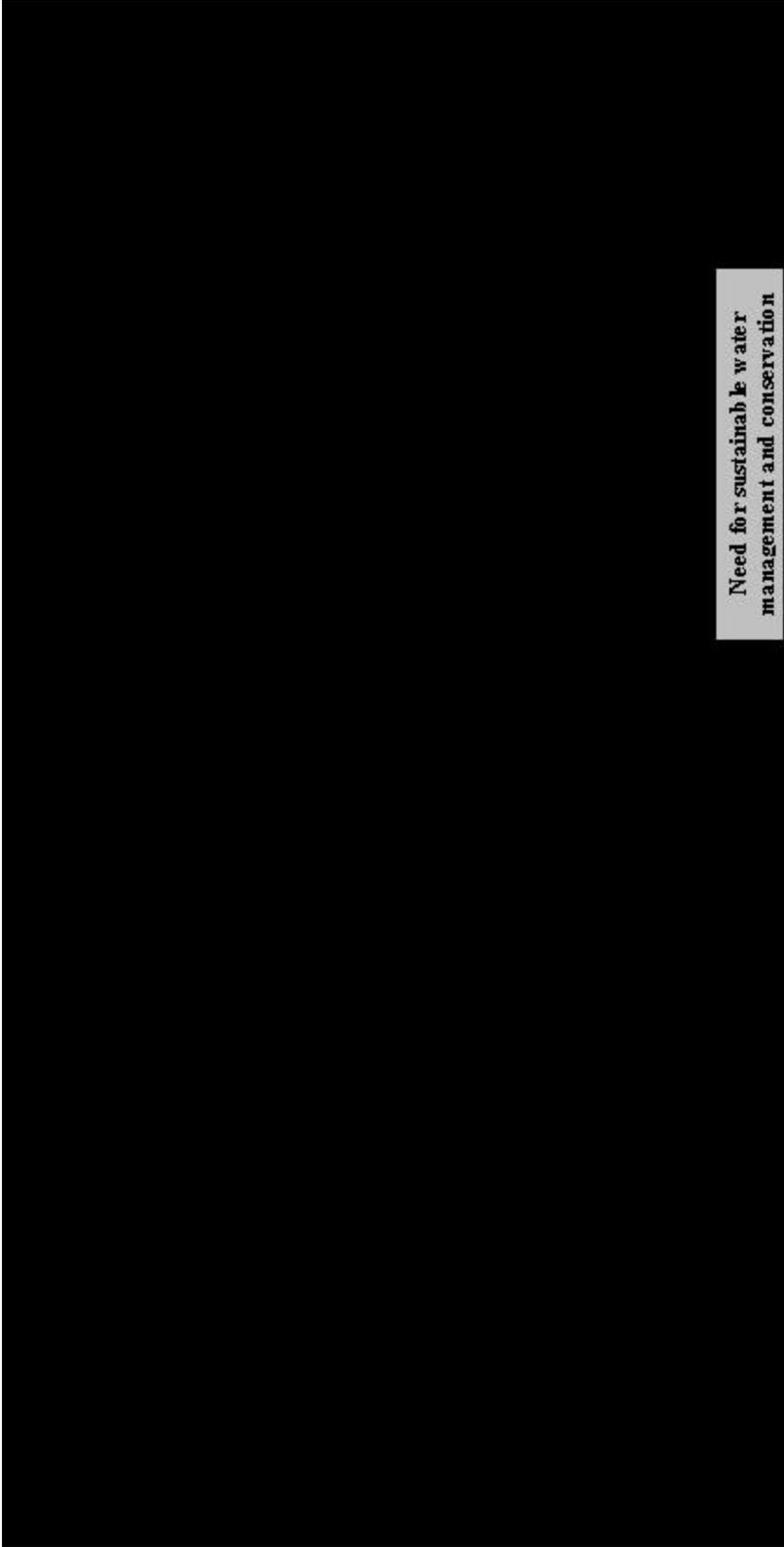
rainwater has declined. Instead, exploitation of rivers and groundwater through dams and tube wells has become the key source of water. As water in rivers and aquifers is only a small portion of the total rainwater availability, these sources inevitably come under increasing and, in many cases, unbearable, stress.

Keeping in view the enormous demand on water resources and the present state of our water sources, alternatives must be devised to supplement the present reserves of fresh water and reduce overexploitation so that the system of extraction is sustainable (Fig. 8). Micro-watershed development is a viable method of harnessing water cheaper, quicker and more safely. This is basically an approach to conserve land and water in which natural and human resources can be dovetailed and deployed to ensure food, fodder, fuel, fruits and fibre. In watershed planning, the basic principle is using land according to its capability and water according to its availability. In this scheme effective moisture conservation holds the key. In order to sustain the available water resources in a region, the key factors that must be taken into consideration include (i) water availability, (ii) favourable topography, (iii) physiography and hydrogeological set-up, (iv) infiltration and percolation characteristics of vadose zone, (v) hydrologic characteristics of the aquifers such as capacity to store, transmit and yield water, and (vi) techno-economic feasibility. Various technological options for groundwater recharge keeping in view the local conditions must also be explored.

Today the major problem seems to be the paucity of drinking water in almost all urban centres of India. In order to supplement the domestic water requirement, harvesting of water received as rain is a wise option. India receives 400 Mha metres of precipitation every year and it is estimated that nearly 70 Mha metres of this water evaporates immediately from the soil and about 105 Mha metres flows out to the sea. After allowing for all the hydrological processes, the total utilizable potential is about 105 Mha metres though less optimistic estimates put it at 86–92 Mha metres. The use of traditional systems of water harvesting to catch and store water is a feasible option. Roof-top harvesting is a good supplementary source of water for domestic purposes and can also enhance the recharging potentials of the aquifers by allowing water to sink into the ground through the new borewells and through the use of defunct borewells. Community-based rainwater harvesting in India — the paradigm of the past — has in it as much strength today as ever before. However, the effectiveness of these options is subject to the vagaries of climatic conditions, and a poor monsoon could seriously affect the potentials of these options.

### **Future Demand for Water**

According to statistics on water demand, the agriculture sector is the largest consumer of water. About 85 per cent of the available water is used for



Need for sustainable water management and conservation

agriculture alone. The quantity of water required for agriculture has increased progressively through the years with expansion of the area brought under irrigation. In 1950, a total area of  $25 \times 10^6$  hectares was under irrigation and this has more than trebled in five decades. The contribution of surface and groundwater resources for irrigation has played a significant role in India's attainment of self-sufficiency in food production during the past three decades, and is likely to become more critical in future in the context of national food security. According to available estimates, the demand on water in this sector is projected to decrease to about 74 per cent by the year 2050 though agriculture will still remain the largest consumer. In order to meet this demand, augmentation of existing water resources by development of additional sources of water or conservation of the existing resources through impounding of more water in the existing water bodies and its conjunctive use will be needed.

Demand for water in the other sectors is also expected to increase significantly. In the energy sector it is likely to increase dramatically, almost 70 times by the year 2050. This may be associated with rapid growth in industry and urbanization. The projected share of demand by the energy sector would most likely be about 8.9 per cent in the year 2050 as against the present share of 0.3 per cent. The demand for water in the industry sector could increase eightfold during the same period. It can be expected to increase to 4.3 per cent in the year 2050 as against 1.2 per cent for this sector, which is poised for rapid expansion in the decades to come.

With the increase in population, there will be a corresponding increase in the demand for water in the domestic sector. The demand for domestic water is likely to increase from the 6.6 per cent at present to 7 per cent in 2050. Even at present, at least a part of the urban populations in many states have no access to drinking water. In certain states like Assam, the percentage of urban population with access to drinking water is only 10 per cent, and in Tamil Nadu it is 50 per cent. The other states experiencing shortage of drinking water include Kerala, Andhra Pradesh, Bihar, Goa, Orissa, West Bengal, Punjab, and the northeastern states of Meghalaya, Mizoram, Manipur, Tripura and Sikkim. The fall in per capita water availability in the future will not be uniform throughout the country. For instance, based on the data on per capita availability of water for the last fifty years, projections have been made for the next fifty years. The national average in the year 2000 has been projected at  $2.5 \times 10^3$  m<sup>3</sup>/yr/person. The corresponding availability of water for the Northeastern region was reported to be  $18.4 \times 10^3$  m<sup>3</sup>/yr/person, which is much higher than the national average. The per capita availability in the southern part of the country, Tamil Nadu, in particular, is lower than the national average at about  $0.4 \times 10^6$  m<sup>3</sup>/yr/person (Suresh 2000).

In order to fulfil such demands in the future, we will need to rationalize the

various means of capturing and storing water. The interannual variability of the monsoons is expected to increase, making the monsoons a less reliable source of water. Therefore, efforts are needed for more efficient groundwater recharge and harvesting of rainwater through identification, adoption and adaptation of technological options. Some of the structural activities such as nalla bunds, contour bunds, contour trenches, gully plugs, check dams, pits and shafts, basin percolation tanks, surface channels, groundwater dams, injection wells, connector wells, storage tanks, dug well recharge, bore hole flooding, ditch and furrow, stream augmentation, de-silting of existing tanks and inter-watershed transfer should be tried depending on local conditions. Restoration, revival, revitalization and upgrading of existing / traditional rainwater harvesting structures would ensure sustainability of water resources.

Much of the future demand will need to be met from the groundwater resources, which may have immense potential. The water potential of the Ganga valley can irrigate an additional 200 Mha of land, which can sustain rice productivity of about 4 tonnes per hectare and produce another 80 million tonnes of rice that can sustain another 350–400 million people (Singh 1995). The excess water requirement in the future can, however, only be made through properly planned and precise management. Studies carried out for the Ganga basin need to be conducted for all major river basins in the country in order to discover additional potential sources of water such as deep artesian aquifers.

The increasing demand for water and its reduced availability is a growing national concern. Projections of water stress in the near future are rapidly turning into stark reality. Major initiatives need to be taken by the government to plan and implement water conservation programmes. Keeping in mind the plausible impacts of global warming on our water resources, the government has to frame appropriate guidelines and action plans for water conservation for the future.

### **Coping with Climate Change and Adaptation**

Climate change is just one of several factors influencing the hydrological system and water resources. Population growth, changes in land use, restructuring of the industrial sector, and demands for ecosystem protection and restoration are all occurring simultaneously. Current policies affecting water use, management, and development are often contradictory, inefficient, or unresponsive to changing conditions. A change in drought or flood risks is one of the potential effects of climate change with the greatest implications for human well-being. In the absence of explicit efforts to address these issues, the societal impacts of water scarcity in India are likely to rise as competition for water use grows and supply and demand conditions change.

There are many opportunities to reduce the risks of climate variability and

change for India's water resources. Past efforts have focused on minimizing the risks of natural variability. Many of the approaches for dealing effectively with climate change are different from the approaches already available to manage risks associated with existing variability. Tools for reducing these risks have traditionally included supply-side options such as new dams, reservoirs, and improving efficiency. This is largely independent of the issue of climate change, which will have important implications for the ultimate severity of future water stresses.

Sole reliance on traditional management responses should be avoided. First, climate change is likely to produce, in some places and at some times, hydrologic conditions and extremes of a different nature than current systems were designed to manage; second, climate change may produce similar kinds of variability but outside of the range for which current infrastructure was designed and built; third, relying solely on traditional methods assumes that sufficient time and information will be available before the onset of large or irreversible climate impacts to permit managers to respond appropriately; and fourth, this approach assumes that no special efforts or plans are required to protect against surprises or uncertainties.

The first situation could require that completely new approaches or technologies be developed. The second could require that efforts above and beyond those currently planned or anticipated be taken. Complacency on the part of water managers, represented by the third and fourth assumptions, may lead to severe impacts that could have been prevented by cost-effective actions taken now.

Recommendations and observations on how to cope with the climate change issue in terms of future water resources in India are as follows: (i) Prudent planning requires that a strong national climate and water monitoring and research programme should be developed, that decisions about future water planning and management be flexible, and that expensive and irreversible actions be avoided in climate-sensitive areas; (ii) Better methods of planning under climate uncertainty should be developed and applied; (iii) Decision makers at all levels should re-evaluate technical and economic approaches for managing water resources in view of potential climate changes. The government should ask all states managing national water systems to begin assessing both climate impacts and the effectiveness of different operation and management options; (iv) Improvements in the efficiency of end uses and the management of water demands must now be considered major tools for meeting future water needs, particularly in water-scarce regions. Water demand management and institutional adaptation are the primary components for increasing system flexibility to meet uncertainties of climate change; (v) Water managers should begin a systematic re-examination of engineering designs, operating rules, contingency plans, and water allocation policies under a wider range of climate conditions and extremes than have been used traditionally. For example, the standard engineering practice of designing for the worst case in the

historical observational record may no longer be adequate; (vi) Cooperation between water agencies and leading scientific organizations can facilitate the exchange of information on the state-of-the-art thinking about climate change and impacts on water resources; (vii) Timely flows of information among the climate change scientists and the water-management community are valuable. Such lines of communication need to be developed; (viii) Traditional and alternative forms of water supply can play a role in addressing changes in both demands and supplies caused by climate changes and variability. Options to be considered include waste water reclamation and reuse, rainwater harvesting and even limited desalination where less costly alternatives are not available. None of these alternatives, however, is likely to alter the trend toward higher water demand in the future; and (ix) Prices and markets are increasingly important for balancing supply and demand. Because new construction and projects can be expensive, environmentally damaging, and politically controversial, the proper application of economics and water management can provide incentives to use less and produce more. Among the new tools that need to be explored are water banking and conjunctive use of groundwater.

### **Research Needs**

Records of past climate and hydrological conditions are no longer considered to be reliable guides to the future. The design and management of both structural and non-structural water-resource systems should allow for the possible effects of climate change, but little professional guidance is available in this area. Further research by hydrologists, civil engineers, water planners, and water managers is needed to fill this gap, as is broader training of scientists in the universities.

The decision-making bodies on water policies in India must realize that climate is not static, and assumptions made about the future based on the climate in the past may be inappropriate. Assumptions about the probability, frequency, and severity of extreme events used for planning should be carefully re-evaluated. Climate change will be imposed on top of current and future non-climate stresses. In some cases, these changes will be larger than those expected from population growth, land-use changes, economic growth, and other non-climate factors. Certain threshold events may become more probable and non-linear changes and surprises should be anticipated, even if they cannot be predicted with a high degree of confidence. The time lags between identifying the nature of the problems, understanding them, prescribing remedies, and implementing them are long. Waiting for relative certainty about the nature of climate change before taking measures to reduce climate-change related risks might prove far more costly than taking certain pro-active management and planning steps now. Methods must be used that explicitly incorporate uncertainty into the decision process. Expensive and long-lived new infrastructures should consider a wider range of climate variability than

provided by the historical record into infrastructure designs.

Areas for further research include the means of improving the ability of global and regional climate models to provide information on water-resources availability, to evaluate overall hydrologic impacts, and to identify regional impacts. Substantial improvements in methods to downscale climate information are also needed to improve our understanding of small-scale processes that affect water resources and water systems. Information about how our summer monsoon will be affected due to climate change is vital for determining impacts on water and water systems; yet such information is still not reliably available. More research on how the severity of cyclones and other extreme hydrologic events might change is necessary.

In addition, increased and widespread hydrologic monitoring systems are needed across the country. There should also be a systematic re-examination of engineering design criteria and operating rules of existing dams and reservoirs under conditions of climate change. Information on economic sectors most susceptible to climate change is extremely weak, as is information on the socioeconomic costs of both impacts and responses in the water sector. More work is needed to evaluate the relative costs and benefits of non-structural management options, such as demand management and water-use efficiency in the context of a changing climate. A detailed analysis of the implications of climate change for international water treaties and agreements with Pakistan, Nepal and Bangladesh is also required. Moreover, no information is available on how climate change might affect our groundwater aquifers, including quality, recharge rates and flow dynamics. Studies on these issues would be useful.

### **Concluding Remarks**

There are two distinct but complementary approaches to the problem of water resources in a holistic manner. They include (a) augmenting and enhancing the present reserves, and (b) taming the end demand. Sustainable use of water resource gets increasingly difficult as the demand for water far exceeds the availability, and the discounting rates for the future tend to increase under such circumstances. Therefore, in order to make our water utilization more sustainable both these approaches will have to be followed.

Though India is endowed with extensive sources of water, the utilizable quantity is less as the full potential of our rivers has not yet been assessed accurately (as is evident from the study of water potential of the Ganga Basin). Neither has there been a proper river management programme. The present water availability is further restricted due to water pollution as well as increasing salinity, which has rendered much of our river water as well as groundwater unfit for one or the other type of use.

In order to meet the future demand of water in a sustainable manner, emphasis has appropriately been laid in recent years on the implementation of rainwater harvesting as well as rooftop harvesting of rainwater. These options are limited in their capacity to meet the burgeoning national demand for water as they are subject to the variability of the monsoon, which is projected to increase due to global warming. These steps would be most effective at the grassroots level in meeting the demands of the rural population without having to depend on the government for the required infrastructure and would help in supplementing the main water supply.

In spite of the growing anti-dam sentiment in the country, it is considered irrational to rule out the hydrological projects completely as it would otherwise be impossible to ensure food security and supply of water for energy and industrial sectors. These projects would also increasingly reduce our dependence on the monsoons as the precipitation patterns over the country become more erratic due to climate change. So we will have to rationalize the options available to us and make the best use of our resources.

The other end of the water problem is to increase the efficiency of end use of water. The water policy of the country has been rightly oriented in this regard but implementation of the policy has been far from satisfactory. The water demand has to be tamed through an appropriate conjunction of economic and legislative mechanisms.

## References

- Ageta, Y. and T. Kadota (1992). Prediction of Change of Mass Balance in the Nepal Himalayas and Tibetan Plateau: A Case Study of Air Temperature Increase for Three Glaciers, *Annals of Glaciology*, 16, 89–94.
- CWC (Central Water Commission) (1995). *Water and Related Statistics*. New Delhi.
- Chitale, M. A. (1992). Water Resource Management in India — Achievements and Perspectives, *World Bank Technical Paper No. 175*.
- Collins, M. (1999). The El–Niño Southern Oscillation in the Second Hadley Centre Coupled Model and its Response To Greenhouse Warming. *J. Climate*, 13, 1299–312.
- Fushimi, H. (2000). Recent Changes in Glacial Phenomena in the Nepalese Himalayas. In Domoto, A., K. Iwatsuki, T. Kawamichi, and J. McNeely (eds.) *A Threat to Life: The Impact of Climate Change on Japan's Biodiversity*. Japan: Tsukiji–Shokan Pub. Co., Ltd., and Gland, Switzerland and Cambridge, UK: The World Conservation Union (IUCN), 42–45.
- GOI (Government of India) (2000). Year Book, New Delhi: Ministry of Information and Publication.
- IPCC (Intergovernmental Panel for Climate Change) (1998). *The Regional Impacts of Climate Change: An Assessment of Vulnerability*. A Special Report of IPCC Working

- Group II [Watson, R. T., M. C. Zinyowera and R. H. Moss (eds.)] and WMO/UNEP. Cambridge: Cambridge University Press.
- IPCC (Intergovernmental Panel for Climate Change) (2001). *Climate Change 2000, The Science of Climate Change*, Assessment Report of IPCC Working Group I [Houghton, J. T. *et al.* (eds.)] and WMO/UNEP, Cambridge: Cambridge University Press (in press).
- Ives, J.D. and B. Messerli (1989). *The Himalayan Dilemma: Reconciling Development and Conservation*. London: Routledge.
- Kitoh, A., S. Yukimoto, A. Noda and T. Motoi (1997). Simulated Changes in the Asian Summer Monsoon at Times of Increased Atmospheric CO<sub>2</sub>. *Jr. Meteor. Soc. Japan*, 75, 1019–31.
- Lal, M., U. Cubasch and B. D. Santer (1994). Effect of Global Warming on Indian Monsoon Simulated with a Coupled Ocean–Atmosphere General Circulation Model. *Current Science*, 66(6), 430–8.
- Lal, M., U. Cubasch, R. Voss and J. Waszkewitz (1995). Effect of Transient Increases in Greenhouse Gases and Sulphate Aerosols on Monsoon Climate. *Current Science*, 69(9), 752–63.
- Lal, M., G.A. Meehl and Julie M. Arblaster (2000). Simulation of Indian Summer Monsoon Rainfall and its Intraseasonal Variability. *Regional Environmental Change*, 1 (3 & 4), 163–79.
- Lal, M., T. Nozawa, S. Emori, H. Harasawa and K. Takahashi, M. Kimoto, A. Abe–Ouchi, T. Nakajima, T. Takemura and A. Numaguti (2001). Future Climate Change: Implications for Indian Summer Monsoon and its Variability. *Current Science*, (Communicated).
- Nakicenovic, N., J. Alcamo, G. Davis, B. de Vries, J. Fenhann, S. Gaffin, K. Gregory, A. Grubler, T.Y. Jung, T. Kram, E.L. La Rovere, L. Michaelis, S. Mori, T. Morita, W. Pepper, H. Pitcher, L. Price, K. Raihi, A. Roehrl, H. H. Rogner, A. Sankovski, M. Schlesinger, P. Shukla, S. Smith, R. Swart, S. van Rooijen, N. Victor, and Z. Dadi (2000). *Emissions Scenarios, A Special Report of Working Group III of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Pant, G. B. and K. R. Kumar (1997). *Climates of South Asia*. West Sussex, UK: John Wiley & Sons Ltd..
- Pender, M. (1995). Recent Retreat of the Terminus of Rika Samba Glacier, Hidden Valley, Nepal. In Wake, C.P. (ed.). *Himalayan Climate Expedition — Final Report*, Glacier Research Group, University of New Hampshire, p. 32–39.
- Singh, T. (1995). *Drought Disaster and Agricultural Development in India*. New Delhi: People's Publishing House.
- Suresh, V. (2000). Sustainable Development of Water Resources in Urban Areas. (Proceedings of 10<sup>th</sup> National Symposium on Hydrology). July 18–19, CSMRS, New Delhi.

- Webster, P. J., V.O. Magana, T.N. Palmer, J. Shukla, R.A. Tomas, M. Yanagi and T. Yasunari (1998). Monsoons: Processes, Predictability and the Prospects for Prediction. *J. Geophys. Res.*, 103, 14451–510.
- Yamada, T., H. Fushimi, R. Aryal, T. Kadota, K. Fujita, K. Seko and T. Yasunari (1996). Report of Avalanches Accident at Pangka, Khumbu Region, Nepal, in 1995. *Japanese Soc. of Snow and Ice*, 58(2):145–55.

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### **Professor M. N. Srinivas Memorial Prize**

The Indian Sociology Society and the Indian Council of Social Science Research have jointly set up Professor M. N. Srinivas Endowment Fund. This Fund has instituted a prize for young sociologists/social anthropologists for publishing the best sociological/social anthropological paper in any of the social science journals, in English, in India. The prize will carry a sum of Rs.1000.

Papers published during 01 January 1998 – 31 December 2000 are eligible for consideration. The author must be 35 years or less in age on 31 December 2000. A reprint of the paper along with a photocopy of the title page of the journal must reach the office of Indian Sociological Society (Institute of Social Sciences, 8 Nelson Mandela Road, Vasant Kunj, New Delhi 110 070) on or before 31 August 2001. Besides the authors, others are also welcome to bring suitable papers to the notice of the selection committee for consideration.

# **Environment-Related Global Issues: Global and Regional Conventions and the Role of the Third World\***

**Bhaskar Majumder\*\***

## **Abstract**

The nation-specificity of environmental issues is true for some resources, though ultimately all usable resources become global issues if they cross the national border. Globalization of the post-Second World War period has led to increasing trade-related conflicts between the developed and the developing countries. Environment-related trade restrictions imposed particularly by the developed market economies obstruct market access by the Third World Countries. This paper explains the apparently national environmental issues in the global context. The interventions by the regional and world bodies through conventions and rules on these issues help the countries to settle environment-related disputes. These interventions confirm coordinated action plans on national environmental problems that have a global impact. The preventive measures in the Third World countries supplement the solution process.

The environmental concerns of countries are manifested in areas of trade, investment, and sustainable development. Though initially confined to the national boundaries (except for trade), these concerns become global not only because of issues that encompass global commons but also because of issues that affect many countries in the chain. For example, river-based irrigation, particularly through construction of big dams in one country in the upstream, may lead to food insecurity in the countries in the downstream. The fact today is that most of the 'global conventions call for national inventories, action programmes and reporting mechanisms, such as climate change country studies, biodiversity country studies on sources and sinks of greenhouse gases, and country programmes for the phase-out of ozone-depleting substances under the Montreal Protocol. Countries have adopted standards, limits, rules and regulations to implement these international agreements at the national level' (UNEP, 1997, p.130). The intervention through

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the world bodies on environment issues is believed to help the countries to settle disputes related to trade, for example, but does not eliminate the disputes. This, rather than undermining the role of global intervention, affirms its positive role in chalking out better coordinated action plans related to national environmental problems that have a global impact, and to transboundary environmental problems.

The mode of cooperation and implementation of the action plans agreed to in principle, however, vary between the developed market economies (DMEs) and the Third World Countries (TWCs). This is because the two basic requirements for the implementation of economic instruments, namely, well defined 'property rights' and 'markets', are not quite visible in the TWCs, where the community owns and uses resources in many of the cases like forestry, grazing land, etc., unlike in DMEs, which have private ownership and use of resources. The relative weightage of resources in production also differs between the DMEs and the TWCs not only because of non-availability of resources but also because of incapacity to import resources and technological incapacity to explore alternative possibilities in resource uses. All these are reinforced by the ongoing processes of core vis-a-vis colonial division of labour, the former being for the DMEs and the latter for the TWCs. The application of instruments for protection and utilization of resources in the TWCs and the relevance of the global action plans for the TWCs are to be examined in this context.

It is our contention that the way environment, when degraded or destroyed, affects people is specific to a sovereign nation. This is because the governed participate in the process of legitimization of the actions of a government on the supposition that the latter is entrusted with ensuring the welfare of the former. This nation-specificity of environmental issues is true for some of the resources, though ultimately all usable resources become global issues if they cross the national border and when they come in the domain of trade. Certain resources do not have national boundaries by nature, like air, ocean water, fisheries in the ocean, etc., while some other resources may be nation-specific like forestry, minerals, etc., while some other resources may be both nation-specific and transnational like rivers. We will thus talk about national environmental issues in the global context.

### **National and Global Environmental Issues**

Environmental issues have roots in the production and processing methods (PPMs) in the developed and developing countries of the post-Second World War period. Environmental laws are less stringent in developing countries, which may favour the inflow of capital. The DMEs have very limited interest in such inflows unless their long-term interests are served. There come, in addition to defensive and obstructionist investment in the TWCs, environment-related trade barriers

imposed by the DMEs on the developing countries. These barriers are imposed through the executing arms of the post-Second World War International Economic Order (IEO). In addition to the Bretton Woods twins, the World Trade Organisation (WTO) became operative on April 1, 1995, to look after the IEO. The General Agreement on Tariffs and Trade (GATT), a multilateral trading system, came into being in 1946 to promote free trade. Following the Uruguay Round between 1986 and 1994, the WTO came into being in 1994 to implement trade rules and agreements. Within the WTO a Committee on Trade and Environment (CTE) was set up in 1995. Let us take a look at the major environmental issues in national economies that have a bearing on other economies and, hence, have become global.

**Example I:** ‘When pollution affects primarily the population of the country of origin, such as the contamination of drinking water by a country’s own industries or people or air pollution in big cities caused by auto emissions, the pollution is national in nature. There is no legitimate case for trade sanctions to combat national pollution problems. International pollution originates in one country, but affects people in one or more other countries, for instance, acid rain that carries pollutants from the United States into Canada is an example of “bilateral” international pollution. Global warming and depletion of the ozone layer are examples of “multilateral” international pollution’ [Asian Development Bank (ADB), 1999, p.223].

**Example II:** ‘Many environmental problems, especially those affecting rural areas and fisheries, spill over national boundaries; examples include acid rain, groundwater contamination, and the depletion of fish stocks. In such cases, much of the costs are not borne by those in the country whose producers or residents give rise to the problem and no legal framework exists which allows the residents of one nation who are adversely affected to take action against the residents of another’ (ADB, 1996, p.180).

**Example III:** In 1988, the United States, at the request of the Earth Island Institute in California, enforced a provision of the Mammals Protection Act (1972) relating to the high mortality rate of dolphins. This happened when tuna were being caught with purse-seine nets. Since tuna swim below dolphins, some dolphins were caught and drowned in the purse-seine nets. Mexico disputed this decision and brought the United States to a GATT (now World Trade Organization) dispute panel. The panel found that the United States’ decision was inconsistent with GATT rules. This decision upset the environmentalists worldwide (UNCTAD, 1998, p.61).

**Example IV:** On January 30, 2000, around one lakh tonnes of cyanide, used at a mine in Baia More in Romania to separate gold from ore, ‘was washed from an open storage basin into the Tisza, a tributary of the Danube. Three weeks and

almost 1,000 km. later, almost everything in the Tisza's murky, brown water is lifeless. Well over 100 tonnes of dead fish have been scooped out downstream in Hungary and Yugoslavia; plankton, invertebrates and birds have been killed too. ...With concentrations of 2.7 milligrams of cyanide per litre of water recorded several hundred kilometres from the source, 130 times the safe limit, the water is now lethal. Environmental bodies, such as the International Commission for the Protection of the Danube, a United Nations Agency, are trying to clean up the river' (*The Economist*, 2000, p.55).

**Example V:** The snow on the mountains in eastern Turkey melts in spring each year into a seasonal surge in the flow of the Euphrates and Tigris rivers farther south. 'That extra water, in turn, constitutes the mainstay of agriculture on the huge Mesopotamian plain of Iraq, Syria and Southern Turkey'. Recently Turkey has started the southeastern Anatolia Project that involves construction of at least 22 dams. Turkey controls almost all the water in the Euphrates and about half of that in the Tigris. This gives Turkey an advantage over their downstream neighbours, Syria and Iraq. Turkey is now planning to increase the current level of irrigation along the Euphrates tenfold over the next ten years. Turkey uses to 'equate its water resource with Arab oil, as a God-given resource to be exploited to the full' (*The Economist*, 1999, p.49).

For Syria and Iraq, the flow of water varies so much and is so distorted by the dams, canals and irrigation projects along the two rivers that the three involved countries really do not know how much water they are using.

'Only two treaties deal with water-sharing in the Mesopotamian basin: a 1987 protocol between Turkey and Syria guaranteeing a minimum flow of 500 cumecs (cubic metres per second) in the Euphrates at the Turkish-Syrian border, and an Iraq-Syrian pact splitting that amount 58:42. (The Tigris, which has a bigger flow and fewer dams, has not yet occasioned much dispute). What the Turkish water authority concedes is that following the completion of the irrigation projects, the guarantee of 500 cumec minimum might prove impossible to maintain in times of drought' (*The Economist*, 1999, p.49).

Syria and Iraq, though unsatisfied with the situation, lack the clout to extract a firm Turk commitment on the sharing of both rivers. Turkey faced down Syria in 1998 in a dispute over Kurdish insurgents, while Iraq cannot make a fuss, having been under sanctions for the last one decade.

**Example VI:** Mexico has long been a dumping ground for rubbish from the United States. 'Since NAFTA took effect on January 1, 1994, Mexico has passed environmental laws similar to those of the United States and Canada, its NAFTA partners ... and has started to benefit from several two-and three-country schemes designed to fulfil "side accords" on the environment' (*The Economist*, 1999, p.34).

Following the formation of NAFTA, there occurred the growth in maquiladoras (factories using imported raw materials to make goods for re-export, usually to the United States) and associated inadequate rubbish disposal, scarcity of safe drinking water and no sewage treatment. The Border Environment Cooperation Commission (BECC), a bilateral agency set up under NAFTA, looks into these problems. After 1994 Mexico's exports of toxic waste to the US have dropped sharply. This suggests that regional agencies and tough rules help greener manufacturing policies.

**Example VII:** Australia sought an injunction in the second half of 1999 to halt 'experimental' fishing by Japan for southern bluefin tuna. Australia has accused Japan of using science to disguise commercial fishing and is seeking a declaration from the International Tribunal for the Law of the Sea that the experimental fishing programme is illegal. Japan announced recently that 'it would resume the experimental fishing programme it began in 1998, despite censure from Australia and New Zealand, its partners in the Commission for the Conservation of Southern Bluefin Tuna. It says the programme will alter it to establish the size of the tuna stock' (*Down to Earth*, 1999, September 15, p.7).

The environmental issue that gets immediate manifestation within a particular country and adversely affects at least another country becomes a global issue. This follows not only from joint consumption of resources by countries but also from illegal trade and from other routes. In December 1999 the Government of the Philippines sent an official report to its Japanese counterpart about the illegal export of tonnes of garbage—including hazardous hospital wastes—to the Philippines in a government-chartered vessel which was returned to Tokyo immediately. Nisso Limited, an industrial waste disposal company in Japan, made the shipment. Following the complaint of the Philippines government, the Japanese government sent inspectors to the Philippines and investigations were initiated into the garbage shipment as it violated the statutes laid down by the Basel Convention of 1992 on the shipment of hazardous waste. The Japanese team confirmed that the garbage did contain hazardous hospital waste. The Japanese government ordered Nisso Limited to immediately recover the waste and accused it of violating the Foreign Exchange and Foreign Trade Control Law (*Down to Earth*, 2000, p.8). Some of the issues are more complex. For example, the Forum for Arsenic Patients (FAP), a newly formed organization in Bangladesh, has threatened to sue UNICEF for compensation on behalf of millions of unsuspecting victims of arsenic poisoning. The hand-pump system, introduced to wean the vast majority of Bangladeshis off contaminated surface water, was identified as the main cause of large-scale diarrhoea-related deaths in the 1970s and 1980s. The FAP reported that of the 30,000 wells dug in Bangladesh by the UNICEF to provide safe water, 63 per cent were found contaminated by arsenic. The FAP has

accused UNICEF of aiding the biggest mass poisoning in human history (*Down to Earth*, 1999, p.9). It is not very clear how the mechanism of compensation is to be worked out, if at all, if the report is true.

For the case of 'one polluter-one or many victims', regional or global bodies can impose a penalty on the polluter. 'American factories cause acid rain that poisons Canadian forests; Indian ones pollute the Ganges, ruining rice paddies in Bangladesh. ... Global problems, such as ozone depletion or global warming, can impinge on trade too. These require global agreements, yet each country has an incentive to free ride on the other's efforts. There might even be cases where the threat of trade sanctions is needed to enforce such agreements' (*The Economist*, 1999, p.15). Often the DMEs suggest imposition of trade sanctions against countries not complying with the environmental norm set by the former. A Committee on Trade and Environment (CTE) also has come under WTO in 1995 to examine this question of imposition of trade sanctions. The Rio Declaration on Environment and Development, however, has already cautioned 'against unilateral actions taken to deal with environmental challenges outside the territory of the importing country' (ADB, 1999, p.224). The regional (bilateral and multilateral) environmental agreements based on cooperation may help solve these environmental problems. Some of the problems apparently internal to the TWCs can be solved in a time phasing manner by the support of the DMEs. For example, under the Montreal Protocol of 1987, India will receive from the DMEs US \$82 million over the next ten years to phase out the production of chlorofluorocarbons (CFCs), of which India is one of the largest producers. India produces 23,000 tonnes per annum of CFC while China produces 50,000 tonnes per annum. China will receive \$150 million to phase out the production of CFC (*Down to Earth*, 2000, p.13). The money is to be spent on developing CFC alternatives. The amount was sanctioned at the 29<sup>th</sup> meeting of the Montreal Protocol held in Beijing, China, recently. Regarding the use of river water that covers a number of countries, for example, a 1998 agreement between the countries belonging to the river system is supposed to govern river usage (*The Economist*, 2000, p.55). The fact is that it is inadequately policed. And old unethical practices, if unchallenged, are hard to correct.

### **Environment-Related Regional Groups and Global Conventions**

Most of the environmental issues for the countries ahead in industrialization are transnational. Thus, the DMEs are ahead of others in terms of environmental information, laws and agreements. The case of the European Union may be taken as a prominent example in this regard. If we consider the period since 1957, we find a number of environmental agreements adopted by the EU. These include the European Agreement of 1957 concerning the International Carriage of Dangerous

Goods by Road, the 1991 Agreement on the Conservation of Bats in Europe, and also a number of conventions (Table 1).

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**Table 1: Regional Environmental Agreements: The Case of European Union, 1957–93**

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Year	Agreements
1957	European Agreement concerning the International Carriage of Dangerous Goods by Road.
1968	European Agreement on the Restriction of the Use of Certain Detergents in Washing and Cleaning Products (as amended), Strasbourg.
1979	Convention on Long-Range Transboundary Air Pollution, Geneva, and its Protocols.
1979	Convention on the Conservation of European Wildlife and Natural Habitats, Berne.
1991	Convention on Environmental Impact Assessment in a Transboundary Context, Espoo.
1991	Agreement on the Conservation of Bats in Europe, London.
1992	Convention on the Transboundary Effects of Industrial Accidents, Helsinki.
1992	Convention on the Protection and Use of Transboundary Water Courses and International Lakes, Helsinki.
1993	Convention on Civil Liability for Damage Resulting from Activities Dangerous to the Environment, Lugano.

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*Source:* UNEP (1997, p.175).

Regarding sharing of information on the environment, EU member countries 'have already been instructed to implement Directive 90/313 on the freedom of access to environmental information, giving any person anywhere in the world the right of access to any information on the environment held by public authorities' (UNEP, 1997, p.177). Recently the European Commission (EC) has taken the UK and France to court for violating EU pollution laws. The EC claims that the UK has failed to prevent water pollution from nitrates and that France has not come up with policies to deal with waste and hazardous materials. The EU laws stipulate that the member states should have plans to identify areas at risk from nitrate and to monitor nitrate levels in surface and groundwater before 1994. The EC claims that

many areas in France do not have adequate measures to deal with waste including clinical waste or hazardous chemicals such as polychlorinated biphenols (PCBs) (*Down to Earth*, 1999, p.21). In April 1997 the members of the European Union announced their decision 'to reduce the fishing capacity of EU fleets by 30 per cent for endangered species, such as cod, herring, and sole in the North Sea, and 20 per cent for overfished stocks, such as cod in the Baltic Sea, the bluefin tuna, and swordfish off the Iberian peninsula' (Brown, 1998, p.5).

The groups of countries in the Third World have also initiated several agreements on environmental cooperation. These include the 1993 Plan of Action (1994–98) of the ASEAN Senior Officials on the Environment (ASOEN), the 1993 South Pacific Regional Environmental Programme (SPREP), the formation in 1991 of an Environment Unit within the Mekong River Commission, the submission in 1992 of 'African Common Position on Environment and Development' by the Organization of African Unity (OAU) at the Earth Summit, etc (Table 2). The initiatives for the conventions and agreements by the groups in the Third World are taken much later than those initiated by the DMEs. In general, the major global environmental issues like climate change, ozone layer, CFC control, Law of the Sea, and trade in endangered species brought about global conventions during the 1980s and 1990s. The Kyoto Convention on Climate Change of 1997, for example, aimed at stabilizing atmospheric concentrations of greenhouse gases at levels that will prevent human activities from interfering dangerously with the global climate (Table 3). The global initiatives and actions on climate change started in 1979 with the first World Climate Conference held in Geneva that expressed concern for global warming. With the passage of time, 176 nations signed the United Nations Framework Convention on Climate Change (FCCC) in Rio de Janeiro in 1992. Ultimately in 1997, the Kyoto Agreement was reached (Table 4).

A total of 160 nations reached a historic agreement in Kyoto, Japan, on limiting emissions of carbon dioxide and other greenhouse gases on December 10, 1997. The Kyoto Protocol enjoins industrialized nations to reduce their average national emissions over the period 2008–2012 to about five per cent below 1990 levels. The Kyoto Protocol 1997 pledged by the industrialized countries commits them to cutting their emissions of greenhouse gases to an average of 5.2 per cent below the 1990 level by 2008–2012. The US made a pledge to reduce its emissions by seven per cent below the 1990 level, slightly less than the European Union and slightly more than Japan. None of the developing countries, including those with large and growing emissions, such as India and China, is required to limit its emissions. To begin with, developing countries do not have commitments under the Kyoto Protocol. They have contributed little to the global warming problem historically, and need time, and ecological space to develop. So far, none of the G-7 countries has shown any willingness to take responsibility for GHG reductions.

**Table 2: Mechanisms of Environmental Cooperation in the Third World — Selected Cases**

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1. In July 1993, the ASEAN Senior Officials on the Environment (ASOEN) agreed on the development of a new strategic Plan of Action on the Environment (1994–1998).
  2. The South Pacific Regional Environmental Programme (SPREP), established in 1993 and covering 22 Pacific Island countries and territories, aims at enhancing the institutional capacity of its members, and hence has initiated an Action Plan (1991–95) covering aspects of environmental assessment management, and law in the sub-region.
  3. Countries of the South Asia Cooperative Environment Programme (SACEP) implement Action Plan called SACEP's Strategy and Programme (1992–96).
  4. The International Centre for Integrated Mountain Development (ICIMD), established in 1993 in Nepal, implements programmes to attain environmental stability, sustainability of mountain eco-systems, and poverty eradication in the Hindu-Kush Himalayas.
  5. The Mekong River Commission (MRC) an inter-governmental organization for cooperation and coordination in the use and development of water resources of the lower Mekong Basin, had an Environment Unit established in 1991.
  6. The Inter-governmental Authority on Development (IGAD) was created to coordinate efforts of member states in controlling drought and desertification. ICAD focuses on food security, management of the environment, and desertification problems.
  7. At the Earth Summit in 1992 the African region, through the Organization of African Unity (OAU), submitted a comprehensive report entitled the African Common Position on Environment and Development as its contribution to Agenda 21.
  8. The Regional Organization for the protection of the Marine Environment (ROPME), established in 1982, covers environmental monitoring, management, legislation, and preparation of protocols, awareness building and training.
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*Notes:*

1. IGAD comprises Djibuti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, and Uganda.
2. ASEAN encompasses Brunei, Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand.
3. SACEP includes Afghanistan, Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka.
4. MRC consists of Cambodia, China, Lao PDR, Myanmar, Vietnam, and Thailand.
5. ICIMD includes Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.

*Source:* UNEP (1997, p.150, 152, 165, & 207).

**Table 3: Global Actions on Climate Change, 1979–97**

Year	Actions
1979	The first World Climate Conference was held in Geneva. It expressed concern about global warming.
1985–87	International meetings in Villach, Austria, and Bellagio, Italy, established climate change as an international concern.
1988	An international group of experts in science organized the Intergovernmental Panel on Climate Change (IPCC).
1990	The Second World Climate Conference in Geneva presented the results of the first IPCC assessment report. The IPCC estimated that a 60 per cent cut in emissions would be needed to stabilize atmospheric carbon dioxide at the 1990 level, but no conclusive link between human activity and global warming was established.
1992	The United Nations Framework Convention on climate change was signed in Rio de Janeiro by more than 160 nations. The Convention included nominal objectives for some countries but no binding targets.
1995	The IPCC published its second assessment report, concluding that ‘the balance of evidence suggests that there is now a discernible human influence on the global climate.’
1997	Agreement was reached on the Kyoto Protocol. Industrial countries and most of the economies in transition from central planning commit themselves to reducing greenhouse gas emissions by an average of 5.2 per cent below 1990 levels in the period 2008–12.

*Source:* World Bank (1999, p.102).

**Table 4: Global/Regional Conventions on Environment and their Purposes, Selected Cases**

Year in which signed	Conventions	Purpose/Aim
1982	United Nations Convention on the Law of the Sea	Effective since November 1994, it establishes a comprehensive legal regime for sea and oceans, establishes rules for environmental standards and enforcement provisions, and develops international rules and national legislation to prevent and control marine pollution.
1985	Vienna Convention for the Protection of the Ozone Layer	To protect human health and the environment by promoting research on the effects of changes in the ozone layer and on alternative substances (such as substitutes for chlorofluorocarbons) and technologies, monitoring the ozone layer, and taking measures to control the activities that produce adverse effects.
1987	Montreal Protocol for CFC Control	To protect the Earth from excessive ultraviolet radiation by cutting chlorofluorocarbon consumption by 20 per cent over their 1986 level by 1994 and by 50 per cent over their 1986 level by 1999, with allowances for increases in consumption by developing countries.
1997	Kyoto Convention on Climate Change	To stabilize atmospheric concentrations of greenhouse gases at levels that will prevent human activities from interfering dangerously with the global climate.
—	Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)	To prohibit commercial trade in endangered species. It requires signatories to closely monitor species trade.

*Note:* — means not available

*Source:* World Bank (1998, p.167).

Instead, countries like the US have toed the industry line and made their action on climate change conditional to the 'meaningful participation' of developing countries. The US industry wants developing country participation because they fear that if the US has emission limits and a country like India does not, then polluting companies will move to India, giving India an economic advantage (Sharma, 2000, p. 52).

The Kyoto Protocol 1997 includes all the major greenhouse gases and takes into account emission changes resulting from changes in forest and land use patterns. The greenhouse gases include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF<sub>6</sub>). The Protocol also contains the elements of a programme for international trading of greenhouse gas emissions. Such trading would employ market incentives to help ensure that the lowest-cost opportunities for emissions reductions are pursued.

The Kyoto Protocol 1997 agreed to ensure in principle 'credits' to nations planting or protecting woodlands at home and abroad. The Protocol approved in principle the establishment of mechanisms to assist developing countries in achieving clean development. However, after three years of negotiations, the Kyoto signatories have still not agreed if there should be sanctions for countries that fail to meet their reduction targets, as proposed by the European Union, and who will impose them. In this context, the Sixth Conference of Parties (COP- 6) to the UN Framework Convention to Climate Change (UNFCCC), scheduled to be held at The Hague in the Netherlands from November 13 to 24, 2000 is crucial. This is because COP- 6 was planned to work out the modalities under which the Kyoto Protocol would function. The specifics of the Protocol's functioning, however, remain unknown.

Industrialized countries have been pleading for soft options for emission reductions. These countries support certain 'flexible mechanisms' provided by the Protocol. These involve trading of GHG emissions, mainly through energy projects, allowing northern countries to meet their targets without substantial domestic action. The EU, for example, has recently stated that domestic action should be employed for most of the emission cuts. The US, responsible for 24 per cent of the global GHG emissions, refuses to take domestic measures till developing countries also do the same (*Down to Earth*, 2000, p. 13). The Kyoto Treaty 1997 sets a long-term framework that requires frequent updating and revision, rather like the post-war process of trade liberalization. The question remains about how to implement Kyoto. One view is that countries should search out 'no regrets' measures that are beneficial in their own right and also reduce emissions—such as scrapping coal subsidies, liberalizing energy markets, and cutting farm support. The supporting second measure is that implementation should use market-friendly measures that minimize the costs and risks of slowing economic growth' (*The Economist*, 2000, p. 19). This is the view of the North. This also shows the way

how the North is denying the developing countries the right to develop by forcing these countries to halt the use of fossil fuel technologies. The view of the North goes without providing a framework for the world to move towards a renewable energy future (Sharma, 2000, p. 53).

The argument in The Hague centres on the second point, and, in particular, on the use of emissions trading and carbon ‘sinks’ such as forests that could lower the cost of reaching the Kyoto targets. The Americans want unrestricted trading and generous definitions of what constitutes a sink, despite scientific uncertainties about this point. The Europeans want strict curbs on both. The common thread of these issues is that the Europeans are taking a moralistic stance that the lion’s share of reductions should come from ‘real’ emission cuts at home. The proper aim of the negotiations in The Hague should be to turn Kyoto into a treaty that bites, but with full flexibility over how countries should reach the targets that they have signed up for. The aim has to be to ‘unleash a wave of clean technology, efficiency and green energy on a scale that would be unimaginable with any deal that dragged down growth. Done properly, the Hague Conference could be the start of a long-term process that can adapt as the science of climate change matures and as the world grows richer (*The Economist*, 2000, p. 19–20).

The ‘FCCC recognized that countries had common but differentiated responsibilities —industrialized countries, with larger historical and current GHG (greenhouse gases) emissions, would be the first to reduce GHG emissions, allowing developing countries space for industrialization’ (*Down to Earth*, 2000, p.34). Though agreed in the Kyoto Agreement, the United States and the European Union have started drifting away from the consensus built in Kyoto. For example, the US insists that the developing countries will be the world’s biggest polluters within a few decades. Thus, before the UN climate change conference of November 2, 1999, in Bonn, Germany, the DMEs insisted that the developing countries such as China and India should voluntarily take steps such as ending coal subsidies for environmental benefits (*The Economist*, 1999, p.20). It is thus not the actual extent of pollution but the possibility of addition to pollution that guides the thought process of the DMEs as far as climate change is concerned.

Environment-related disputes, many of which are trade-related, remain across countries. The product and process-specific cases are brought to the WTO where a particular country or a group of countries has to respond. India, Malaysia, Pakistan, Thailand, and later the Philippines, complained in the WTO against the USA’s imposition of a ban on the import of shrimp and shrimp products. Canada complained against South Korea about measures concerning bottled water (Table 5). The CTE admits the complexity of the relationship between trade and environment. This relationship is a matter of concern because it is mostly the environment-related trade issues that determine the formation and functioning of

regional groups. The countries as trade partners are also members of WTO and parties to Multilateral Environmental Agreements (MEAs). 'An MEA that calls for restrictions on certain imports as part of protecting the environment may violate that country's commitment to WTO' (ADB, 1997, p.202). The CTE affirms that GATT Article XX and other WTO provisions permit countries to impose trade-related measures for environmental reasons. The CTE emphasizes the need to avoid disputes through consultation and cooperation among governments and between WTO and MEA institutions (ADB, 1997, p.202–203). The fact is that the disputes remain.

**Table 5: Environment-Related Disputes Referred to the WTO Dispute Settlement Body, Selected Products, (1 January 1995 to 18 October 1996)**

Respondent	Complainant	Products
Malaysia	Singapore	Prohibition of polyethylene and polypropylene.
Korea, Rep. of	US	Testing and inspection of agricultural products.
Korea, Rep. of	US	Shelf life of products.
Korea, Rep. of	Canada	Measures concerning bottled water.
India	US (joined by EU)	Patent protection for pharmaceuticals and agricultural chemicals.
US	India, Malaysia, Pakistan, and Thailand	Import prohibition of certain shrimp and shrimp products.
US	Philippines	Import prohibition of certain shrimp and shrimp products.

*Source:* ADB (1997, p.206).

The product and method of production that are thought safe in a particular country may not be thought safe in another country. The method of production includes the human environment. There may also be evils like use of cheap child and women labourers in production in some countries, not in others. The labourers may work in unhygienic conditions in some countries, not in others. Levels of technology in advanced and underdeveloped countries are also different. These differentials in labour and environmental standards across countries are now considered at a particular time in history, and labour-environmental situations across countries are not similar over different periods. The goals of the TWCs for immediate industrialization now compel them to ignore some of the environmental issues. The DMEs have crossed the stage of slavery and nationally unacceptable environmental situations. At the same time these DMEs ignore major global issues regarding climate change, export or dump environmental hazards in other

countries, particularly in TWCs, while trying to impose stringent environment clauses on the TWCs. The trade sanctions remain a vital instrument in the hands of the DMEs. The DMEs and the TWCs thus have different targets, opportunities and compulsions.

### **Role of the Third World Countries**

Market-globalization of the post-Second World War period has led to increasing trade-related conflicts between the developed and the developing countries. Of late, these conflicts are linked with labour and environment. The TWCs are against the linking of uniform environmental standards to market access provisions. Market access refers to the ability of a country to supply commodities and services to the rest of the world. The TWCs visualize environment-linked trade restrictions as a form of protectionism used by the DMEs. The WTO Committee on Trade and Environment (CTE) supports the view that the sovereign governments 'have the right to set their own environmental standards and that trade action should not be taken to offset any perceived competitive disadvantage arising from other countries' environmental policies' (ADB, 1997, p.178). At the same time, WTO rules allow any country to 'deny entry to imported goods failing to meet the same product regulations as domestically produced goods' (ADB, 1997, p.203). The WTOCTE thus accepts the right of the nation state to have control over its own products, produced and sold internally. The problem comes when this chain from production to consumption becomes global, i.e., commodities produced anywhere in the world means its destination to any consumer anywhere in the world. Global division of labour as such makes the WTOCTE norm difficult for the firms that originate in the TWCs because they remain in a position of non-competition vis-a-vis the TNCs, the latter originating in the DMEs. The environment questions really become global when the particular country looks at markets beyond its own boundary. Thus, in any non-autarkic situation the environment questions become global.

The regional groups for environmental protection are not necessarily state-centred, represented by the governments at the regional and international fora, but also are represented by the non-government organizations (NGOs). As an active part of the civil society, these NGOs are expected to play a positive role between the people and the State. At the first conference of parties of the United Nations Framework Convention on Climate Change (UNFCCC) in Berlin in 1995, NGOs from the DMEs and the TWCs came together under a coalition called the Climate Action Network (CAN). The CAN tried to counter the idea that the large TWCs are a hindrance to solving the climate problem. Recently, the CAN backed the Centre for Science and Environment (CSE), an NGO based in New Delhi, India, in opposing a German proposal that implicated the TWCs by looking only at future

emission projections. The consolidation of NGO opinion at Berlin, Germany, led to the withdrawal of the proposal. What the DMEs ignore in these processes is their own past and present in emissions. For example, the US is the world's largest emitter of carbon dioxide (CO<sub>2</sub>) today. The point that should be clear here is that the interests of the NGOs that originate from the DMEs are different from those of their counterparts from the TWCs. This may be evident if the relative neglect of the North-South equity, the mainstay of NGO concerns during the UN Convention on Environment and Development (UNCED) in 1992, is kept in mind (Sharma, 2000, p.55). The outcome of the WTO ministerial meeting held in Seattle, USA, in 1999 confirms that the civil society of the DMEs favours the use of trade as a lever to control the environmental behaviour of the TWCs (*Down to Earth*, 2000, p.40).

There is no doubt that international cooperation is a prerequisite for tackling transboundary environmental issues as these cannot be solved by any country in isolation. However, 'it is not clear how the decision of the dispute settlement mechanism (within WTO) will be upheld if it conflicts with the unilateral action proposed by a major trading nation, although countries are beginning to acknowledge the benefits of multilateral settlement of disputes' (ADB, 1997, p.200). It is also a fact that the 'large trading nations that had in the past resorted to unilateral action now seem to prefer submitting disputes to WTO. Nevertheless, the threat of unilateral measures persists. India and Pakistan, for example, continue to be on the US 'watch list' for possible unilateral action under Section 301' (ADB, 1997, p.200).

Positive steps have already been initiated by countries to ensure safe products and processes. In particular, following the regional and global conventions, the nation states have initiated action on standards, limits, rules and regulations to implement the international and regional agreements at the national level. At present around 20 eco-labelling programmes exist, most of which are voluntary. Among these are the 'Green Dot' or 'Dual System' of Germany, and the 'Eco-Mark' of Japan. In areas of textiles and footwear eco-labels are emerging fast in Third World countries, which are the major exporters of these, with the destinations being the DMEs (ADB, 1997, p.203). Many of the countries in the Third World are taking steps to protect the quality of natural resources while these are used in industrial production. In Indonesia's 'Proper' programme, government officials rank water polluters by colour code. Black is for those factories that make no attempt to control pollution; red is for those that have some pollution control but fall short of compliance; blue is for those that meet national standards; green for those that are much cleaner than required; and gold for world class performers. No factory in Indonesia has yet earned the gold colour code (*Down to Earth*, 2000, p.21). Generally, as opposed to the 'command and control' approach, market-based instruments (MBIs) are being applied in both DMEs and TWCs. 'In

general, price-based MBIs have been more widely used than those that are quantity based. Within price-based MBIs, indirect instruments such as input-output taxes, differential tax rates and use fees have found extensive application in developed countries. By contrast, developing countries have made greater use of subsidies including those for end-of-pipe treatment equipment' (GOI, 1998–99, p.167). Many of the environment-related problems that accumulate later can be nipped in the bud if the firms and governments in the TWCs respond positively and in time to the citizens' problems. If the government is committed to ensuring environmental safety, voluntary disclosure of environment-related problems by firms saves time, cost and lives. Often the citizens' problems are revealed when they are victimized. Voluntary action groups constituted by people who are environmentally more aware may take initiatives at the local, national, regional and global levels and hence can take the cause of environmental safety forward.

Some of the steps that the governments of TWCs can initiate at the national level are as follows:

1. Ex-plant information on the process of the product for the consumers,
2. Ex-firm information on the quality of the product for the consumers,
3. Eco-labelling on the product by the national government,
4. Tax concessions for the firms satisfying eco-standards,
5. National Eco-Fund for rationalization of plants/firms, shift of hazardous plants to non-resident areas,
6. Protection and use of forestry to be left to local communities, other than a stipulated percentage of total forestry reserved by the government for specific purposes,
7. Clean production, in the sense of internalization of wastes and minimizing risks to human environment,
8. Resource recovery, in the sense of reuse and recycling of wastes,
9. Resource saving, in the sense of reducing use of material resources per unit of final output.
10. Prior knowledge of the firm about 'what to do and what not to do' in a specific time frame, for example, installing an effluent treatment mechanism if the plant is going to discharge wastes, etc.

Some of the steps that the TWCs can initiate at the regional/global level are formation of product-specific cartels, sharing of information about the nature of products, resource use, and market access among themselves. The TWCs raised a demand for a New International Economic Order (NIEO) in the United Nations (UN) in 1974. Keeping in mind the lessons, they could plan to initiate a demand for a New Environmental Order in the UN.

## References

- Asian Development Bank (1996). *Asian Development Outlook*. New York: Oxford University Press.
- (1997). *Asian Development Outlook*. New York: Oxford University Press.
- (1999). *Asian Development Outlook*. New York: Oxford University Press.
- Brown, Lester R. (1998). The Future of Growth. In Lester R. Brown et al. (ed). *State of the World*, A Worldwatch Institute Report. Chennai: EarthWorm Books Pvt. Ltd.
- Down to Earth* (1999). Vol. 8(7).
- (1999). Vol.7(19).
- (1999). Vol.8(8).
- (2000). Vol.8(16).
- (2000). Vol.8(18).
- (2000). Vol.8(21).
- (2000). Vol 9(13).
- Government of India, Ministry of Finance, 1998–99, *Economic Survey*.
- Sharma, Anju (2000a). That ‘E’ Word Again. In *Down to Earth*, Vol.8(21), March 31.
- (2000b). Whose Carbon Hypocrisy? *Down to Earth*, October 15.
- The Economist* (1999). August 7–13.
- (1999). November 13–19.
- (1999). October 9–15.
- (1999). October 30–November 5.
- (2000). February 19–25.
- (2000). November 18.
- United Nations Conference on Trade and Development (1998). *World Investment Report, Trends and Determinants*. New Delhi: Bookwell.
- United Nations Environment Programme (1997). *Global Environmental Outlook*. New York: Oxford University Press.
- World Bank (1998). *World Development Indicators*. Washington D.C.
- (1999). *World Development Report*. New York: Oxford University Press.

# **Conflicts over Canal Water for Irrigation in Mandya District, South India\***

**Steen Folke\*\***

## **Abstract**

The article highlights several conflicts over canal irrigation in Mandya district, which spearheaded the green revolution in Karnataka. Intensive cultivation of paddy and sugarcane, based on canal irrigation from the Krishnarajasagar dam and reservoir, has brought relative prosperity to the district. But it has also created conflicts between those who are favoured — by land ownership, location, caste and political backing — and those who are not. While the conflicts are played out between individuals, they are often reinforced by caste differences, notably between the major farming castes, Vokkaligas and Lingayats, and between these and the Dalits. The problems in Mandya are compared to those in the Cauvery delta, which were illuminated in a previous article. Political interference in the water conflicts tends to exacerbate the problems. Parsimonious use and equitable sharing of water could lead to a more just and sustainable development.

## **Introduction**

This is the third and last of a series of articles focusing on conflicts over natural resources in South Indian agriculture. The first article (Folke 1998) deals at a general level with the conflicts over land and water in various parts of the Cauvery basin and relates them to the inter-state dispute over the Cauvery river between Karnataka and Tamil Nadu. It also presents the design and method of the extensive field study that forms the basis of all articles, as well as the political economy perspective which informs them. The second article (Folke 2000) gives a detailed account of a number of conflicts related to canal and well irrigation in the Cauvery Delta. Moreover, it discusses at a theoretical and at a practical level the difficulties involved in establishing relevant water management institutions, notably Water Users Associations. The present article highlights several conflicts related to canal irrigation in Mandya district. It thus provides more substance to some of the arguments of

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the previous articles and discusses similarities and differences between the situation in Mandya and that obtaining in the Cauvery delta.

### **The Visvesvaraya Canal System**

When the first seeds of the green revolution were sown around 1960, Mandya district — like Thanjavur district in the Cauvery delta of Madras state — was selected to pioneer the introduction of the new strategy in Mysore state under the Intensive Agricultural District Programme. The main reason for this was the comparatively favourable conditions for irrigated agriculture, mainly based on canal irrigation originating from the Krishnarajasagar (KRS) dam on the Cauvery, which was completed in 1933<sup>1</sup>. These favourable conditions exist in particular in the southern part of the district irrigated by the huge Visvesvaraya Canal (VC) system<sup>2</sup> as well as by some minor canal systems. All the 13 sample villages are located in this part of the district, so selected as to cover both the upper, the middle and the lower reaches of the VC system. But although this part of the district is favoured, the situation is different from that obtaining in the Cauvery delta where virtually all land in the sample villages in principle is covered by canal irrigation.

All but two of the sample villages in Mandya, have substantial drylands as well as lands irrigated by canal (and to a much lesser extent tanks). In most of the villages the wetlands are more extensive than the drylands, and owing to the higher productivity and the possibility of taking several crops a year irrigation-based farming is much more important than dryland farming. One village, favourably located near the head end of the VC system, has only wetlands, and one village in the midst of the area for topographical reasons has only drylands. The contrast between two villages in this area, dominated respectively by wet and dryland agriculture, was the subject of T. Scarlett Epstein's classical study 'Economic Development and Social Change in South India' (Epstein 1962). When I first visited some of the villages (including several of the sample villages) in 1959–60, i.e., before the green revolution, I was struck by these contrasts. Now, forty years later, the contrasts remain, but irrigated agriculture has been extended, bringing relative prosperity to the entire region.

Generally speaking, canal irrigation is far more important than either tank or well irrigation in Mandya district, particularly in the southern part. For the district as a whole, 40 per cent of the net sown area was under irrigation in 1993–94. Roughly 25 per cent of the cropped area was sown more than once, reflecting the practice of double cropping in most irrigated lands. Out of a total net irrigated area of 1,03,969 ha, 86,471 ha (83%) was by canal, 8,353 ha by tanks, 6,633 ha by open wells, only 986 ha by borewells and 1,526 ha by other sources (Government of Karnataka 1996). Thus in terms of the sources of irrigation the situation is comparable to that in the Cauvery delta. Canal irrigation is almost as dominant, well irrigation

covers roughly the same, around 7 per cent, but tank irrigation is somewhat more important, although still quite marginal. However, many tanks have been converted into 'system tanks', fed by the canals, and others enjoy the advantage of receiving seepage water from canals in addition to rainfall.

### Problems in Canal Irrigation

Over the years the Visvesvaraya Canal system has been extended to cover a larger area than anticipated. The VC system was designed to irrigate 1,20,000 acres (49,000 ha). In the mid-1960s it was stated to cover 44,000 ha (Government of Mysore 1967:110), but at present it covers roughly 74,000 ha. Around 95 per cent of this area falls in the southern part of Mandya district dealt with in this study. The main canal from the KRS dam is led through a 3 km-long tunnel (Hulikere tunnel) before it divides into several branches and fans out into numerous distributaries in three main sectors. Some of the more distant branches get regular supply of canal water only during the *kharif* (monsoon) season. Even so, the entire VC system has severely overstretched its capacity.

Moreover, the canals, branches and distributaries as well as the tanks generally are not well maintained owing to lack of funds. For instance, there are concrete plans to desilt 68 system tanks (out of a total of 211 tanks). According to these plans, silt covering 20 per cent of the tank capacity will be removed. The total cost of this, however, is budgeted at Rs.103 crore, an indication of the magnitude of the task. Apart from reasons of cost, maintenance and desiltation of the canal system is being resisted by the farmers because it may imply the prolonged closure of canals. The state government had planned the closure of the Visvesvaraya Canal for four to five months from February 1996 in order to execute maintenance and improvement works. But this was met with strong protests from both farmers and political parties forcing the government to backtrack on the issue.

The problems are exacerbated by the cropping pattern, which is entirely dominated by the most water-demanding crops, paddy and sugarcane. The VC system was originally designed for one-third under paddy, one-third under sugarcane and one-third under semi-dry crops like *ragi* (*Eleusine coracana*) and other millets. But today out of a total of 74,000 ha, 45,000 ha are under paddy and 24,000 ha under sugarcane. This leaves a mere 5,000 ha for other, less water-demanding crops. Thousands of farmers thus violate the rules governing cropping pattern.

On top of this comes the widespread illegal tapping of water from the canal system, either by breaking pipes, or damaging sluice gates or by installing energised pumpsets to pump water from the canals. Several cases of such unauthorised use of surface water will be dealt with in what follows.

Evidently, all these problems set the stage for conflicts between farmers and villages over water from the canal system. At all levels in the system there are

widespread conflicts between the more fortunate head-enders and tail-enders who are often denied their rightful share. Moreover, the illegal tapping of water has consequences for those further downstream, notably in the Cauvery delta, and hence adds fuel to the inter-state conflict between Karnataka and Tamil Nadu.

In terms of well irrigation the situation is different from that in the Cauvery delta in several respects. Whereas the wells in the delta everywhere are used in conjunction with canal irrigation this is only partly true in Mandya district. The existence of extensive drylands here entails considerable use of well irrigation in lands that do not receive any water from canals or tanks. In most of the sample villages there are wells both in drylands and as a supplementary source of irrigation in wetlands. But in all the villages (except the one with only drylands) the role of the wells is secondary — and often quite marginal — when compared with canal irrigation. None among the sample villages has a coverage by well irrigation comparable to the best endowed sample villages in the delta, and the water markets are not as highly developed as there.

In the main Visvesvaraya Canal water flows continuously for 320 days a year. Generally, there is enough water in the canals — at least in the upper and middle reaches — from June till January, and this, in combination with the monsoon rain, makes it possible to grow two paddy crops in lands that are close to the head-end canals or tanks which are used to store the water. But in most of the lands there is only enough water for one long-duration paddy crop, sometimes followed by a dry crop, typically ragi or one of the pulses. Moreover, in the tail-end parts of the VC system (at several levels) the amount of canal water has been reduced over the years by the expansion of the system and the concomitant dilution of the water resource.

### **Conflicts over Canal Water**

In most of the sample villages it was reported that year after year there are conflicts between individual farmers over canal water in the dry season. This notably was also the case in the better off villages near the head end of the VC system. From January onwards (until May) there is hardly any rainfall and the amount of water in the canals is reduced. As mentioned above, some sectors get no canal water at all during the dry season, and those that do are usually supplied with water for about a week followed by a break of two to three weeks (repeated in a regular pattern). In comparison with the more fortunate parts of the Cauvery delta, the consequences of scarcity of water in the dry season are more severe because well irrigation as a supplement or alternative is not developed to the same extent in Mandya district.

More serious conflicts between groups of farmers at the head end and tail end of the distributary within a village were encountered in several villages. In some such cases the conflicts are amplified when different castes happen to be

involved. In a village (No. 17), for instance, in the lower reaches of the canal system, the dominant Lingayat caste (150 families) owns most of the irrigated lands, located at the head and middle reaches of the distributary. There is also a smaller group of Vokkaligas (90 families), the other major farming caste that is dominant in many villages in Mandya district, but which in this particular village constitutes a less well-endowed minority. Lastly there is an unusually big group of Dalits, mostly Adi Karnatakas. In fact the Dalits (200 families) are more numerous than any of the other castes, but their position is clearly inferior and their lands are located at the tail end of the distributary. Almost all Dalit families in the village acquired small plots of land (usually less than an acre) forty years back with government assistance.

Most of the lands owned by Dalits are drylands, but some 100 Dalit farmers have limited access to canal water. The farmers we interviewed were reluctant to give details about the disputes over water within the village, no doubt out of fear of reprisals from the Lingayats. During our first visits to the village the existence of disputes between head- and tail-enders was readily acknowledged, but most informants (notably among the Lingayats) claimed that amicable solutions were generally found, usually involving the good offices of a group of respected village elders. However, after several visits a different picture emerged:

Initially, after the Dalits had acquired lands they usually got their share of water, enough for an irrigated crop in the main *kharif* season. However, after the construction of more canals elsewhere in the VC system this village near the tail end gets less water on rotation. Recently, 200 acres of wetland have actually been reclassified as dryland. In the wetlands usually there will only be canal water during July–November and for only two to three days a week. The Lingayats for many years have appropriated the lion's share of the canal water, taking advantage of the favoured location of their lands as well as their power in the village. In violation of the stipulated cropping pattern (the Dalit farmers claimed) most of them have been growing paddy and mulberry and even sugarcane (only farmers with wells), i.e. highly water-intensive crops. The consequence has been that in most years even the Dalit farmers with access to canal irrigation have been able to cultivate only dry crops like *ragi*.

Year after year they have protested and discussed the matter with the Lingayats, but to no avail. They have also frequently appealed to the engineer concerned in the PWD, but he usually professes his inability to do anything by referring to the dwindling amounts of water in the main canal. They have even organised *dharnas* (sit-down demonstrations) in front of the PWD office, but in vain. Sometimes the Lingayats also initiate such *dharnas*, but this is viewed by the Dalits as shrewd attempts to defuse the conflict within the village by directing attention towards the responsibility of external bureaucrats. Appeals to the local MLA in some cases have resulted in canal water being released for an extra day or

so. But by and large the Dalits have been compelled to accept their fate in terms of scanty supply of canal water.

Nevertheless, the situation of some of the Dalit families has been greatly relieved by government intervention. They have got assistance for drilling of wells and installation of pumpsets under various government schemes like the Million Wells Scheme, the Special Component Plan, and the Ganga Kalyana. The SC/ST office in Mandya has been helpful in facilitating their access to the government schemes.

Around fifteen Dalit farmers have open wells with pumpsets, whereas another fifteen Dalit families have installed borewells. This has been acquired with varying degrees of financial support from the government, in some cases free, in other cases with 60 per cent of the cost covered. In one case the borewell benefits a group of six to seven Dalit farmers, each owning one acre of land or less. Because their lands are quite distant from the canal, and owing to a fall in the groundwater table, the borewells have been drilled to depths of 150–200 feet or even more. In the early 1980s when the first borewells were drilled, the groundwater could be reached at 60–100 feet depth. As a consequence of the government support in this village there are as many Dalits with energised wells as farmers from the dominant farming castes, Lingayats and Vokkaligas; this is quite unusual. Even so, it is the slightly better off Dalits who have been able to avail of the government assistance for wells. The majority still have to rely on rainfall and some canal water.

Generally speaking, the Dalits have to accept the power equation that subordinates them to the dominant caste. Many among them also work as agricultural labourers on lands owned by the Lingayats, which of course produces a special dependency. Moreover, it is a sign of the power relations that the Dalits are not allowed inside the main village temple by the Lingayats.

In an interesting development a young, educated Dalit woman from this village was elected chairman of the gram panchayat, covering several villages. This election evidently was the result of the government's reservation policies (with reservations for Dalits as well as for women). We interviewed her and found her quite articulate and assertive except when we took up agricultural issues, which she preferred to refer to her husband. But we also interviewed a group of leading Lingayat farmers who dismissed the significance of this and appeared to be certain that they and their caste fellows could handle it in a way that would not jeopardise their hold on village affairs.

The conflicts in the described village may be contrasted with the conflicts in another nearby village (No. 16). The distance between the two villages is just around 10 km and they are similar in many respects. But village No. 16 is even more unusual than village No. 17 in the composition of its population. In this village Dalits form an outright majority (200 families). In terms of numbers the main farming

caste in this village, Urs, constitutes a small minority (30 families). Even though their landholdings tend to be larger than those of the Dalits, most of the lands in the village are actually owned and cultivated by the latter. They have obtained lands for cultivation by various means. Some Dalits got surplus land during the land reform of 1974, some have purchased their lands, some are engaged in share cropping and some have encroached on lands and taken up cultivation. The encroachments have given rise to unresolved conflicts between Dalit and Urs families.

This village is not located quite at the tail end of the VC system as village No. 17, but the difference is marginal. Even in this village canal water is supplied only during the *khariif* season but for only two to three days a week. Previously, the village used to get water six days a week, but this practice was discontinued in the mid-eighties. In general, farmers with access to canal water can grow one paddy crop. Around twenty farmers, half of them Dalits, have a borewell or pumpset; these farmers may grow two paddy crops or sugarcane. The scarcity of canal water leads to repeated conflicts between head- and tail-enders within the village. But here the Dalits have lands both at the head, middle and tail end of the distributary within the village. In conjunction with the numerical superiority of the Dalits this results in a different pattern of conflict. Conflicts over water here tend to be played out between individuals without widening into caste conflict.

When the farmers are unable to solve the conflicts themselves they are usually solved by a PWD engineer. A Water Users Association has been formed, the first in Malavalli taluk, and it is hoped that this among other things will ensure a more equitable distribution of water.

During our several visits to this village (which I had also visited previously) we observed that the Dalits were quite assertive. A number of them have received higher education, and there is a unit of the Dalit Sangasha Samithi, which fights for the rights of Dalits, in the village. We conducted group interviews with farmers in mixed groups, notably Dalits as well as Urs, and everybody expressed the view that on the whole the different castes were on good terms. The contrast to village No. 17 is striking and no doubt related to the overwhelming numerical superiority of Dalits in village No. 16.

Village No. 16 also happens to be one of the villages investigated by Aase Mygind Madsen in her study of the upward mobility of Dalits (Madsen 1996). Although the topical context is different, our observations tend to reinforce hers. Numerical strength, land ownership, and education have contributed strongly to the position of Dalits in this village, which in turn has provided a different setting for the conflicts over water.

Conflicts between villages over canal water were encountered in several sample villages. Village No. 17 (described above) has not only internal conflict, but also regular conflicts with two neighbouring villages. All three are at the tail end of

the VC system, and every year (usually in June) they fight over canal water. During one of our visits to the village we could observe that somebody from one of the neighbouring villages had torn down a concrete-reinforced bund next to a closed sluice gate in order to tap unauthorised water from the canal. Sometimes the confrontations between farmers from the involved villages turn violent with brandishing of swords and actual use of sticks, agricultural tools, etc. Usually the conflicts are solved by the intervention of an official from the PWD who sometimes threatens to cut off water to all three villages if they do not find a solution.

In another village (No. 18) the farmers complained that they, as well as five neighbouring villages, were denied their rightful share of canal water almost every year due to the interference of a powerful local politician with vested interests, including lands, in a neighbouring group of villages. Year after year water has been unlawfully diverted to a tank serving these villages. They have repeatedly complained to the Irrigation Department, but without result because of the power and influence of the politician who has for some time been a minister. This conflict thus is heavily politicised with some of the combatants belonging to the two main rival parties in the area, Congress and Janata Dal. The villagers have tried to mobilise their own MLA, but complain about his lack of interest in the matter and explain this in terms of the peculiar location of the village. Because the village is in Maddur taluk, but belongs to a constituency of Malavalli taluk, the MLA does not look after it properly, and hence they do not get his assistance in the water conflict. Recently, however, it appears that the conflict has been solved as the politician at the centre of the controversy has sold his lands in the neighbouring village. Since then canal water has been available to village No. 18.

### **Illegal Pumping of Water from Canals**

We now turn to a different type of conflicts, namely, the unauthorised drawing of water from canals with privately owned pumpsets, either electric or diesel-fuelled. Although this practice is illegal under the Karnataka Irrigation Act it is widespread in the VC system. In most cases it involves individual farmers who lift water for their own fields by applying a pumpset and a tube to the canal water. Usually there is no localised conflict around this since the individual appropriation is negligible compared with the water flow in the canal, and since the victims of this water theft are far downstream at the tail end of the canal system. Here follow two interesting cases of this practice that are both fairly large-scale, but in other respects quite different. The first case deals with a group of enterprising farmers who have made a lucrative business out of selling water, illegally tapped from a canal, to other farmers. The second case deals with a group of farmers who lifted so much water from a canal that a major conflict arose between them and their fellow farmers in the same village.

In village No. 19, located on the banks of a major canal, there are numerous farmers who draw water from the canal, using either their own pumpset or a rented one. The village also gets authorised canal water, which is partly stored in a system tank before being released. Even in this village the rivalry between Congress and Janata Dal is evident in the water affairs. Under the Janata Dal government in the mid-1980s it was promised that the tank capacity would be increased by desiltation and heightening of the dam. This would have considerably increased the area under irrigation. But when the Congress government took over, this plan was scrapped. Instead, the village was promised a public lift irrigation scheme<sup>3</sup>, which, however, has not materialised.

Although the village is located somewhere in the middle of the VC system, water is usually sufficient only for one paddy crop. But since the main canal carries water most of the year farmers with access to water pumped from the canal can easily take two crops: in many cases two paddy crops, in some cases paddy and *ragi* or mulberry and in a few cases (long-lasting) sugarcane. Some small farmers with lands close to the canal rent mobile, diesel-operated pumpsets (Rs.10 per hour for a 5 HP pump, Rs.15 per hour for a 10 HP pump) and irrigate their own lands. A group of about ten bigger Lingayat farmers have invested in permanent, electrically-operated pumpsets, installed on the bank of the canal. They lift water for their own lands and also sell water to other farmers with adjoining lands.

This practice started about twenty-five years back, but has been considerably expanded since then, particularly after the introduction of the flat rate payment for electricity in 1980 (Rs.50 per HP)<sup>4</sup> and all the more after the policy of free electricity for pumpsets (up to 10 HP) came into force in 1992. It is interesting that the Karnataka Electricity Board (KEB) has not objected to furnishing power connection to these pumpsets in spite of the illegality of water lifting from canals. The provision of electricity to these pumpsets also violates a rule that stipulates a certain minimum distance between electrically operated pumpsets and canals. We were unable to find out whether the power connections had been obtained by bribing the KEB personnel or as a reflection of *de facto* government policies tolerating — and semi-officially encouraging — this unauthorised use of water.

There are many problems with the regular supply of electricity, insufficient capacity, voltage fluctuations, etc. During summer, when the problems reach a peak, the KEB usually resorts to load shedding from 6 a.m. till noon. But immediately after noon all farmers switch on the pumps, with the result that the system gets overloaded and breaks down. This happens frequently to pumpsets everywhere in the region.

The ten enterprising farmers have installed pumpsets with motors ranging from 5 to 20 HP. The biggest among them has installed two pumps, a 5 HP pump twenty-five years ago and a 10 HP pump recently. He owns 8 acres, but with the

help of the two pumps he can sell water to 25 and 40 acres respectively throughout the year. The total price of the pumps is only around Rs.25,000 (Rs.15,000 for the 10 HP pump). However, in future he will have to pay Rs.100–150 annually per HP above 10 HP for the electricity. In view of the income from water selling this is negligible.

But in order to distribute water efficiently and economically this farmer has invested Rs.1,50,000 in 3,800 ft. of PVC pipes that carry the water (over the soil surface) to the fields. The other water sellers have made much smaller investments in pipes and sell water only to more limited lands. Pipe systems are common in the distribution of groundwater in a few regions elsewhere in India, e.g., Gujarat, where they constitute highly elaborate underground networks (Shah 1993:59ff), but we did not encounter a comparable pipe system anywhere else in the Mandya or Delta sample villages.

The big water seller supplies water to 65 acres cultivated by about 50 families. The biggest water buyer purchases water for 3 acres, most of the others for less than one acre, but usually for two crops a year. The payment is in cash and the amount depends on the crop grown. For paddy it is Rs.500/acre (per season); for *ragi* it is Rs.10–15/hour, i.e., a total of Rs.300–350/acre for the entire crop; for mulberry it is Rs.300/acre for three months. After the installation of the new pumpset the farmer also intends to sell water for sugarcane, a 14 months' crop. The price for this will be around Rs.3,000–4,000/acre. Since the water seller pays virtually nothing for electricity (and water) it is clear that his unauthorised business is a real bonanza. The water buyers think that the rates they have to pay for water are too high, yet it is remunerative enough for them to continue to purchase water. Whereas the water seller is a Lingayat, among the water buyers there are both Lingayats and Vokkaligas, and this may lead to frictions.

This village is unusually densely inhabited and the scarcity of land has resulted in extensive sharecropping (in almost 30 per cent of the land) on terms that often appear unfair to the sharecropper. In some cases of *ragi* sharecropping the expenses are shared equally, but the land owner gets two-thirds of the harvest. In paddy sharecropping mostly the costs as well as the output are shared equally. There are clear tensions in the village around this, reinforced by the fact that Lingayats own most of the lands, while at the same time there is a bigger group of Vokkaliga farmers who constitute the dominant farming caste in many neighbouring villages. So typically the land owner will be a Lingayat and the sharecropper a Vokkaliga. The uneasy relationship between these two major farming castes, who have for decades been vying for political hegemony in Karnataka, thus complicates everyday conflicts within agriculture.

Another interesting case was encountered in a village (No. 24) located in the upper-middle reaches of the Visvesvaraya canal system. This village primarily

cultivates paddy, generally two crops a year in the lands with canal irrigation. In the dry lands *ragi* and groundnuts are the main crops. In the past the favourable location within the canal system in most years assured enough water for paddy cultivation. But in the early 1980s a group of about twelve well-to-do farmers in the village, owning around 100 acres of dryland (holdings varying from 6 to 16 acres) near the head end of the distributary, installed pumpsets (mostly with 10 HP engines) and started lifting water illegally from the canal. They cultivated both paddy and sugarcane, and in the process deprived their fellow villagers — and some in neighbouring villages — of their rightful share of the water.

In 1985 the deprived farmers got together against the twelve perpetrators. They protested to the Irrigation Department, and staged *dharnas*; politicians got involved and the case was reported in the *Deccan Herald*. It was also taken up by Tamil Nadu in relation to the Cauvery Waters Disputes Tribunal as an example of illegal use of the Cauvery waters in Karnataka. In 1986 the government issued a ban order on lifting water from the canal because this is illegal under the Karnataka Irrigation Act (1965, section 55). The government also instructed the Karnataka Electricity Board to disconnect power supply to all illegal pumpsets. But the twelve farmers concerned in turn appealed to the High Court, which issued a stay order on the government order in January 1987.

Then an informal village youth association spearheaded a movement to fight the case in court. The youth took a contract from the Irrigation Department for desilting of the distributary and organised people to do the work. The contract amount (Rs.14,000) was used towards expenses in the High Court case. In July 1991 the court finally gave its verdict and upheld the government's order from 1986. The court directed the government to take steps to stop the illegal use of canal water, and subsequently the twelve farmers gave up their practice. This case demonstrates that there is a limit to the economic power of individuals when they threaten the vital economic interests of the majority.

Interestingly, the conflict served to catalyse what became the first Water Users Association to be established in Mandya district. Already in 1986 the farmers formed an informal association dealing with the conflict and getting involved in the desiltation work. Later, after contact with the Command Area Development Authority, a formal Water Users Association was set up in January 1993, which in many ways resembles the WUAs established in the Cauvery delta (cfr. Folke 2000). At the time of field work the association had 106 members (out of about 300 cultivators in the village) each of whom had paid a share of Rs.100. About one-third of them are Dalits, whose shares were paid by the Command Area Development Authority. The majority are Vokkaligas and all board members are Vokkaligas except one Dalit who holds a reserved seat. The twelve farmers who had previously lifted water from the canal have not been allowed to become members in view of their past misdeeds.

In the first two years the government contributed Rs.100 per ha, and in the

third year Rs.75 per ha, but after that the association should stand on its own feet. The main activities are supervision of water distribution, ensuring that tail-enders can also get their share, and desiltation of sub-canals. The WUA has also supervised the lining of the main distributary, funded by the government. But in addition the association hires out agricultural implements and sells fertilizers, seeds, and pesticides at subsidised rates. It has even contributed to the financing of a small temple in a neighbouring village (as thanks for their support during the court case). Relatively speaking, this WUA appears to be functioning reasonably well, a fact that may be related to its history of growing up from below rather than being initiated from above as is frequently the case.

The case analysed here has much more than local perspectives. A retired executive engineer from the Irrigation Department (who himself happens to own lands at the tail end of the Visvesvaraya Canal system!) played an important role in ensuring that this conflict was brought to court. At the same time he was a member of an official Irrigation Consultative Committee, where he brought up the problem at a more general level. Documents from the Command Area Development Authority (1988–92) show that in the Visvesvaraya Canal system there were in 1987 no less than 900 cases of illegal tapping of water from the VC system, using energised pumpsets. This illegal water lifting benefited 4,300 acres, mainly devoted to sugarcane cultivation in the upper reaches — with the result that a similar area at the tail end of the system was deprived of its rightful share of water. The documents also demonstrate the political difficulties of checking this illegal practice:

‘It is very difficult for the officers of the Irrigation Department to enforce elimination of these pumpsets, in view of the fact that some of the local MLAs are urging for regularisation of those unauthorised pumpsets..... It is also to be stated here that if such pumpsets are allowed to continue, there is scope for further increase of pumpsets and consequently there would be more and more scarcity of water in the tail end’ (letter dated April 6, 1988, from Administrator, Command Area Development Authority, Cauvery Basin Projects, Mysore, to Secretary, PWD, Government of Karnataka).

Two of the MLAs were members of the Irrigation Consultative Committee and used this position to block elimination of the illegal practices. This amply illustrates how politicians often intervene in the conflicts in a way that serves narrow, vested interests, particularly those of their constituencies.

### **Conclusion**

One of the main strands of the argument running through the presentation of these cases has been the continued importance of caste in analysing conflicts over water for irrigation. While the conflicts are played out in everyday life between individuals, they are often reinforced by caste differences, notably between the

major farming castes and between these and the Dalits. Moreover, frequently there is a congruence of caste and class; many Dalits are agricultural labourers and even if they own land it is usually less, of poorer quality and less favourably located. Whereas the roots of the conflicts over water are economic — based on competition for a scarce resource — they are embedded in social relations characterised by inequality and power.

Inevitably this tends to disfavour the Dalits, but the cases also demonstrate that there are some nuances to this general picture. In the power game, numbers matter, as demonstrated in the difference between a village where the Dalits form a minority and a neighbouring village where, unusually, they are in a majority. It is also noticeable that government legislation in favour of Dalits, whether in the form of grants for wells or reservation for political posts, can actually make a difference.

More generally, however, politics comes into the picture in a way that usually backs the rural elites and the dominant castes. In this respect there are great similarities between the picture in Mandya district and that in the Cauvery delta. Influential politicians often interfere in irrigation management in a way that takes care of the interests of their kin and constituency, sometimes in ways that blatantly ignore or actively undermine rules and legislation as the case of political support for illegal water lifting has amply shown. Moreover, the policies regulating water management in Karnataka — as in Tamil Nadu — are a mixture of timid regulation and populist policies such as free electricity for pumpsets and almost free access to canal water. A symbolic ‘water tax’ ranging from Rs.20 per acre for *ragi* and Rs.40 per acre for paddy (per crop) to Rs.150 per acre for sugarcane may or may not be collected.

In Mandya district the farmers’ movement, Karnataka Rajya Ryota Sangha (Karnataka State Farmers’ Association), is particularly strong and the movement has been successfully lobbying against any attempts to introduce price, subsidy, and taxation policies that could harm the farmers’ immediate economic interests. Interestingly, even the farmers’ movement has a caste bias. Its adherents are primarily Vokkaligas, but the movement generally serves the interests of the better-off farmers (cfr. Kripa 1993).

As a consequence, the irrigation practices are clearly unsustainable. Generally speaking, water is flushed over the fields, entailing a lot of waste (by evaporation, percolation and excess use). But it is the easiest way and there is no premium on conservation. The situation is similar to that obtaining in the Cauvery delta, but even more pronounced because Mandya enjoys the advantage of being upstream in the Cauvery basin. Besides, Mandya district lags behind the Cauvery Delta in attempts to establish Water Users Associations. At the time of field work for this study there were just a handful of such WUAs (about eight in the entire district), set up on an experimental basis and with uncertain viability.

No doubt, canal irrigation has brought prosperity to Mandya, particularly to

the farmers with substantial lands and easy access to water for irrigation. But as demonstrated in this article it has also created divisions and conflicts between those who are favoured — by land ownership, location, caste affiliation and political backing — and those who are not. A more parsimonious use and equitable sharing of the water resources could pave the way for a more just and sustainable kind of development.

### Notes

1. Mandya District Gazetteer gives the following explanation: ‘Mandya district was selected for this experiment because of its high irrigation potential, existence of efficient cooperatives and other institutions and the progressive outlook of farmers’ (Government of Mysore 1967:142). A contributing factor may have been its proximity to the State capital, Bangalore.
2. Named after Dr. (Sir) M. Visvesvaraya, who designed the Krishnarajasagar Dam when he was Chief Engineer of Mysore State. He contributed in many other ways to the modernisation and industrialisation of Mysore and later became Dewan (chief administrator) of the State.
3. Some villagers claimed that the minister concerned in the Congress government, who hails from this area, scrapped the tank project because he had some associates in a neighbouring village who were (illegally?) cultivating coconuts in an area that would be submerged if the tank were expanded by increasing the dam height. Whether this is true or not we have not been able to verify, but it does testify to the political discourse which largely focuses on such vested interests.
4. Until 1980 owners of pumpsets had to pay according to the consumption of electricity. The unit rate was 15 paise for the first 200 units consumed monthly and 17 paise for the amount above 200 units, subject to an annual minimum of Rs.50 per HP (information obtained at the Karnataka Electricity Board office in Mysore).

### References

- Cauvery Basin Command Area Development Authority (1988–92). Various letters and documents.
- Epstein, T. Scarlett (1962). *Economic Development and Social Change in South India*. Manchester University Press.
- Folke, Steen (1998). Conflicts over Water and Land in South Indian Agriculture — A Political Economy Perspective. *Economic and Political Weekly*, 33 (7): 341–349.
- (2000). Conflicts over Water for Irrigation in the Cauvery Delta, South India — Some Institutional Implications. *Journal of Social and Economic Development*, 3 (1): 42–75.
- Government of Karnataka (1994). *Karnataka Irrigation Act, 1965 — with Rules and Notifications*. Bangalore: Vijaya Publications.
- Government of Karnataka (1996). *Karnataka at a Glance, 1994–95*. Bangalore: Directorate

of Economics and Statistics.

Government of Mysore (1967). *Mandya District*. Mysore State Gazetteer, Bangalore: Government Press.

Kripa, A.P. (1993). *The Urban-Rural Divide and Agrarian Contradictions — A Study of Karnataka's Farmers' Movement*. Ph.D. thesis, Institute of Development Studies, University of Mysore. Unpublished.

Madsen, Aase Mygind (1996). *Untouchables: Stuck at the Bottom or Moving Upward? A Study of Changing Conditions for the Scheduled Castes in Five Villages in Karnataka, South India*. Ph.D. thesis, Aarhus University. Unpublished.

Shah, Tushaar (1993). *Groundwater Markets and Irrigation Development — Political Economy and Practical Policy*. Bombay: Oxford University Press.

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# **Rural Indebtedness and Usurious Interest Rates in Eastern India: Some Micro Evidence\***

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## **Abstract**

On the basis of data collected from three villages in Orissa, Eastern India, this paper reveals that the rural poor have limited access to institutional sources of finance. When in need they borrow from their lessors or employers at exorbitant rates of interest charged either explicitly or implicitly. The borrower repays the loan usually in the form of labour in the lenders' fields or through crop produce. The amount of borrowing increases as income increases. The debt burden decreases as income increases. Major loans are meant for cultivation rather than for consumption. Credit contracts, interlinked with land, labour and output transactions, are observed more in irrigated villages than in non-irrigated villages. However, interlinkage is not found to be the dominant set of relationships in the study villages. Regional disparity in development seems to perpetuate interlinkage.

In the wake of agricultural advancement and the growing need for adoption of high-cost yield-enhancing technology, rural credit is assuming a pivotal role in accelerating agricultural development of India. Agriculture has been identified as a priority sector for allocation of credit. But what is worrisome is that in spite of various governmental measures and guidelines to advance credit to agriculture sector on a priority basis, institutional credit agencies are not adequately meeting the credit needs of farmers. Due to risk of default, fungibility of loans giving rise to diversion of borrowed funds for unproductive uses, and difficulty in enforcing the use of loans for the intended purposes resulting in poor recovery, the formal credit agencies are hesitant to advance loans to the farmers.

Moreover, whereas large farmers somehow manoeuvre to get crop loans, the access of small farmers to formal credit agencies or institutional sources is quite limited (Sarap 1991; Swain 1986). The creditworthiness of small farmers is viewed with suspicion because of their inability and unwillingness to provide acceptable

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collateral like owned land, houses, or buildings as mortgage. In most cases they do not possess such assets, and some even lack valid documents to prove ownership. Also, as land is their major source of income and a secured asset, they hesitate to pledge it for fear of losing it in the event of non-repayment of the loan. Petty tenants are also deprived of credit facilities from institutional sources as in most states of India, leasing of land is prohibited and tenancy rights are not recorded. Therefore, the tenants are unable to pledge the tenanted land for obtaining loans from rural banks or co-operatives. Thus, the deficit households that actually need credit are screened out of the list of potential beneficiaries of formal credit agencies. To meet their credit needs they usually depend on private or non-institutional or informal sources. Their personal relationship with their lessors or employers helps them to get loans. The landowner/employer lends to his tenant/labourer as in a closely knit village economy, the prospect of being ostracised deters the borrower from defaulting on the loan. Even in case of default the landowner/employer can recover the loan in terms of labour or crop produce by exercising his economic power. Though they provide credit to deficit households in emergencies, they usually charge exorbitant interest rates.

Economists have probed deep into the reasons for high interest rates charged on private loans in backward agriculture. Their different viewpoints can be broadly categorised into three schools of thought, viz., the lenders' risk hypothesis, the default hypothesis and the theory of interlinkage. According to the lender's risk hypothesis propounded by Bottomley (1963), while advancing loans the lender faces the risk of default and so has to add a premium to the opportunity cost of money to cover the likely loss of capital due to default. Once the risk of default is taken into account, the effective interest rate may turn out to be no higher than its counterpart in the organised sector (Basu 1983). Consequently, there is no real room for arbitrage and high interest rates persist unabated.

Rural interest rate is considered to have four components: (i) opportunity cost of money involved, (ii) premium for administering the loan, (iii) premium for risk, (iv) monopoly profit. Bottomley (1975) considers that administrative costs and risk are the important factors governing interest rate determination in backward agriculture. Platteau *et al.* (1981), with data on marine fishing in some sample villages in Kerala, single out risk considerations as playing a decisive role in the determination of interest rates. He finds no conclusive evidence that the lender's policy takes administrative costs into account. On the other hand, Bardhan (1984) supports the monopoly explanation of usurious rural interest rates. According to him, the dominant landlord/lender earns monopoly profits by a two-part tariff on consumption credit. This is because due to his large assets and urban connections he can obtain unlimited funds at a fixed interest rate from an outside loan market and then lend them to his labourers at a higher interest rate. In this case the labourers pay a marginal interest

rate per unit of consumption credit equal to the landlord's opportunity cost plus a free 'entry fee' for the privilege of borrowing at this rate. The entry fee represents monopoly profits on the transaction. But Bottomley (1975), Platteau *et al.* (1981) undermine the importance of monopoly profit in the determination of interest rate in rural areas on the ground that evidence of a strongly personalised informal credit market does not by itself preclude the operation of the forces of competition as there are no barriers to entry. The threat of competition is also attested by the fact that borrowers sometimes move, on their own initiative, from one credit giver to another. Thus the exponents of the lender's risk hypothesis consider the risk of default as the major determinant of rural interest rate.

The lender's risk hypothesis has been vehemently criticised as the moneylender is the dominant party in the loan transaction, and in the specific power relations that prevail in village communities, it is very unlikely that the borrower can default on the loan and go scot free. Thus the lender's risk is more myth than reality and the lender is rational enough to extend loans only against collateral kept as security. If the borrower defaults, the lender confiscates the collateral.

Knowledge of this social fact prompted Bhaduri (1977) to expound his 'default hypothesis'—that the lender deliberately raises the interest rate to cause default and confiscates the collateral kept as security. Bhaduri (1975) explains the phenomenon of usurious interest rates in backward agriculture in terms of two of its institutional characteristics, i.e., its isolation and its personalised nature. The isolated character of the unorganised market is based on the fact that the determination of creditworthiness and thereby the treatment of collateral acceptable to a lender are different in the two markets. Collateral such as standing crops, promise of future labour, and revision of tenurial conditions are unmarketable in the organised money market. Moreover, the legal and administrative procedures involved in satisfying the criterion of creditworthiness are quite different in the two markets. Thus, a borrower in the unorganised credit market has no access to the organised market. This isolation, coupled with an inelastic demand for credit, allows the private moneylender to decide freely what interest rate to charge. Furthermore, the highly personalised relation between lender and borrower permits the lender to secure from the borrower the collaterals, which the latter cannot employ in the organised market. Bhaduri's model suggests that the essence of usurious extraction lies in the undervaluation of collateral. Comparison of the risk premium theory and Bhaduri's model shows that they are to some extent based on opposite sets of assumptions. While the risk premium theory is based on free competition, involuntary default and exogenously caused default, Bhaduri's model assumes monopoly power, voluntary default and default induced by interest rate.

In sharp contrast to the lender's risk hypothesis, the default hypothesis has deservedly received much attention. Borooah (1980) talks of situations in which an alternative lending strategy might be to generate default by offering large loans at

low rates rather than small loans at high rates. Again in such cases as in the cultivation of commercial crops the lender might assume an entrepreneurial role and regard lending as an input into a production process rather than as a direct source of income. Then, the assumption of the default hypothesis, that lenders act so as to maximise their direct returns from lending (both from interest payments and from asset transfer through default) may not be justified.

Rao (1980) questions the theoretical adequacy of Bhaduri's model for the conclusion he draws from it and briefly suggests a theoretical and methodological alternative. Rao (1980) argues that economic power relations between borrowers as the depressed class and lenders as the dominant class are the chief determinants of the interest rates on credit transactions in rural areas. The credit relation is a historically specific mode of appropriating surplus and of transferring control over the means of production, frequently appearing during periods of transition between modes of production. Basu (1984b) argues that while Bhaduri uses the undervaluation of collateral in a significant way, he does not provide a formal explanation of why the collateral is underpriced, but casually mentions that it is a consequence of the monopolistic position of the lender. To provide a solution to the dilemma of default hypothesis, Basu (1984) develops a model that explains simultaneously the determination of interest rates and collateral prices; in other words, explicit and implicit interest rates. In contrast to Bhaduri's model, in Basu's model, collateral price is endogenously determined.

Recently there has been a spurt of research on interlinkage of factor markets. It is argued that rural credit markets are characterised by potential risk, which generates an inherent tendency for them to get interlinked with other factor markets. In a world of costly information, a credit system based on personal trust and interlinking obligations in different land, labour and output transactions between the same parties is a way to insure against either party ending up with too many of Akerlof's (1970) lemons and to economise on some of the excessive costs of acquiring information in imperfect markets (Bardhan 1984). The most plausible explanation for the occurrence of interlocked credit contracts is the existence of risk, uncertainty, information asymmetry and moral hazard problems in backward agriculture.

Interlinked personalised transactions by their very nature act as a formidable barrier to the entry of third parties and are thus a source of additional monopoly power for the dominant partner in such transactions. Besides, personalised credit transactions interlocked with wage contracts are often an effective way of averting group assertiveness or attempts at collective bargaining by labourers. Moreover, as control on prices is not uniform in all markets or as prices adjust at different speeds in different markets, the dominant party can bypass the legal and social control by exercising his power in other markets.

In the case of interlinked credit contracts, if no/low interest rate is charged, it is unwise to jump to the conclusion that there is absence of usury, since there may

be implicit interest charges in the form of extraction of labour at low wages or purchase of crops at a lower predetermined price from the borrower. In such cases though the explicit interest rate is low, the implicit interest is quite high (Basu 1984b). Actually when deals are interlinked, it is no longer correct to think of interest as payment for loans and wages as payment for labour. The wages and interest vector jointly reflect the price of labour and loans.

Against this backdrop, this study attempts to shed some light on rural indebtedness and usurious interest rates in Eastern India. A critical analysis of various aspects of credit transactions will be made: who borrows and from whom, purpose of borrowing, mode of repayment, interlinkage of credit contracts with other factor and output markets. Thus, the principal objectives of the study are:

- (1) to analyse the extent of indebtedness of farm households according to farm size and their relative access to formal and informal sources of finance;
- (2) to examine the purpose of borrowing for consumption or production activities and see whether there is any variation across farm sizes;
- (3) to analyse the terms and conditions of loans like interest rate charged, linkage with other transactions in land, labour and output markets and mode of repayment;
- (4) to critically examine the determinants of the indebtedness status of a household through regression equations.

### **Methodology**

The study is based on the findings of a field survey conducted in three villages of Orissa in Eastern India. Eastern India is an agriculturally backward region and rural poverty is pervasive in the area. The states in this region were under zamindari settlement before Independence and have inherited a semi-feudalistic and skewed land distribution. The three villages selected as our study area belong to three categories based on a simple notion of the extent of development. The most advanced village is Charapara, situated in the fertile alluvial tracts of the coastal district of Cuttack. Charapara receives perennial canal irrigation, and the farmers take advantage of irrigation by cultivating H.Y.V. paddy, using chemical fertiliser and farmyard manure. The moderately advanced village is Harinababi, which is adjacent to Charapara and is canal irrigated, but here the use of yield-stimulating inputs is less than that of Charapara. The least advanced village or the backward village is a dry-land village, Sandhagaon, situated in the table land of Dhenkanal district.

Data have been collected from all the households of the three study villages by the direct interview method with the help of a designed questionnaire. The landowning households have been categorised as marginal farmer (MF), small farmer (SF), medium farmer (MDF) and large farmer (LF) on the basis of size of land ownership

holding. The landless households have been broadly divided into landless tenants or pure tenants (PTs), and landless labourers (LLs). Those who do not fit into any of these categories are grouped under 'others'.

### The Differentiated Peasantry

It is an acknowledged fact that in rural areas in a hierarchical society, class and caste relationships are considerably intertwined and overlapping. An analysis of the caste configuration in the three villages reveals that in Charapara, out of the total of 43 households, 27 are *Khandayats* and the remaining 16 belong to Scheduled Castes. The *Khandayats* are upper castes and are traditionally believed to belong to the warrior caste: supposedly fighting for the king during war and cultivating their land at other times. The Scheduled Castes are the lower castes, who traditionally do sweeping and scavenging jobs and hire out their labour. It may be noted from Table 1 that all the labourer households and the pure tenants in Charapara belong to Scheduled Castes.

**Table 1: Distribution of Households by Farmer Category and Caste**

Village/ Category	Caste				Total	Percentage
	Khandayat	Karan	Gudia	SC		
<b>Charapara (1)</b>						
OC	13	-	-	-	13	30.2
PRT	4	-	-	-	4	9.3
PT	-	-	-	5	5	11.6
PL	9	-	-	-	9	20.9
LL	-	-	-	11	11	25.6
Others	1	-	-	-	1	2.3
Total	27	-	-	16	43	100.0
<b>Harinababi</b>						
OC	2	-	12	-	14	63.6
PRT	-	-	5	-	5	22.7
PL	-	-	3	-	3	13.6
Total	2	-	20	-	22	100.0
<b>Sandhagaon</b>						
OC	-	4	-	1	5	15.2
PRT	-	3	-	1	4	12.1
PT	-	-	-	6	6	18.2
PL	-	5	-	1	6	18.2
LL	-	-	-	9	9	27.3
Others	-	1	-	2	3	9.1
Total	-	13	-	20	33	100.0
Grand Total	29	13	20	36	98	

*Note:* OC – Owner Cultivator, PRT–Part Tenant, PT–Pure Tenant, PL– Pure Lessor, LL– Landless Labourer.

In village Harinababi, out of a total of 22 households, 20 belong to caste *Gudia* and the remaining two are *Khandayats*. *Gudias* are a middle caste in the hierarchy and traditionally prepare and sell sweets and snacks. Now they are considered under Other Backward Classes (OBC) just above the Scheduled Castes. In the non-irrigated village Sandhagaon 13 out of a total of 33 households are of the *Karan* caste and the remaining 20 are Scheduled Castes. The *Karans* are an upper caste and are traditionally held to have accounting jobs near the king. In the advanced village Charapara, all the Scheduled Caste households are found to possess no land, whereas in Sandhagaon some Scheduled Castes own land and thereby belong to farm categories like owner cultivator, part tenant and pure lessor. Also, in Charapara no family members of a landowner hire out labour or work in others' fields for wages. But in Sandhagaon some landowners are found to earn wage income by hiring out labour. Thus, a rigid caste-based differentiation and a hierarchical social structure are observed in the irrigated village.

Now coming to the classwise differentiation of the peasantry, the distribution of owned area according to farmer class, as shown in Table 2, reveals that the peasants are more differentiated in the advanced village Charapara than peasants in the other two villages. The MFs of Charapara, constituting nearly 31 per cent of

**Table 2: Distribution of Owned Area According to Farmer Class**

Class	No. of Households	% of Total	% of Owned Area
<b>Charapara</b>			
MF	8	30.8	8.1
SF	6	23.1	14.7
MDF	7	26.9	29.7
LF	5	19.2	47.5
Total	26	100.0	100.0
<b>Harinababi</b>			
MF	8	36.4	15.0
SF	7	31.8	30.9
MDF	7	31.8	54.1
LF	-	-	-
Total	22	100.0	100.0
<b>Sandhagaon</b>			
MF	7	46.6	20.9
SF	4	26.7	32.1
MDF	4	26.7	47.0
LF	-	-	-
Total	15	100.0	100.0

Notes: Size of land holding=L, MF=  $0 < L < 1$  ha, SF= $1 \text{ ha} \leq L < 2$  ha, MDF= $2 \text{ ha} \leq L < 4$  ha, LF = 4 ha and above.

the households, own only 8 per cent of owned land, whereas the LFs, constituting about 19 per cent of the households, account for 48 per cent of the owned area. In village Harinababi the MFs are 36 per cent of the total households and own only 15 per cent of the landholding. On the other hand, the MDFs, constituting 32 per cent of the households, occupy about 54 per cent of the owned land. In the non-irrigated village Sandhagaon, about 47 per cent of the households are MFs, who own 21 per cent of the owned area, whereas the MDFs, constituting 27 per cent of the households, possess 47 per cent of the owned land.

Thus, it is observed that caste rigidity, class hierarchy and inequality in landownership, and above all peasant differentiation, are more pronounced in the advanced villages than in the backward villages.

### **Who Borrows and Why?**

In this section a classwise analysis of the indebted ratio of farm households and the purpose of their borrowing is attempted. The indebted ratio of a farm class is determined by dividing the number of indebted households by the total number of households in that class and expressing it as a percentage. Land ownership has been considered as the index of economic status of a household. In rural areas not only does land help in generating income, but also its mere ownership adds power and prestige. An examination of the indebted ratio of different landed classes reveals that in irrigated villages there exists an inverse relationship between the size of land holding and the indebted ratio. In Charapara, while 62.5 per cent of the MFs are indebted, it is only 20 per cent in the case of LFs. By contrast, in Sandhagaon, the relationship is direct, implying that the indebted ratio increases as farm size increases. This is partly because other sources of income like salary are more important than agriculture in total household income. In all the villages most of the landless labourers and pure tenants are found to be in debt. Indebted ratio, however, is higher in the case of PTs than that of LLs in Charapara and Sandhagaon.

As to the purposes of borrowing, it is observed that in all the villages consumption loans constitute an insignificant proportion of the total loan. Though the PTs and LLs occasionally borrow in cash, they usually take (crop) loans in kind from their landowners/employers during the lean season and repay them in terms of crops just after the harvest. On such loans the lenders usually do not charge any explicit interest.

In Charapara in the case of MFs, SFs and MDFs more than 50 per cent of the loans are meant for ceremonial expenses, mostly for daughters' marriage. For PTs and LLs most of the loans are for small businesses like buying rickshaws, sheep, jersey cows, bullocks, and for frying '*mudhi*' (puffed rice) sanctioned under government poverty alleviation programmes. In village Harinababi the highest proportion of loans for MFs, SFs, and MDFs is for ceremonial expenses, house

building, and for cultivation respectively. In Sandhagaon in the case of SFs and MDFs all the loans are for cultivation. The major proportion of loans in the case of MFs, PTs, and LLs is meant for small business, ceremonial expenses and small business respectively.

Thus, in all the villages production loans or loans for cultivation are found to be more important than loans for consumption.

### Sources of Finance

It is well known that the rural poor have limited access to institutional sources of credit. Table 3 shows that in village Charapara in the case of SFs, MDFs, and LFs more than 75 per cent of the number of loans are from institutional sources like commercial banks, co-operatives and under government employment programmes meant for the self-employment of educated youth.

**Table 3: Percentage Distribution of Number of Loans from Different Sources According to Farmer Class**

Village/ Class	Commercial Banks	Co- operatives	Under Govt. Programme	Private Sources	Others	Total
1	2	3	4	5	6	7
<b>Charapara</b>						
MF	0.0	-	42.9	42.9	14.3	100.0
SF	20.0	40.0	20.0	20.0	-	100.0
MDF	25.0	50.0	-	25.0	-	100.0
LF	-	-	100.0	-	-	100.0
PT	-	-	33.3	66.7	-	100.0
LL	-	-	50.0	50.0	-	100.0
Others	-	-	-	100.0	-	100.0
Total	5.9	11.8	35.3	44.1	2.9	100.0
<b>Harinababi</b>						
MF	20.0	-	40.0	40.0	-	100.0
SF	-	50.0	-	50.0	-	100.0
MDF	33.3	-	33.3	33.3	-	100.0
Total	20.0	10.0	30.0	40.0	-	100.0
<b>Sandhagaon</b>						
MF	-	-	75.0	25.0	0.0	100.0
SF	50.0	50.0	-	-	-	100.0
MDF	50.0	50.0	-	-	-	100.0
PT	-	-	25.0	75.0	-	100.0
LL	-	-	40.0	50.0	10.0	100.0
Others	-	-	66.7	33.3	-	100.0
<b>Total</b>	<b>6.9</b>	<b>6.9</b>	<b>37.9</b>	<b>44.8</b>	<b>3.4</b>	<b>100.0</b>

But in the case of MFs, PTs, and LLs, more than 50 per cent of the loans are from private sources; the rest are subsidised loans under government poverty alleviation programmes like Integrated Rural Development Programme (IRDP) and Economic Rehabilitation of Rural Poor (ERRP). It is clear from the table that they have no access to institutional loans from commercial banks and cooperatives, where a borrower has to pledge collateral like land or gold to get a loan. Many do not have such assets to provide as collateral and others do not have resources to meet the transaction costs of getting a loan. The transaction costs include: member's registration and identification fee, land record verification fee, borrower's travelling expenses incurred in negotiating, sanctioning, and repaying the loan, providing a guarantor for sanction of loan and opportunity cost of the borrower's time used in negotiating the loan. (Sarap 1991: 64). It was found that the Panchayat Secretary of the village could manoeuvre to avail of a second loan from the co-operative even if he had an outstanding loan. Usually a member is debarred from taking a second loan if he has not fully repaid the first one. Table 3 further shows that in Charapara in the case of MFs, 14.3 per cent of the number of loans are from other sources which are the housing loans from the company (the employer) being adjusted against salary. In Harinababi the SFs and MDFs have better access to loans from commercial banks and cooperatives than the MFs.

In Sandhagaon the SFs and MDFs have borrowed only from institutional sources. But the landless like PTs and LLs have borrowed mainly from private sources. In the case of PTs 10 per cent of the loans are from other sources, which is interestingly from the *Yubak Sangha* (youth club) in that village. Some young men of higher castes have formed a youth club. They raise funds from its members every month to organise village functions or sports events. To increase the amount, they often lend to co-villagers at exorbitant interest rates, i.e., 120 per cent per annum.

Thus, it is observed that in all the villages private agencies are the predominant source of finance for the rural poor, specifically for the MFs, PTs, and LLs.

The percentage distribution of the amount of loan among different sources according to farmer class is presented in Table 4. The table shows that the percentage of loan amount from private sources is 46.1 per cent in Charapara, 25.8 per cent in Harinababi and 23.1 per cent in Sandhagaon. It is found that in the case of PTs and LLs a major proportion of loans is from institutional sources under different government programmes, but this does not mean that the landless poor have access to formal loans. As subsidised loans under government programmes are meant for the poorest of the poor and are aimed at upliftment of the poor, it is natural that they get these loans. But none of the landless classes is able to get a loan from a commercial bank or from cooperatives. Consequently, when in need, the rural poor borrow from private moneylenders who in most cases are their employers, lessors or shopkeepers.

Table 4: Distribution of Amount of Loans among Different Sources of Finance According to Farmer Class

Village/ Class	1	2	3	4	5	6	7	8	9	10
	Total Amount Borrowed (Rs.)	Commercial Banks (Rs.)	Co-operatives (Rs.)	Under Govt. Programmes (Rs.)	Others (Rs.)	Institu- tional Sources (Rs.)	% of Total	Private Sources	% of Total	
<b>Charapara</b>										
MF	42,650	-	-	10,850	10,000	20,850	48.9	21,800	51.1	
SF	29,300	-	3,000	3,000	-	6,300	21.5	23,000	78.5	
MDF	26,000	2,000	7,000	-	-	9,000	34.6	17,000	65.4	
LF	25,000	-	-	25,000	-	25,000	100.0	-	-	
PT	5,400	-	-	4,000	-	4,000	74.1	1,400	25.9	
LL	12,950	-	-	11,000	-	11,000	84.9	1,950	15.1	
Others	40	-	-	-	-	-	-	40	100.0	
Total	141,340	2,000	10,000	54,150	10,000	76,150	53.9	65,190	46.1	
<b>Harinababi</b>										
MF	22,200	3,000	-	9,000	-	12,000	54.1	10,200	45.9	
SF	8,400	-	8,000	-	-	8,000	95.2	400	4.8	
MDF	13,200	4,000	-	8,500	-	12,500	94.7	700	5.3	
Total	43,800	7,000	8,000	17,000	-	32,500	74.2	11,300	25.8	
<b>Sandhagaon</b>										
MF	35,900	-	2,500	32,900	-	32,900	91.6	3,000	8.4	
SF	17,500	15,000	2,600	-	-	17,500	100.0	-	0.0	
MDF	5,600	3,000	-	-	-	5,600	100.0	-	0.0	
PT	18,300	-	-	6,000	-	6,000	32.8	12,300	67.2	
LL	20,850	-	-	14,100	200	14,300	68.6	6,550	31.4	
Others	9,500	-	-	6,500	-	6,500	68.4	3,000	31.6	
Total	107,650	18,000	5,100	59,500	200	82,800	76.9	24,850	23.1	

In Harinababi and Sandhagaon the percentage of loans from private sources for the landholding class is significantly low and decreases as the size of holding increases. In Charapara this percentage is quite high because some of the households have borrowed from their relatives and friends for their daughters' marriages.

As regards the distribution of the amount of private loans among different sources, in all the villages in the case of the landholding class a major proportion of private loans is from friends and relatives. But the landless poor do not have well-to-do relatives to whom they can turn for financial assistance; they usually turn to their employers or lessors when in need. It is observed that in Charapara and Harinababi, most of the tenants and landless labourers have taken loans from owner cultivators who have additional salary income. The professional moneylender class, whose major source of income is moneylending, is non-existent in the villages. Salaried people like school teachers, lecturers, doctors and professional musicians, who have surplus income, lend money to the needy. In Sandhagaon, a major amount of loans in the case of landless casual labourers and pure tenants is from shopkeepers.

Thus, among private sources of finance, friends and relatives are major sources of finance in Charapara and Harinababi, and shopkeepers are important sources in Sandhagaon. Professional moneylenders as a class are totally absent in all the villages. Trader moneylenders are also found to be unimportant as a source of finance.

### **Extent of Indebtedness and Loan Repayment**

In this section an attempt is made to analyse the indebtedness status of households according to farmer class. The indebtedness of a household has been determined by subtracting the amount of government subsidy and the amount repaid from the amount borrowed. In Charapara the landed class on an average is more indebted than the landless class. This is because of their better access to credit facilities. But this difference is not so conspicuous in Sandhagaon. Interestingly, it is observed that whereas the landless are somehow repaying their loans, the landowners do not care to repay the loans taken under government employment schemes and pumpset loans. They can prevail upon the bank officials to refrain from taking punitive action.

The landowning class repay their loans mostly from income from cultivation and from salaries, whereas the landless poor repay from their earnings from petty business like pulling rickshaws, selling milk, hiring out bullock carts (in Sandhagaon), etc., and from wage income. Sometimes they pay in kind in terms of labour in the lender's field or selling agricultural produce at a pre-determined lower price as contracted. In the worst case the poor peasants and landless labourers repay loans by selling their assets like homestead land, cow or calf.

### **Results of Regression Analysis with respect to Borrowing, Debt Burden and Default Rate**

In the estimated regression equations the amount of total borrowing, the debt burden and the default ratio are the dependent variables and income is the explanatory variable. Table 5 contains the regression results. In Charapara the total borrowing (TOTALBOR) is positively and significantly related with total income (TOTALIN). But debt burden (DEBTBURD), which is measured as the ratio of total borrowing to total income, is negatively related with the logarithm of total income (LTINCOME). There is negative association between the default ratio (DEFAULTR i.e., the ratio of indebtedness to total borrowing) and the total income. DEFAULTR and LDEBTBUR (logarithm of DEBTBURD) are negatively related. Thus all regression coefficients are of expected signs and are significant. In Harinababi most of the regression coefficients are found to be not significant. Only DEBTBURD and LTINCOME are negatively and strongly related. This implies that debt burden decreases with increase in income.

In the non-irrigated village Sandhagaon, the relationship between DEBTBURD and LTINCOME is negative and significant. The regression coefficient in the case of LDEBTBUR as the explanatory variable and DEFAULTR as the dependent variable is estimated to be negative and significant.

Thus the amount of borrowing increases with increase in income. Debt burden decreases with increase in income. Default rate is positively related with income in Charapara and negatively in Harinababi and Sandhagaon. Default ratio and debt burden are negatively related in Charapara and Sandhagaon but positively related in Harinababi.

### **Usurious Interest Rates**

On the basis of interest charged, private loans have been sub-divided into three categories: with explicit interest, with implicit interest and with zero interest. Table 6 shows that interest rate is significantly high when charged explicitly. It ranges from 60 per cent to 120 per cent per annum, whereas institutional agencies charge only 12 per cent. Recently, much literature on interlinkage has emerged, which propounds that if no interest rate is charged this does not mean an absence of usury, since there may be implicit interest charges in the form of a lower wage payment or purchasing crops at less than the ruling market price from the borrower.

The table shows that in the case of the landowning class a major proportion of borrowing is from friends and relatives, and is interest-free. Usually they borrow to meet the expenses of their daughters' marriage. But in the case of landless labourers and pure tenants the loans are charged either explicit or implicit interest. In Sandhagaon for the landless class a significant amount of loans is shown to have been charged at zero interest rate. These loans are from a shopkeeper in the nearby

Table 5: Result of Least-Squares Regression Analysis Borrowing, Debt Burden and Default Rate

Village	Dependent Variable	Explanatory Variables	Regression Coefficient	t-Value	Probabilities	R Square	F-Value	Probabilities
1	2	3	4	5	6	7	8	9
<b>Charapara</b>	TOTALBOR	TOTALIN	0.29	2.94	0.005	0.17	8.66	0.005
		Constant	971.61	0.85	0.400		(1.41)	
	DEBTBURD	LTINCME	-1.07	-1.50	0.150	0.09	2.26	0.146
		Constant	4.90	1.80	0.084		(1.23)	
	DEFAULTR	LTINCME	0.40	2.25	0.034	0.18	5.06	0.034
		Constant	-0.84	-1.23	0.231		(1.23)	
	DEFAULTR	LDEBTBUR	-0.21	-1.85	0.078	0.13	3.40	0.078
		Constant	0.60	6.98	0.000		(1.23)	
<b>Harinababi</b>	TOTALBOR	TOTALIN	-0.04	-0.54	0.594	0.02	0.29	0.594
		Constant	2666.11	1.86	0.078		(1.20)	
	DEBTBURD	LTINCME	-1.04	-3.20	0.015	0.59	10.22	0.015
		Constant	4.72	3.57	0.009		(1.7)	
	DEFAULTR	LTINCME	-0.10	-0.23	0.826	0.01	0.05	0.830
		Constant	1.04	0.58	0.581		(1.7)	
	DEFAULTR	LDEBTBUR	0.27	0.85	0.425	0.09	0.72	0.425
		Constant	0.50	2.42	0.050		(1.7)	
<b>Sandhagaon</b>	TOTALBOR	TOTALIN	0.08	1.00	0.324	0.03	1.00	0.324
		Constant	2320.64	1.77	0.087		(1.31)	
	DEBTBURD	LTINCME	-1.29	-2.57	0.019	0.26	6.62	0.019
		Constant	5.72	3.03	0.007		(1.19)	
	DEFAULTR	LTINCME	-0.15	-0.68	0.506	0.02	0.46	0.506
		Constant	1.20	1.42	0.172		(1.19)	
	DEFAULTR	LDEBTBUR	-0.31	-1.98	0.063	0.17	3.90	0.063
		Constant	0.54	6.02	0.000		(1.19)	

village from whom they buy all their groceries. In fact, these loans carry implicit interest charges as the shopkeeper extends loans only to his regular customers, charging them about 10 – 15 per cent more than the price in nearby town shops.

**Table 6: Distribution of Private Loans as per Interest Charged According to Farmer Class**

Village/ Category	Total Private Loan (Rs.)	Zero Interest Charged (Rs.)	Explicit Interest Charged (Rs.)	Interest Rates per Annum (%)	Implicit Interest Charged (Rs.)
<b>Charapara</b>					
MF	21,800	15,000	6,000	60	800
SF	23,000	20,000	3,000	120	-
MDF	17,000	17,000	-	-	-
LF	-	-	-	-	-
PT	1,400	400	1,000	60	-
LL	1,950	100	-	-	1,850
Others	40	-	40	120	-
Total	65,190	52,500	10,040	2,650	-
<b>Harinababi</b>					
MF	10,200	10,000	-	-	200
SF	400	-	-	-	400
MDF	700	-	700	60	-
Total	11,300	10,000	700	-	600
<b>Sandhagaon</b>					
MF	3,000	3,000	-	-	-
SF	-	-	-	-	-
MDF	-	-	-	-	-
PT	12,300	11,000	1,300	60	-
LL	6,550	1,200	5,200	60	150
Others	3,000	3,000	-	-	-
Total	24,850	18,200	6,500	-	150

### Interlinked Credit Contracts

In underdeveloped rural areas it is very often observed that the landowner extends credit to his tenant, hires labour against loan advances, and buys crops at a predetermined lower price as stipulated in fertiliser or seed advance extended. The consequences of such interlinked transactions are interpreted differently by different economists. While Marxists (Bharadwaj 1974, Bhaduri 1977; Prasad 1974) believe that interlinkage is a method of surplus extraction in a class society, the neoclassicals (Bardhan 1984; Braverman and Stiglitz 1982; Basu 1983) propound that it is a rational individual's endeavour to increase allocative efficiency under conditions of market imperfections.

Bhaduri (1983) has developed an interlinked model of tenancy and usury, and holds that the simultaneous operation of two methods of surplus extraction

in the form of rent as well as usurious extraction tends to increase the total claims on the peasant's produce by the expropriating class. Thus Bhaduri's view resembles the classical form where the precapitalist relations are a direct relationship of domination and subordination between the ruling classes and direct producers unmediated through the market and are thus characterised by extraeconomic coercion. By contrast, Bardhan (1984) does not have such a pessimistic view of interlinked contracts. In explaining the existence of attached labourer arrangement, for example, Bardhan (1984) notes that 'the employee's need for job security and the employer's need for a dependable and readily available source of labour supply and not feudal subordination provides the major motivation for a predominantly market relationship between the attached labourer and his master.' Thus, the relationship is viewed as symbiotic rather than as a dominant-depressed class relationship. With this theoretical underpinning in place, the following sections attempt to analyse the kind of interlinked contracts observed in our study villages to examine whether the credit contracts are exploitative or mutually beneficial.

### **Interlinkage between Tenancy and Credit**

In our study villages, some of the tenants are found to borrow from their lessors (Table 7). As a result, the land, labour and credit contracts are interlinked. In Charapara a pure tenant has borrowed Rs.1,000 from his lessor at an interest rate of 60 per cent per annum for expenses on his father's funeral ceremony with a contract to repay the loan in terms of labour. Usually when a loan is repaid in terms of labour the assumed wage rate for conversion of labour to money is lower than the prevailing market rate. It was Rs.8 per day when the market wage rate was Rs.10 per day and thus involves implicit interest charges. It is to be noted that the minimum wage for unskilled labour declared by the Government at that time was Rs.25 per day.

In Harinababi a part tenant has borrowed Rs.400 from the landowner for cultivation which he will repay in terms of paddy at the market price just after harvest. As the price of paddy is quite low after harvest, an implicit interest is charged. In the non-irrigated village Sandhagaon one part tenant and two pure tenants have borrowed from their lessors. The part tenant had borrowed Rs.50, which he repaid in cash by selling straw. Two pure tenants have borrowed Rs.200 and Rs.300 at 60 per cent interest, which they will repay in terms of labour.

Thus it is found that loans from the lessors are not interest free. Moreover, the interest rates charged, explicitly or implicitly, are quite high. Landowners with additional sources of income like salary or small business are advancing loans to the tenants. Thus, agriculturist moneylenders whose major source of income is agriculture are few and far between.

**Table 7: Distribution of Commercial Private Loans among Different Linked Transactions According to Farmer Class**

Village/ Category	Commercial Private Loan (Rs.)	Linked Loan (Rs.)	% of Total	Linked with Tenancy (Rs.)	Linked with Labour (Rs.)	Linked with Asset (Rs.)	Linked with Produce (Rs.)
<b>Charapara</b>							
MF	6,800	800	11.8	-	-	800	-
SF	3,000	-	-	-	-	-	-
MDF	-	-	-	-	-	-	-
LF	-	-	-	-	-	-	-
PT	1,000	1,000	100.0	1,000	-	-	-
LL	1,850	1,850	100.0	-	1,850	-	-
Others	40	-	-	-	-	-	-
Total	12,690	3,650	28.8	1,000	1,850	800	-
<b>Harinababi</b>							
MF	200	200	100.0	-	-	-	200
SF	400	400	100.0	400	-	-	-
MDF	700	-	-	-	-	-	-
Total	1,300	600	46.2	400	-	-	200
<b>Sandhagaon</b>							
MF	-	-	-	-	-	-	-
SF	-	-	-	-	-	-	-
MDF	-	-	-	-	-	-	-
PT	1,300	1,300	-	-	-	-	-
LL	5,350	1,650	-	-	150	1,500	-
Others	-	-	-	-	-	-	-
Total	6,650	2,950	-	-	150	1,500	-

### **Interlinkage between Credit and Asset**

As an insurance against default, the moneylenders usually demand collateral like land, houses, buildings, silver, gold, and brass utensils against loans. In village Charapara, four years ago, an MF borrowed Rs.800 by mortgaging 0.64 acres of his non-irrigated land with a large farmer of a nearby village, which he has not yet repaid. The contract is such that he will recover his land when he repays the loan. Until then the lender cultivates the land and retains the produce as interest on the loan.

By contrast, in the non-irrigated village Sandhagaon a landless pure tenant is found to have advanced Rs.700 to the landowner with the stipulation that he will cultivate the latter's two acres of land and retain the entire produce until the land owner repays the loan in full. And he has been cultivating the land for the last four years. This type of reverse usufructuary mortgage observed in the non-irrigated village is interesting. Another case of interlinked asset and credit contract is observed in this village. A landless casual labourer has borrowed Rs.1,500 by placing his gold necklace as collateral with a large farmer of the nearby village. The market value of the necklace is about Rs.3,000 and he is allowed to borrow half of the market value. He is also charged 60 per cent interest and will get his necklace back when he repays the principal with interest in full. Thus the village poor mortgage whatever assets they possess to get a loan. Whereas the landed class are found to borrow from commercial banks and co-operatives against gold or land kept as collateral, the rural poor do not have such access. It is the poverty of the resource-poor households that compels them to borrow from private sources even at usurious interest rates.

Interestingly, in the villages under study no household reported losing land due to non-repayment of a loan except one in Charapara. There all the landless Scheduled Castes reported that their ancestors did not own any cultivable land. Only one higher caste widow said that fifty years back she had lost her entire holding as the moneylender confiscated all of her land when she failed to repay a loan. This agriculturist moneylender and his younger brother together owned about 45 acres of land. On disintegration of the joint family, the ancestral land was divided between the two brothers, each of whom inherited 22.5 acres. After their death the land was further divided among their sons. One had five sons and the other brother had three sons. Thus, the landholding size of the present heirs comes to less than 7 acres per household. All their family members are settled in cities and are now selling their land. Thus the offspring of big farmers are gradually becoming detached from cultivation. The size of land-holding keeps shrinking generation after generation, due to the law of inheritance, population growth and disintegration of the joint family system. As a result, nowadays large farmers with enough surplus to engage in usury are rarely found in the villages. Thus a Bhaduri-type exploitative moneylender is no longer found in the villages under study though in the past such

a class did exist.

### **Interlinkage between Labour and Credit**

In backward agriculture, the boundaries of the village labour market are often narrowly delimited and heavily dependent on social and territorial affinities. The employer's personal knowledge of the work capacity, reliability and trustworthiness of particular labourers plays a crucial role in labour hiring (Bardhan and Rudra 1985). These affinities are often cemented by relationship of regular consumption credit, provision of rent-free land or homestead land and wage advances. In the absence of any developed market for credit and insurance these interlinked transactions act as an imperfect substitute and perpetuate the territorial segmentation of the labour market even in adjacent areas. In this section we analyse the loans linked with labour and wage advances to semi-attached labourers and farm servants in our study villages.

Table 7 shows that in village Charapara landless labourers have taken loans of Rs.1,850 against the promise of future labour in the lender's field. When a labourer repays loans in terms of labour he is paid a lower wage than the prevailing market wage rate and thus implicit interest is charged. In Sandhagaon also a landless casual labourer has taken a loan of Rs.150, which he will repay in terms of labour. The landless possess only their labour, which they pledge for a loan.

In the irrigated villages, as agricultural operations are undertaken throughout the year and availability of labour is an acute problem at peak periods, the medium and large farmers prefer to make labour tying arrangements with the labourers by providing them with land for cultivation or homestead land, so that the labourer is compelled to work for the employer when the latter needs his services. These attached labourers are found only in the irrigated villages. They are paid wages at less than the prevailing wage rate. When they are in need, they usually borrow from their employers either in cash or in kind and repay it in terms of labour at the usual wage rate at which they are paid. Two attached labourers have borrowed Rs.200 and Rs.600 respectively and have repaid in terms of labour. One attached labourer takes an advance in kind (paddy) from the employer, which he repays in terms of labour. The attached labourers are actually semi-attached in the sense that when the employer does not need their labour, they are free to work for other landowners in the village.

To get dependable labour service at odd hours of the day, the big farmers also engage farm servants or permanently attached labourers. Bhalla's (1976) study in Haryana reveals that the landowners employ some trustworthy workers as permanently attached labourers to supervise the work of casual labourers, an arrangement that works as a check on class solidarity. These workers who are willing to make the required behavioural adjustments are paid wages above their marginal

products as tied rent or ability rent.

In the irrigated villages a big farmer usually employs an attached labourer, a farm servant and a cowboy to get dependable labour supply. In Charapara and Harinababi there are nine farm servants, five of whom belong to Scheduled Tribes. They have emigrated from tribal areas of Keonjhar district where work opportunities are scarce due to rainfed farming. The farm servants usually stay in the landowner's house and their maintenance expenses are borne by the employer. They are paid a salary ranging from Rs.1,000 to Rs.1,800 per annum. Farm servants associated with a single employer for many years are paid more. The native farm servants usually take cash advances at the beginning of the contract year which they repay in terms of labour. But immigrant tribals are paid at the end of the contract period.

In the case of non-irrigated village Sandhagaon even marginal farmers and landless tenants who have other sources of income keep farm servants. These servants are called *halia* (ploughmen). The contract runs for a year beginning in March, and in most cases salary is fixed on a monthly basis in contrast to the annual payment made in the irrigated villages. As the employers are salary holders they engage farm servants for agricultural operations and also to supervise the work of other hired casual labourers. In Sandhagaon five out of six farm servants are immigrants from jungle areas, and four of them have possessed land in their native places. Interestingly, one of them reported that in his native place he had taken a loan of Rs.1,000 from a private moneylender at 60 per cent interest to buy a young bullock. To repay the loan he has migrated to this village to earn money. Thus, exploitation in one village has an impact on another village and shapes production relations in the target village.

This instance suggests that interlinked transactions may be observed in a particular place not because poverty or backwardness prevails in that particular area, but because poverty prevails somewhere else. For example, in Punjab the employment of farm servants is on the increase. Most of these farm servants are immigrants from backward and poor states like Orissa and Madhya Pradesh. Thus, poverty in Orissa helps to perpetuate interlinked transactions in Punjab. Also, marginal farmers who were tenants and hiring out labour in Charapara and Harinababi have migrated to Calcutta and are employed there in unskilled manual jobs as gardeners, cleaners and watchmen in purely private companies, where they are paid low wages. Therefore, interlinkage is no longer considered to be an intravillage phenomenon. With overall development and improvement in transport and communication facilities the mobility of the depressed class has of course increased, but from one set of exploitations they enter into another set at a different place. Thus, interlinkage has crossed village boundaries. In a vast country like India there is much scope for migration, and as long as unbalanced regional development and inequality prevail, interlinkage is here to stay.

### **Interlinkage between Credit and Produce**

Usually traders-cum-moneylenders advance loans for the cultivation of cash crops like jute at the time of sowing or transplanting on the condition that just after harvest the cultivator will sell the crop to the lender at a predetermined price irrespective of the market price. Interest payment conditions vary. In our investigation only one respondent, a tenant in Harinababi village, had borrowed Rs.200 from a trader moneylender for cultivation of jute for two months. After the harvest he repaid the principal in terms of jute at the prevailing market price, paying interest of 2 kgs of jute for every hundred rupees. As the price of jute was Rs.380 per quintal, interest for Rs.100 was Rs.7.60 for two months. So the annual interest rate was 45.6 per cent. But here the borrower is compelled to sell just after harvest when the price is very low. To that extent there is further implicit interest charged. Almost all the cultivator households have supplementary income like remittances from family members and salary income. Therefore, they rarely go to the trader moneylenders for loans. In Harinababi a tenant has borrowed Rs.400 from his lessor, which he will repay in terms of paddy just after the harvest at the prevailing market price. As the price of paddy is quite low at harvest, it amounts to charging an implicit interest rate.

### **Conclusion**

We now enlist our main observations on indebtedness of households in the sample villages. With regard to indebted ratio of households, it is observed that in Charapara the percentage of indebted households decreases as the size of holdings increases. But in Sandhagaon, the opposite is the case. The important sources of finance in all the villages are non-institutional or private sources. Specifically, the rural poor like PTs, LLs, and MFs lack access to loans from commercial banks and co-operatives. They rely primarily on private sources like cultivators, salaried people and shopkeepers for their credit needs. In all the villages professional moneylenders are conspicuous by their absence. Trader moneylenders are also unimportant. The MDFs and LFs borrow mainly from institutional sources and from friends and relatives. With respect to the purpose of borrowing, consumption loans are less important than production loans. But PTs and LLs are found to borrow marginally from their lessors and employers in kind, which they repay in terms of crops or labour. It was observed that whereas landless labourers are somehow repaying their loans, landowners do not care to repay institutional loans.

The regression results show that the amount of borrowing increases as income increases. The debt burden decreases with increase in income. The default rate is positively related with income in Charapara, and negatively in Harinababi and Sandhagaon. Default ratio and debt burden are negatively related in Charapara and Sandhagaon but positively related in Harinababi.

It is observed that caste rigidity, class hierarchy and peasant differentiation and inequality in land ownership are more pronounced in the advanced village. Also, interlinked transactions are more prevalent in irrigated villages than in non-irrigated villages. However, interlinkage is not found to be the dominant set of relationships in study villages. The tenants, attached labourers and farm servants are exploited as the interest rates charged either explicitly or implicitly are exorbitant, wages paid to the workers are low and the minimum wage declared by the government is not paid to the labourers. The labour tying arrangements are in total contrast to the free labour found in capitalist agriculture. The relationship between the employer and the employee is not a symbiotic relationship as Bardhan presumes. It resembles a dominant and dependent relationship where the landowning class has the upper hand. Through various devices the landowning class extracts a surplus from the poor peasants. Of course, the modality is different from that observed in a feudalistic society characterised by extra-economic coercion.

### References

- Akerlof, G.A. (1970). The Market for Lemons: Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics* 84.
- Bardhan, P.K. (1984). *Land, Labour and Rural Poverty: Essays in Development Economics*. Delhi: Oxford University Press.
- Basu, K. (1983). The Emergence of Isolation and Interlinkage in Rural Markets. *Oxford Economic Papers*, 35: 262–80
- (1984a). *The Less Developed Economy: A Critique of Contemporary Theory*. Oxford: Basil Blackwell.
- (1984b). Implicit Interest Rates, Usury and Isolation in Backward Agriculture. *Cambridge Journal of Economics*, 8: 145–59.
- Bhaduri, Amit (1977). On the Formation of Usurious Interest Rates in Backward Agriculture. *Cambridge Journal of Economics*, 1: 341–52.
- (1983). *Economic Structure of Backward Agriculture*. Delhi: Macmillan Press.
- Bhalla, Sheila (1976). New Relations of Production in Haryana Agriculture. *Economic and Political Weekly*, 11(13): A23–30.
- Bharadwaj, K. (1974). *Production Conditions in Indian Agriculture*. London: Cambridge University Press.
- Borooh, V. (1980). High Interest Rates in Backward Agricultural Communities: An Examination of the Default Hypothesis. *Cambridge Journal of Economics*, Vol.4.
- Bottomley, A. (1963). The Premium for Risk as a Determinant of Interest Rates. *Quarterly Journal of Economics*, Vol.77.
- (1975). Interest Rate Determination in Underdeveloped Rural Areas. *American Journal of Agricultural Economics*, 57: (279–91).
- Braverman, A., and J. Stiglitz. (1982). Share Cropping and Interlinking of Agrarian Markets.

*American Economic Review*, 72: 695–715, September.

Platteau, J.Ph., J. Murickan, and E. Delbar (1981). *Interlinkage of Credit, Labour and Marketing Relations in Traditional Marine Fishing: The Case of Purakkad (Kerala)*. Delhi: Hindustan Publications.

Prasad, P. H. (1974). Reactionary Role of Usurer's Capital in Rural India. *Economic and Political Weekly*, 9(32–34): 1305–308, Special Number.

Rao, J. M. (1980). Interest Rates in Backward Agriculture. *Cambridge Journal of Economics*, Vol.4.

Sarap, Kailas (1991). *Interlinked Agrarian Markets in Rural India*. New Delhi: Sage.

Swain, Mamata (1986). *Usurious Interest Rates in Backward Agriculture: Interlinkage, Competition and Monopoly*, M.Phil Dissertation, The Delhi School of Economics, University of Delhi.

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## **M. N. Srinivas: Ace Interpreter of Indian Society**

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### **Abstract**

This paper attempts to assess the work of M N Srinivas and the appropriateness of his methodology. The distinction in methodology between idiographic and nomothetic sciences is crucial to any such assessment. Intensive fieldwork and participant observation propagated by Srinivas was appropriate to the idiographic nature of work he carried out. An example of this is his path-breaking study on the religion and society of Coorgs of South India. *Social Change in Modern India*, a product of his insightful observations of the traditional nature of Indian society based on the trilogy of concepts, Sanskritization, Westernization and secularization, is another example. However, the problematic aspects of Indian society can be analyzed only through propositional or axiomatic models, which are not Srinivas' forte. Yet, his contribution will have an enduring value for Indian sociology.

M. N. Srinivas was one of the most celebrated Indian sociologists, both at home and abroad. As a senior professional colleague, I had always valued his sage advice and held him in high esteem, and have been greatly stimulated and benefited from his writings. Srinivas claimed to be a social anthropologist and also sociologist. However, when regarded as a sociologist, Srinivas had been an enigma to me until I had to figure out for myself, the real reason, according to me, for his being acclaimed as an outstanding Indian sociologist notwithstanding his undisputed stature as a renowned social anthropologist.

Let me first explain my reason for doubting the credentials of Srinivas as a thoroughbred sociologist. Srinivas defined anthropology, I think, in too restricted a sense, as the study of society other than one's own. In that sense, a foreigner studying Indian society would be regarded as an anthropologist, whereas an Indian scholar studying the same society becomes a sociologist, the reason being that in order to study a society sociologically a scholar, first of all, should be familiar with the meaning the members of that society attribute to their actions. As compared with the foreign scholar, the native scholar is assumed to be already equipped with such insights. Such a definition of anthropology and sociology is only partially true. But there are others, including myself, who maintain that the major distinction between sociology and anthropology lies, not so much in their subject matter as in their different approaches and methodologies.

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The anthropologists principally employ the method of intensive fieldwork and participant observation for data collection, and holistic and conceptual description for presentation, which was what Srinivas followed. Sociologists, on the other hand, are inclined toward the use of the modern scientific method, which calls for the use of deductive and inductive reasoning, the logic of probability, and appropriate statistical tools and techniques to deal with qualitative and quantitative data. Ideally, the sociologists present their findings in the form of propositional statements. Unlike anthropological studies, sociological studies have to be designed in a manner capable of being replicated by other scholars so that their objectivity and validity can be continually put to test. Thus, anthropology is, by and large, an idiographic science whereas sociology follows the pattern of nomothetic discipline.

There are also basic differences in the type of explanations that are possible in the two types of disciplines. The idiographic model of explanation consists of describing a variety of factors that lie behind a given phenomenon to be explained; whereas the nomothetic model is designed to provide the greatest amount of explanation with the least number of causal variables, and is also aimed at uncovering the general pattern of cause and effect.

Given the models of explanations aimed at in anthropology and sociology, it follows that in anthropology a wide variety of information needs to be collected and the explanation dawns on the researcher even during the process of study, but it has to be concretized at the time of writing the report. It can therefore be recognised that intensive fieldwork and participant observation are techniques of data collection that are well suited for the study of anthropology. On the other hand, in well-designed sociological studies the explanation has to be arrived at before the collection of data, purpose of the data being to verify if the explanation is valid. Therefore, the method of sociology is parsimonious in the collection of data as the data are precisely targeted by formulating beforehand, the variables to be measured. All these procedures of sociological research are spelt out in the complex of research procedures known as survey research methods.

In India, the initiation of teaching programmes in sociology preceded the introduction of training in survey research methods. The research method that was practised and advocated in the department of sociology, Bombay University, where Srinivas received his initial research training, was anthropological fieldwork. When Srinivas continued his research studies at Oxford, his guide there was A. R. Radcliffe-Brown, a well-known social anthropologist, who too favoured the anthropological fieldwork method. In this manner, Srinivas was firmly set in the anthropological fieldwork technique. Therefore, when he started his teaching career in India with an opportunity of shaping the programmes in sociology both at Baroda and Delhi Universities, he spontaneously introduced his research students to the methods he inherited from his teachers.

Oddly enough, the training programmes for research students in survey research methods were first introduced in India mostly in the departments of Economics by American sociologists under the sponsorship of the Ford Foundation, in the 1950s. Later on, when reports of some city surveys began to appear, the established Indian sociologists reviewed them with snide comments (Mukherjee 1978:66). The sociologists, however, were not entirely unjustified, for, unless theory and method are deftly integrated in the design of the study, which was rarely the case, the survey results can be sterile. All the same, training programmes in social science research methodology soon found their entry into departments of sociology in most of the Indian universities including the Department of Sociology of Delhi University headed by Srinivas. However, as for himself and for his own research students, Srinivas strictly adhered to the anthropological fieldwork method. Arguably, it is his phobia for mathematics, which he developed during his early schooling (Srinivas 1996: 2), which discouraged him from acquiring new skills of survey research methods. But it is also possible, as I will show presently, that the particular research method he clung to was admirably suited to the nature of the subject matter that he was investigating.

I have dwelt upon the research methodology of Srinivas in a rather too detailed a fashion, in order to make two important observations which, I hope, will be helpful in evaluating Srinivas' works as well as the appropriateness of his methodology. First, let me refer to the quality of the knowledge content of his works in general. In this context, I should like to advert to my earlier remarks about the distinction between the methodology and explanatory models in idiographic and in nomothetic sciences. Such a distinction is important to recognise the fact that the properties of knowledge are also influenced by the type of methods and models employed in its production. Srinivas' works are mostly cast in the idiographic mould. Therefore, in evaluating his contributions one has to exercise caution lest one should put to test idiographic knowledge by nomothetic criteria.

I should like to illustrate my point with a simple example. Srinivas is well known for the theoretical development of the concept of Sanskritization, which has proved seminal to his descriptions of several social-cultural phenomena. However, he has used this concept in different places with different causal implications but without adducing valid evidence for varying his stand. He first used this concept in his book, *Religion and Society among the Coorgs of South India*. In that study, he describes Sanskritization as a cultural process of social mobility in the caste system, whereby a lower caste can move up in the caste ranking by imitating the ritual way of life of a higher caste. In the causal sense, here he uses Sanskritization as an independent variable. At a subsequent point of time when Srinivas uses the concept in connection with another of his concepts 'Westernization', he elaborates 'Sanskritization' by treating it as one among the three main axes of power namely

the ritual, the economic and the political, Sanskritization being the ritual dimension. In this context, he employs Sanskritization as an interdependent variable (Srinivas 1962: 45). The concept of Sanskritization is subjected to further elaboration when Srinivas is explaining social change in modern India. Here he tries to correct the impression conveyed by his initial use of the term which leads one to think that Sanskritization automatically results in the achievement of higher status for the group, and now accepts the possibility of Sanskritization also being a dependent variable when the economic and political dimensions become independent variables (Srinivas 1962: 56-57). I have given this illustration not in order to pick holes in Srinivas' analysis but to demonstrate the inherent limitations of his methodology when verifiable information is called for. The problem of causality can be resolved efficiently only through the nomothetic approach. All the same, Srinivas' analysis is stimulating and thought provoking, regardless of all the uncertainty about the nature of the causal connections between the variables he is investigating.

My second observation relates to the appropriateness of Srinivas' methodology to the subject matter he has dealt with. It can be better expressed in Srinivas' own words. In one of his more recent writings entitled 'Social Anthropology and Literary Sensibility', he makes it clear that the nature of the social reality that he was studying defies the distinction between sociology and social anthropology, and so makes the use of fieldwork incumbent upon the scholar. And I quote,

'I consider sociology and anthropology as fundamentally the same, both concerned with the study and understanding of human societies in space and time. Such a view is particularly relevant in India for it would be irrational to separate the study of tribal societies from that of peasants, and the upper castes, minorities, and the working and middle classes in urban areas. All these groups and categories are an integral part of Indian culture and civilization, and they share certain institutional forms, beliefs, ideas, values, and modes of worship, though it may not always be easy to identify the tribal and near-tribal elements in the culture of the so-called higher groups. But the former are there, and surface during crises in the life of an individual, family or community. Recognition of the existence of several layers in the culture, and of the links between them, is necessary for a proper understanding of Indian culture even though the elite tend to ignore the existence of the "lower layers."

Further on, he states, 'While there is need to use statistical methods, and quantify information when necessary, there are vital areas of social life which demand different skills and qualities.' He amplifies that areas of social life he has in view 'has strong links with history, in particular, social and economic history and philosophy.' And it becomes clear from his following statement that the special skills and qualities required for the study are those implied in anthropological fieldwork. I quote his statement: 'Fortunately, in both social anthropology and

sociology, a tradition of fieldwork has come to be accepted as part of the disciplines...'. Srinivas also has left us in no doubt as to what type of explanations he was seeking in his analyses. 'Explanation often consists in elucidating the relationship of an institution or complex of institutions, with other institutions or institutional complexes. This is what is meant by placing an institution in the total context of social life and culture' (Srinivas 1998: 2525-26).

As a sample of Srinivas' explanation, we may consider his following conclusion about the religion of Coorgs of South India: 'Coorg religion was a variant of Hinduism, the latter consisting of several levels which I labelled "local", "regional", "peninsular", and "All India"'. (Srinivas 1966: 149). Srinivas was able to arrive at such a conclusion by an intensive field study of the Coorg society and by synthesizing his insights drawn from that study with his knowledge of Indian history, religion, philosophy and civilization as a whole. As he puts it, 'Actually, the study of a village or a small town or a caste provides a strategic point of entry for the study of Indian society and culture as a whole' (Srinivas 1966:158). It is from such studies as this that Srinivas has been able to derive some of his theoretical formulations such as Sanskritization and Westernization which are rich in meanings, enabling us to have a grasp of the traditional Indian society and its changing contours.

In this connection it needs to be pointed out that in his theoretical formulations, Srinivas has made use of the structural-functional theoretical framework as developed by Radcliffe-Brown. Unlike other scholars who regard structural functionalism as a theory, Srinivas refers to it as the structural functional method in which 'theory and data are fused together in an inseparable whole, setting a new trend for the writing of monographs'. He further points out that the structural functional method rendered unfashionable the previous tendency to explain contemporary institutions and ritual by reference to the sacred scriptures of the Hindus, and in its place the new method shows a better way of finding explanations in the inter-relationships of the ongoing system itself (Srinivas and Panini 1973: 201). Therefore, it cannot be gainsaid that fieldwork has served well Srinivas' analytical purposes.

Having made the aforesaid observations on Srinivas' methodology, let me now say something about the distinctive contribution of Srinivas to our understanding of Indian society. Here again, it is useful to keep in view the nature of the social reality that he is investigating, the type of social data he is dealing with and the theoretical model in which he has presented his data.

Srinivas regarded himself as an empiricist who did not identify himself with any school of theoretical perspective (Shah 1996: 217). As an empiricist, what Srinivas was doing was to interpret the meaning present in the Indian society of his time, which, although linked with sacred scriptures and historical evidence, could

not be directly deduced from them. He was one of those sociologists who strongly advocated the cultivation of the 'field view' of society compared with the earlier popularity of the 'book view.'

Generally, in collecting information from the field or the current society, the social facts are distinguished in terms of their two different dimensions, one stressed by Durkheim, and the other, by Weber. Durkheim laid stress upon the externality and objectivity or the 'thing-like' character of social facts, whereas Weber drew attention to the intentionality of social action. Since Srinivas was especially concerned with the meaning existing in the society, he naturally had to concentrate on the dimension stressed by Weber and this again justifies Srinivas' strong preference for the method of anthropological fieldwork which pays attention to the subject's own meaning for his or her behaviour.

The pioneers of Indian sociology did recognise the strong religious base and qualitatively distinct nature of the Indian society, but could not hit upon the right methodology of studying society as conceived by the people themselves. Srinivas got his chance when he went to Oxford where he studied under Radcliffe-Brown. From his guide he learnt both the major technique for the analysis of a religiously pervasive society as well as an appropriate model of organising such data. The language of religion is ritual and Srinivas learnt how to decipher that language from Radcliffe-Brown who had propounded a theory of ritual (Singer 1996: 23).

Srinivas' path-breaking contribution to Indian sociology, *Religion and Society among the Coorgs of South India*, came out of his Ph.D. dissertation which he submitted to the Oxford University. In that study, as pointed out by Milton Singer, Srinivas 'goes considerably beyond Radcliffe-Brown's redefinition of the "sacred" in terms of "ritual value" and an analysis of rituals and myths in terms of "symbolic action" and "symbolic" thought.... His most original contribution to a theory of ritual is his analysis of the hierarchies of ritual purity and ritual pollution among different castes, occupations and age and sex groups. Srinivas' linking of this analysis to social strategies that different groups adopted for changing their social and "normal ritual status" by changing their ritual practices and beliefs generated the famous theory of "sanskritisation" and "desanskritisation", and his later theory of secularization and Westernization' (Singer 1996: 49-50).

It is well known that traditional Indian civilization was conceived in a sacred world view of the natural as well as the supernatural universes compared with the traditional western civilization in which sacredness is attributed only to the supernatural universe. Srinivas has interpreted the sacred world view of the Indian people by rank-ordering categories of people as well as things according to their degrees of sacredness and in his concept of Sanskritization he brings out the intertwining of religion and society in a virtual inextricable way (e.g., Srinivas 1989: 51-71).

Finally, it is because of his insightful characterization of the nature of traditional Indian society that Srinivas is able to describe with a similar discernment, the qualitative changes that Indian society is undergoing. In his slender volume, *Social Change in Modern India* (Srinivas 1966), he gives a comprehensive yet succinct view of the qualitative changes taking place in the nature of Indian society by deftly using the trilogy of theoretical concepts of Sanskritization, Westernization and secularization. Each concept signifies a system of meanings as well as a process of transformation affecting not merely social consciousness but also culture and social structure.

Through the use of his concept of Sanskritization, Srinivas explains the process of institutionalization of Hinduism, which one may regard as the foundation of traditional Indian civilization. Sanskritization explains how in Hinduism the various exclusive 'tribe-like' groups are integrated in a hierarchical order of caste system. In the caste system each group retains its primordial loyalties but the several groups are integrated into a hierarchical moral order on the basis of a pantheistic religious world view, in which religious beliefs and practices of the highest caste are regarded as the superior model. Thus religion and social structure are closely intertwined so much so that Srinivas regards the caste system as the structural basis of Hinduism.

By using the concept of Westernization, Srinivas depicts the fundamental changes brought about in the traditional society as a result of British rule. Westernization implies a new system of meanings linked to the introduction of new technology, institutions, ideology and values, which are at variance with their traditional Indian counterparts. Westernization set in motion a process of secularization that led to de-Sanskritization in which the members of the upper castes who were closer to the British power were the first ones to be affected. It is these westernized Indian elite who became the trailblazers in the accentuation of the process of secularization in Indian society.

Although the process of secularization was set in motion as part of Westernization it became more pronounced and broadbased after Independence and with the declaration of India as a secular state. The concept of secularization has two dimensions, namely, desacralization of society and rationalization of thought and action. Because of the peculiar religious world view of Hinduism, the desacralization process in India is much more complex as compared with the West. Srinivas gives a graphic account of the growing irrelevance of the rules of purity and pollution and of the sacred-ritual elements connected with life-cycle events and group cults, and the corresponding changes in the basic institutions of the traditional Indian society. Such changes, as pointed out by Srinivas, are reflected in the growing tendency to reinterpret the Hindu religion itself in a more puritanical fashion by dismissing the now desacralized elements as being extrinsic to Hinduism.

I have referred to some of the significant features of Srinivas' works so as to highlight the kind of knowledge he has generated, which relates to the basic

character of Indian society and culture. It enables us, for example, to compare Indian society with other societies, say, European or Japanese; or to compare the emerging modern Indian society with its pre-modern counterpart. This in itself is no mean achievement. However, if we were interested in explaining the problematic aspects of the Indian society we would have to develop theoretical knowledge in the form of propositional or axiomatic model, which is not Srinivas' forte. But even for the building up of such knowledge, Srinivas' contribution would provide a solid foundation. It is in that sense, I believe, Srinivas' contribution will have an enduring value for Indian sociology.

### References

- Mukherjee, Ramakrishna (1979). *Sociology of Indian Sociology*. Allied Publishers.
- Shah, A.M. (1996). M. N. Srinivas: The Man and His Work. In Shah, *et al.* (eds.) (1996): 197–218.
- Shah, A. M., B. S. Baviskar, and E. A. Ramaswamy (eds.) (1996). *Social Structure and Change, Volume I: Theory and Method—Evaluation of the Work of M. N. Srinivas*. New Delhi: Sage Publications.
- Singer, Milton (1996). On the Semiotics of Ritual: Radcliffe-Brown's Legacy. In Shah, *et al.* 20–54.
- Srinivas, M.N.(1962). *Caste in Modern India and Other Essays*. Bombay: Media Promoters.
- Srinivas, M. N. (1966). *Social Change in Modern India*. Berkeley and Los Angeles: University of California Press.
- Srinivas, M. N. (1996). *Indian Society through Personal Writings*. Oxford University Press.
- Srinivas, M. N. (1998). The Cohesive Role of Sanskritization. In M. N. Srinivas, *The Cohesive Role of Sanskritization and other Essays*. Delhi: Oxford University Press. 56–71.
- Srinivas, M. N. (1998). Social Anthropology and Literary Sensibility. *Economic and Political Weekly*, 33 (39): 2525–8
- Srinivas, M. N., and M. N. Panini. The Development of Sociology and Social Anthropology in India. *Sociological Bulletin*, 22(2): 179–215.

## Book Reviews

**Imtiaz Ahmad, Partha S. Ghosh and Helmut Reifeld (eds.). *Pluralism and Equality: Values in Indian Society and Politics*. New Delhi: Sage Publications. 2000. Pp.378, Rs.325 (Paperback).**

It is well known that values such as those relating to individual rights, democracy and state, and plurality and secularism originated in Europe under certain socio-historical conditions. They were initially accepted by the political elite in India as part of its struggle against colonialism, and came to characterise nation-building in the post-colonial era. Apparently, given India's own socio-cultural heritage, such an adoption of alien values has not gelled well with her ethos and has not yielded the desired returns.

To explore the implications of and the problems in transferring values from one socio-cultural context to another (South Asia in general; India in particular), the Konrad Adenauer Foundation (Germany) sponsored a workshop, which was held at Neemrana Fort Palace (Rajasthan) during March 5–8, 1999. The volume under review is a compilation of the papers presented at this workshop. These papers, claims Helmut Reifeld, the Foundation's representative in India, 'reflect an interest both in an Indo-European dialogue as well as in a comparison of Indian and European core-values' (p.7).

Considering the Foundation's avowed 'profound interest in the promotion of inter-cultural and inter-religious dialogues' (p.7), this claim appears to be no more than a *pro forma* rationalisation for the workshop. Even if such a *dialogue* was intended, it is not evident in the contributions to the volume, not excluding the 'Summary of Discussion' so ably prepared by Dietmar Rothermund. Thus, whatever dialogue transpired at the workshop was more by chance than by design: Obviously, any discussion of the 'core-values' under reference automatically invokes a reference to the European traditions. Moreover, the participants — three from Germany and twelve from India — have all had international exposure and some even have mutual India-Germany contacts.

Even while ignoring the rationale for the workshop, one can hardly deny the intensification of a renewed academic interest in the values of state, pluralism, secularism and equality. There can also be no disagreement with the volume's claim (in the blurb) that these values can be understood (better!) by examining them comparatively in the differing historical and socio-cultural contexts of Europe and India. However, as in any conference volume, the papers here vary in terms of substance as well as originality. Only two papers, on 'State as Value' by Satish Saberwal and 'Individual and Group Rights' by Dietmar Rothermund, have an explicitly comparative framework.

In his 'Introduction,' Helmut Reifeld stresses the importance of inter-cultural dialogue in the context of globalisation and locates the workshop in the context of his Foundation's mission. The fourteen papers are classified under three parts: 'civil space and value premises,' 'concepts of the "other" in India,' and 'facing universalism.' While introducing the foci of individual papers, Reifeld identifies five sets of questions. Considering the limited space of this review, we may follow his thematic ordering.

The first theme relates to 'the value and political position of the individual human being.' Chaturvedi Badrinath analyses the place of 'individual' in Indian thought and polity, which he finds to be radically different from that in western thought. Andre Habisch discusses the role of the individual in western political thought. He views values, norms and institutions as devices of 'European developmental success,' a 'cultural capital,' which has adapted itself to historical circumstances and is generally in consonance with collective experiences.

The relation between individual and group rights, particularly in the Indian context, constitutes the second theme. Papers dealing with this theme invariably focus on the interface between the social reality of India and her juridical superstructure. In his perceptive essay comparing individual and group rights in India and western Europe, Rothermund explains the variations in the development of rights and laws in these two cultural regions.

The problems of secularism form the third theme. Ajay K. Mehra describes the variegated nature of cultural traditions in India and reflects on the implications of 'unity and diversity'. Arguing against a 'purely instrumentalist' interpretation of the concept of secularism, Rajeev Bhargava elaborates its substantive value foundations. Mushirul Hasan offers a historian's perspective on 'majorities' and 'minorities' in modern South Asian Islam. The basic conflicts of 'we' and 'they' form the crux of papers by Imtiaz Ahmad, Ambrose Pinto, and S. Partha Ghosh.

The value that is attributed to the state itself is the fourth theme. Satish Saberwal provides a comparative perspective by comparing three different 'worlds' — of India, Europe and China. Saberwal's analysis lends additional support to some of Habish's explanations. Zoya Hasan focuses on the role of the state with reference to inter-group (in)equality in India. She delineates how the state's effort to restructure social relations by extending group rights to religious and social minorities has created new problems as it has solved old ones.

The last theme concerns India's experience with globalisation. Ranabir Samaddar examines the implications and possible contradictions of pursuing democratisation within a state on the one hand, and opening up and liberalisation of its markets on the other. Yogendra Singh argues that globalisation does not automatically pose a threat to regional and local identities; rather it may enhance the consciousness of cultural roots and of the multifarious local identities.

Concentrating on the social and legal implications of the gender problem, Kumkum Sangari contends that legal options and restraints should respond to social realities.

There is a caveat in the Introduction that disarms a reviewer: '[T]he contributions to this book are not to be taken as attempts to offer any definite or final conclusions on the themes that they deal with, but rather as reflections which may serve as a starting point for continued discussion on them in future.' Since most of these papers by and large repeat ideas and points of view that are already in circulation, one returns from the volume with paltry benefit.

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**Paul Cook and Colin Kirkpatrick (eds.). *Privatisation in Developing Countries, Volume I*. Cheltenham, UK: Edward Elgar Publishing Ltd; Massachusetts, USA: Edward Elgar Publishing Inc. 2000. Pp. 238.**

Privatization has attracted much attention in recent years, and reflects a world-wide interest in reducing the role of the state in national economies while enhancing the scope of private ownership. Privatization emerged as a major issue in the second half of the seventies thanks to the experience of the United Kingdom, which pioneered what came to be called Thatcherism, and swept the other advanced economies into its fold. However, interest in privatization is not confined to the industrial countries. In many LDCs privatization is being actively pursued as a policy option and a growing number of developing countries have formulated detailed proposals for privatising significant segments of economic activity.

Experience of the developing countries with privatization raises questions as to the extent to which they should carry on the process. This necessitates an appraisal of the performance of privatization in such countries, which, in turn, leads to considerations of economic efficiency and the comparative performance of private and public sectors. These themes form the primary focus of the volume under review, which comprises a set of papers organised in four parts. Part I introduces the issues which are discussed threadbare in the rest of the volume. Part II is devoted to a theoretical treatment of the behaviour of public enterprises. Part III discusses the issues surrounding the need for post-privatization regulation, and Part IV reviews the comparative performance between enterprises under private and public ownership.

Nicholas Kaldor's lead article and the second one, by Leroy Jones and Edward Mason, present a set of criteria governing the choice between the public

and the private sectors in Third World countries. The main ones, according to Kaldor, are private profitability *versus* social profitability; the choice between national and foreign ownership of large industrial enterprises; efficiency of operation; and the degree of inequality in the distribution of wealth and power. The role of economic factors in the structure and level of public sector activity are emphasised in the paper by Jones and Mason.

These issues are articulated very well in the paper 'Privatisation in Less Developed Countries: An Overview', by Paul Cook and Paul Kirkpatrick. After building a case for privatization in LDCs — central to which is the widespread 'concern with the perceived weaknesses in the performance of the public enterprise sector' — it discusses the new development orthodoxy, which upheld active state intervention as the answer to market failures, and led to the emergence of the public sector. The performance of the public sector in LDCs, however, was disappointing, making it synonymous with inefficiency and corruption. This led to a shift in the dominant paradigm towards a neoclassical market-oriented view of the development process. The policy prescriptions flowing from such a view entail a reduction in the public sector, removal of government controls, fostering of competition, and a greater reliance on the market and price mechanism for the allocation of resources.

Is privatization a panacea for the ills of public sector? Much of Part I represents an attempt to deal with this question by comparing the performance of private sector with that of public sector. Cook and Kirkpatrick argue that the performance of a public enterprise is difficult to measure, principally because there are seldom any clear-cut objectives set out for them; objectives may be mutually inconsistent; and devising satisfactory single-and multiple-goal performance measures may be problematic. There is a small but growing body of evidence that compares the performance of public and private enterprises in LDCs, using the criterion of productive (technical) efficiency. The evidence on productive efficiency performance does not demonstrate that public enterprises in LDCs are always outperformed by private enterprises. Hence, Cook and Kirkpatrick maintain that the available evidence on productivity performance in the public enterprise sector in LDCs is inconclusive. Nevertheless, they hold that public enterprises have scope for making significant improvements in efficiency. They envisage public sector reform, rather than privatization, as the major focus of public enterprise policy in LDCs in the coming period. The agenda for public sector reform is vast, encompassing the setting of clear-cut objectives; using shadow pricing to assess public enterprise efficiency; the use of negotiated agreements such as contracts or corporate plans; and provision of financial autonomy and accountability.

The first part of the book does justice to its task of clarifying issues and initiating the discussion on a subject that is of contemporary relevance. However, it could do without a few articles that merely repeat platitudes about the public

sector commonly found in textbook discussions of the subject without making any contribution to the primary focus of the discussion.

The second part of the book models public enterprise behaviour. Among the various approaches used are the principal-agent theory, (discussed in the papers by Aharoni; Vickers and Yarrow) where the principal is represented by the state officials, and the agent by the managers functioning under them. Theories of competitive forces analyse the influence of competitive and regulatory constraints on company behaviour under public and private ownership (extensively discussed in a paper by Vickers and Yarrow). Public choice theory and the study of property rights have been invoked by Martin and Parker to mount a case against state ownership. Shapiro and Willig explore models in which privatization reduces not only the information available to regulators but also the effort levels of managers of the enterprise concerned. On the flip side they argue that public ownership provides politicians and bureaucrats with more opportunities to pursue their own agendas/goals to the potential detriment of economic efficiency. Hence, there is a trade-off between the conflicting incentive effects. George Yarrow criticizes the theories of privatization based on the principal-agent analysis, which are popular in theoretical economics. He offers an alternative that locates the theory of privatization within a more general theory of state behaviour, wherein the increasing cost of government finance appears to be a factor that is of particular empirical significance in explaining the emergence of privatization programmes.

The theoretical treatment of the behavioural issues brings interesting insights into the debate on privatization and imparts clarity to the preliminary discussion of the concepts and issues set out in the previous part, with mathematical models that are friendly rather than heavy-going.

Part III presents a few papers that have provided new theoretical and policy insights into the issues surrounding the need for post-privatization regulation, which is a means by which the government can elicit certain desired outcomes. It lies midway between methods that involve more direct controls (nationalisation of an industry) and those that involve the use of more indirect control mechanisms (taxes and subsidies). The form of control a government chooses depends on the problems posed by imperfect and costly information. In the face of limited information the government cannot exercise effective control over a firm or industry unless the latter truthfully reveals information to the government. Much of the modelling by Sappington and Stiglitz is aimed at devising methods by which the firm is induced to reveal this information truthfully.

Willig argues that the performance of the regulated private enterprise may be worse than that of the public enterprise from the perspective of the public interest if the government cannot commit itself to a confined regulatory mechanism. He argues also that the rationale for privatization is ultimately this: the privatized

enterprise, albeit regulated, is more insulated than the public enterprise from arbitrary government intervention. Relative efficiency of public and regulated private enterprises is analysed with two assumptions: first, the government can commit itself to an optimal regulatory mechanism, and second, that it cannot make such a commitment. In the latter case, the paper suggests a possible role for international organizations in providing the necessary commitment to a regulatory regime.

Leroy Jones takes the position that markets are more distorted in developing countries because: (a) they are generally small in relation to the minimum efficient plant size; (b) they have made less progress in developing institutions to deal with market power; (c) the room for rent-seeking behaviour is greater; and (d) information is less widely available.

Part IV reviews the comparative performance between enterprises under private and public ownership on the basis of economic efficiency. Ardent votaries of privatization would be disappointed by the verdict that it does not necessarily lead to more efficiency, a conclusion drawn by Millward and Parker, Yair Aharoni, and Robert Milward.

The debate on privatization has covered much ground, throwing up several conceptual and empirical issues, which have been presented very competently in this volume, along with rich insights and perspectives. Its additional benefit is the extensive range of references to the literature, making it a boon to students of market structure, firm-level efficiency, and industrial organization. Policy makers, development practitioners and bureaucrats too would benefit immensely from the case studies and examples drawn from the experiences of various countries.

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**Leela Fernandes. *Producing Workers: The Politics of Gender, Class and Culture in the Calcutta Jute Mills*. New Delhi: Vistaar Publications. 1997. Pp. 198, Rs. 395.**

In an era of politically dominant social systems and sub-systems political processes are inevitably shaped by a number of cultural identities, meanings and practices. Social relations have come to be defined by them, particularly those between nation-states and the efforts at nation building. Even non-secular institutions like caste and religion have been influencing affiliations based upon secular identities of class and citizenship. It is at such a time, when the values underlying identities overlap due to persistent issues of differences, that the book under review has appeared. Initiating a scholarly debate on the question of formation of categories based upon political considerations, Leela Fernandes argues that 'the boundaries of a particular category are produced in relation to other social categories

or boundaries.’

Fernandes presents a thoroughly developed discussion of how identities, which are created in everyday lives, become central to contemporary debates in feminism and in cultural and social theories of class formation. She questions how theoretical frameworks are generated for understanding livelihoods of people, women in particular, and how they produce themselves in various roles, through social and cultural identities or relations.

How can relationships between individuals be so managed as to help in achieving the desired outcome in producing processes? The book undertakes an important and timely exercise in unfolding aspects of women’s labour and how ‘identities based upon a multiplicity of factors like race, caste, religion, gender, etc., have come to play a central role in shaping relations between and among people.’ The analysis brings out the intimate nexus between gender, caste, political processes and the formation of categories or identities. Basing her findings on an ethnographic study of working-class politics in Calcutta Jute Mills, Fernandes argues that the boundaries between class, gender and community result from the political processes, which are, in turn, the products of ‘institutional, discursive, and everyday social and cultural practices’. She further argues that these boundaries and, what she calls hegemonic representations of class, gender and community, are interrupted by moments of contesting. In other words, the entire analysis centres on testing the prevalence of hegemony and resistance under various circumstantial evidences, like the family, work place, community, etc. It is these dyadic and synergistic interrelations between the political boundaries that exist between categories, she argues, that decide the extent of resistance from them against hegemonic practices of Unions and Community Organizations.

The nineteenth and twentieth centuries witnessed great changes in the ideological structure and thinking in the lives of the working class. This was when the communist manifesto emerged while in the latter part of the latter century, the system collapsed owing to the interplay of a number of socio-economic and political factors. Nevertheless, binaries emerged that hindered an objective understanding of working class behaviour. Some of them are class and community, modern and traditional, capitalist and pre-capitalist, and the east and the west. The author dismisses these binaries as meaningless as far as their relevance to the working class in India is concerned. Taking gender as an example here, she advances the view that its ideal goes beyond the capitalist or pre-capitalist terrain.

Fernandes’ work is basically an exercise in blending the issues of gender, caste, class and ideology in understanding the complexities of conflicting identities of hierarchy, power, deprivation and opportunities. Political processes, which take place in everyday life, are the result of contesting for power by representatives of workers and managers. But these result in the creation of boundaries between gender, class and cultural identities. Political boundaries, she argues, are not

constructed as externalities from family or community relations, but are based upon hegemonic practices within the community and work organizations. In other words, Fernandes' study goes on to unfold how 'hegemonic representatives of class, gender and community are attempted to be preserved by unions, managers and workers. She argues that politics of gender plays a central role in the whole exercise, since marginalisation of women cuts across boundaries of ideologies and approaches. 'Production of boundaries has material and political implications for different participatory groups'. She hopes that her work would lead to the production of analytical space to understand them.

There are two premises upon which the book bases itself. In the first, the author argues that social and political confrontation is to be understood through the boundaries created and contested through political processes. Working class politics was constructed through 'caste politics', thereby making boundaries of class interests become contingent upon caste hierarchies, through a specific political process involving participation of workers, unions and managers in the factory.

In the second premise, Fernandes conceptualizes her arguments in the context where class is constructed through politics of gender and community. Following Gramsci, she asks whether relationships between cultural or 'Super Structures of Civil Society and Hegemony' cannot stop at the question of which aspect of one's cultural identities becomes the basis for collective political action? She attempts to place the process of social construction of category within the theory of hegemony and goes on to conceptualize this process, not as random or continually changing, but 'as fundamentally linked to forms of available resources' that Bourdieu (1985) classifies as economic, cultural, symbolic and social 'capital'.

The book has seven chapters. In the introduction, Fernandes displays her skills as a social anthropologist in taking the readers to the complex understanding of working class behaviour and of social organization of production relations through overlapping and conflicting identities through case studies of labour conflicts. Quoting Stuart Hall (1992), she suggests that social categories are not created but marked by production of 'political, symbolic and positional boundaries'. Fernandes makes a convincing case for an understanding of the interconnections that play a fundamental role in shaping political activities of workers that also represent their interests. Strikes, protests and agitations by workers indicated the culmination of a political struggle where union contributes to the creation of class identities marked by particular case hierarchies.

Chapter two makes a strong case for the absence of a unified national trade union movement in India. 'What we have are Trade Union Organizations linked to political parties'. The author criticises the common discourses of the State and trade unions that try to conceive labour as a monolithic category, transcending differences of gender and community. She has discovered that this conceptualization has resulted in 'shaping production of legitimate boundaries of labour politics in

the jute industry'. But, in reality, she contends that political processes, which take place in everyday life, are the result of contesting for power by representation of workers and managers. But these result in the creation of boundaries between gender, class and cultural identities.

In fact, chapter three discusses politics of gender and community in the labour market and labour force. Here, the author tries to bring in an exercise of blending the issues of gender, caste, class and ideology in understanding the complexities of conflicting identities of hierarchy, power, deprivation and opportunities. Political boundaries are constructed, she argues, not as externalities from family or community relations but are based upon hegemonic practices within the community and work organizations.

Believing that 'Production of boundaries has material and political implications for different participating groups,' Fernandes hopes that her work would lead to production of analytical space to understand them. She prefers comparative analysis to contextualizing issues and processes to get a wider view of theoretical boundaries and dichotomies as the basis of social structure analysis. Following Rudolphs' argument on the distinction between tradition and modernity, Fernandes develops a critique of modernity in the context in which traditional politics of categories can be understood.

Discussing the role of religion and rituals in reinforcing political legitimacy, the author has put in commendable efforts to unravel the interaction, or rather the intimate nexus between various units of identities. She admits that in the whole exercise, politics of gender plays a central role, since marginalisation of women cuts across the boundaries of ideologies and approaches. Chapters 4 to 6 bring this out clearly. The author uses the case study method to understand the patriarchal models of working class family. Life histories of women workers in the mill are drawn in chapter 6 to get insights into what she calls their (women workers') potentiality of social location to serve as a source of resistance to the hegemonic practices of unions and community organizations. This has resulted in the application of the genealogical approach in chapter 7 to recast existing approaches to working class politics, residential segregation and gender code.

The book offers a concise and critical account of the intellectual landmarks in developmental theory, adding to the rare but invaluable literature on the issues raised. The book has rigorous, provocative and innovative ideas, and is recommended to labour specialists and social anthropologists. It demonstrates that there are good reasons for management practitioners, students and researchers to address the issues of gender, which go beyond the organizational aspects.

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**Roger Jeffery and Nandini Sundar (eds.). *A New Moral Economy for India's Forests? Discourses of Community and Participation*. New Delhi: Sage Publications. 1999. Pp.305, Rs.265.**

The book under review brings together scholarly contributions on the historical, conceptual and empirical aspects of community participation in forest management in India. While most of the literature on the subject has dealt with the organizational level, this book focuses on parameters within which each of these organizational groups operates and the consequences of their intervention. Moreover, it tries to identify the 'common ground' on which the new initiatives of community participation are taking shape. This common ground is termed the moral economy, which refers to the notion of legitimate or illegitimate (economic) practices grounded in a consistent traditional view of social norms and obligations.

While Sumit Guha presents a historical view of early forest management in India, Arun Agrawal focuses on the concept of community as it has evolved. It is pointed out that the concrete policy proposals to involve communities in conservation generally address it as a social organization and that the past could not provide a perfect model of institution for governing the commons. A historical analysis of forest management of Midnapore (West Bengal) by Sivaramakrishan demonstrates the limited role of community management and the leading role played by the State in the past. This article gives the message that the common ground for community participation was weak in the past.

There are a few case studies on the present initiatives of community participation in forest management by Amitha Bhaviskar, Savyasaachi, Vasavada *et al.*, N C Saxsena *et al.*, Correa, Locke, and Bhasker Vira. Bhaviskar examines the participation by social actors engaged in ecological transformation around the great Himalayan national park in Himachal Pradesh in the context of eco-development projects, and notes that unlike JFM, community participation is not institutionalized in eco-development. Savyasaachi gives a detailed account of Kuianka's (a tribal community of Orissa, which practices shifting cultivation) and observes that in schemes like JFM there is no place for Kui cosmology or their understanding of the forest. Vasavada *et al.* has looked into people's participation in JFM as it is envisaged in government policies and reflected in the formation of committees at the village level by drawing examples from Madhya Pradesh and Orissa. The study suggests that the best option in the existing system is for the panchayats to act as coordinators, or as a nodal agency to implement all governmental programmes.

In a preliminary assessment of the Western Ghat Forestry Environment Project in Karnataka, Saxsena and Madhu Sarin have expressed doubts over the long-term sustainability of efforts towards conservation of biodiversity and benefits to the people, but have highlighted the changes in the traditionally adversarial relationship between the villagers and forest department staff. Another study by Correa on the same project in Karnataka has noted that given the very nature of the project, which views the village as a unit of intervention, the participation of women

and other disadvantaged groups in JFPM is likely to remain superficial. In this volume Locke also reviews the gender environment debate and argues that there is no adequate conceptual or operational basis for gender planning in JFM. Finally, Bhasker Vira focuses on the field-level dynamics of JFM implementation, and proposes a framework that can accommodate such a spectrum of field-level outcomes by synthesising the results from community studies with a range of possible responses by forest bureaucrats to the participatory agenda.

Though the book has the merits mentioned in the beginning, a notable limitation is its inability to spell out the 'common ground' on which the new initiatives of the community participation are taking shape. Although all the articles deal with community participation in forest management, it is difficult to draw a general conclusion on what is 'common' in the new moral economy that is developing around Indian forests. As the editors clearly mention in the introduction, another missing aspect is the ecological one. The author of this review would rather say that the missing aspects are ecological and economic. But for these shortcomings, the book is an excellent contribution to the literature on people's participation in India's forest management.

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**Renana Jhabvala, and R. K. A. Subrahmanya (eds.) *The Unorganised Sector: Work Security and Social Protection*. New Delhi: Sage Publications. 2000. Pp. 191, Rs. 195.**

Despite the fact that the unorganised sector accounts for 92.5 per cent of the total workforce and 63 per cent of the GDP, it suffers from poverty, uncertain work security and inadequate social protection. As against this, the organised sector, which accounts for barely 10 per cent of the population and less than 9 per cent of the workforce, enjoys better work security and social protection. This anomaly naturally warrants a comprehensive study to find ways of ensuring that the unorganised sector is provided with better social security. Such a study is particularly relevant in the context of globalisation, which has been bitterly criticised as anti-poor and anti-labour.

This timely and important volume under review consists of essays by experts in the field. There are 13 articles along with a concluding note, covering various aspects of the main problem from the basic needs of the unorganised sector to strategies, organising insurance cover for women workers, child-care services, maternity benefits, social security for the aged, and disaster management. The chief merit of these articles is that they present social security issues in practical rather than theoretical terms. The need for providing social security benefits for the people in the unorganised sector is strongly emphasized. The various social security schemes sponsored by the government such as provident fund schemes, specialised

welfare funds as well as social assistance schemes are closely examined. Other schemes reviewed in the articles are those implemented by non-governmental organisations such as SEWA, ODP, SPARC, and ADITHI, covering the main needs of workers in the unorganised sector such as health care, child-care services, maternity benefits for working women below the poverty line, and different forms of insurance, including disaster mitigation schemes.

Provision of social security benefits for the unorganised sector becomes more complex from the point of view of 'how' rather than 'why' they should be extended. Concepts such as 'welfare state', 'social justice' and the workers' right to have these benefits have been explained to provide a rationale for vesting the State with the responsibility to provide these benefits.

On the question of 'how' these benefits have to be provided to the people in the unorganised sector, most of the contributors advocate decentralisation as the most desirable method of reducing the role of the government and assuring better services for the underprivileged. Decentralisation, according to them, can best be achieved by allowing local government with the support of the beneficiaries, to run the social security system. Some also suggest tripartite boards for the purpose, as in Kerala and Maharashtra. Yet other authors suggest that the unorganised sector be helped to set up its own organisations such as trade unions, cooperatives, village mandals, and micro-finance institutions to run its own social security system. This type of participatory decentralisation not only assures accountability to the users but also provides good services to the beneficiaries through specially trained local people to take over the services of technical medical personnel. Most of the authors state that along with participatory decentralisation, the State should assume the role of policy maker, not that of manager.

On the question of financing of the social security system, many practical solutions are offered. One of them is to get funds allocated in government budgets and to determine the funding required for specific purposes, as in the case of Rs.9 billion per year calculated to provide support for all poor widows in the country. Apart from this, many authors suggest the creation of special funds for particular purposes such as the beedi workers' welfare fund, construction workers' welfare fund, and the fishermen's social welfare fund.

This volume would be of great help to professionals and scholars in the fields of social work, labour studies, sociology, economics, development studies as well as to non-governmental agencies in the field and the departments of labour and welfare in the central and state governments. Every article is well documented with references, making it extremely useful to researchers in the field.

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**T. S. Papola and Alakh N. Sharma (ed). *Gender and Employment in India*. New Delhi: Indian Society of Labour Economics and Institute of Economic Growth in association with Vikas Publishing House. 1999. Pp.439, Rs.500.**

The trends in female employment, as explained by both the NSS and Census data, indicate that there is a shift from agricultural to non-agricultural employment in respect of both the sexes, owing to agricultural diversification since the 1990s. In urban areas, conditions were favourable to women as the women in the regular employee category increased while it has been declining for men. Strikingly enough, women in the organized sector, particularly in the public sector, received a higher share than men. The trend in the unorganized sector is the opposite for women. These trends have been addressed in the book under review, which is a comprehensive collection of seventeen articles divided into six sections, replete with facts and figures on various aspects of gender and employment in India.

In the first section Pravin Visaria attacks the database of the Census and maintains that the distinction between main and marginal workers is unwarranted. He analyses the level and pattern of employment of women in comparison with those of their counterparts and underlines the need for technological progress to raise the productivity of human resources when the role of the State is shrinking. Amitabh Kundu's article on the status and sectoral composition of female employment draws certain cautious inferences about the informalisation of female work and its manifestations. S. S. Suryanaranan, in his discussion of gaps and biases in data, points out that the female workforce is under-enumerated, and stresses the need for refinements in the estimates of various data sources. He argues that activities relating to agricultural production, processing of primary articles produced for household consumption and other activities for own consumption but resulting in economic benefits of the household must be included in gainful activities.

Jeemol Unni's work on casualisation of the workforce, in Part II, shows how it varies with access to land and diversification of agriculture. The author infers that the change in the character of labour households and increase in the supply of casual labourers and longer-term changes in real wages have not necessarily stemmed from the reform process of 1991, but rather from creeping liberalization since the 1980s, and an emphasis on the supply side to the neglect of the demand side may be responsible. G. Parthasarathy and K. Annie Nirmla place emphasis on technology and female workforce, and underline the various manifestations of marginalisation. They hold that there is a steady decline in the ratio of female to male work participation in the period of internationalization, with a higher intensity among rural females but cannot fully establish that the marginalisation is due to technology as the cultural factors are more dominant. G. K. Chadha's analysis of the growth of non-farm employment in a comparative

perspective of both the rural and urban female workforce attributes post 1987–88 reverses to a slowing down of female non-farm employment in most sectors. He advocates a bias in terms of imparting better education, skill and training to rural females in the era of globalisation to save them from marginalisation and casualisation.

In Part III, Nisha Srivastava discusses the pattern and nature of employment of women in the organized sector, specifically the banking sector, with the justification that this sector is the most suitable sector for female employment and that women are increasingly joining this sector in large numbers. With the implementation of the Narasimham Committee's recommendations, the author cautions that it will have far-reaching implications on female employment. Swapna Mukhopadhyay has inferred that there is a significant crowding in of women workers in the lower bottoms of the informal sector and that these women have taken up employment for sheer survival. She advocates the need for addressing family survival so that marginalisation of female workers may be reversed.

In Part IV, Sudha Deshpande and Lalit K. Deshpande attempt to bring out gender discrimination with respect to employment arising from occupational segregation, wage discrimination, human capital discrimination, etc. They hold that discrimination of whatever type, i.e., employment, wage or human capital, is rooted in sexual division of labour. Geetha Gandhi Kingdom has used Mincerian Earnings Functions to estimate the returns on education by including as many as twenty variables unlike the conventional method of calculating the returns on education. It was emphasised that education alone accounts for a major gender gap in earnings. They are of the view that encouragement of female education should take into consideration not only economic benefits but also the whole range of social benefits of female education such as low fertility and reduced IMR, which will bring indirect benefits to the country. D. P. Chaudhri highlights the issues relating to female child labour. On the basis of data from 1961 till 1991, the author observes that the 'nowhere girls' in urban India have been increasing. The female child labourers continue to be in agriculture in rural areas. The full-time female child labourers are mostly found in lower paid economic activities in agriculture. While analyzing the gender bias in primary education, it was pointed out that the concentration of gender bias is high in rural India.

In Part V Nirmala Banerjee's contribution has raised several issues about female employment. Making a thorough survey of the literature, she shows how feminisation of work in the modern world differs from the stereotype of feminisation. On the question whether feminisation leads to empowerment, she argues convincingly (against Sen's statement that work alone will not bring bargaining strength) that work helps women to mix with their peers and eventually get organized, thereby empowering them though not immediately but in the long run. Taking a similar line, Jayati Ghosh emphasises that the feminisation of employment is the

result of an increased demand for cheap labour and more flexible sources of labour. It is argued that structural adjustment results in more home-based work for women, technically referred to as 'putting-out system', where there is no proper environment for work nor security of employment and that the positive trends in female employment are a result of distress entry. Indira Hirway has brought out the pattern of female employment in the changing scenario. Admitting that there is increasing scope for educated and skilled women, the author has emphasised the need for collective strength for articulating their demands and bargaining position, which may be a task in future.

In the last section, Mahendra Dev critically assesses the contributions of various employment generation programmes of the government in empowering women and strengthening their position in the labour market. He argues that the excessive burden of work hampers the education of girls and increases the child labour force, reflecting the failure of State interventions in eradicating child labour. Renana Jhabvala has brought out the case study of SEWA, by highlighting its role and achievements, and describing its various activities, which may be followed by other NGOs in the field.

To sum up, the book under review is extremely useful and informative. The sequence in which the articles are presented, the analyses that are carried out, and the analytical insights that emerge are impressive. However, certain vital issues of gender and employment have been neglected. First, the impact of SAP on gender has not been fully explored or supported by the data. In many contexts, there seem to be observations or statements rather than inferences based on evidence. The fate of the rural womenfolk in the informal sector in the context of the implementation of SAP and the impact of WTO agreements due to the removal of barriers have not been addressed in detail. Second, the NGO sector, which is growing along with the government sector, has been contributing considerably to female employment in different parts of rural India. So are the emerging SHGs, micro-finance, and micro-enterprises but this aspect has not been given emphasis. Third, many papers have stated the obvious by concluding that only education and technological skill would empower women. Most of the contributors have underlined the need for technological improvement and skill training without suggesting any appropriate technology to be imparted to women. This should have been the focus, so that the future employment policy and the nature of technology and skills to be promoted may be well planned. Nevertheless, the book is useful to both researchers and policy makers, and could serve as an impetus for further work in such areas.

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**Bhikhu Parekh. *Colonialism, Tradition and Reform: An Analysis of Gandhi's Political Discourse*. New Delhi: Sage Publications. 1999. Pp. 359, Rs.295.**

This is a revised edition brought out after a gap of ten years, during which period, many changes have occurred both at the national and at the international levels: in the former case Hindutva forces have become more rabid and aggressive, communal issues are rewriting history, retrieving symbols, constructing an imaginary past. Congress domination is being replaced by politics of alliances; the State is succumbing to the pressures of globalisation introduced from above. At the international level, the New Economy, in the garb of globalisation, is becoming a reality, widening the gap between the rich and the poor; US hegemony is making deeper inroads; and finally, consumer industries are trapping the Third World within the framework of western capitalism. It is in this context that the retrieval of Gandhism is becoming essential both for alternatives at the global level and to confront the shift taking place from within.

Gandhi's political discourse operated within the context of two frameworks interacting with each other: One was the Indian tradition, the second was British colonialism. In the former case, Gandhi faced the predicament of interpreting the Indian traditions so as to contextualise the discourse/tradition and the strategies. At the same time he faced the practical problem of entering into 'a critical dialogue' as he lacked mastery over 'sanskrit' and 'shastras' (17). It is here that Gandhi was forced to revolve around three streams of Indian tradition operating vis-à-vis colonialism, which the author calls modernist, critical modernist and critical traditionalist. For the critical traditionalist, colonial rule was morally and politically inconsequential, and upholding or defending the glorious past becomes essential. The modernist saw in colonialism a space for political stability, secular government, liberty and a strong state, etc, which ultimately meant treating colonialism as a 'historical necessity'. However, the modernist faced a peculiar problem of transplanting western ideas, notion of modern India, as the latter is largely perceived in terms of plurality, spirituality or based on dharma. On the other hand, the critical modernist would accept both the modernist arguments as well as defend the Indian tradition with a certain amount of reservation. Meanwhile, they were for a synthesis between the two. Gandhi, however, was not content with any particular stream, as he would be accused of being too narrow, nor could he defend all the streams in their entirety. It is in this predicament and ambiguity that one has to locate Gandhi's politics vis-à-vis Indian tradition and colonialism.

An important issue that concerns Gandhi was non-violence or *Ahimsa*. For Gandhi non-violence represents the highest moral value, largely derived from the traditional texts. However, in the present context of colonialism it became a 'broadly based, open, loosely structured, value of passion and action of love,

element of consciousness, compassion, a virtue, (127, 128) refraining from causing any injuries', a rule for conduct of society, positively promoting well-being, etc. However, the theory of *Ahimsa* derives its arguments from the theory of violence too: not all the violence perpetrated by the masses can be treated as 'violence'—a rape victim resorting to violence in self-defence, destruction of lifeless property, allowing a chronic patient to die are, in the strict sense, not violence. Nonetheless, this particular discourse of Gandhi had one weakness: he did not diagnose the violence perpetrated by the state—colonial and post-colonial, especially when the role changed. How Gandhi reconciled these two situations during his lifetime remains unanswered in the text.

One more fascinating issue is dialogue with terrorists. Terrorist activities, though motivated by many factors, are sought to be justified by entering into debate with Indian tradition: in fact, the Indian tradition justifies the killing of an enemy for the survival of oneself. It is here that terrorists, to root themselves in politics, reinterpret mythological symbols such as Ganesha, Durga, Kali, Shakti, which include interpretation of such texts as the Gita and the Mahabharata. However, Gandhi's dialogue took place vis-à-vis the terrorist at two levels: one, at the level of disagreeing with the advocacy of violence, and two, at the level of interfacing the traditional/cultural arguments. Gandhi, nonetheless, denounced violence on an ontological, epistemological, spiritual, moral and practical level. However, he did not understand the counterproductive effects of bringing mythological symbols into mainstream politics. This is why anti-colonialism, nationalism and communalism converged to become inseparable entities. Here lies Gandhi's weakness in containing the terrorist using the symbols and containing the counterproductive effect on the nationalist movement.

Gandhi's political discourse is further stretched to analyze the relationship between sex, power and politics. His experiment with sex was ultimately meant to conquer himself and to establish himself as a powerful man vis-à-vis the violence surrounding the Indian subcontinent. It is in the process of conquering his own self that Gandhi became 'half woman', to total women, and that many women became his 'sisters', 'mothers', etc. His love became a spiritual one wherein one finds Krishnaite love around him.

Untouchability is another important issue in Gandhian politics. Gandhi's attack on untouchability derived from the fact that its continued existence would hinder national unity, and that it has no sanctity in Indian tradition. This is why he went on to argue with the Sanatanists, and traditionalists. However, Gandhi too had ambiguities on both the issue of untouchability and the caste system. In the former case, his experiments ultimately became symbolic, serving to show that he was opposed to untouchability, and in the latter case he defended the retention of the caste system. Neither could Gandhi provide space for untouchables to enter into different structures of power nor could untouchables claim the attendant benefits

of Gandhian politics. Rather they were appropriated to suit the needs of nationalist politics. It is here that Gandhi's politics failed again.

Finally the issue of the relationship with the bourgeoisie has thrown up many debates: which classes did Gandhi represent? Was Gandhi a representative of the bourgeoisie? What kind of relationship did the bourgeoisie establish with the nationalist movement, Gandhi and the colonial power. Incidentally, Bikhu Parekh dismisses the arguments of Marxist scholars, including those who have been arguing that the Gandhian movement was basically bourgeoisie (Judith Browth 1979; Neil Charlesworth 1982; Dhanagere 1982 and Pouchaepadass 1980) and argued that it was basically a middle class or petty bourgeoisie movement. This does not mean that the capitalists or the bourgeoisie were not part of his linkages: they supported his movement, funded his social activities, sent hundis to campaign for Congress candidates, financed his ashram, etc. It is in the process of establishing linkages that Gandhi failed to realize the larger agenda of the capitalists, including the strategies that they employed, to appropriate Gandhian politics to their advantage and dominate the post-colonial Indian state. This is one more failure of Gandhian politics.

This is a scholastic, intellectually stimulating text, not merely a book on Gandhian politics. By interrogating or focussing on different trends, debates, discourses, and perspectives, this text has retrieved Gandhi both for the colonial past and for the post-colonial present.

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**Jonathan P. Parry, Jan Breman, and Karin Kapadia (eds.). *The Worlds of Industrial Labour*. New Delhi: Sage Publications. 1999. Pp. 435, Rs. 595.**

The decline of scholarly interest in labour history is routinely lamented, but this book begins by pointing to the singular absence of ethnographies of labour (and indeed industrialisation). The substantial volume, a reprint of a special issue of *Contributions to Indian Sociology*, more than amply sets this right, but whether it will define a new agenda for scholarship in sociology/social anthropology is much less certain: it is no coincidence that the India-based contributors to the volume are all historians, though even history struggles to retain its interest in labour. The book consists of 14 articles, all of consistently high quality and rigour, bringing fresh perspectives to old questions while remaining unafraid to propose provocative theses, and above all, illuminating the worlds of labour in relatively unknown industries and areas. A short review of this book can only highlight some of the novel themes that are explored.

Conventional industries such as the cotton and jute mills of Bombay, Kanpur, and Calcutta, the coal mines of Jharia, are discussed here from a historical

perspective, while ethnographies are of the informal sector, diamond industry (Surat and rural Tamil Nadu), the public sector (Bhilai), the footwear industry (Agra), rayon and viscose mills (Nagda). Jonathan Parry's thoughtful introduction singles out common themes and questions in the articles, while two pieces by Jan Bremen, one each on the formal and the informal sector, provide a critical survey of the literature, and form a valuable backdrop to the more detailed studies.

If the old war horse of working class consciousness appears here at all, it is cast in refreshingly new terms: Rajnarayan Chandavarkar's now familiar assertion that long and sustained strikes in the Bombay textile industry were made possible by several contingencies which were not preordained, is offset by Jonathan Parry's suggestion that divisive ethnicities have been kept at bay in Bhilai by the ideologies of Nehruvian nationalism in the public sector. In some contrast to Chandavarkar is Chitra Joshi's reconstruction of Red Kanpur, now only a memory in the face of closure and retrenchment, but one where organisation and ideology were crucial to the sustenance of the 1937 strike even when the challenges from bitter communal strife were severe. Another challenge to Chandavarkar comes from the more conventional narrative of working class resistance at Jharia coal fields by Dilip Simeon. Parry's suggestion that the threat to (nationalist) worker solidarity posed by increased contract labour is well taken (p.133, 137) but is countered, or at least limited in its explanatory scope, by evidence from public sector units in other locations such as Bangalore, where the battle over the language, caste and fine arts associations was as bitter as the fight for control of the unions in the 1970s and 1980s even before contract labour was the norm.

One of the productive tensions of labour studies is to demonstrate the manner in which the universal tendencies of capital adapt to, deepen or challenge hierarchies and differences that exist in the societies it colonises, while also structuring industrial life in universally recognisable ways. Thus kinship relations (as in contributions of Samita Sen, Karin Kapadia, Jonathan Parry and Geert De Neve), caste solidarities or cleavages (as in Miranda Engelshoven's, Peter Knorringa's, and Douglas Hayne's contributions) and gender ideologies (as Dilip Simeon, Christopher Penny and Karin Kapadia show) are deployed in specific ways in the capitalist workplace, often to the advantage of managers. Sometimes, though perhaps less expectedly, such differences work to the disadvantage of capitalists: the reluctance to employ Dalits and women, says Geert de Neve, can be a burden for employers. (p. 382). But as most of the contributors to this volume also demonstrate, notably Arjan de Haan, there are specific ways in which the worker deploys informality or difference to his or her own advantage. Indebtedness, as Jan Bremen points out, has very different meanings within the contemporary capitalist workplace compared with feudal debt bondage: it could be more advantageous to the worker, and even desired. (p.410–421).

Dilip Simeon and Miranda Engelshoven provide instances of the more recognisable, and exploitative, features of capitalism, which could be true of several other locations. But finally, the value of a volume such as this, as both Parry and Bremen assert, is in demonstrating the impossibility of separating, even analytically, the rich ambiguity of relations between culture and capitalism. Further, as Douglas Haynes' contribution points out, it is very rewarding for both the scholar and the labour activist to remain more attentive to the workers' subjective readings of relations within the new workplace.

Of the more unusual themes that are explored here, I would like to touch on two. The first is the nebulous zone of hope, nostalgia, and desire. Sometimes, there are the memories of better days, whether those were the days of 'family-like relations' in the textile industry of Surat or Bhiwandi (as Douglas Haynes shows), a time of militant trade unionism as in Kanpur (Chitra Joshi) or a time before 'machines' as in Christopher Pinney's account of GRASIM employees at Bhatiusuda. But there is equally an absence of sentimentality for the hard work of the village, the indignities of the countryside, that all the evils of the modern workplace would find difficult to undo (p.105, 117). Indeed some of the articles, such as those by Engelshoven and de Neve, also point to the extraordinary optimism about the value of hard work in the industrial/urban setting, of people who dream of emulating the quick economic successes of their caste fellows. In turn, these affective ties make collective action difficult, if not impossible, as a means of transforming what are fundamentally exploitative labour relations.

The scrupulous attention to questions of *gender* in this volume, and not merely in the article by Sen that refers to *women* workers in the jute industry, is a very encouraging sign. In several of the articles, the authors have found it critical to speak of the materiality of gendered labour relations, for instance the increasing reliance on domestic female labour by unemployed textile mill workers (Joshi, p.201), the construction of women workers as more 'hard working' when previously circumstances had not permitted their employment at all (de Neve, p.386; Kapadia, p. 346-350), or the exploitation of the domestic work/ factory work divide on gendered lines (Knorringa, p.315). Some of the authors draw on the implications – for wages, skill formation and possibilities of collective action – of the materiality of gender at the workplace. By far the most detailed analyses of gendered relations are in the contributions of Kapadia, Sen and Pinney. Pinney provides an illuminating account of masculinity, as it is formed or threatened, in the modern work situation. Sen's article focuses on the intimate links that exist between petty peasant production and mobility of women into jute mills (although some of these contentions are countered in de Haan's argument). Kapadia provides a fascinating account of the transformations in the work force, conditions of bondage or indebtedness and gender relations as they are linked to the synthetic gem cutting industry of Tamil

Nadu. What most of these contributions forcefully point to are the instabilities in the meaning of ‘masculinity’ and ‘femininity’ in the workplace, calling for their reiteration and enforcement in specific ways.

Indeed, there may be much to learn from a volume such as this on the importance of ethnographic methods, even by those from other disciplines such as history, for these methods seem to capture the emerging subjectivities of workers much more successfully than dogged archival or quantitative work research might do. In that sense, both for breathing life into labour studies and for offering exemplary modes of investigation, this book will remain a vital text for a long time to come.

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**Syed Ajmal Pasha. *Economic and Ecological Dimensions of Livestock Economy: An Indian Case Study of Small Ruminants.* New Delhi: Commonwealth Publishers. 2001. Pp 198, Rs.450.**

This book presents the results of Dr Pasha’s detailed study on ‘economic, ecological and equity’ aspects of small ruminants (goat and sheep) in ecologically fragile, arid and drought-prone areas of Karnataka. The study aims to ‘fill the serious vacuum in empirical literature on goats and sheep.’ It covers a wide range of issues: role of small ruminants in the household economy; trends in small and large ruminant population and the pattern of their ownership among rural socio-economic groups; economic returns from small ruminants; marketing of small ruminants and their products; the interactions between small ruminants and the environment; and the status of common property resources.

The study is based largely on a household sample survey, carried out during 1988. The survey covered 102 households owning small ruminants in a cluster of three villages in Bagapalli taluk in Kolar district. The 285 households in the selected villages have been classified into ‘rich peasants’, ‘poor peasants’, and ‘landless peasants’, each of which categories constitutes 36 per cent, 60 per cent, and 40 per cent of the total number of households respectively. The rich peasants are mainly land-owning ‘forward caste’ households; the poor peasants and the landless are largely Scheduled and Backward Caste groups. The importance of small ruminants is reflected in the fact that 36 per cent of the households own these animals. Ownership of small ruminants is a subsidiary occupation and accounts for 19 per cent of the income of the total number of households.

The important finding of the study is that rearing of small ruminants is ‘entering largely into the hands of land-owning households’, and ‘the traditional association of keeping goats and sheep almost exclusively with backward castes is not common any longer.’ The survey data show that although rich peasants

constitute 36 per cent of all the owners, they own 59 per cent of all the animals. The increasing concentration of small ruminants among rich peasants is explained by their larger farm size (9.2 acres), larger family size (9.1 persons) and greater access to common property resources. The author believes that this has serious implications for equity because small ruminants have played a critical role in the livelihood of the poor, especially during droughts.

The study focuses on economic returns from small ruminants. Dr Pasha has done a lot of work in estimating gross and net returns from agriculture, big livestock and small ruminants. These estimates have been worked out according to various cost concepts. The author has even estimated marginal cost and marginal value products. Indeed, there are too many estimates. As expected, the costs and returns vary according to the concept used and flock size. The major conclusion is that the cost of human labour and animal feed (grazing) together account for 75 per cent of the total cost (labour 61 per cent, grazing 14 per cent). Net private returns per animal are positive. However, if the costs of grazing are included, returns are negative for poor peasants and landless owners. Rich peasants get positive but very low net returns owing to their larger flock size. A flock size of over 31 animals is required for obtaining positive net returns. Further, 'maximum profits are made at the flock/ herd size of around 100. Thus, the economies of scale favour larger flocks, which cannot be maintained by the poor peasants and the landless.

The last chapter focuses on the critical environmental issues, namely, the increasing demand for grazing on shrinking and degraded common property resources. The study highlights the fact that the increasing pressure on grazing lands is largely due to large ruminants and that the negative role of small ruminants is highly exaggerated. The author has suggested a two-pronged strategy for tackling this problem. First, there is a need for a special programme for regeneration and regulation of CPR to augment grazing feed. Second, there is enough scope for reducing grazing pressure by promoting improved sheep and goats and control of grazing by large ruminants on CPR. The author is hopeful that small ruminants are a potentially viable source of livelihood for poor households in the arid regions without being a threat to the environment.

This book is a useful contribution to the literature on the subject. It provides new insights into the complex issues of private and social costs and returns as well as the problems of sustainable development of small ruminants.

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**B. R. Virmani and Kala Rao. *Economic Restructuring, Technology***

***Transfer and Human Resource Development. New Delhi: Sage Publications. 1999. Pp. 323, Rs.450.***

The global economy is undergoing rapid transformation, with the majority of the nations introducing structural economic reforms to attain rapid rates of growth. These reforms have been a success in some countries, and their experiences are worth emulating by others that have embarked on a similar process. In this context, the book under review, which gives a lucid account of the varied policies adopted by four Asian countries, assumes relevance. The book, which is structured into four parts, Introduction, Country Case Studies, Organisational Case Studies, Lessons and Directions for the Future, dwells at length on issues of technology transfer, and its assimilation and absorption in the process of economic restructuring. The country cases dealt with include Singapore, Thailand, Malaysia, and India. It is notable that all the four countries had an inward-looking approach before the reforms were launched. Through a comparative analysis of the economic restructuring strategies and experiences of these countries, the book clearly brings out the factors responsible for their successes and failures.

The first part of the book highlights the importance of technology in the industrial development of a region. Some important aspects discussed include transfer of technology through alliances and various kinds of technology transfer. It highlights the importance of appropriate national policies in making the technology transfers enhance the productive efficiency of a country. Some of the essential micro and macro issues that influence the technology transfer, its absorption, assimilation and upgradation are highlighted.

Four country cases, Malaysia, Singapore, Thailand and India, are discussed in Part II. Attainment of rapid growth is guided by many factors, of which systematic intervention by the government has been an important variable in the context of East Asian economies. These apart, the author also discusses the structural reform processes, economic and industrial policies, technology transfer, and human resource development in these countries. Success lies not merely in the adoption of technology but in absorbing and updating it continuously. This is evident from the Malaysian experience wherein despite its weak internal R&D it has made the best use of imported technology through persistent efforts to upgrade and improve the skills of the employees. The country has also offered sound incentives and provided infrastructure to promote foreign investment in the country.

Singapore's development too has been attended by ardent effort on the part of the government to promote infrastructure and skill development through various incentives. Non-interference by the government, responsible behaviour of the trade unions, etc., have added to the rapid growth of industry in the country. Public sector enterprises enjoy considerable autonomy unlike their counterparts in India and other countries, thus enabling industry to perform well.

Thailand's firm commitment to a free market economy has resulted in favourable policies, infrastructure development and minimal governmental intervention. The abundant natural resources that the country is endowed with, congenial industrial relations, and the comparative advantage that the country has in the labour-intensive agricultural and agro-based industry have helped the country to achieve a good growth rate. The government's bold measures such as banning of trade unions, have also been a factor. While trade unions are essential, they should be prevented from hampering industrial growth. Countries like India have a lot to learn from such experiences. However, the 1998 crisis serves as a reminder that the role of government does not end with liberalisation of the economy but lies in properly regulating and monitoring the economic developments in the country.

In a comprehensive account of India's approach to the economic reform process the authors uncover the lapses in the Indian reform measures. Although the Indian government has also attempted to promote industrial investment through various incentives, these have been insufficient. The inadequate attention given to infrastructure development, even in the industrial estates, has adversely affected industrial development in the country. Privatization is yet another area where India has lagged behind other countries like Malaysia and Singapore. The conservative Science and Technology policy underwent considerable changes after 1991. Restrictions on import of technology were greatly eased. India finds itself strangely placed amid a surplus of technically qualified personnel in some sectors and a shortage of skilled professionals to meet the needs of the latest technologies. Hence, there is an urgent need to impart job-oriented training to meet the growing need for skilled personnel. Multinational corporations (MNC) have played a major role in technology transfers in Singapore and Malaysia. Unfortunately, MNC investments in India are very low as compared with Singapore and China for various reasons. There is an urgent need to strengthen infrastructure development in the country in order to promote industrial investment. It is unfortunate that efforts to reduce the fiscal deficit in the country have resulted in a deceleration in public sector investment in infrastructure while private investment has not come forth in adequate quantities. Good infrastructure in countries like Malaysia, Singapore and Thailand has paved the way for their success. A discussion pertaining to the experience of four organisational case studies from India, two each from the public and private sectors, aid in drawing useful policy inferences. While the public sector units were constrained by pressures from the government in responding to the needs of technology, the private sector had no such restrictions. The private concerns acquired information on the recent technologies and made investments in improving their Human Resource Development. It can be observed that India, which enjoys abundant natural resources and educated manpower, has not attained the rates of growth achieved by the other three countries under comparison, which lacked one or the other of the above advantages.

In short, the mere availability of natural resources, educated manpower, etc., does not guarantee higher rates of growth. A conscious development effort on the part of the government through effective policies and provision of infrastructure would aid in improving the investment climate. Long-term policies rather than sporadic reform measures result in rapid growth. The study, which has carefully reviewed the policies guiding the success of certain country cases, will be of immense use to the policy makers.

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### Books Received

- Bavinck, Maarten (2000) *Marine Resource Management and Conflict and Regulation in the Fisheries of the Coromandel Coast*. New Delhi: Sage Publications.
- Chai, C.H. Joseph. *The Economic Development of Modern China, Volumes I, II, III*. Cheltenham: Edward Elgar Publishing Ltd.
- Chakravarti, Anand. *Social Power and Everyday Class Relations: Agrarian Transformation in North Bihar*. New Delhi: Sage Publications.
- Chopra, Kanchan, and S. C. Gulati (2000). *Migration, Common Property Resources and Environmental Degradation—Interlinkages in India's Arid and Semi-Arid Regions*. New Delhi: Sage Publications.
- Dev, S. Mahendra, Piush Antony, V. Gayathri, R. P. Mangain (eds.). *Social and Economic Security in India*. New Delhi: Institute for Human Development.
- Dube, Leela. *Anthropological Explorations in Gender: Intersecting Fields*. New Delhi: Sage Publications.
- Grant, P. Wyn, and John T. S. Keeler. *Agricultural Policy (Volume I & II)*. Cheltenham: Edward Elgar Publishing Ltd.
- Iyer, Lalitha. *The Strategic Business Spiral: Retracing the Past*. New Delhi: Sage Publications.
- Jakobsen, Gurli and Jens Erik Torp (2001). *Understanding Business Systems in Developing Countries*. New Delhi: Sage Publications.
- Kahkonen, Satu and Mancur Olson (2001). *A New Institutional Approach to Economic Development*. New Delhi: Vistaar Publications.
- Melkote, Srinivas R., and Sandhya Rao (2001). *Critical Issues in Communication: Looking Inward for Answers: Essays in Honour of K.E. Eapen*. New Delhi: Sage Publications.
- Qadeer, Imrana, Kasturi Sen, K. R. Nayar (2001). *Public Health and the Poverty of Reforms: The South Asian Predicament*. New Delhi: Sage Publications.
- Salvi, Gouri. *Development Retold—Voices from the Field*. New Delhi: Concept Publishing Company.
- Sankar, U. (2001). *Economic Analysis of Environmental Problems in Tanneries and Textile Bleaching and Dyeing Units and Suggestions for Policy Action*. New Delhi: Allied Publishers.

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## CONTENTS

### SUPPLEMENT TO CONFERENCE NUMBER: JULY-SEPTEMBER 2000

#### Presidential Address:

Agricultural Research and Small Farms *Dayanatha Jha*

#### Summaries of Group Discussion:

Contractual Arrangements in Land and Labour Markets  
in Rural Areas *Ajit Kumar Singh*

Forestry and Related Issues *Vishwa Ballabh*

Education, Technology Adoption and Agricultural  
Productivity *P. K. Joshi*

Conference Paper: Summary

#### ARTICLES

Irrigation and Rural Poverty Nexus: A Statewise Analysis *A. Narayanamoorthy*

Risk in HYV and Traditional Rice Cultivation: An Enquiry  
in West Bengal Agriculture *Anamitra Saha*

Agricultural Performance in Semi-Arid Tropics of India  
*P. K. Joshi, B. S. Chandel,  
S.M. Virmani and J.C. Katyal*

#### RESEARCH NOTES

An Economic Analysis of Borrower and Non-Borrower  
Rice Farmers in Cuttack District of Orissa *Sanat Kumar Satapathy  
and Sudhakar Tripathy*

Perspective and Prospects of Sustainable Agriculture in  
Haryana *D. B. Yadav and  
K. N. Rai*

Economics of Wild Marigold Production and Distillation  
in Himachal Pradesh *Kechar Singh*

BOOK REVIEWS\*

REVIEWS IN BRIEF\*

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# JOURNAL OF RURAL COOPERATION

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## CONTENTS

### 1. ARTICLES

Research on Women in Rural Israel: The Gender Gap  
*Motzafi-Haller, P.*

New Forms of Economic Cooperation in Family Agriculture:  
The Case of *Condominios* in Santa Catarina, Brazil  
*Moyano-Estrada, E. and Sacco dos Anjos, F.*

Entrepreneurship in the Kibbutz Setting: Towards A Classification  
of New Business Ventures  
*Samuel, Y. and Heilbrunn, S.*

The Development of Group Farming in Post-War Japanese Agriculture  
*Sarker, A. and Itoh, T.*

### 2. BOOK REVIEWS

Carbonnier, G.                      Conflict, Postwar Rebuilding and the Economy:  
A Critical Review of the Literature  
*S. Maron*

Gavron, D.                            The Kibbutz: Awakening from Utopia  
*S. Maron*

Ravensburg von, N.G.              Self-help Cooperatives in Rural South Africa  
*D. Rosolio*

Schwartz, M. and                    Foreign Experts and Unsustainable Development  
Hare, A.P.                            Transferring Israeli Technology to Zambia, Nigeria  
and Nepal  
*Y. Don*

### 3. CURRENT INFORMATION

Dissertation Abstracts

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