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## Articles



## Book Reviews

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# Forty Years of Change in Rural South India

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## Abstract

Meant to be a tribute to M. N. Srinivas, this paper presents a longitudinal study of over forty years of the different paths of development of socio-economic changes that were triggered off by the Krishnarajasagar irrigation scheme in two South Indian villages that are situated near each other and are also similar in terms of social composition: Wangala, a village where access to canal water facilitated the growing of sugarcane and paddy as cash crops, and Dalena, where lands remained dry because they lie above the canal levels. In Wangala irrigation has reinforced traditional patron-client relationships and thus resulted in continuing village introversion. To benefit from the regional economic growth resulting from irrigation Dalena villagers had to diversify their activities and seek contacts with the wider economy. This village extroversion led to a breakdown in the social fabric.

## How the Late Professor M. N. Srinivas Influenced My Life

I owe a great debt to the late Professor M. N. Srinivas: he exerted the foremost influence over my career — if I have achieved anything at all, the credit must go to him.

I first met the late Professor M. N. Srinivas in 1953 when he was a Visiting Professor at Manchester University, and I was a graduate student preparing for my anthropological-style Ph. D. research. Having read and admired his publications, I was then overawed by his importance. Thus I was pleasantly surprised when I found him to be not only an expert teacher, modest of his scholarly achievements and with a great sense of humour, but also an extremely gentle and patient supervisor. With his advice and under his guidance I prepared my Ph. D. proposal to study the socio-economic impact of the large South Indian dam irrigation scheme on local villages. He met me on arrival at Bombay seaport and accompanied me on the long train journey to Mysore, thereby helping me to adapt to life in India. He found me a teacher of the vernacular and helped me in the selection of my first fieldwork site. His concepts of 'Sanscritization' and the 'Dominant Caste' proved a great help to me in trying to understand the process of change on which my village studies focused. It was he who sparked off in me my love for South Indian village societies.

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In later years I was proud to notice that he came to regard me as a colleague and family friend, though to me he remained my *guru*. The last time I met him was a few weeks before his death when at a seminar organised by the Karnataka Department for Rural Development to launch my documentary film *Village Voices – Forty Years of Rural Transformation in South India* he was asked to say a few words. As always on such occasions he impressed the audience with his scholarly argument presented in a modest and unassuming fashion. This symbolized the kind of extraordinary man he was.

Professor Srinivas's devoted supervision and guidance throughout my fieldwork helped me to bridge the gap between economic and anthropological studies. This is reflected in the analysis of different social change processes in the two South Indian villages I studied....

## 1954–62[1]

I began my research in 1954 in Wangala[2], which is situated in Mandya Taluk in Karnataka State. Before canals reached the Taluk in 1934, villages in the area had largely subsistence economies. Uncertainty of rainfall and poor quality of soil restricted local riots to subsistence cultivation of dryland crops; small-scale sericulture and sheep breeding provided the only village sources of cash income. Thus it was reasonable for me to assume that in pre-irrigation days, the economy of Dalena, a dryland village even after canal irrigation, was almost identical with that of Wangala, a wetland village.

### Wangala and its Unilineal Changes

The advent of irrigation upset the balance of these almost stagnant economies. To Wangala irrigation brought one dominant new opportunity: the growing of cash crops such as sugarcane and paddy. To Dalena farmers irrigation presented no such single outstanding opportunity. My studies clearly indicated that canal irrigation had made Wangala altogether much more prosperous. Farmers were able to grow the more valuable crops of paddy and sugarcane. These crops required more labour than their traditional dryland millet crops, which meant more employment for local landless labour and also attracted migrant labourers to settle in Wangala during the agricultural peak seasons. Irrigation had thus raised Wangala's income at a stroke onto a higher level, though the degree of improvement in levels of living differed considerably between landowning farmers and landless labourers.

**Tradition and Modernity:** The changes within Wangala resulting from irrigation strengthened the ties between Peasant caste farmers on the one hand and their landless Functionary Caste and Scheduled Caste (SC) clients on the other. It thereby reinforced the traditional intra-village social system. At the same time,

external forces were trying to break these hereditary dependencies. India's independence in 1947 had set in motion a process of radical socio-political changes aiming at transforming India's hierarchical caste societies, which emphasized status ascription into egalitarian democratic social systems with universal adult franchise. For instance, legislation introduced democratically elected village panchayats (councils) with reserved seats for SCs. It thereby attacked the traditional hereditary system that access to irrigation in Wangala had in fact reinforced. The first democratic panchayat elections, which I was fortunate enough to observe in 1955, turned out to be no more than a farce to the greatest distress of the Revenue Inspector, who was also the Electioneering Official. For at least two years after the election the statutory elected panchayat never met as a body nor was a secretary appointed. None of the SCs ever attended the village panchayat meetings, except as silent observers sitting well apart from the caste men. The traditional Peasant caste panchayat, composed of the elders of the 'major' lineages, continued to function and the statutory panchayat was no more than a *de jure* authority. The conduct of the election of Wangala's panchayat was hardly that envisaged by the Act. The difficulty arose from the State attempting to introduce revolutionary changes in the internal economic and/or political relations within villages. Such changes as had taken place in Wangala since irrigation were in consonance with the traditional system and could therefore be absorbed in it.

All this made me analyze the impact of irrigation on Wangala's socio-political system in terms of *unilinear changes* in the sense that the new opportunities were in line with the former mode of economic organization and therefore reinforced the traditional socio-political system to such an extent that it could withstand external interventions.

## Dalena and its Multifarious Changes

Dalena displayed much more radical socio-political changes than had taken place in Wangala, although it remained a dryland enclave in the midst of an irrigated belt. Dalena land was actually traversed by a canal yet remained completely dry. Across the canal Dalena farmers would see immediately before their eyes the benefits resulting from irrigation and exactly what was involved in growing cash crops. This spurred some of them onto efforts leading to their own economic progress, and encouraged them to participate in the economic growth resulting from irrigation in the region. Dalena villagers, like Wangala people, referred to the advent of irrigation as the turning point in their history. Alternative economic opportunities that occurred in the new wetland region made dryland farming comparatively less advantageous to Dalena farmers. They were eager to take part in the economic expansion they could see happening in front of their eyes. Realizing that they could do so only by reaching out into the wider economy they looked for opportunities outside Dalena.

The village dry land continued to be cultivated, but mainly by female labour. This allowed men to take up other income-earning opportunities. Since they could not grow cash crops in their own village, many purchased newly irrigated land in neighbouring villages, where they would then grow crops for sale. Dalena families were shrewd and tried to marry their daughters into neighbouring irrigated villages to make sure they would be the first to hear whenever land came onto the market there. By this and other methods they managed to acquire considerable wet land acreage outside their own village. In 1956 as much as 73 per cent of Dalena households owned and cultivated wet lands in the vicinity. Their extra-village network of relations put them in a strategic position to venture also into work outside farming. A fair number of Dalena ryots acted regularly as contractors for the building of canals and the accompanying road system. Most of Dalena's poorest farmers and landless have worked at one time or other as labourers for private contractors or for the Public Works Department directly. Their contact with the Administration made Dalena people realise the importance of literacy in particular and education in general. Accordingly, a few sent their sons to secondary school in Mandya and two of these students subsequently secured jobs in the Mandya Administration. They worked in 1955 in the town's Agricultural Office and transmitted the latest techniques of farming to Dalena ryots. The patel was thus encouraged to experiment with the Japanese method of paddy cultivation on wet land he cultivated in neighbouring villages. Surprisingly as it seemed, as a native from a dryland village he won the prize for the best-irrigated paddy cultivation in the region in 1954. Their many extra-village contacts enabled Dalena men to take advantage of the new economic opportunities resulting from irrigation in the region. In 1956 altogether twenty-six men (13 per cent of the male working population) were employed in Mandya, most of whom worked as labourers in the sugar factory; others were clerks, orderlies or drivers. Dalena men also helped to provide the services needed by neighbouring irrigated villages. Some bought carts and strong bullocks and transported cane from nearby villages to Mandya's refinery at a daily hiring charge. Others again became cattle traders and/or middlemen in bullock sales.

**Diversification of economic activities:** By providing these services they enabled farmers of recently irrigated lands to concentrate on cultivating their lands. In doing so Dalena men first of all helped to extend the benefits of irrigation even to villages situated at the margin of the canal system; second and most important, they spontaneously promoted the development of a regionally integrated economy. They introduced specialization and division of labour between irrigated and dryland villages and thereby promoted the development in Mandya Taluk of a regionally integrated economy. This desirable by-product of large irrigation schemes appears to have eluded the planners of the overall canal irrigation scheme and still seems to

be ignored by planners of large irrigation schemes.

The broadening of Dalena's economic horizon also broadened villagers' political horizons. Unlike Wangala, where nobody read papers and only a few were aware of the wider political issues, Dalena commuters were members of Trade Unions. As factory workers they not only participated in strikes but also became familiar with elected authority and majority decisions, political arrangements, which differed radically from their customary hereditary succession in particular and ascribed status in general. The hereditary principle of social organisation appeared to be compatible only with a closely integrated society, in which economic, political and ritual relations were concentrated within the boundaries of the village. Once the range of these relations was extended beyond the limits of the particular society, the dependence on fellow-villagers diminished and the personal character in the indigenous relationships gave way to an impersonal one.

Dalena's diversification of economic activities represented *multifarious* changes. I argued that these multifarious economic changes that had taken place in Dalena since irrigation reached the area triggered off a more radical socio-political transformation. Already in 1955 they had so many different economic links with the regional economy that their political attitudes and social relations had changed accordingly.

## Restudy in 1970[3]

### New Economic Opportunities in Mandya District

The years between 1955 and 1970 saw a considerable economic expansion of Mandya District's integrated regional economy the formation of which I had noted in my earlier studies. The authorities realised the area's overall economic potential, and consequently in 1962 it was included in the All-India Intensive Agricultural Development Programme (I.A.D.P.). The programme aimed at, among other things, maximisation of crop production by providing facilities such as supplies of improved seeds, fertilisers, agricultural credit and technical know-how and marketing to all the participating farmers. The State Authorities devoted considerable amounts of money and effort to the promotion of agricultural development in Mandya District. During the year 1970–1, public expenditure on agricultural development per head in Mandya District was more than three times that in the neighbouring Mysore District: in the former it was Rs.1.60 while in the latter only Rs.0.50, although the amount spent in Mandya District on rural development was still considerably less than what the State spent on industrialisation.

### How and Why Wangala and Dalena Changed Between 1955 and 1970

Both villages changed considerably in appearance. The most striking feature was the increased economic differentiation. It was not even necessary to

collect statistical evidence for the claim of polarisation that had gone on between 1955 and 1970; it was so obvious. The lifestyle of the wealthier had considerably improved in every aspect: they had better housing, wore better clothing and looked better nourished. By contrast, among landless labourers and marginal farmers, housing had deteriorated; their clothing looked more tattered and their bodies seemed more emaciated. The households with larger wet land acreages were strategically placed to improve their economic position; the more acres of wet land a family owned the greater was its overall income. During the fifteen years that had elapsed since my first field studies in Wangala and Dalena a decline in real wages had led to a deterioration in the levels of living among all those households that depended on employment for most of their income. On the other hand, the wealthier parts of the villages had access to more and better facilities. Dalena had already been connected in 1955 with the State power supply; Wangala installed electricity in 1963 mainly to operate power cane crushers but then also benefited from street lighting. A few of the village magnates had built for themselves nice modern two-storey houses by the main road passing through Wangala; they formed a roadside elite. The Scheduled Caste settlement, consisting mainly of landless labourers, presented a stark contrast to the increased wealth among Peasant farm households. Their poverty was glaring.

### Wangala's Village Introversion

In 1955 I analysed the change that had taken place in Wangala as a result of the advent of canal irrigation in terms of a *unilineal* process. Fifteen years later I was struck by the continuing effect of this process expressed in terms of resistance to outside interference in intra-village affairs. I then decided to refer to this social phenomenon as village introversion.

### Dalena's Village Extroversion

In contrast to Wangala, Dalena's multifarious style of economic development had continued in a big way. The socio-political system had changed more radically since I lived there first. Increasingly Dalena villagers looked to the wider economy to improve their standard of living. Realizing this I decided to refer to this process as village extroversion.

## Restudy in 1996[4]

### Wangala

Since 1955 when almost all houses in Wangala were on the east of the main road passing through the village, housing now extends to a considerable distance on both sides of the road. The whole area is built up. The space that years ago clearly separated the Caste from the Scheduled Caste settlement is no longer so obvious. A few years ago they established near Wangala's border and at a distance

from the main village residential area a new colony with small RCC structures for landless households. In this colony there are about 50 households, the majority of which are Scheduled Castes. But there are also a few Peasant and Functionary Caste families residing there. The number of houses in Wangala has greatly increased and their appearance has changed considerably. Many now are urban-style well-furnished two-storeyed structures with modern facilities, private water taps and some even with latrines; some also have telephones and/or television sets. Moreover, there are public water taps so that all households have easy access to water. The housing of the poorest too has improved greatly; there are now many fewer conventional small thatched huts; these have been replaced by RCC structures. Street lights and drainage are also important innovations. Most houses have access to drainage. This has done away with the 1955 stench of the streets and makes the village healthier and cleaner looking. The hustle and bustle around Wangala's main road — where most Peasants still reside — gives the impression of a small but thriving urban settlement. Indeed I heard people refer to their village as 'Little Mandya,' a small replica of Mandya town. The headquarters for the Village Council are housed in a substantial structure consisting of a large meeting hall and three rooms with a telephone. The Village Council covers five villages: Wangala and four neighbouring villages. This means that many Government officials as well as residents from other villages frequently call at the council offices. Throughout the day buses, cars, scooters and bicycles stop off in Wangala on their way to other destinations. Such busy traffic was unknown in 1955. Many village buildings carry boards with big lettering indicating the nature of their business. As was to be expected, the branch of the Corporate Bank occupies the most solid and impressive building. This bank also caters for neighbouring villages and therefore attracts many visitors. In the morning when school begins and in the afternoon when it ends, crowds of boys and girls neatly dressed in uniforms stream through the village streets; many go to the shops and treat themselves to snacks. Small specialist shops and restaurants cater for a variety of consumer requirements. They all appear well frequented throughout the day.

## Dalena

To approach Dalena one has to go south of Mandya along the major highway connecting Bangalore with Mysore. Forty years ago four miles of open countryside separated the town from Dalena. Since then Mandya too has grown a great deal and residential areas extend in all directions. Along both sides of the highway south of the town, many colourful advertisements try to attract the passers-by to the numerous small shops and restaurants along the roadside; there are cane crushers and flourmills; and mechanics provide bicycle and car repair services. These buildings extend now all the way to Dalena. The village lands situated to the west of the highway used to be open fields. I was surprised to find a church and

other nice buildings including a health clinic there. Next to this missionary complex there is an industrial estate. Opposite to the east of the highway there now is a line of buildings including a post office, small restaurants and various shops selling a great variety of goods. Much traffic passes along the highway. Buses travelling in both directions stop at Dalena. This creates the impression that by now Dalena is almost a suburb of Mandya. On turning left into the village itself I spotted the primary school building which had looked nice and new in 1970. Now it was run down and badly in need of renovation. In front of it a water tank has been constructed to provide piped drinking water. There are eleven public water taps in the village and a number of houses have their own private taps. In Dalena the main village square was being sealed to facilitate the traffic of cars and trucks. Bordering on the square and between a small temple and the house I occupied in 1955, there are now the offices of the Dairy Co-operative Society, which buys milk from the villagers. The Anjeneya temple near the square also looks completely renovated with attractive, colourful decorations. Along one of the village streets the old Marichowdi temple, which in 1955 housed the local primary school, was undergoing renovation. I spotted a few new elaborate and urban-style houses, but far fewer than in Wangala. The majority of Dalena's improved houses were in the Scheduled Caste settlement at the back of the Peasant residences. A lot of the old Scheduled Caste thatched huts have been replaced by RCC structures. Most houses now benefit from drainage — another welcome innovation. Four Peasant households have built their own biogas plants to provide fuel for cooking. The increase in the number of houses has greatly overshadowed the separation between the Caste and the Scheduled Caste settlements, which still existed in 1970. Peasant residences extend even behind the Scheduled Caste settlement, which is now sandwiched between Caste houses. Judging by appearances, the lifestyle of Dalena's Scheduled Castes has considerably improved. Their housing has improved; they are better clothed and look better nourished than what I remembered in 1955. Altogether there is no doubt that both Wangala and Dalena have grown considerably during the past forty years. This was to be expected. Yet I found a noticeable difference in the way the two villages appeared to have changed.

## Economic Change Factors

**Agricultural technologies:** With population growth and limited availability of lands, the average per capita land area has declined in Wangala by about 33 per cent and in Dalena by about 50 per cent. But Wangala's wet lands permitted the application of new agricultural technologies, which improved crop productivity. In discussions with farmers it emerged that many single out the change in cultivation practices as *the* most important change that has taken place over the past forty years. Most Wangala farmers these days plant High Yielding Varieties (HYV) of seeds and apply fertilizer to their irrigated lands. Much agricultural labour has been replaced by

mechanization. Different types of capital assets are now available to farmers: for instance, besides the numerous cane crushers and flourmills, there are now irrigation pump sets, power tillers and tractors. One Wangala farmer told us:

> 'About four months ago I managed to get a loan of Rs.70,000 at 14 per cent interest from the Wangala branch of the Corporation Bank. This enabled me to purchase a power tiller, which I now use on my own lands, but I also offer it for hire. With my power tiller it takes about three hours to plough one acre of land. I charge Rs.125 per hour. I am pretty confident that there will be sufficient demand for my power tiller to enable me to repay my debt within about two or three years. Once I am in the clear I can then continue earning quite a bit of money by offering my power tiller on hire.'

To meet the higher costs of agricultural inputs, farmers can get credit from different sources. By paying Rs.10 and thus becoming a shareholder of the Wangala cooperative society, a farmer qualifies for credit on the security of his landholding. He can also get seeds or fertiliser through the co-operative society on payment of only 20 per cent cash down; of the remaining amount he gets 60 per cent in kind and 40 per cent in cash. Farmers can purchase fertiliser on credit also from private traders at Government-controlled prices. Only when traders have access to certain kinds of fertilizer that are temporarily in short supply while farmers are eager to get hold of some quantities do they get away with charging higher prices unofficially.

**Urban impact:** The recent commercial and industrial development of Mandya, the headquarters of Mandya District, which is within easy reach from Dalena and Wangala, has had a considerable impact on its rural hinterland. Mandya's population has increased manifold from only about 6,000 persons in 1951 to 120,000 in 1991. This large population growth resulted, of course, mainly from urban migration. Increasing numbers of villagers not only from Mandya's immediate vicinity but also from much farther afield have been attracted by the income-earning possibilities the growing town offers. The town has over the years developed into a thriving commercial, industrial and educational centre. Travelling through the various parts of Mandya, it becomes apparent that a distinct class division has accompanied its development. An area with substantial residential buildings, each of which is surrounded by large and well-tended gardens, manifests the presence of wealthy households. A sprawling area with smaller but also nice looking bungalows indicates the presence of a considerably sized middle class, each standing on a separate plot. The large mass of unskilled labourers and unemployed mostly stay in small thatched roofed huts or in temporary and improvised accommodation.

Mandya's rapid urbanisation has had numerous repercussions in Dalena and Wangala. It provided a demonstration model for village development. In terms of lifestyles, this is reflected not only in the many recently built urban-style houses in the villages but also in the furniture that now forms part of many such houses

and altogether in the availability of amenities such as television sets and telephones. In 1955 these were luxuries of which villagers would not even have dreamt; now they have become an accepted part of everyday village reality. Economic activities have also been shaped by Mandya's development. It encouraged the process of economic diversification. Though this process has occurred both in Dalena and Wangala, it took a different form in each of these two villages.

The constraints of dry land have led Dalena men to seek incomes from other sources outside their village: skilled mechanics and electricians work on nearby industrial estates, building contractors build houses in neighbouring villages and towns, horticulturists work for the Bangalore and Mandya Departments of Agriculture; cane crushers process cane grown outside Dalena; carpenters make the more elaborate carts now wanted by better-off farmers in neighbouring irrigated villages; buying agents and merchants operate at Mandya's jaggery auction and many villagers are employed at the Mandya refinery. Dalena shops and restaurants by the side of the highway cater mainly for passing traffic — they sell, for instance, bottled petrol. Dalena villagers own four lorries, which fetch the cane to the crushers and take the jaggery to buyers. Fifteen households own scooters. A few houses have their own telephones. There are eight small shops and as many small restaurants catering for villagers' requirements but none of the many specialist services that are now available in Wangala. Dalena's internal market is too small for much specialisation to meet local demand; villagers have to export their skills and services to secure and/or improve their livelihood. This has meant that they have turned more to work in secondary than in tertiary industry, because in doing so they encounter less competition for employment in the wider economy. Some 65 per cent of Dalena men within working age are engaged in non-agricultural work outside the village, and about 60 per cent of these pursue industrial activities. Also a considerable number of professionally-trained Dalena men have already left the village with their immediate families to work and reside elsewhere. They appear to have severed their links with their native village and are likely to be soon forgotten by the people of Dalena.

By contrast, Wangala's access to irrigation and the consequent increase in crop productivity and rural incomes has created a sufficiently large internal demand to promote non-agricultural activities within the village. There are small vegetarian and non-vegetarian restaurants, all of which appear to be well frequented by Caste members. Most have sheltered seating accommodation outside, so that customers can take their drinks and food while enjoying a bit of the breeze. There are also many small stores. Two cycle workshops and one engineering workshop offer hire and repair services. A post office provides, among other things, savings arrangements. One Corporation Bank branch offers general banking facilities and two Finance Corporations offer credit. Two private fertiliser businesses and one

general farmers co-operative as well as a dairy co-operative, together with tractors, power tillers and harvesters on hire, and many cane crushers provide the goods and services farmers need. Those craftsmen like the potters, whose products are no more in demand, have had to turn to other work. One Wangala potter does tailoring and another has acquired a motor rickshaw with the help of a bank loan; he runs it as a taxi. Almost all Wangala individuals who pursue non-agricultural occupations work within the village; the activities of about 60 per cent of them can be classified under tertiary industries; the rest are mainly craftsmen like the blacksmith and carpenter whose hereditary skills are essential in making and repairing agricultural tools and equipment. Most of the goods and services villagers require are now available within Wangala, and this attracts neighbouring villagers to avail themselves also of Wangala's facilities. The expanding market induces craftsmen from outside to move to Wangala and some of them have settled in the village recently. Wangala's non-agricultural activities are almost all directly or indirectly connected with village agriculture. Significantly, when I asked what changes they would like to see in the near future the Wangala men invariably said: 'We need a factory in Wangala that will manufacture agricultural implements.' Thus whereas Dalena villagers concentrate their non-agricultural activities in secondary industries and meet needs arising outside their immediate rural environment, Wangala's non-agricultural activities tend to relate in one way or another to intra-village requirements and agriculture.

**Commercial opportunities:** The railway line and the major highway connecting Bangalore with Mysore pass through Mandya. There is now a quite substantial industrial estate to the west of the railway line. The sugar refinery was the first factory established in Mandya. It set the pace for the town's subsequent rapid expansion. By now there are many other industrial and commercial establishments that flourish in Mandya. Over the years the refinery's fortunes have depended not only on the productivity of cane crops, which in turn largely depended on availability of water in the irrigation canals, but even more so on competing cane sale outlets. The jaggery boon of the 1960s caused by prohibition obviously alerted farmers to the possibility of alternative sales outlets besides the Mandya refinery and they never forgot it. There has been a growing demand for jaggery for sweetening purposes in different parts of India. Demand for jaggery therefore continued even after the 1960s, though the abolition of prohibition considerably reduced its level. This meant that buyers continued to tour the cane growing areas to buy jaggery from local farmers. Many farmers and even some of the buyers complained that this was an inefficient and unsatisfactory marketing system. In some cane-growing Indian states there already existed official Agricultural Marketing Corporations where jaggery was successfully auctioned. In 1989 the then Mandya District Commissioner decided to sponsor the establishment of such a corporation in

Mandya, where jaggery auctions are held daily. This corporation operates through licensed agents and licensed buyers. The agents form relationships with specific farmers; they take care of their jaggery delivery and see it through auction. The cane supplier ultimately receives the total amount that the buyer offers. The buyer has to pay 103 per cent of that amount: two per cent goes to the agent and one per cent to the Agricultural Marketing Corporation. The jaggery auctions have considerably improved the cane farmers' bargaining position and have resulted in a mushroom growth of village cane crushers as can be seen in Dalena and Wangala.

The two villages were, however, affected differently by the commercialization of jaggery sales. In Wangala rising jaggery prices encouraged extension of cane cultivation besides the establishment of more cane crushers. Wangala cane farmers now try to keep themselves informed about jaggery prices and compare them with what the refinery pays for contracted cane. When jaggery prices are more attractive than those paid for cane by the refinery many farmers are tempted to default on the cane contracts they have entered into with the refinery. This poses serious problems for Mandya's refinery because it makes its planning extremely difficult. Wangala farmers, who in 1955 were all risk minimisers and struggled to secure contracts with Mandya's refinery, are now prepared to take more risks. They produce a much larger quantity of cane than they contract with the refinery in the hope of selling it as jaggery at attractive prices. They are happy as long as the going is good, but complain bitterly if the jaggery market fails. Having become aware of the bargaining strength they can derive from facing competing buyers, they have learned to choose how and where to sell their cane with a view to optimizing their returns. Wangala's 32 cane crushers clearly indicate that many farmers consider it an economic advantage to process the cane they grow. Yet they still do not appear to appreciate the impact on prices of increasing volumes of supplies. High jaggery prices induce many farmers to put more acreage under cane cultivation. They do not consider that when many farmers do likewise the jaggery market will be flooded and prices will fall.

By contrast, Dalena villagers did not have the option of growing more cane on their own village dry lands. This induced some of the enterprising men to seek a niche for themselves as jaggery agents or buyers. Commercialization of the jaggery trade has led Dalena entrepreneurs not only to strengthen their commercial links within their region but also to extend them beyond the boundaries of Karnataka. As jaggery merchants they have to take higher risks. When bidding at the auction they must already have in mind potential buyers and an estimate of the price they will pay. The different aspects of involvement in the jaggery trade reinforced Dalena's village extroversion that already existed to a certain extent in 1955 and which had developed further by 1970.

**Financial opportunities:** The introduction of new and costly capital assets to farming and the expansion of non-agricultural activities could not have taken place without improvements in savings and credit facilities. In 1955 most villagers were indebted to informal moneylenders; only the largest landowners qualified for bank credit. Nowadays many villagers have savings in appropriate institutions and have access to credit from various sources. Their financial position has thus greatly improved, though of course this does not apply to the same extent to all villagers. Post offices in Wangala and Dalena besides postal services also offer savings facilities. There are now numerous 'Recurring Deposit Accounts' at Wangala's post office that are meant for longer-term deposits and carry an interest ranging from 10.5 per cent during the first year to 12.5 per cent during the fifth year. There are also short-term savings accounts that earn five per cent interest. Half of the post office savings belong to the Wangala school complex and the other half to individuals. Post offices also distribute government pensions and welfare payments.

A Corporation Bank branch in Wangala provides only savings and credit facilities and current cheque accounts; it serves all the villages included in the Wangala Gram Panchayat. In 1996 Wangala villagers had some 1,200 savings accounts of which about 125 are held by women without their husbands' knowledge and 25 are in the names of widows, who receive a monthly State pension of Rs.150. There are 85 current accounts with a total of about Rs.100, 000 and 105 fixed deposit accounts worth a total of about Rs.530, 000. The earnings of members of Wangala's Dairy Co-operative Society are paid directly into their bank accounts, which explains the large number of small savings accounts. The bank also offers credit, but only on the basis of security of land, jewellery or third-party guarantees. The bank manager emphasised that his branch runs at a loss. If it were a private bank it would have already been closed down. But as it is a Government institution it can continue incurring losses.

Finance Corporations, of which there are two in Wangala, were started in 1994. They are registered as co-operative societies. Kangowda, one of the founding members of the Soudhardha Kougaroda Finance Corporation, related:

> 'We saw the numerous Finance Corporations that have been established in Mandya and are registered as co-operative societies allowed to offer loans to business ventures only, not for agricultural purposes. We found out that all these corporations were thriving because of the many petty business people who had difficulty in getting loans. This gave us the idea to set up such finance corporation in Wangala where there are also many small businesses in need of loans to meet their working expenses. Six of us got together and each contributed Rs.15, 000. We started off with a working capital of Rs.90, 000. Our loans to small entrepreneurs range from Rs.2, 000 to Rs.25, 000 at 23 per cent interest for a maximum period of 10 months. We deduct the interest at the time we give the loan. A man specially engaged to call

> personally on each of our debtors on a daily basis collects the rest. He is paid Rs.500 monthly for the job. Our debtors prefer to repay small amounts daily and always do so. The secret of our collector's success lies in his personal contact with our debtors. Unlike the banks we have no loan recovery problem. By now we have altogether advanced about Rs.350, 000 and with it have helped small businesses to grow not only in Wangala but also neighbouring villages. The Rs.90, 000 working capital with which we originally started our Finance Corporation has almost doubled during the first two years of operation. Our financial success has encouraged some of our fellow villagers to invest in our venture; this has added another Rs.159, 000 for which we pay 16 per cent annual interest to depositors.'

Kangowda stated that the other Wangala Finance Corporation in the village had developed in a similar way and other villagers present nodded in agreement. The success of Wangala's Finance Corporations made me wonder why none of my enterprising Dalena friends had yet thought of establishing such a corporation in their village. When I asked them they told me that a few of them are involved in such corporations in Mandya; they felt that the demand in Dalena and neighbouring villages for small business finance was not sufficiently strong to warrant the establishment of a Finance Corporation in their own village. Wangala Finance Corporations represent ingenious institutions appropriately adapted to the needs of small businesses. The *modus operandi* of the loan collection is so obviously well suited to debtors' requirements and ensures a high recovery rate. It has the advantage of continuing the personal aspect of creditor-debtor relationships, which used to be the central feature of traditional money-lending arrangements in Wangala; only now loans are set in a new financial environment. The Government may therefore be well advised to encourage such Finance Corporations also to finance agricultural activities instead of prohibiting them from doing so. Unlike the Government bank branch in Wangala, which concentrates on agricultural credit and operates at a loss, these privately organised Finance Corporations make a handsome profit and lenders as well as debtors are pleased with the way they operate.

## Rural Development and Water Shortages

External interventions to increase rural incomes have until recently concentrated on improving agricultural productivity. This has succeeded pretty well in South India. Irrigation schemes have relieved farmers from dependence on uncertain and scarce rainfall. Irrigation, together with the High Yielding Varieties of seeds and artificial fertiliser, brought about the 'Green Revolution.' Agricultural productivity of irrigated lands increased manifold. Wangala farmers did well out of the 'Green Revolution' so much so that their crop outputs have kept pace with their growing population. This has reinforced their village introversion and strengthened their social unity. However, irrigated farming practices use up excessive amounts of water, with the result that water rather than land has now become the scarce resource.

Accordingly, the rural development focus is likely to have to change from optimising agricultural productivity per unit of water rather than per unit of land. This important fact does not appear as yet to be fully recognised either by South Indian authorities or the public at large. The recent temporary closing of the K.R.S. irrigation system in Karnataka State for the purpose of relining the canals clearly illustrates that the authorities are taking a narrow and short-term view rather than the wider and longer-term implications of water scarcity.

## The Social Cost of Change

Rapid South Indian rural development appears to have been accompanied by serious social problems. *Drinking and gambling* often result in violence. The elder villagers complain about the declining moral and ethical standards. Previously it was taboo for Peasant Caste members to touch alcohol, and wife beating was a rare and punishable phenomenon. Now most village men enjoy at least some alcohol in the evening after work. Not everyone drinks excessively, but a considerable number do. These days there is a lot of drunkenness among villagers. The liquor stores, which can be found in each village, provide ready access to alcoholic beverages. Men seem to be the main offenders in terms of drinking and gambling. When drunk they often become violent and beat their wives and children. If they lose in gambling they are often driven to pledging their wives' jewellery and household possessions. This causes havoc with family relationships. It forces many wives to fend for themselves to look after their children and to keep their families together. There are many such cases both in Dalena and Wangala. In Dalena the drink problem has taken on such proportions that the informal traditional Peasant Caste panchayat introduced a rule according to which any person found drinking or gambling in the village has to pay a fine. The money thus collected is used for development purposes.

*Psychological strain* is another regrettable feature that did not exist in 1955 and is now prevalent in these villages. According to the doctor at Wangala's Primary Health Unit, 'as much as 60 per cent of the patients who come to the clinic suffer from psychological stress. Most of them are not severe cases and get better reasonably quickly; all they seem to need is a sympathetic listener to their problems. The more serious cases are transferred to Mandya or if necessary even to Bangalore psychiatric units.' In Dalena and Wangala a growing number of suicides have occurred in recent years. This manifests the existence of stress and strain in these societies. Psychological stress has been on the increase also in Western industrialized society for some time already. It is regrettable that it has now come to bedevil even Indian rural societies that previously were thought to be immune to psychological problems.

*HIV/AIDS* is another health issue that has been imported into rural areas. The Wangala doctor related that 'there has already been one case of AIDS in

Wangala. It was a young man who when diagnosed was expelled and died three months later. We checked and tested all his village contacts but found them all negative. Now there is another case in one of the neighbouring villages; in my judgement the young man will also soon die — there is hardly anything we can do to help HIV/AIDS affected patients...'

At the end of my brief return to Dalena and Wangala in 1996, when I came to say my fond farewells to my many village friends, I could not help but wonder whether the various health and social problems villagers now encounter are an unavoidable social cost of change. Further, is it possible to ensure the advantages of progress without having to suffer the accompanying disadvantages?

## Notes

1. For a more detailed account see Epstein 1962. The book also appeared in the ELBS series and the Agricultural University, Bangalore, has published a vernacular translation. It was republished by Media Promoters and Publishers Pvt Ltd, Bombay, 1979.
2. I have used pseudonyms for the villages to conceal the identity of my informants. I have called the wet village **W**angala and the dry **D**alena.
3. For a more detailed account see Epstein 1973. The book also appeared in the ELBS series, and the Agricultural University, Bangalore, has published a vernacular translation.
4. For a more detailed account see Epstein et al. 1998, and the documentary film with the same title produced by the German Institute for Scientific Films, Goettingen University.

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# A Critical Reflection on Development of Scheduled Castes

**M. Mahadeva** *

## Abstract

Notwithstanding the Constitutional guarantees and developmental interventions, the goal of bringing the Scheduled Castes (SCs) into the mainstream has proved to be a distant dream. It is turning out to be a daunting challenge especially in the light of ongoing economic changes, as the public actions have further distanced this section from the core economic activities. Unrealistic interventions have compounded the misery among SCs. On the demand side, large-scale landlessness and lack of skills have impeded their economic advancement. This paper examines the scale of deprivation among SCs in the economic and social spheres at the national and state levels. The paper advocates alternative development strategies for SCs under the 'Comprehensive Development (CD)' and 'Integrated Approach (IA)' framework to empower all segments and to contain the existing levels of social and economic deprivation.

## Introduction

Scheduled Castes (SCs) are prominent socially and economically disadvantaged groups in India, comprising 138.22 million. SCs account for 16.48 per cent of the country's population and 39.45 per cent of the socially disadvantaged population. For centuries, SCs have been subjected to the inhuman practice of untouchability and discrimination on the basis of caste by the upper caste people. Unfortunately, untouchability and discrimination, though legally banned, continue to flourish even to date. The hope of eliminating the inhuman practice has been largely belied by the relative resilience of various socio-cultural institutions, particularly in rural areas. Atrocities (e.g., beating, burning of property, rape, killing, denial of civil rights, social boycotts) against SCs are routine occurrences and are increasing at an alarming level, for social-economic-political reasons (see, Shah

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2000; Pai 2000). The law and order authorities are callous in dealing with such atrocities against SCs. The number of unregistered incidents is said to be at least one-and-a-half times that of registered incidents (Pai 2000, p.419). While the State machinery is insensitive to the hardships of SCs, the intervention efforts[1] to improve their lives have been mostly half-hearted. Even after five decades of independence, access to economic and social bases to lead a normal decent living has been a far-reaching dream for a majority of SCs. Their current plight is mainly attributable to limited public action together with scant public investment for the welfare of SCs. Lack of need-based interventions has also been a factor. Further, new employment opportunities have gone in favour of head-starts in society, and as a result the SCs have hardly reaped these benefits, as most of them are not technically equipped or skilful. Indeed, a serious attempt to assess the socially lopsided impact of the recent economic changes is yet to be made either by the state or scholars concerned.

A few recent studies assume significance in their attempt to account for development in the light of the changing economic sphere. *Journal of Indian School of Political Economy* and *Journal of Rural Development* brought out special issues during the past two years on Scheduled Castes. The first one carried contribution of experiences from major states like Punjab, Uttar Pradesh, Bihar, West Bengal, Gujarat, Maharashtra and Tamil Nadu. The several papers focus on the levels of advancement among Scheduled Castes as well as the lags in economic and political spheres, from a sociological perspective. The second, being a combination of contributions from bureaucrats and academics, examined constitutional guarantees, protective measures and discriminations, impact of states' intervention for the welfare of Scheduled Castes, etc. Also, the weaknesses in the development and empowerment programmes and their contributions to continued inequality have been clearly spelt out (Thorat 2000). However, notwithstanding the efforts of these contributions, they fail to document the overall position of this section and to account for the scale of advancement over the years. Also, these studies fail to throw light on the volume and scale of social and economic deprivations among SCs vis-à-vis others both at the macro level and at the state level. Further, critical issues such as landlessness, higher incidence of illiteracy and drop-outs at various levels, higher scale of poverty, representation of SCs in services (central public sector undertakings/ commercial banks and financial institutions) have not been extensively examined. Similarly, issues pertaining to housing, drinking water, electricity and sanitation have never been addressed, despite their growing importance in bringing about social advancement and improvement in living standards. Since all these issues form the bases of backwardness, this paper attempts to examine critically the scale of social and economic deprivations among SC families at the macro and state levels. Such an analysis is extremely important to remind the states of their responsibilities towards SC families in the changing circumstances besides

answering the popular question as to how much longer the state should take the responsibility of improving the conditions of SCs.

This paper analyses the information contained in a number of official reports and data sources. All India Report on Agricultural Census (1990–91) of the Ministry of Agriculture and Co-operation (1998) has been used to assess the land and landlessness situation. Annual Reports of the Department of Administrative Reforms and Public Grievances (1994), Ministries of Chemicals and Fertilisers, Industries and Commerce and Finance (2000–2001), Government of India, are the sources to account for the representation of SCs in public services. Similarly, Report of the Expert Group on Estimation of Poverty (1993–94) has been consulted to present the status of poverty among SCs at the national and state levels. Finally, to measure 'houselessness' and lack of amenities, an occasional paper on housing and amenities of Census of India (1991) has been made use of. Data for two periods would have better indicated the development distance of SCs, but owing to non-availability of comprehensive data on many indicators used in the paper the same could not be attempted. This paper is organised into four sections. In the second section, skewed distribution of holdings and landlessness, lags in educational advancement and in public services have been discussed. The third section analyses the scale of poverty and social deprivation. In the final section, obstacles to development of SCs and future policy options have been indicated.

## Land and Landlessness

The importance of land as a means of livelihood cannot be overemphasised in an agrarian and rural-based society like India. In a country where over one-third and around half of its population respectively are below the poverty line and illiterate, land is considered the basis for sustenance or survival. Especially for those who have been considered untouchables, with large-scale poverty and illiteracy, it is impossible to visualise the plight of the landless. Besides higher scale of landlessness, access to land by SC families is far from satisfactory. Before analysing the skewed distribution, it is worth noting that just over 134 lakh families of SCs are reportedly landholders. This works out to 51 per cent of the total number of SC families whereas in the case of general population/families the share of landholders is well over 70 per cent. This only confirms the scale of deprivation of land for SC families as compared with general families. Yet another aspect is the skewed distribution of land. At the outset, although SC families account for 12.59 per cent of the total number of holdings in the country, the total area held by them has been only around 8 per cent. Similarly, the average size of holding of SC families has been only 0.57 hectares as against the national average of 1.55 hectares. The shortage exists in various size categories, and is particularly widespread in the large holdings category. The difference in SC large holdings is less by 0.63 hectares followed by 0.13 hectares

among medium farming, 0.06 hectares in semi-medium, 0.03 hectares in small and 0.04 hectares in marginal farming.

Table 1 depicts a wide range of differences in landholdings across sizes. Marginal holding being a characteristic feature of Indian farming, its share in the total number of SC holdings is very large. Though it appears to be common, the difference is around 13 per cent over all the holdings. In the case of other holdings the variation works out to 2.90 for small, 5 for semi-medium, 3.9 for medium and 1 for large farming. Equally disheartening is the position regarding area by sizes. There are two scenarios. First is lower the number of holdings corresponding drop in the area size. This is typically the case of SC holdings. For example, small holdings the second largest with 2130 thousand holdings have a area of 3010 thousand hectares and large holdings with least size has the lowest area of 1319 thousand hectares. Whereas, in the second lower the number higher the share of land, which is the case of all holdings. For example, medium farmers in 7580 thousand hectares (second lowest) own the highest area of 44,752 thousand hectares or 27 per cent.

**Table 1: Scheduled Castes' Holdings by Size (1990–91)**

(in thousands)

| **Farm Size** | **Scheduled Castes** | | | **All Holdings** | | |
|---|---|---|---|---|---|---|
| | Number | Area (Ha) | Average Size | Number | Area (Ha) | Average Size |
| Marginal (< 1 Ha) | 9689 (72.20) | 3409 (25.90) | 0.35 | 63389 (59.40) | 24894 (15.00) | 0.39 |
| Small (> 1 <2 Ha) | 2130 (15.90) | 3010 (22.80) | 1.41 | 20092 (18.80) | 28827 (17.40) | 1.44 |
| Semi-Medium (>2 <4 Ha) | 1092 (8.10) | 2944 (22.40) | 2.70 | 13923 (13.10) | 38375 (23.20) | 2.72 |
| Medium (>4 <10 Ha) | 432 (3.20) | 2492 (18.90) | 5.77 | 7580 (7.10) | 44752 (27.00) | 5.90 |
| Large (>10 Ha) | 79 (0.60) | 1319 (10.00) | 16.70 | 1654 (1.60) | 28659 (17.30) | 17.33 |
| Total | **1,34,22** | **1,31,73** | **0.98** | **10,66,37** | **16,55,07** | **1.55** |

*Note*: Figures in parentheses are percentages of the total.

*Source*: Government of India (1998)

Owing to their large-scale illiteracy and landlessless, the majority of the SC workforce are agricultural labourers. Of the total male workers, agricultural labourers constitute over 49 per cent among SCs as against 26 per cent of the agricultural labourers in the country. SCs have the largest number of agricultural

labourers as compared with any other community. 'Uncertainty of livelihood' best describes the plight of these labourers. Since they work during the agricultural season and migrate to urban areas during the slack season, they constantly face the challenges of employment both at home and at destinations. Agricultural sluggishness and increasing mechanisation of economic activities (e.g., construction sectors) in urban areas have substantially reduced the human labour requirement. The eroded employment opportunities have forced these labourers to accept employment under public works, whose money wages are far below the ruling wages. That apart, public works have generated only a limited number of employment[2] opportunities owing to lack of public investment and eroded public expenditure especially during the 1990s. Their added misery is the shocks to artisans from the new programmes of liberalisation. Increasing product differentiation and market diversification have destabilised the conditions of a wide range of artisans.

## Educational (Dis) Advancement

Public concern for educational advancement of SCs is one of the founding expectations of the Indian Constitution under Article 46. Ever since the adoption of the Constitution, public interventions could make just over one-third of the SC population literate. Despite the dismal progress, the position of the so-called illiterates or educated persons is equally disappointing. The public concern to promote the educational interest of SCs has yielded only fringe benefits. Though reservation in public services has helped only a limited number of persons, the majority of the so-called educated SCs have ended up unemployed.[3] Increasing educated unemployment among SCs is mainly due to the gap between the employment market and educational skills that these sections are acquiring. The employment market demands skills that many educated SC persons do not possess, owing to their poor status and poor guidance. Further, the new economic regime has widened the existing gap that has been referred to. It can be said that the economic reforms of the late 80s were introduced when SCs (and other weaker sections also) were educationally consolidating their positions. The public opportunities, which were till then a source of hope for these sections, are dwindling owing to withdrawal of public investment, recruitment holdings, increasing private investment, etc. These buzzwords have not only further marginalised these sections but have also thrown them into a worst ever situation. However, SCs are partly responsible for their plight. The majority of SCs, especially in the rural areas, take pride in pursuing such education, which does not fetch them a basic livelihood let alone a decent living. Apart from the shrinking opportunities, lack of capital has driven a number of persons into the informal sectors for employment such as garment units/outlets and hotels.

The plight of educated SCs is thus seen to be unenviable. However, that of school drop-outs among SC wards is worse. The incidence of such drop-outs is particularly high in rural areas (NSSO 42nd Round). Of the total number of drop-outs (6,31,72,776) in the country, SC wards account for 15.61 per cent or 98,60,465. Among the total number of drop-outs from the depressed sections (SC, ST and Neo-Buddhist), the share of SC wards was over 70 per cent. Male wards constitute the majority (71,02,208 or 72.03 per cent) of the total number of drop-outs. The percentage of drop-outs is highest (63.29 per cent) at the primary level followed by the secondary level (34.66 per cent) and at other levels (2.05 per cent). Similar to the primary level, post-secondary level is also considered for higher scale of drop-outs with 76.73 per cent of 8,706 wards. The only difference is that the incidence is higher among female wards (53 per cent). The higher incidence of drop-outs among SC wards is largely explained by several factors such as lack of interest in education/further studies (30.42 per cent), other economic reasons (23.54 per cent), participation in household economic activity (18.38 per cent), failures (15.97 per cent), attending domestic chores (4.84 per cent), and the remaining for other reasons. Though these reasons vary slightly between male-female wards, attending to domestic chores is one of the main reasons for drop-outs among female wards, whose incidence is thrice as high as the average. Also these reasons hold good for non-enrolment as students besides non-availability of schooling facilities close to SC habitations. It has been estimated that about 6.10 lakh children have never been enrolled in school, i.e., around 23 per cent of the total number of non-enrolled children in the country. The incidence is higher among SC female children (3.54 lakhs or 58.03 per cent).

## Representation in Services

Given the skewed distribution of landholdings, large-scale landlessness and higher incidence of poverty, it has been impossible for Scheduled Castes to enter into the mainstream of society and to become partners of development. Added to this, lack of capital in the hands of SCs has kept them away from economic activities like trade and business. Employment in government services (central and states) and public sector undertakings is the only avenue for SCs to improve their socio-economic conditions and to make a decent living. But for the representation in services over five decades even the meagre development benefits that have accrued would have been impossible for SCs, thanks to the protective discrimination and Constitutional safeguards. This only reinforces the need for such safeguards and positive discriminations as long as these people are outside the mainstream of society in the social and economic spheres. With the given representation in services for SCs, not everything is all right. Owing to their poor educational background and lack of professional skills, SCs have had to start from the lower cadres of services,

and by the time they reach the positions that matter they would have attained superannuation. Even if some have reached the positions that matter, they would have either consolidated themselves in such positions or would have got entangled with difficulties/pressures from others. Though the data set is questionable, the representation of SCs in services, as listed in Table 2, depicts the overwhelming scenario and confirms the above arguments.

**Table 2: Representation of Scheduled Castes in Public Services**

| | | Total Employment | Scheduled Castes | Percentage Share |
|---|---|---|---|---|
| I | **Government (Central) (As on 1.1.1994)** | | | |
| | Group A | 59016 | 6046 | 10.24 |
| | Group B | 103198 | 12442 | 12.06 |
| | Group C | 238613 | 374758 | 15.73 |
| | Group D | 1023285 | 209423 | 20.46 |
| | **Total** | **3567112** | **602670** | **16.90** |
| II | **Public Sector Undertakings (50) (11 M/C&F) (39 (M/Commerce) (As on 31.12.2001)** | | | |
| | Group A | 16138 | 1632 | 10.11 |
| | Group B | 14572 | 1949 | 13.37 |
| | Group C | 25251 | 4111 | 16.28 |
| | Group D | 6827 | 1926 | 28.21 |
| | **Total** | **62778** | **9618** | **15.32** |
| III | **Public Sector Banks / Financial Institutions (As on 31.12.2001)** | | | |
| | Officers | 240615 | 31367 | 13.03 |
| | Clerks | 435330 | 66044 | 15.17 |
| | Sub-staff | 157505 | 39057 | 24.8 |
| | Sub-Staff (sweepers) | 35200 | 18867 | 53.60 |
| | **Total** | **868650** | **155335** | **17.88** |

*Source*: Government of India (1994, 2002).

Overcrowding in the lower cadres and thin representation of SCs in positions that matter are the features. Though the overall representation of SCs in services is well above the provisions, there is cause for concern with regard to higher positions. The legal provisions in the context of social justice enjoin judicious and equal representation of SCs in all cadres, but this has not happened to the expected level in government and PSU services let alone in other services. It is clear from the table that in the hierarchical cadres SCs have been overrepresented in

group D segments to the extent of over 20 per cent in government, over 28 per cent in public undertakings[4] and around 25 per cent in the public sector banks and financial institutions. Further SC representation constitutes over fifty per cent of the total sub-staff category of the banking sector. As a result, there exists deficiency of representation for SCs in group A & B categories of Government and PSUs and at officers level of the banking sector. Lack of motivation on the part of the authorities alone is not the reason. SC employees are also responsible for their plight as most of them take pride in their present positions rather than industrious and painstaking steps toward upward mobility.

## Poverty and Scheduled Castes

Poverty is synonymous with Scheduled Castes in India as most of them, especially rural illiterates, are born in poverty, live in poverty and die in poverty. Also it may not be wrong to use 'poverty' and 'Scheduled Castes' interchangeably. Lack of assets, income and proper livelihood system being a regular feature of SCs on the one hand, deprivation of even basic needs like a decent house with proper lighting and drinking water is a reality on the other hand. Not that the poverty of SCs is unique or extraordinary, but the magnitude of poverty is always higher among this section. This means that either the anti-poverty intervention is not properly designed or was not provided sufficiently. This is clear from the fact that poverty among SCs, which was 8 per cent more than the national average in 1977–78, continues to maintain the gap rather increasingly. This gap was around 13 per cent in 1983–84, dropped to around 12 per cent in 1987–88, and then increased to 13 per cent in 1993–94. A further disappointing feature has been a marginal reduction of poverty among SCs as compared with the total population. Over the years, the overall poverty trend has dropped by over 12 per cent (from 48.3 per cent in 1977–78 to 35.97 per cent in 1993–94), whereas in the case of SCs, the drop is only 7.93 per cent during the period. Interestingly, the falling trend in the ratio among both SCs and the general population till 1987–88 has reversed itself by 1993–94, which is eventually the period of economic reforms. During the reforms period the poverty ratio increased by 6 per cent among the general population and by 7 per cent among SCs (Table 3).

**Table 3: Percentage of Scheduled Caste Population below Poverty Line (1977–78 to 1993–94)**

| Year | SCs | All population |
|---|---|---|
| 1977–78 | 56.30 | 48.30 |
| 1983–84 | 50.10 | 37.40 |
| 1987–88 | 41.50 | 29.90 |
| 1993–94 | 48.37 | 35.97 |

The scenario is far more disturbing across states than at the national level. There are two major disappointing features in this regard (Table 4). First, higher poverty gaps among SC families, which are even more than the national average (12.4 per cent). Second, higher poverty ratio, which is over and above the national average for SC families. With some overlapping states in both the categories, fifteen of the sixteen states have registered a higher poverty gap among SC families ranging from 2.52 to 22.66 per cent above the average. Especially in the case of nine of the fifteen states the situation has aggravated. Karnataka maintains a huge gap of poverty among SC families with 22.66 per cent followed by Uttar Pradesh (19.66 per cent), Tamil Nadu (16.65 per cent), Rajasthan (15.03 per cent), Maharashtra (14.52 per cent), Madhya Pradesh (14.88 per cent), Gujarat (13.59 per cent), Punjab (13.37 per cent) and Haryana (12.87 per cent). Similarly in seven states, the SC poverty ratio is far more than the SCs national average (48.37 per cent) ranging from the highest (60.51 per cent) in Uttar Pradesh to the lowest (51.08 per cent) in Orissa. Others are Madhya Pradesh (57.40 per cent), Karnataka (55.82 per cent), Bihar (54.40 per cent), Maharashtra (51.78 per cent) and Tamil Nadu (51.68 per cent). In all the above states the poverty alleviation efforts are inadequate and far from ground reality. Therefore, in these states a lot more needs to be done in order to arrest the higher incidence of poverty among SCs.

Further, the distribution of poverty ratio among the SC families in rural/ urban areas across states is equally worrisome. The SC population in urban and rural areas faces higher poverty, which is above all population at the national level. In urban areas the SC population below the poverty line works out to 49.48 per cent, which is over 17 per cent higher than that of all population in urban areas. Also, it is higher by more than 1 per cent of total SCs. Though the incidence of poverty among SCs in rural areas is not as severe as in urban areas, the scale of incidence is still higher at around 11 per cent vis-a-vis all-rural population. This apart, the SC poverty ratio is extremely high in rural-urban areas of a number of states. For example, around 71 per cent of SCs in rural Bihar are BPL followed by 59 per cent (Uttar Pradesh), 52 per cent (Maharashtra) and 49 per cent (Orissa). Similarly, Madhya Pradesh takes the lead with a high poverty ratio among SCs in urban areas with 65 per cent followed by Karnataka (61.59 per cent), Tamil Nadu (61.50 per cent), Uttar Pradesh (58 per cent), Bihar (54.40 per cent) and Maharashtra (52.56 per cent). The higher incidence of poverty in all population in Bihar and in Madhya Pradesh also contributed to the higher incidence among SCs in rural and urban areas respectively.

## Houselessness

Absolute houselessness[5] is defined as the difference between the number of households and the number of occupied residential houses. It is a state in which the number of households/families exceeds the number of houses. Before analysing

**Table 4: Statewise Percentage of Scheduled Castes Population Below Poverty Line (1993–94)**

| State/UT | Scheduled Castes | | | All Population | | |
|---|---|---|---|---|---|---|
| | Rural | Urban | Combined | Rural | Urban | Combined |
| Andhra Pradesh | 26.02 | 43.82 | 29.99 | 15.92 | 38.33 | 22.19 |
| Arunachal Pradesh | - | - | - | 45.01 | 7.73 | 39.35 |
| Assam | 45.38 | 14.34 | 44.35 | 45.01 | 7.73 | 40.86 |
| Bihar | 70.66 | 55.16 | 54.40 | 58.21 | 34.50 | 54.86 |
| Goa | - | - | - | 5.34 | 27.03 | 14.92 |
| Gujarat | 32.26 | 44.99 | 37.80 | 22.18 | 27.89 | 24.21 |
| Haryana | 46.56 | 23.58 | 37.92 | 28.02 | 16.38 | 25.05 |
| Himachal Pradesh | 36.89 | 18.52 | 36.38 | 30.34 | 9.18 | 28.44 |
| Jammu & Kashmir | - | - | - | 30.34 | 9.18 | 25.17 |
| Karnataka | 46.36 | 61.59 | 55.82 | 29.88 | 40.14 | 33.16 |
| Kerala | 36.43 | 31.59 | 34.28 | 25.76 | 24.55 | 25.43 |
| Madhya Pradesh | 45.83 | 65.00 | 57.40 | 40.64 | 48.38 | 42.52 |
| Maharashtra | 51.64 | 52.56 | 51.78 | 37.93 | 35.15 | 36.86 |
| Manipur | - | - | - | 45.01 | 7.73 | 33.78 |
| Meghalaya | - | - | - | 45.01 | 7.73 | 37.92 |
| Mizoram | - | - | - | 45.01 | 7.73 | 25.66 |
| Nagaland | - | - | - | 45.01 | 7.73 | 37.92 |
| Orissa | 48.95 | 47.45 | 51.08 | 49.72 | 41.64 | 48.56 |
| Punjab | 22.08 | 27.96 | 25.14 | 11.95 | 11.35 | 11.77 |
| Rajasthan | 38.38 | 48.63 | 42.44 | 26.46 | 30.49 | 27.41 |
| Sikkim | - | - | - | 45.01 | 7.73 | 41.43 |
| Tamil Nadu | 44.05 | 61.50 | 51.68 | 32.48 | 39.77 | 35.03 |
| Tripura | - | - | - | 45.01 | 7.73 | 39.01 |
| Uttar Pradesh | 58.99 | 58.02 | 60.51 | 42.28 | 35.39 | 40.85 |
| West Bengal | 45.29 | 37.73 | 45.56 | 40.80 | 22.41 | 35.66 |
| A & N Islands | - | - | - | 32.48 | 39.71 | 34.47 |
| Chandigarh | - | - | - | 11.35 | 11.35 | 11.35 |
| D & N Haveli | - | - | - | 51.95 | 39.93 | 50.84 |
| Daman & Diu | - | - | - | 5.34 | 27.03 | 15.80 |
| Delhi | - | - | - | 1.90 | 16.03 | 14.69 |
| Lakshadweep | - | - | - | 25.76 | 24.55 | 25.04 |
| Pondicherry | - | - | - | 32.48 | 39.77 | 37.40 |
| **All India** | **48.11** | **49.48** | **48.37** | **37.27** | **32.36** | **35.97** |

*Source:* Planning Commission (1994).

the absolute houselessness among SC families, it is important to review the scenario at the national level and in regard to non-SC families as some positive changes have taken place in terms of reducing the incidence of the problem. The overall deprivation at the national level has dropped in the sense that the number of families that were absolutely houseless has declined from 116.03 lakh in 1981 to 89.52 lakh in 1991. This means that absolute houselessness has been arrested to the extent of 26.51 lakh families in rural and urban areas during the period. By and large, the trend in arresting deprivation remains positive as far as non-SC families is concerned, i.e., over 21 lakh families have been housed as the total deprivation dropped from 60.37 lakhs to 38.92 lakhs. Non-SC families in urban areas have taken the lead in arresting absolute houslessness. The trend is more disappointing with regard to SC families as the success in arresting absolute houselessness has been marginal and negative. Only about 5 lakh SC families have been able to arrest the problem by 1991 out of 55.66 lakhs, and the remaining families continue to face the problem. Interestingly, the success among SC families in this respect is only one-fifth and one-fourth of the national and non-SC families respectively. A further disappointment is that as against the drop in deprivation trend at the national level and among the non-SC families in rural and urban areas, absolute houselessness got aggravated among the SC urban families. The total number of urban SC families facing absolute houselessness has increased from 6.85 lakhs in 1981 to 7.25 lakhs in 1991 (Table 5). Inadequate public intervention over the years has not only contributed to the mounting of the problem among SC families but has also turned out to be a national problem. It is clear from the fact that of the total absolute houselessness (89.52 lakh), SC families account for 50.62 lakh or 56.55 per cent. Therefore, public action on arresting absolute houselessness should focus largely on SC families in the coming years, if the state is serious about raising living standards.

**Table 5: Absolute Houselessness among SC Families**

(in lakhs)

| Families | 1981 | | | 1991 | | |
|---|---|---|---|---|---|---|
| | Rural | Urban | Total | Rural | Urban | Total |
| SCs | 48.81 | 6.85 | 55.66 | 43.37 | 7.25 | 50.62 |
| Non-SCs | 47.36 | 13.01 | 60.37 | 31.13 | 7.79 | 38.92 |
| **Total** | **96.17** | **19.86** | **116.03** | **74.40** | **15.04** | **89.52** |

*Note*: Calculated by the author with the help of the General Population tables and primary census abstracts for Scheduled Castes of Censuses 1981 and 1991.

## Lack of Amenities

Provision of safe drinking water, electricity and safe disposal of human waste are obviously central to good housing and living conditions and to health (UNCHS 1996). If consideration is given to housing rather than to the services associated with it, then it is only development without quality. In fact, the quality of amenities (drinking water, electricity, toilet/wash rooms) within housing has become increasingly important in the context of improving living standards. Unfortunately, in the Indian context, development of housing, particularly in the rural areas, is being taken up on a compartmentalised basis without providing these amenities simultaneously. Interestingly, public-social housing schemes are not an exception to this because plans and budgets are evolved only for construction of housing units but not for these amenities. Therefore, an integrated approach (housing along with related amenities) is confined to only private initiatives, and is yet to become a reality in the public housing schemes. Since public housing schemes are the principal sources for SC families to meet their housing needs, the scale of deprivation in regard to housing amenities is greater than it is with others.

Despite considerable progress in providing safe drinking water to a majority of the population, over one-third of them had no alternative but to use unsafe water for their day-to-day needs. These people would have been using contaminated water owing to lack of piped water supply to their homes. Though with regard to access to safe drinking water, the variation is only marginal between SC families and all population, the former experience extreme difficulties when it comes to the question of 'pay and use water'. Access to electricity and washroom (toilet) facilities is no better. A little over 28 and 11 per cent of SC families have access to electricity and wash-room facilities respectively as against over 48 and around 29 per cent in respect of all population (Table 6). With this, the development disparity varies at around 20 and 18 per cent. This indicates that development of services has not reached all sections, especially those who are incomeless. The lack of electricity and toilets has forced the disadvantaged sections to resort to unhealthy practices. Kerosene continues to be the principal source of lighting for most SC families despite the emission of a lot of carbon dioxide and consequent respiratory problems. As regards human waste disposal, most SC families, especially in rural areas, use open spaces around their habitation, thereby endangering their health. A simple pit latrine in the household is yet to become a reality for most SC families. With regard to access to all the three services (drinking water, electricity and toilet), the position remains lamentable at the national level let alone among SC families. However, when compared with whatever little progress the country achieved, SCs' access to these three facilities is one-third of what it is at the national level. This calls for measures to take the development efforts to the doorsteps of the vulnerable groups instead of the other way round.

**Table 6: Access to Principal Housing Amenities by SC Families**

(in percent)

| Population | Drinking water | Electricity | Toilets | All three facilities combined |
|---|---|---|---|---|
| Scheduled Caste | 63.60 | 28.10 | 11.16 | 6.62 |
| All population | 64.10 | 48.06 | 28.63 | 19.83 |

*Source*: Government of India (1991).

The deprivation of principal housing amenities is far more in the case of SC families as compared with the general population (Table 7). It is around 94 per cent for SCs as against 80 per cent in general in combination of these services. It is around 89 per cent, 72 per cent and around 37 per cent respectively as against 71, 52 and 36 per cent respectively for toilets, electricity and safe water. The gaps work out to 13.2, 17.47, 19.94 and 0.5 between SCs and general population. Across the states, the scenario of deprivation is extremely disappointing. The level of deprivation at the national level (93.38 per cent in all the three amenities) is exceeded in ten of the twenty-three major Indian states. The highest among the ten is Orissa, where over 98 per cent of SC families are deprived of safe water, electricity and toilet facilities in combination. The levels of deprivation in the remaining nine are as follows: Bihar (97.23 per cent), Andhra Pradesh (96.19 per cent), Uttar Pradesh (95.60 per cent), Himachal Pradesh (95.12 per cent), Kerala (94.77 per cent), Tamil Nadu (94.89 per cent), Haryana (94.72 per cent), Karnataka (93.58 per cent) and Rajasthan (93.41 per cent). Followed by this, individually in eleven, eight and nine of the twenty-three states, SC families have been suffering higher deprivation respectively for water, electricity and toilets than their respective state averages. Interestingly, none of the Union Territories falls short of these services for SC families over and above the national averages although the levels of deprivation are still disturbing.

In addition to lack of an integrated approach, the conspicuous absence of national efforts exclusively for development of SC households has contributed to higher deprivation in its own way. At present, the national level schemes such as Rural Water Supply, Sanitation (subsidised household latrine) and Rural Electrification and such schemes intended to increase access to housing amenities at the state levels have failed to meet the total needs of SC households. Therefore, an exclusive financial commitment is always believed to bring about improvement in the development of the housing amenities among SC households. Also, an exclusive scheme to provide housing and amenities to SC households would supplement the state-level efforts.

**Table 7: Percentage Deprivation of Principal Housing Amenities among SC Families**

| State/UT | Safe Drinking Water | | Electricity | | Toilets | | All the Three Facilities | |
|---|---|---|---|---|---|---|---|---|
| | SCs | Others | SCs | Others | SCs | Others | SCs | Others |
| Andhra Pradesh | 42.44 | 45.04 | 75.83 | 46.51 | 93.34 | 78.00 | 96.19 | 85.16 |
| Arunachal Pradesh | 30.31 | 32.55 | 50.42 | 47.90 | 48.88 | 46.71 | 65.09 | 61.93 |
| Assam | 54.65 | 52.33 | 83.62 | 79.13 | 66.05 | 58.12 | 92.54 | 89.39 |
| Bihar | 44.60 | 37.56 | 92.56 | 85.57 | 95.01 | 85.84 | 97.23 | 91.34 |
| Goa | 56.01 | 56.60 | 27.04 | 15.02 | 79.13 | 58.88 | 88.67 | 78.26 |
| Gujarat | 26.26 | 25.45 | 34.68 | 27.68 | 76.86 | 63.61 | 80.84 | 68.09 |
| Haryana | 27.67 | 25.18 | 49.24 | 24.67 | 92.71 | 73.70 | 94.70 | 75.60 |
| Himachal Pradesh | 27.07 | 20.80 | 18.68 | 10.10 | 94.04 | 85.75 | 95.12 | 85.87 |
| Karnataka | 21.37 | 29.79 | 66.44 | 42.99 | 90.76 | 72.37 | 93.58 | 79.71 |
| Kerala | 76.50 | 81.51 | 76.26 | 48.72 | 70.67 | 46.10 | 94.77 | 90.57 |
| Maharashtra | 30.47 | 29.49 | 41.32 | 26.49 | 83.19 | 66.07 | 86.20 | 70.12 |
| Manipur | 72.54 | 65.61 | 49.19 | 38.24 | 59.57 | 43.61 | 87.70 | 80.03 |
| Meghalaya | 51.31 | 40.73 | 53.01 | 38.37 | 53.21 | 33.83 | 77.06 | 57.27 |
| Mizoram | 78.41 | 79.05 | 26.91 | 17.07 | 18.75 | 17.64 | 81.12 | 83.55 |
| Nagaland | 00.00 | 49.82 | 00.00 | 43.13 | 00.00 | 30.85 | 00.00 | 71.53 |
| Orissa | 57.31 | 60.25 | 85.86 | 66.39 | 96.18 | 84.78 | 98.14 | 91.53 |
| Punjab | 9.86 | 6.22 | 31.89 | 12.03 | 83.96 | 59.99 | 86.30 | 62.79 |
| Rajasthan | 40.95 | 39.13 | 76.77 | 56.72 | 89.38 | 74.61 | 93.41 | 78.95 |
| Sikkim | 33.19 | 26.11 | 51.14 | 40.26 | 73.18 | 64.39 | 78.66 | 70.49 |
| Tamilnadu | 29.15 | 33.19 | 69.09 | 38.69 | 90.16 | 76.24 | 94.89 | 81.56 |
| Tripura | 59.96 | 52.37 | 66.30 | 50.82 | 24.74 | 16.18 | 83.23 | 70.43 |
| Uttar Pradesh | 44.85 | 35.39 | 88.61 | 74.61 | 93.13 | 78.23 | 95.60 | 84.51 |
| West Bengal | 19.81 | 15.02 | 81.25 | 59.77 | 83.39 | 60.64 | 92.24 | 73.06 |
| A&N Island | 00.00 | 28.31 | 00.00 | 35.15 | 00.00 | 61.18 | 00.00 | 68.37 |
| Chandigarh | 2.57 | 2.21 | 40.53 | 12.41 | 52.12 | 24.87 | 55.65 | 26.98 |
| D&N Haveli | 28.59 | 27.04 | 18.17 | 16.80 | 70.77 | 51.93 | 75.51 | 57.05 |
| Daman & Diu | 17.14 | 28.43 | 2.97 | 4.16 | 86.10 | 69.91 | 88.80 | 74.63 |
| Delhi | 6.17 | 3.70 | 35.55 | 16.56 | 68.85 | 28.15 | 73.01 | 33.63 |
| Lakshadweep | 00.00 | 95.24 | 00.00 | 1.78 | 00.00 | 5.45 | 00.00 | 96.53 |
| Pondicherry | 11.71 | 11.14 | 54.89 | 32.17 | 86.90 | 60.11 | 90.97 | 66.61 |
| **All India** | **36.40** | **35.90** | **71.90** | **51.94** | **88.84** | **71.37** | **93.38** | **80.17** |

*Source*: Ibid

## Discussion and Conclusions

Scheduled Castes have undergone suppression over centuries and have always been the target of atrocities owing to their disabilities. The sufferings of SCs are entirely different in terms of volume. It is simply unfair to compare the sufferings of SCs with those of others. Ordinary SCs (assetless, young girls and other weak) have to adjust their lifestyle and livelihood according to the whims and fancies of landlords in rural areas, whereas the other segment of SCs is struggling to earn a moderate and dignified living. Unfortunately, this has turned out to be a distant goal even after over five decades of development planning and constant but incommensurate interventions. While these are only a few instances of the attitudes of the 'civilised society' towards SCs, the government, as protector of the oppressed section, has failed to give due recognition to the cause. Subsidiary attentions are reflected in the public interventions targeted at SCs over the years. First of all, the strategies and programmes designed for socio-economic advancement of SCs are by and large ad hoc and have only supplemented the fringe development instead of contributing to total transformation. This is because the strategies, volume of assistance (monetary and kind) and contents targeting SCs have not been dissimilar to that of the programmes of other target groups. Unfortunately, the Special Component Plan, meant only for SCs, also emphasises creation of such assets, which are impermanent in nature and have hardly helped these families to cross the poverty line. Also, these assets have been prone to either loss or disposal. Therefore, a comprehensive and self-sustainable intervention is the need of the hour to create a strong but onetime asset base for the landless and vulnerable SC families. Also, there needs to be a separate public action exclusively for the human development of SCs to make them development seekers instead of dole seekers. Second, the kind of education the younger generation of SCs is acquiring is cause for concern. It has largely failed to give them the needed upward mobility together with an independent livelihood. In other words, except for creating a band of unemployed educated, educational initiatives have hardly achieved anything worthwhile over the years. This is because the educational skill that these sections acquire has hardly any relevance to the present context. Unfortunately, the educational background that was sufficient to fetch them a livelihood up to the early 80s is being pursued largely by SCs even in the changing circumstances. This is partly on account of lack of campaigning for a relevant education system designed to provide economic stability with secure employment and independent livelihood with regular income. Another lacuna in the public educational intervention is the scant attention given to skill development among SCs. This could have increased their employability not only in the public sector but also in the private sector besides giving rise to self-employment. It is disappointing that skill development efforts have serious weaknesses like limited perceptions and coverage, administrative snags, etc.

Notwithstanding the felt need for skill development, the focus has been on a very restricted range of economic activities such as handicrafts, carpentry and others. These limited approaches have obviously generated employment for only a few and have marginally supplemented the family income. As a result, the majority of potential workforce (like cultivators, agricultural labourers, semi-skilled artisans, etc) have been left uncovered. Further, the most important lacuna is with regard to financial and institutional infrastructure for skill development of SCs. Owing to the skewed distribution of provisioning of financial resources and missing priorities, only limited resources have been earmarked for skill development and job orientation purposes. It is also for obvious reasons of overemphasis on basic education promotion. This apart, the limited number of training institutions and their urban locations have also contributed to the disappointing scenario. These institutions are catering only to those who have access to information in urban areas and have ignored the needs of a huge segment in rural areas. In this regard, the much expected role of development initiatives of the corporation and their rural spread have been belied owing to their urban concentration.

The rising poverty among SCs over the years is a clear reflection on the inadequacy of public interventions. Three reasons can be cited for the failures: lower participation of the poorest of the poor, failure to create a strong and sustainable asset base for employment generation, and lack of adequate income generation in the hands of these families. This is evident from a number of empirical studies. For example, the participation of SCs in Integrated Rural Development Programme (IRDP), a major anti-poverty initiative, was only 53 out of the 1,000 households, which works out to a little over 5 per cent. Similarly, in other public works, SC participation was 4 per cent. Participation of SCs both in IRDP and public works was even worse, working out to 3.3 per cent in 1,000 households (Central Statistical Organisation 1998). Similarly, the kind of assets given under these initiatives were not only impermanent but have also failed to last long. Milch animals, draught animals and sheep/goats, being the major component of assistance, would have either died for want of proper care or failed to generate the needed income and employment. Though the official reports (GOI 1997) claimed to have generated 11 man days of employment in 30 days under Jawahar Rozgar Yojana, the empirical study (Mahadeva 2003)[6] indicates only 8 man days in rural areas. If this is the scenario of SCs' participation and employment generation under anti-poverty programmes, the impact on income should be anything less than one-third of the poverty level income under the then minimum wages framework.

If the social development approach was to bring about quality in living standards among SCs, an integrated approach should have been evolved. An integrated approach advocates development of housing and housing amenities (drinking water, electricity and toilets) simultaneously. But this did not happen both

under the schemes aimed at housing and amenities to the poorer sections in general and in those meant exclusively for SCs (also STs) to provide these benefits in particular. Instead, construction of houses and provision of these services have been undertaken on a compartmentalised basis at different points of time owing to separate action plans and eventually for financial allocation. At this juncture, it is important to note that despite growing concern to integrate housing development with related services (safe drinking water, sanitation and electricity) the practice is yet to get established in the rural context, especially in the public-financed social housing schemes.[7] If the costs of these services are not built into the cost of housing, not only would the goal of quality in living standards suffer but also such development (housing without amenities) would be termed mal-development as has been the experience of SCs over the last five decades.

Before discussing alternative strategies, it is necessary to throw light on the database on Scheduled Castes, its nature and limitations. The existing database on Scheduled Castes is scant and has many limitations. Census, national surveys (NSS, CSO etc), reports of various expert groups, annual reports of ministries at the national level and departments at the state level and field-based empirical studies are the main sources of data for research on Scheduled Castes. Unfortunately, all these sources have limitations. Census being an important source of data on SCs, the information is usually made available only once in a decade and often its dissemination takes even longer. For example, Agricultural Census (1991) and Housing and Amenities (1991) with information on social groups were released in early 1998 and at the end of 1994 respectively. As a result, researchers have got to use these sources as long as the next series of data are made available, which probably takes another ten years or even more. The absence of estimation in between by these sources is another lacuna. Often the information provided by the ministries and departments pertaining to SCs/STs is not comprehensive and complete. Moreover, only a few ministries and departments have been able to present data and a large number of them have failed to disseminate such information presumably owing to apprehensions of not having met their Constitutional obligations. Similarly, in sample surveys, the information provided is mostly in percentage terms and often researchers do not get absolute figures pertaining to all parameters of SCs. Further, the position of expert group reports (constituted by public authorities at national and state levels) is not different from that of the other sources as their investigations/ probes are generally purpose specific. These reports are also not complete. For example, in the BPL estimates of SC families of 1993–94, information is not available for 9 of the 25 states and for all union territories. If this is the concern of public authorities, it is less said the better in the case of field-based or empirical studies. First, even to date the subject matter of research on SCs has largely attracted scholars from within the castes rather than outsiders. However,

with a few exceptions these studies are often region and purpose specific. In fact one hardly finds any serious attempt by researchers to document the SCs' deprivations, development scale across all states and union territories for different points of time. The possibility of lack of a good database on SCs cannot be ruled out for such apathy. Therefore, considering the fact that Scheduled Castes are a prominent target group for all public policy making, a well-defined and well-structured database is the need of the hour to promote proper understanding and pursuance of all aspects of SCs both by the inside and outside researchers.

From the above analogy, it is clear that the SC population suffers from large-scale poverty and deprivation. The state-sponsored development intervention over the years has hardly contributed to containing poverty and deprivation. Unfortunately, the public action initiated in the economy since the late 80s has aggravated the sufferings of SCs and has turned out to be a stumbling block. In the light of these realities, further deterioration should be immediately checked. Especially in the changing economic circumstances, the state should reengineer its approaches to the welfare of SCs to accelerate the pace of bringing them into the mainstream of society. Also, to rebuild the lost hopes, the state needs to revitalise its initiatives towards these sections through purpose-oriented and need-based strategies. Therefore, a comprehensive development plan for SCs with consolidated efforts of the state is necessary to cater to the needs of different segments.

The proposed plan should emphasize creation of permanent assets for the families of the landless, which is a major segment of the SC population. Together with permanently income yielding assets, family-based economic activities also need to be promoted to generate employment for these families. Marginal and small farmers, being the second largest segments, need to be supported with agricultural inputs such as modern equipment, small and mini-irrigation facilities and subsidised fertilisers, certified seeds, regular exposure to modern methods of cultivation and technological advancements, etc along with off-season employment in family-based industries. Such incentives would encourage these families to grow more to earn their livelihood and increase avenues for employment during non-agricultural seasons. To contain the growing incidence of educated unemployment, skill development, and training to increase employability are the need of the hour. In addition, assistance for self-employment on a large scale should be provided to make them self-reliant. Finally, the young segment of the SC population needs to be carefully nurtured in order to be equipped to face the new challenges. This segment should be provided with not just basic education but a scientific and technological orientation. To bring about the needed change in this section of the population, they should be developed in residential schools with round-the-clock care by trained manpower. Residential schools not only provide a conducive educational environment but also help children to excel in their pursuit, which generally SC wards are deprived of in their home environment.

The Comprehensive Development Plan (CDP) for SCs has been proposed to put an end to the ongoing piecemeal assistance under various anti-poverty programmes and special component plan. In other words, the resources earmarked for SCs under various anti-poverty programmes and SCP need to be pooled with the proposed CDP. This approach has many advantages. It encourages single window to evolve and execute development measures for SCs. It eliminates overlapping, which is widespread across various schemes. It also brings about efficiency in administration of welfare. CDP and its execution do not of themselves bring about the needed change in the life of SCs. Monitoring and supervision have a role to play. As has happened over the decades, the assets given, economic activities promoted, and assistance given for the welfare of SCs should not be left unmonitored. Instead, the CDP should have an in-built mechanism to avoid loss/ disposal of assets with proper monitoring. Committed voluntary action needs to be formed within this section to educate beneficiaries and to bridge the gap between servicing authorities and target groups. Similarly, skill-oriented training and residential schools' pursuits should be closely monitored. Though these suggestions appear to be like prescriptions they are immensely necessary to judiciously reap the benefits of public investment and to bring about improvement among SCs within a definite time-frame.

Similar to CDP for economic improvement, an integrated approach is the solution to the current social deprivations among SCs. Efforts are necessary to provide housing benefit along with safe drinking water, electricity and toilet facilities. Towards this goal what is needed is an integrated plan with coordination between agencies. Therefore, the total cost of housing under various public-sponsored schemes has to be revised including the costs of the housing amenities. The greatest advantage of the approach is that housing and related amenities can be developed simultaneously and also yield cost efficiency. Besides, the approach can minimise the disparity that exists between rural and urban areas in the development of housing and amenities. Financial assistance (loan-cum- subsidy) would go a long way in this regard.

A comprehensive development plan and integrated approach are the practical and realistic interventions for securing the economic and social security of SC families given the present order of deprivation. Especially in the present economic climate these interventions would go a long way as they intend to empower economically all segments and bring this section of the population into the mainstream in the years to come. However, bringing SCs into the mainstream depends largely on 'political will and honesty and realistic financial commitment on the part of the governments'. Under the new economic order, political will and honesty refers to the total commitment needed to implement all the provisions in the Indian Constitution in their true spirit for bringing about honour, social, economic

and political justice for SCs. Educational attainment emphasising technical and skill orientation would help SC youths to obtain employment in the market besides setting up their own ventures. Regular exposure to SC farmers for modern methods of cultivation and technological know-how along with subsidised inputs would pave the way for increasing agricultural production beyond the subsistence level. Finally, large-scale financial assistance with skill development is seen as an alternative method of arresting growing educated unemployment among SCs. Importantly, while implementing these provisions and public action, the government needs to see SCs as a core group among the poverty-stricken population without proper access to production agents such as land, capital, entrepreneurial skills, etc. It should also ensure that SCs are not seen as a target group for antidotes of poverty and as a segment for political gain. In other words, subsidiary attention and improper attitudes towards SCs would only mean ineffective interventions, thereby increasing their misery as in the last five decades. This reflects the need for meaningful and adequate intervention for accelerated upward mobility of this section.

A final issue is public allocation and financial facilitation for the cause of SCs. Considering the high scale of deprivation and the future challenges to bring about equitable development, not only does public allocation need to be hiked but also a new stream of financial commitment needs to be initiated. The current public financial commitments of government are very meagre and unrealistic in relation to the present order of social and economic needs of SCs. Therefore, it is important to increase public allocations to arrest the current economic and social deprivations and to meet the fresh challenges ahead. Further, in order to increase the pace of upward mobility of SCs and bring them into the mainstream, a definite financial earmarking needs to be worked out for all the Public Sector Banks (PSBs) and Public Financial Institutions (PFIs). It cannot be denied that these institutions have hardly fulfilled their social responsibility of meeting the financial needs of SCs. PSBs/PFIs can be instrumental in meeting the financial needs of the SC students of technical/ professional education in the light of the growing incidence of dropouts owing to financial difficulties. Also, educated-unemployed SCs could be a target for financial services. PSBs/PFIs and other financial institutions need to be given fiscal incentives for the cause of development equity and bringing about social and economic justice.

## Notes

1. Educational advancement, improvement of economic and living conditions have been the focal strategies of public interventions ever since the beginning of development planning. The underlying philosophy has been to educationally empower the SCs to increase access to economic opportunities and thereby to improve their quality of living. Second, it is to support SC families with agricultural inputs so as to promote and sustain their

economic activities. Finally, the aim has been to bring about improvement in quality of life by meeting the basic needs. These three long-term goals are sought to be achieved through joint financial commitment and action between the central and state governments. Post-matriculation scholarships, students hostels, special coaching, etc, have been provided to achieve educational advancement. State governments provide assistance to purchase agricultural implements, bullocks, carts, fertilisers and effect land improvement. Through construction of residential houses, supply of safe drinking water, electricity etc., social development is aimed at, with central and state government assistance. As an additional strategy, training for skill development for SC youths to make them self-employable and improve their employability has also been pursued. Financial assistance in the form of loans and subsidies to set up tiny service centres was also intended to be provided (see, Sankaran 2000). Although these approaches were followed up to the end of the Fifth Five Year Plan (1974–79), to further strengthen and accelerate the socio-economic process a Special Component Plan (SCP) (Mohanty 2000) was introduced during the Sixth Plan (1981–85) to finance exclusively the beneficiary-oriented projects. Self-employment (in industrial, service and business sectors) and family-oriented projects (land purchases, individual and community irrigation) are being financed under the scheme. To implement and monitor the scheme, development corporations at the state level have been created. The scheme has been supported with Special Central Assistance (SCA) in addition to regular budgetary allocations for filling up the critical gaps in achieving the objectives of the scheme (Planning Commission 1997–2002). In addition to these specific interventions, it is mandatory that all anti-poverty programmes adequately represent SCs in beneficiary coverage. About one-third of the beneficiaries need to be SCs for generation of employment, creation of income-generating assets (IRDP-JRY, EAS, etc) and skill development (vocational and apprenticeship) training programmes from the late 80s.

Since the outcome of these initiatives was not encouraging vis-à-vis the total needs of the SCs and to minimize further marginalisation of these sections, it was decided to adopt a three-pronged strategy during the Ninth Five Year Plan (1997–2002). Social and economic empowerment and social justice were reassured for SCs to bring about all-round development. A Special Plan of Action (1998) was initiated to fill the critical gaps in providing basic minimum services to those living below the poverty line (Planning Commission, p. 2.222).

The measures proposed as part of the strategy included improving the educational status, universalisation of primary education by 2005, reaching the unreached areas, free educational inputs, vocationalisation, encouraging higher technical / professional education, promoting education among children of unclean occupations, complete eradication of untouchability and manual scavenging, and a special health package to combat endemic diseases. The economic components included a special thrust on employment and income generation activities, strengthening of national and state-level finance and development corporations to play a catalytic role, motivating private and corporate

sectors to invest on SCs, ensuring minimum size of landholding and preserving land ownership, promotion of small and lift irrigation, and prioritising the group for financial support. Finally, strict implementation of reservation policy, curbing social discrimination, untouchability, exploitation, atrocities through effective implementation of Indian Penal Code, Protection of Civil Rights and SCs/STs (Prevention of Atrocities) Act, setting up of special and mobile courts, compensating adequately the victims of social injustice, developing community-based defence, changing attitude and mind-sets, sensitising all working for the well-being of SCs, and making the National Commission to enforce the rights and interests of these sections to bring about social justice.

2. For more details on employment erosion under public works, see Government of India (1997).
3. Owing to paucity of systematic data it has not been possible to present a quantitative analysis of educated unemployment among SCs at the macro level. However, there is evidence that unemployment among educated SC persons has increased markedly as per the information available for the period 1992 to 1998 from the live Register of Employment exchange in Karnataka.
4. The information pertains to 11 and 39 public sector undertakings respectively under the Ministries of Chemicals and Fertilizers and Finance of the Union Government of India. Similar information with regard to PSUs of other ministries was not made available in the official website: www://Indiastats.com. There has been a dearth of consolidated information for SCs' representation in services at the state level.
5. Absolute houselessness is one of the three components employed to estimate total housing shortage, evolved by the National Buildings Organization (NBO). The other two components are pavement dwelling and families/households living in sub-standard or life-threatening houses. Owing to non-availability of data on the extent of SC families living on pavements and in sub-standard houses it has not been possible to analyze the dimension of the problem. In fact these forms of dwelling are high among SC families facing higher incidence of poverty and some of them are nomadic for employment purposes.
6. For a detailed discussion on failures of employment generation see, Mahadeva (2003a and b).
7. For example, Indira Awaas Yojana, a centrally sponsored housing scheme exclusively for families of SCs/STs freed from bonded labour. Also, there are a number of similar schemes at the state level meant for these sections.

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# Investment in Power Sector: Past Trend and Short-Term Prospect

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## Abstract

Investment in the power sector from the 50s to the 80s of the last century was almost wholly in the public sector. Power sector reform, which began in 1991, opened the doors to private investment but the response has been poor. Public sector investment in power as a part of Plan outlay has declined in the Eighth and Ninth Plan periods, especially in the States. The progress of Distribution reform at the State level, which is crucial for attracting private investment, has been halting and uneven. The interim solution is to step up public investment; this has been factored into the Tenth Plan. For maximum result, public sector investment in power projects should be leveraged through joint ventures with private investors. There is urgent need for political commitment at both Central and State levels to a time-bound reform agenda.

## Introduction

Power shortages have become endemic in most parts of the country and have had a crippling effect on the economy. At the end of the Ninth Plan (March 31, 2002), energy and peak shortages were assessed to be 7.5 per cent and 12.6 per cent for the country as a whole[1]. There is general agreement that inadequacy of power supply has resulted in a significant loss of the country's Gross Domestic Product (GDP). Analysis of energy consumption data over the last few decades shows that whereas energy – GDP elasticity (including traditional fuels) has declined, electricity-GDP elasticity is still the highest among different forms of energy, indicating that electricity is a vital input into the different sectors of the economy. Not only does electricity demand show a high growth rate but the electricity industry also happens to be highly capital intensive. Therefore, mobilisation of investment funds on the scale required to eliminate shortages and to sustain an accelerated growth of the economy poses a serious challenge in a capital-scarce country like

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India. According to the Blueprint for Power Sector Development prepared by Ministry of Power, the country requires an addition of over 1,00,000 MW of generating capacity and associated transmission and distribution (T & D) infrastructure. Over the current and the next plan periods, this breaks up roughly into 40,000 MW during the Tenth Plan (2002–07) and 60,000 MW during the Eleventh Plan (2007–12). This entails an investment of about Rs.8, 00,000 crores over ten years, which means a threefold increase in the next five years and a fivefold increase in the following five years over the current level of public sector investment. Resource mobilisation of this order by the public sector is clearly not feasible and there is an urgent need to channel private investment into this sector. Given the limited size of domestic financial markets, this means also that we need to tap into international capital markets and attract foreign direct investment (FDI) in order to build up requisite capacity in the power sector.

The compulsions of non-availability of investment funds for the power sector apart, there has been a radical change of the country's economic policy since 1991. As is happening in many countries around the world, the power sector in India is being restructured so as to dismantle public monopolies, allow a greater role for the private sector and permit market forces to operate in all segments of the power industry. This, it is believed, will result in improved technical and operational efficiency of power systems and provide better service to consumers at an economic cost. Thus, as a part of the new economic policy, power sector reforms were initiated in 1991, starting with the generation segment. Since then, there have been statute changes and policy pronouncements to deepen the sectoral reforms by opening up avenues for private sector participation in T and D also. Broadly, the approach so far has been to permit entry of multiple players including private entities into the generation segment of power systems, a component which is clearly amenable to competition. Operation of the transmission system will remain with a public sector entity; the law has however been amended to permit private ownership of transmission lines. As regards distribution, after unbundling the power system, the general approach is to divide the State into different distribution areas in each of which there will be a distribution company. The ultimate objective is to induct private entities through a competitive bidding process to take over the distribution function in each area. A long-term objective is to separate 'wire' and 'energy' business in both T and D and allow electricity to be traded like any other commodity, with freedom of choice of the supplier by the consumer and vice versa.

As mentioned earlier, an important element of power sector reform is to attract private capital especially from abroad to boost investment in the Indian power sector. With this end in view, Government of India has offered a variety of incentives and concessions. Foreign investment in equity is permitted up to 100 per cent, tax exemption is allowed for five years followed by 30 per cent tax

concession for the following five years, foreign investment is protected by exchange rate guarantee, etc. What is more, a return of 16 per cent on equity at a performance level of 68.5 per cent PLF is guaranteed (with incentive for better performance) and 'take or pay' clause is included in the power purchase agreement. Considering that the package offered by India was more attractive than that of many other developing countries, the expectation was that the power sector would attract a massive inflow of foreign capital. Though the initial response from the industrialised world was encouraging, the results on the ground have been disappointing.

Public finances at both central and state levels are in poor shape and public sector investment on power has not been rising rapidly. This, coupled with the low scale of private sector funding, has resulted in a widening gap between demand for and availability of power. The attempt in this paper is to explore measures that can be taken in the short run (three to five years) to overcome the present impasse and raise the level of both public and private investment in the power sector so as to move towards an adequate, competitive and efficient power industry in the country. In the next section, we examine the past pattern of investment in the pre- reform and post-reform periods. This is followed by a section that looks at initiatives taken by the Government of India in the last few years to give an impetus to investment as a part of the effort to push forward implementation of sectoral reforms. Possible lines of future action are examined in the last section.

## Past Pattern of Investment in the Power Sector

Before charting the future course of action, it will be useful to look at how the power sector has been funded so far. This will help us to identify problem areas that need to be addressed. The past record of investment can be broken into two parts — the pre-reform period and the post-reform period.

### Pre-Reform Period 1961–90

Table 1 shows the plan outlay on the power sector during the three decades preceding the launch of the new economic policy in 1991, while Table 2 shows the composition of installed capacity at the end of the Seventh Plan, i.e., on the eve of the launch of reforms.

It may be recalled that soon after the country attained independence, Parliament enacted the Electricity (Supply) Act in 1948. This brought the entire power industry in the country into the fold of the public sector, establishing the SEB as a vertically integrated utility in each State and setting up the Central Electricity Authority (CEA) as the apex technical body to oversee the power industry at the national level. However, development of the power sector was almost wholly the responsibility of the state governments until the 1970s. The only central intervention earlier had been the setting up of the multi-purpose Damodar Valley Corporation in 1948 in exercise of the Centre's constitutional role in the development

**Table 1: Plan Outlay on Power Sector (1961–90)**

| Plan | Centre | | States and UTs | | Total | |
|---|---|---|---|---|---|---|
| | Outlay (Rs. Cr) | Percentage of Plan Outlay | Outlay (Rs. Cr) | Percentage of Plan Outlay | Outlay (Rs. Cr) | Percentage of Plan Outlay |
| Third Plan (1961-66) | 109 | 3.0 | 903 | 23.1 | 1012 | 13.5 |
| Fourth Plan (1969-74) | 447 | 5.0 | 2001 | 28.5 | 2448 | 15.4 |
| Fifth Plan (1974-79) | 825 | 4.1 | 6469 | 33.4 | 7294 | 18.6 |
| Sixth Plan (1980-85) | 4725 | 10.0 | 14540 | 28.9 | 19265 | 19.8 |
| Seventh Plan (1985-90) | 11051 | 11.6 | 23222 | 27.5 | 34272 | 19.0 |

*Source*: Planning Commission – respective plan documents

**Table 2: Composition of Installed Capacity at the End of Seventh Plan**

| Sector | End of Sixth Plan (31.3.1985) | | End of Seventh Plan (31.3.1990) | |
|---|---|---|---|---|
| | Capacity (MW) | Percentage | Capacity (MW) | Percentage |
| Centre | 6,758 | 15.9 | 16,285 | 25.6 |
| States & UTs | 33,642 | 79.0 | 44,709 | 70.2 |
| Private | 2,185 | 5.1 | 2,642 | 5.4 |
| All India | 42,585 | 100.0 | 63,636 | 100.0 |

*Source*: Planning Commission, Report of Working Group on Power for Ninth Plan, Table 1.5

of inter-state river valleys. For the first time in the 1970s, the Government of India decided to play a positive role in augmenting power generation in the country and established the National Thermal Power Corporation (NTPC) and National Hydroelectric Power Corporation (NHPC) in 1975. The idea was to set up large pithead thermal power stations and optimally located large hydropower stations, the benefits of which would be shared by the states in the region.

As seen from Table 1, central investment in power started rising from the 1980s. But the state governments accounted for the major share of outlay on this sector and the allocation to this sector under the State plans was the highest among all the sectors of development. Only a small share of generating capacity was under private ownership for historical reasons — in the cities of Ahmedabad, Mumbai and Kolkata. The states were the dominant players in the power industry with a share of nearly four-fifths of aggregate capacity and near–total ownership of

the transmission (except inter-state lines) and distribution system. We do not have the break-up of the investment between generation on the one hand and T and D on the other during the period 1961–90. We should note, however, that even in the early 80s, the Committee on Power, popularly called Rajadhyaksha Committee, had noted that investment in T and D was significantly lagging behind that in generation, resulting in high technical losses in power systems (Govt. of India 1980).

**Post-Reform Decade 1992–2002**

It will be interesting to see the manner in which the pattern of investment in and ownership of the power sector changed under the Eighth and Ninth Plans, representing roughly a decade after the new economic regime was launched. Tables 3 and 4 show the scale of public sector investment in power and capacity addition during the ten-year period, while Table 5 sets out the Ninth Plan power sector outlay in major States.

**Table 3: Public Sector Investment in Power 1992–02**

| Plan Period | Centre | | States and UTs | | Total | |
|---|---|---|---|---|---|---|
| | Investment (Rs. Cr.) | Percentage of plan outlay | Investment (Rs. Cr.) | Percentage of plan outlay | Investment (Rs. Cr.) | Percentage of plan outlay |
| Eighth Plan (1992–97) | 30,486 | 11.0 | 46,251 | 24.0 | 76,677 | 15.8 |
| Ninth Plan (1997–02) | 53,299 | 10.8 | 70,926 | 18.9 | 1,25,526 | 14.5 |

*Note*: In the 'Investment' columns, expenditure is shown for Eighth Plan and outlay for Ninth Plan.

*Source*: Planning Commission, Annual Report (2001–02) on the Working of State Electricity Boards and Electricity Departments, Annexures 2.3 & 2.4

The salient points that would be apparent from a look at these tables are the following:

a. As a percentage of total plan outlay, the outlay on power did not show any increase; in fact, it went down at both central and state levels.
b. The Centre-State proportion of power sector investment started tilting in favour of the Centre.
c. Actual capacity addition fell seriously short of the target in both Eighth and Ninth Plan periods. Disaggregated figures of actual expenditure are not available, but there are clear indications of shortfall in relation to planned outlay.
d. The proportion of expenditure on power shows wide variation among states. Even if the comparison is confined to major states, the range of variation is so large that it cannot be explained away by reason of the extent of energy resource

**Table 4: Capacity Addition 1992–2002**

| Type | Target (MW) | | | | Achievement (MW) | | | |
|---|---|---|---|---|---|---|---|---|
| | Central Sector | State Sector | Private Sector | Total | Central Sector | State Sector | Private Sector | Total |
| | | | | Eighth Plan (1992–97) | | | | |
| Hydro | 3260 | 5860 | 162 | 9282 | 1465 | 795 | 168 | 2428 |
| Thermal | 8498 | 9010 | 2646 | 20156 | 6252 | 6041 | 1262 | 13555 |
| Nuclear | 1100 | - | - | 1100 | 440 | - | - | 440 |
| Total | 12858 | 14870 | 2810 | 30538 | 8157 | 6835 | 1430 | 16423 |
| | | | | Ninth Plan (1997–02) | | | | |
| Hydro | 3455 | 5815 | 550 | 9820 | 540 | 3912 | 86 | 4538 |
| Thermal | 7574 | 4933 | 17038 | 29545 | 3084 | 5538 | 4975 | 13957 |
| Nuclear | 880 | - | - | 880 | 880 | - | - | 880 |
| Total | 11909 | 10748 | 17588 | 40425 | 4504 | 9450 | 5061 | 19015 |

*Source*: Planning Commission, Ninth Plan, Vol.II, Chapter 6, Table14 and Draft Tenth Plan, Vol.2, Table 8.2.2

**Table 5: Ninth Plan Power Sector Outlays of States and UTs**

| State | Ninth Plan | |
|---|---|---|
| | Outlay (Rs. Cr.) | % of Plan Outlay |
| Andhra Pradesh | 5749 | 22.8 |
| Bihar | 2300 | 13.8 |
| Jharkand | - | - |
| Gujarat | 4000 | 14.3 |
| Haryana | 2648 | 28.5 |
| Karnataka | 3650 | 15.6 |
| Kerala | 2531 | 15.7 |
| Madhya Pradesh | 3464 | 17.2 |
| Chattisgarh | - | - |
| Maharashtra | 5580 | 15.2 |
| Orissa | 4623 | 30.8 |
| Punjab | 2927 | 25.4 |
| Rajasthan | 4489 | 20.4 |
| Tamil Nadu | 6000 | 24.0 |
| Uttar Pradesh | 7468 | 16.1 |
| Uttaranchal | - | - |
| West Bengal | 5632 | 33.3 |
| Total-States & UTs | 70926 | 18.9 |

*Source*: Planning Commission, Draft Tenth Plan, Vol.2, Annexure 3-C

endowments available in the respective states. Some states appear to have consciously accorded lower priority to investment in power.

e. Private sector performance was highly disappointing, the achievement being not even a third of the target.

In brief, the post-reform performance shows that far from the expected improvement in the country's power situation, the sector suffered a severe setback. It is not surprising that the overall power situation in the country has deteriorated.

There is another aspect of power sector outlay, namely the break-up of expenditure between generation and T and D. The position during the Eighth and Ninth Plan periods is shown in Table 6.

As seen from the table, the proportion of expenditure on T & D has remained low. However, there was some improvement in the Ninth Plan. But the backlog of investment, especially in distribution, has yet to be corrected.

The cumulative position of power generation capacity in the country at the end of the Ninth Plan (March 31, 2002) is shown in Table 7.

**Table 6: Percentage Share of Generation and T&D in Power Sector Outlay**

| Plan Period | Central Sector | | State Sector | | Total | |
|---|---|---|---|---|---|---|
| | Generation | T&D | Generation | T&D | Generation | T&D |
| Eighth Plan | 67.4 | 32.6 | 61.7 | 38.3 | 64.0 | 36.0 |
| Ninth Plan | 61.6 | 38.4 | 43.3 | 56.7 | 51.2 | 48.8 |

*Note*: The figures under 'Generation' include 'R&M'. All other components are clubbed under 'T&D'.

*Source*: Planning Commission, Annual Report (2001–02) on the Working of State Electricity Boards and Electricity Departments, Annexures 2.7 & 2.12

**Table 7: Cumulative Position at End of Ninth Plan**

(MW)

| Sector | Hydro | Thermal | Nuclear | Total |
|---|---|---|---|---|
| Centre | 3049 | 25837 | 2720 | 31606 |
| States and UTs | 22636 | 39547 | - | 62183 |
| Private | 576 | 9046 | - | 9622 |
| TOTAL | 26261 | 74429 | 2720 | 103410 |

*Note*: The figures presented above do not include 1507.46 MW from wind (State – 62.86 MW, Private – 1444.60 MW)

*Source*: Planning Commission, Draft Tenth Plan, Vol.2, Table 8.2.3

In brief, we see that at the end of a decade after the reform process started, the reform process had yet to make an impact in terms of augmenting investment in the power sector. Private investment remained low and its share of capacity did not touch even ten per cent. Within the public sector, the centre started occupying an increasingly larger space at the expense of the states. The central share of capacity had become significant, exceeding thirty per cent of total capacity. Incidentally, one also sees that the share of hydro capacity in the country has declined to around a quarter of the total capacity; this has a bearing on the overall economics of power system operation.

**Why Private Investment Was Not Attracted**

As mentioned earlier, when India announced its new policy in 1991 of attracting private investment into generation, the response was encouraging. At that time, there was a global recession in the heavy power equipment industry because of slowdown in demand in the industrial countries. Manufacturers identified India and China as their main markets; naturally, they were keen to exploit those markets taking advantage of cross- border capital flows, which were increasing in

volume. India, being a stable democracy with an established legal system and independent judiciary, was a good destination. India had also offered an attractive package of incentives for foreign capital investment in the power sector. Though not stated explicitly, the perception at that time was that the main interest of private investors would be in thermal power stations. Because of higher capital intensity, long gestation period, geological uncertainties, environmental and rehabilitation problems, private investors were unlikely to venture into hydropower generation. As for nuclear power projects, they remained reserved for the public sector. The initial package of incentives and concessions was influenced by these considerations. These considerations, we should note, still hold good.

In the wake of announcement of the new policy, a large number of Memoranda of Understanding (MOUs) were signed between state governments and prospective investors. As many as 58 schemes, having a total capacity of 29,614 MW, were cleared by CEA. In reality, however, as seen from Table 4, there was little progress on the ground.

What were the reasons for the failure to attract private investment? This has been discussed extensively in recent literature and we will not elaborate on them here. A summary is presented below:

(a) The most important factor deterring foreign investment was the fact that SEBs, which were the sole buyers in their respective states under the Indian reform model, were on the verge of bankruptcy. Almost all of them were working under loss and had accumulated huge losses. They had defaulted in payment to central PSUs for supply of power, coal, etc. The situation of SEBs suffering loss year after year arose out of inherent weaknesses in the power industry in India. The industry was characterised by lack of incentives to improve efficiency, excessive manpower, poor project management, indiscriminate extension of grids, irrational tariffs, high proportion of unmetered supply, large-scale theft of power in collusion with local SEB staff, poor billing and collection, prevalence of a general culture of non-payment of government dues and even resistance to disconnection of supply for non-payment of dues.

In the early stages, state governments were willing to stand guarantee for payment for power purchased by the SEBs. But given the fact that their own finances were far from healthy and that some states had defaulted in making payments arising from guarantees, this did not provide comfort to investors. Escrow arrangements involving tripartite agreements between the SEB, the Independent Power Project (IPP) and the Bank concerned appeared to be an alternative feasible arrangement for payment security. But this could also not be resorted to on a wide scale because the number of large, regularly paying consumers was limited. The SEBs were also unhappy with an arrangement which creamed away revenues from the best customers, leaving their own finances in an even more precarious state. In 1992, in

order to give a fillip to investment in power generation, Government of India offered counter-guarantee to a few so-called fast-track projects. While Enron ran into difficulties for reasons that we need not go into here, none of the other projects covered by sovereign guarantee could reach financial closure because of other factors listed below.

(b) Investors had to face formidable procedural hurdles, negotiations had to be carried out with a variety of agencies at both central and state levels and multiple clearances from national to local levels had to be obtained. Single-window mechanisms proved ineffective. Investors discovered that the transaction costs were high.

(c) In order to reach the guaranteed level of performance at which the IPP would earn the guaranteed return on capital, thermal power stations required assured and timely supplies of coal. But both coal companies, which produce coal, and Railways, which transport coal to the power station sites, were unwilling to enter into legally enforceable fuel supply agreements.

(d) It was clear from the outset that regulatory mechanisms were needed to maintain a balance between the interest of the consumers and the interest of the suppliers. But there was delay in carrying out changes in the relevant statutes and the first State Electricity Regulatory Commission (SERC) was established in Orissa in 1996. It was only in 1998 that every state was legally required to set up such a commission and the Central Electricity Regulatory Commission came into existence. Some of the State Commissions are still not functional.

(e) As mentioned earlier, a return of 16 per cent on equity was guaranteed subject to a normative level of performance. Initially, the MOU route was followed for negotiating the Power Purchase Agreement (PPA). But there was apprehension of cost padding, and the Government of India soon changed its policy to make competitive bidding compulsory for all projects (except small projects). Nevertheless, the public perception has been that power supply by an IPP is costlier than that from a similar publicly owned generating station. The problem of popular dissatisfaction with IPP tariff has been faced in other countries also (e.g., Philippines and Pakistan) and the PPAs have been reopened. This is not conducive to attracting private investment in the power sector.

We must recognise that the charge per unit levied by an IPP is bound to be higher than what it would have been under government ownership. The reason is that risk allocation does not figure at all in the appraisal of public sector investment in a new generation project; this is because all risks are absorbed by the exchequer. The private investor naturally pays meticulous attention to risk allocation, as he has to protect his investment. Stated simplistically, commercial risks should be borne by the investor while country risks should be borne by the host country government through extension of appropriate guarantees. We have in India a

situation in which the investor is unwilling to take responsibility for all commercial risks because of the poor financial situation of SEBs. Even when the host country government offers protection against country risks, investors and international financial institutions make their own assessment of the risk status of the country involved and invariably add a risk premium to the capital cost. Naturally, this is reflected in the cost of power supplied by the IPP. The difference in cost between 'public' and 'private' power can be narrowed down only if we are able to offer a better investment climate.

(f) Judicial processes in India are long drawn and do not provide quick relief.

(g) Confusing signals continue to emanate from both central and state governments in regard to the degree of their commitment to the power sector reform agenda.

So far, we have discussed factors affecting private investment in power generation. We will now briefly focus on the other two components of power systems, namely, transmission and distribution. Compared with generation, power transmission is less interesting to private investors. In the transmission business, there is a high proportion of fixed cost. The scope available to the owner of a transmission line to cut costs or maximise revenue is limited because he has no control over the flow of power in his line. Even in USA and UK, there has not been much investor interest in erecting transmission lines. For this reason, as at present in India, state public sector entities will have to continue to be responsible for intra-state transmission, while inter-State transmission will have to be the responsibility of a central public sector utility (like Power Grid Corporation of India).

The private sector has to play an important role in power distribution also. As mentioned earlier, there is a sizeable backlog of investment required to reduce technical and commercial loss and to keep pace with load growth. More importantly, improvement in operational efficiency and quality of service, proper billing and collection and greater responsiveness to consumer needs will be the principal gains from private ownership and management of distribution networks. The extent to which there will be private inflow into power distribution will depend on the nature and pace of reform of this sub-sector, especially in regard to tariff structure and regulation. Different models of reform can be visualised, including those tried in other countries. But we will not attempt an examination of the relative merits of these models because that would be outside the scope of the paper. We would only reiterate that successful distribution reform holds the key to success in the restructuring of the power sector.

It would be clear from the foregoing account that there are no 'quick fix' solutions which can improve the investment climate for attracting private investment. Restructuring of the power industry has to be the first step. Involving as it does a variety of stakeholders and vested interests, it is not an easy process and a transition

period is inescapable. Our effort should be to keep this period to the minimum. It is not that the reform process would have to be completed before investor confidence is restored. If credible reform measures are initiated and concrete results in the shape of improvement in technical and financial performance begin to show up, private investment will start coming in even while the reform process is under way.

## Current Steps

The states are still the major players in the power industry in India. It is at the state level that the main action lies in the implementation of power sector reforms. The progress so far has been uneven and, in general, slow. Appreciating the need to stimulate implementation of reforms at the state level, Ministry of Power (MOP) has taken some initiatives; an integral feature of most of these initiatives is the offer of incentives to state governments predicated on the achievement of milestones in the agreed reform agenda.

**New Initiatives of Ministry of Power**

(a) In 1995, Government of India announced special concessions for mega power projects, including exemption from import duties on capital equipment and tax holiday for ten years. Eighteen projects were identified, the basic criteria being that the project should have a capacity of 1000 MW or more in the case of thermal projects and 500 MW or more in the case of hydro projects, the benefits being shared by more than one state.

(b) MOUs have been entered into by MOP with most state governments under which the states have undertaken to reduce T & D loss through metering of all 11 kV lines by a specified date, as well as metering of all consumers by another specified later date. In return, Government of India has given assurance of support under APDP (explained below), assistance in securing funds from Power Finance Corporation, allocation of additional power from central generating stations, etc.

(c) A substantive measure taken by MOP was the introduction of Accelerated Power Development Programme (APDP) in February 2000, under which investment funds were provided for Renovation and Modernisation and Life Extension of power plants and upgradation of sub-transmission and distribution lines (33 kV and below). To begin with, APDP was launched in sixty-three specified circles all over the country, with the expectation that these would serve as models for replication in other areas. Release of APDP funds was made conditional on achievement of reform milestones by the state government concerned. Following the recommendation of the Expert Committee on State –Specific Reforms, this scheme was later converted into the Accelerated Power Development and Reforms Programme (APDRP), the modification being that,

while a part of the funds would be utilised for purposes contemplated under APDP, the rest of the funds would be earmarked for providing financial incentives to the states for achieving higher power system efficiency measured in terms of reduction in the gap between unit costs of supply and realisation. APDRP is to be funded jointly by the Government of India, state governments and financial institutions; the central budgetary provision would be leveraged to attract total funding of a higher order. The allocation for APDRP in the Central budget 2002–03 was Rs.3, 500 crores. For the remaining period of the Tenth Plan, an outlay of Rs.40, 000 crores is planned, the funding to be shared equally by central government and financial institutions. Out of this amount, Rs.20, 000 crores will be allocated for investment, while the balance will be offered as incentive for improvement of power system efficiency. APDRP will thus be of strategic importance in accelerating the pace of reform.

(d) The Expert Group on Settlement of Dues (headed by Montek Ahluwalia), which was constituted by Ministry of Power to suggest the manner in which SEB dues to NTPC, NHPC, PGCIL, Coal India, etc. towards supply of power, coal and transmission charges should be dealt with, submitted its report in May 2001. The committee noted that, as at the end of February 2001, the dues amounted to Rs.41, 473 crores, inclusive of Rs.15, 766 crores of interest/ surcharge and recommended that these dues might be securitised, with some write-off of interest/surcharge. Government of India has accepted the recommendation with a slight modification — the dues are to be securitised with a waiver of 60 per cent of surcharge. SEBs will have to pay current dues promptly in future failing which penalty will be imposed in the shape of reduction of power supply from central stations and coal supply. The states have also to accept reform – based milestones specified in MOUs with MOP. This method of settling the dues is a step in the right direction, because clearance of dues from future earnings would call for an unacceptable increase in tariff and endanger the entire reform process.

(e) MOP constituted two other Expert Groups. The first was the Distribution Policy Committee (chaired by Ashok Basu) to study issues related to distribution reform, including private sector participation. The committee presented its report in May 2002; the report identified different models of restructuring the power sector at the State level and appraised their relative merits. The other group set up by MOP was the Expert Committee on State-Specific Reforms (Deepak Parekh Committee), which was asked to review the APDP programme (to which reference was made earlier) and to devise state-specific reform programmes for five or six states. In its report submitted in September 2002, the committee took the position that it was the prerogative of each state to determine how it wanted to run and fund its power sector and confined itself to

suggesting a 'template' for initiating discussions with individual states. Introduction of competition, avoidance of single buyer model, formation of concentrated zones for privatisation of distribution and multi-year regulatory regime are the principal features of the template. The Committee emphasised the interdependence of different components of reform and the importance of proper sequencing.

(f) As stated in the Blueprint for Power Sector Development brought out by MOP in August 2001, MOP constituted a Committee of Experts (headed by Udesh Kohli) to identify sources of funding for power sector development, including government funding, multilateral and bilateral assistance, institutional finance, market borrowings, international resources, private investment, etc.; the committee submitted its report in December 2002. According to the well-known NGO, Prayas (Prayas 2003), the recommendations included disinvestments of existing power stations to mobilise funds for fresh investment required to be made by the public sector. We will comment on this particular recommendation later in this paper.

All these initiatives are to be commended as they have helped to highlight problem areas and suggest solutions. Different reform models have been presented from which the state government can make a choice. Guidance needed to facilitate decision on reform measures has been provided, as also incentives for reform implementation.

In the Indian context, in which both the centre and the states have a role and share responsibility for development of the power sector, it is clearly necessary to have the support of the states to put through the sectoral reform. Keeping this in view, besides the usual interaction at the official level, the instrumentality of Chief Ministers' Conferences chaired by the Prime Minister has been utilised to secure support for the programme. Conferences of state chief ministers and power ministers were held in 1996, 1998 and 2001 to persuade the states to move faster on the power reform effort. At each of these conferences, the chief ministers agreed to take specific time-bound measures. The conference of 1996 resulted in the Common Minimum National Action for Power which required, among others, fixing a minimum tariff of 50 ps. per unit for agricultural consumption and raising it to at least 50 per cent of the average cost of supply within three years. An important decision taken at the conference in December 1998 was to set up State Electricity Regulatory Commissions before March 31, 1999. Energy audit of 11 kV feeders to be made effective within six months and of all consumers by the end of 2001 was one of the action points agreed to in the March 2001 conference. Unfortunately, these did not result in concrete action in most states.

**Budget Announcements**

It will be relevant at this stage to note additional concessions announced in the Union Budget 2003–04, in order to encourage investment in the power sector. Exemption from import duty and tax exemption, which were hereto confined to specified mega projects, have now been extended to all projects that conform to the criteria of capacity (1000 MW and more for thermal, 500 MW and more for hydro stations) and area of benefit (more than one state). The import duty on specified transmission equipment has been reduced from 25 per cent to 5 per cent and on LNG re-gasification plants from 25 per cent to 5 per cent. It is disappointing however that, barring these announcements, there was no reference whatever in the Finance Minister's Budget speech to the problems facing the power sector and steps contemplated to overcome them.

**Tenth Plan**

We now turn our attention to the Tenth Five Year Plan, which embodies projections of financial and physical progress which the country hopes to achieve during the period 2002–07.

The Draft Tenth Plan was approved by the National Development Council (NDC) recently. The final version is yet to be released by the Planning Commission; the figures in the tables below based on the Draft Plan are, however, unlikely to undergo substantial change.

Table 8 shows the projected public sector outlay on the power sector during the Tenth Plan 2002–07.

**Table 8: Tenth Plan Power Sector Outlay**

| Sector | Ministry/Department | Outlay (Rs. Cr.) |
|---|---|---|
| Centre | Power | 1,43,399 |
| | Coal | 8,008 |
| | Atomic Energy | 25,577 |
| | Total | 1,76,984 |
| States & UTs | | 82,224 |
| All-India | | 2,59,228 |

*Note*: The outlays of Ministry of Coal and Department of Atomic Energy are for 'Power' programme.

*Source*: Draft Tenth Plan presents Plan outlay under the broad head 'Energy'. The numbers in the above table have been derived from details of outlay presented in Annexures 3-A to 3-C and Appendices of Vol.2.

**Table 9: Tenth Plan Outlays of States and UTs**

| State | State Plan Outlay | | Power Sector | |
|---|---|---|---|---|
| | Outlay (Rs. Cr.) | % increase over Ninth Plan | Outlay (Rs. Cr.) | % of Plan Outlay |
| Andhra Pradesh | 46614 | 64.8 | 7618 | 16.3 |
| Bihar | 21000 | 89.2 | 2479 | 11.8 |
| Jharkand | 14633 | | 1727 | 11.8 |
| Gujarat | 40007 | 55.1 | 4850 | 12.1 |
| Haryana | 10285 | 28.0 | 1400 | 13.6 |
| Karnataka | 43558 | 39.9 | 2267 | 5.2 |
| Kerala | 24000 | 72.4 | 3500 | 14.6 |
| Madhya Pradesh | 26190 | 50.3 | 3555 | 13.6 |
| Chattisgarh | 11000 | | 1493 | 13.6 |
| Maharashtra | 66632 | 41.9 | 8351 | 12.5 |
| Orissa | 19000 | 58.8 | 3863 | 20.3 |
| Punjab | 18657 | 74.9 | 3314 | 17.8 |
| Rajasthan | 27318 | 37.7 | 4586 | 16.7 |
| Tamil Nadu | 40000 | 60.5 | 6779 | 16.9 |
| Uttar Pradesh | 59708 | 103.0 | 7790 | 13.0 |
| Uttaranchal | 7630 | | 995 | 13.0 |
| West Bengal | 28641 | 32.9 | 6182 | 21.6 |
| Total-States & UTs | 632456 | 58.2 | 82244 | 13.9 |

*Source*: Planning Commission, Draft Tenth Plan. In the footnote to the Table at Annexure 3C, Vol. II (from which figures in the above Table have been drawn) of the Draft Plan, it is indicated that Arunachal Pradesh, Assam, Haryana, Karnataka, Kerala, Meghalaya, Mizoram, Nagaland and Sikkim have submitted firm sectoral allocations and other state allocations are indicative.

The Tenth Plan projections show a sharp jump in the public sector outlay on power. As the Draft Plan rightly points out, 'Keeping in view the low level of investment by the private sector, it would be desirable, in the short run, to step up public sector investment even as efforts continue to put the SEBs back on the rails in order to attract private investments'. For the country as a whole, the outlay on this sector will show an increase of 106.5 per cent, whereas the overall Tenth Plan outlay goes up by only 62.1 per cent compared with the Ninth Plan. What is more significant and interesting, the central power outlay (Rs.1, 76,984 crores) is slated to increase by 220.6 per cent over the Ninth Plan outlay of Rs.52, 299 crores. In contrast, the aggregate of the Tenth Plan outlays of states and UTs is to increase by 63.4 per cent over the Ninth Plan outlay, but the outlay on power will go up by only

15.9 per cent. As a percentage of state plan outlay, the share of power sector will decline from 18.9 per cent in the Ninth Plan to 13.9 per cent in the Tenth Plan. In fact, some states have projected a steep fall in the allocation to the power sector. For example, Karnataka's Tenth Plan will be about 40 per cent larger than its Ninth Plan, but the share of power will decline from 15.6 per cent to 5.2 per cent; even in absolute terms, there is a decline. The sharp increase in central plan allocation taken together with the meagre increase in state plan allocations portends relegation of the states' role to a minor position compared with that of the centre — a reversal of the historical position. The states seem to be no longer interested in investing on new generation projects. It looks as though the spirit of Electricity Bill 2003 (discussed later in the paper), which seeks to integrate the power industry in the country under central control, is reflected in the allocations.

The projected capacity addition during the Tenth Plan and its break-up between on-going schemes and new schemes can be seen in Tables 10 and 11.

**Table 10: Capacity Addition during Tenth Plan**

(MW)

| Type | Centre | States & UTs | Private | Total |
|---|---|---|---|---|
| Hydro | 8742 | 4481 | 1170 | 14393 |
| Thermal | 12790 | 6676 | 5951 | 25417 |
| Nuclear | 1300 | - | - | 1300 |
| Total | 22832 | 11157 | 7121 | 41110 |

*Source*: Planning Commission, Draft Tenth Plan, Vol. 2, Table 8.2.10A

**Table 11: Benefits from Ongoing and New Schemes in Tenth Plan**

(MW)

| Type | Ongoing/sanctioned Schemes | CEA-cleared Schemes | New Schemes | Total |
|---|---|---|---|---|
| Hydro | 9184 | 3962 | 1247 | 14393 |
| Thermal | 8175 | 5231 | 12011 | 25417 |
| Nuclear | 1300 | - | - | 1300 |
| Total | 22832 | 11157 | 7121 | 41110 |

*Source*: Planning Commission, Draft Tenth Plan, Vol.2, Table 8.2.10

Compared with the dismal performance during the Eighth and Ninth Plan periods, the capacity addition target of 41,110 MW is ambitious. Out of the new capacity creation, the capacity to be added by the centre will be more than that of states and UTs and the private sector taken together. The target fixed for the private sector is modest and could be considered realistic. Even this limited growth of the

private sector will be achieved only if payment security issues are resolved quickly. Incidentally, it may be noticed that a three-fold increase in additional hydro capacity is planned. Given the recent experience of infructuous attempts in India and elsewhere to construct large hydro projects, how far this will be achieved is open to question.

As already mentioned, the Tenth Plan envisages a vastly increased role of the central government, calling for a steep rise in power sector outlay. The manner in which financing on this scale will be organised is shown in Table 12.

What stands out from the above table is that while the increase in budgetary support looks manageable, there is to be an extraordinary increase in 'Internal and Extra- Budgetary Resources' (IEBR). Internal generation of funds by public sector enterprises like NTPC, NHPC, etc. cannot go up in a spectacular manner, as bulk supply tariffs for sale of power from central power stations are subject to regulation and there are limits to the extent to which they can be raised. Equally, market borrowings by public sector undertakings (PSUs) cannot be unrestrained; the viability of projects and the need to maintain overall financial stability of the PSU impose constraints. It looks as though the quadrupling of IEBR is sought to be achieved through joint ventures. According to the Draft Plan, 'The Government proposes to enhance public funding for the sector as well as encourage PSUs to take up projects in joint ventures with private investors and state governments during the Tenth Plan period.' How joint ventures will be launched overcoming the problem of payment security has not been explained.

The strategy of relying primarily on public funding of power projects in the next few years is to be welcomed. It shows an appreciation of the fact that the financial viability of the power industry has to be established as a pre-condition to attract private investment on a large scale and that reforms in the power sector geared to achieve this objective will take a few years to be fully carried out. It is disappointing, however, that the power sector has not been accorded due priority in the state plans.

While, as stated earlier, the sharp increase of the outlay on the power sector is to be commended, there is the larger question of credibility of the Tenth Plan projections. Central and state government finances continue to be in a bad condition. In fact, the central budgetary allocations in the first year of the Tenth Plan (2002–03), which is already over and the allocations in the budget of 2003–04 recently presented by Union Finance Minister, do not hold out hope of the Tenth Plan financial projections coming through in the central sector. Most state budgets have yet to be announced, but one does not expect the position to be different. Table 13 shows the allocations in the Union Budget.

**Table 12: Financing Pattern of Central Sector Outlay in Tenth Plan**

(Rs. crore at 2001–02 prices)

| Ministry/ Department | Budgetary Support | | | Internal and Extra-Budgetary Resources | | | Total Outlay | | |
|---|---|---|---|---|---|---|---|---|---|
| | Ninth Plan Realisation | Tenth Plan Projection | % increase | Ninth Plan Realisation | Tenth Plan Projection | % increase | Ninth Plan Realisation | Tenth Plan Projection | % increase |
| Atomic Energy | 6771 | 21550 | 218.3 | 1671 | 10820 | 547.5 | 8442 | 32370 | 283.4 |
| Coal | 2233 | 1050 | -53.0 | 14623 | 30541 | 106.0 | 17058 | 31591 | 85.2 |
| Power | 14907 | 25000 | 67.7 | 29785 | 118399 | 297.5 | 44692 | 143399 | 220.9 |

*Note*: 1. The outlay under Atomic Energy covers both power and R&D programmes. In the Tenth Plan, Rs.25, 577 crores is provided for power.

2. The Budgetary support for 'coal' includes Rs.1257.4 cr. and Rs.8007.6 cr. under 'Ninth Plan Realisation' and 'Tenth Plan Projections' respectively for power (Neyveli Lignite Corporation).

*Source*: Planning Commission, Draft Tenth Plan, Vol 1, Annexure 3-B

**Table 13: Central Energy Sector Annual Plans 2002–03 & 2003–04 (Budgetary Allocations)**

(Rs. Cr.)

| Ministry/Department | 2002–03 | | 2003–04 |
|---|---|---|---|
| | BE | RE | BE |
| Atomic Energy | 2741 | 2686 | 4106 |
| Coal | 3491 | 2744 | 3321 |
| Power | 13483 | 11268 | 14070 |

*Note:* The figures shown above for Ministry of Coal and Department of Atomic Energy are gross provisions; the allocation for power programmes is not known.
*Source:* Union Budget 2003–04 — Central Plan Outlay by Ministries/Departments

The budgetary provision in 2003–04 for Ministry of Power, which has the key role in power development, is only slightly higher than in 2002–03. The position is similar in the case of Ministry of Coal. The increased allocation to Department of Atomic Energy could be due to the launching of the 1000 MW Kudankulam Project with Russian assistance. If, as is apparent, the financial provisions in the first two years are not in line with the plan projections, it follows that the projected physical targets will also be difficult to achieve.

**Electricity Bill 2003**

A new and important milestone in the development of the power sector in India is the passing of the Electricity Bill 2003 by Parliament recently. Apart from bringing the electricity industry in the country within the fold of a single legal enactment, it sets out the framework for its emergence as an efficient and competitive industry, besides serving larger social goals. The highlights of the Bill are:

- Central Government will, in consultation with State Governments, formulate the National Electricity Policy and Tariff Policy for development of power systems and optimum utilisation of domestic energy resource endowments including renewable sources of energy.
- Rural areas will receive special attention. Central Government will, in consultation with state governments, draw up a national policy permitting stand-alone power systems for supply to rural areas. There will also be a national policy for rural electrification which will provide for bulk purchase of power and its distribution by panchayats, NGOs, cooperative societies, users' associations, etc.
- No licence is required for generation except for hydropower stations (beyond specified capital investment). Captive generation is freed from restrictions.

- The private sector can participate as licensees in both transmission and distribution. Electricity trading is recognized as a distinct activity.
- There will be non-discriminatory open access to transmission lines, subject to availability of capacity. Open access to distribution lines will be provided in a phased manner. These will be subject to such surcharges as the Regulatory Commission concerned may impose. The proceeds of the surcharge are to be utilised for meeting the requirement of cross-subsidy. Both the surcharge and cross-subsidy are to be phased out gradually.
- There can be more than one Distribution Licensee in a given area, with separate distribution systems. A consumer may choose to take supply from a source other than the Distribution Licensee, subject to payment of specified charges.
- Metering will be compulsory.
- There will be an Appellate Tribunal for Electricity. The order of the Authority can be taken in appeal to the Supreme Court.
- Subsidies are to be paid by Government through the Budget (so as to be transparent).
- There will be more stringent penalties for theft of power.
- Provisions of State laws already passed as are not inconsistent with this law will be saved.

As would be apparent from the salient features presented above, Electricity Bill 2003 will provide a coherent framework for reform of the power sector and give direction to policy actions to be launched hereafter. It is therefore a measure to be welcomed.

Our immediate interest is in the impact the Bill may have on investment in the power sector in terms of attracting private funds. Viewed from this angle, non-requirement of a licence for generation and open access to transmission and distribution networks to both suppliers and consumers should stimulate investor interest. Third party sales to selected customers at mutually negotiated rates could be an attractive proposition. This will come about eventually when we have adequate capacities in the transmission and distribution systems and there are no bottlenecks of the kind we find at present; it is obviously uneconomic for power stations to construct dedicated delivery systems. Also, we should remember that SEBs could establish escrow arrangement of payment security only to a limited extent because of the limited number of large consumers paying remunerative tariff. It is difficult for a new power supplier to counter the market power of the public sector entities and wean away good customers. It is not surprising that private investment is not forthcoming unless there are long-term arrangements that assure a market for the power generated (and thereby reduce market risk) and provide security of payment.

The new Bill has special provisions to ensure spread of electricity to rural areas. Under Clause 13, SERC may, in consultation with the State Government, exempt local authorities, panchayats, cooperatives, etc. from licensing requirement for transmission and distribution in rural areas. Clause 14 lays down that in rural areas notified by the State Government, a person can generate and distribute power without having to obtain a licence. The focus of Clause 13 is on institutional arrangements for proper management of distribution rather than on mobilising local investment. As for Clause 14, one cannot be optimistic about private investment coming forward to set up generation and distribution facilities in rural areas. First, it is presently hard to find distributed generation technologies capable of producing power at rates competitive with grid power. They may be appropriate for remote areas, but do not lend themselves to wide application. Second, the bulk of rural consumers belong to subsidised domestic and agricultural categories. There is little scope for cross-subsidy, apart from the fact that the law mandates its gradual elimination. Viability of investment will therefore be totally dependent on the extent and consistency of commitment on the part of the state government in regard to payment of subsidy. A prudent investor is unlikely to risk his funds under such circumstances.

Thus, the impact of the Bill will be limited in the short run. The beneficial effects of Electricity Bill 2003 will accrue only when the financial health of the electricity industry improves. As argued elsewhere in this paper, this is critically dependent on sectoral reforms at the state level. Unfortunately, the bill leaves it to the state government to decide whether to unbundle the SEB at all and if so, in what manner. Thus, the movement forward in restructuring the power industry has been rendered unpredictable. Reviewing the earlier version of the bill as introduced in Parliament, namely Electricity Bill 2001, S. L. Rao commented, 'In the absence of financial viability of the state sectors, this bill will make for some slight improvement in procedures, but not in the substance of the electricity system in India' (Rao 2001). As the relevant provisions remain unchanged in Electricity Bill 2003, this observation applies equally to the final version.

## Short-Term Prospect

It is over ten years since reform of the power sector, which is a vital part of the country's infrastructure, was initiated as a part of wide-ranging changes in the country's economic policy. Power sector reform started with the generation segment and later extended to transmission. It took some time to appreciate that priority really ought to be given to distribution reform, because the fundamental weakness of the power industry lay there. Meanwhile, the power industry as a whole has suffered a setback. Public investment has come down and private investment has not picked up. Indeed, the sector is in bad shape.

Reform impulses have not percolated equally to all parts of the country. While regulatory mechanisms have come up in most states, which is a healthy development, progress in implementation of other reform measures has been slow. A few states have made some headway, but this is confined to what may be called the soft part of the reform package, namely, unbundling and corporatisation. Change of formal structure does not by itself provide a solution. What is basic is tariff rationalisation; this has to be paralleled by control of theft of power and reduction of system losses. True, this cannot be done overnight and has to be phased over a period of time, say three to five years. But what is worrisome is that we do not see any concerted move in this direction in most states.

It is not that enough knowledge is not available in the country as to how we should proceed. As we have seen, there has been extensive exploration of different aspects of reform and expert advice is available within the country and outside. The lines of action that need to be taken are well understood by those who occupy decision-making levels in the governance of the country. The missing element is political will and commitment. The country's political economy has reached a stage when the time horizon for policy making at the political level is limited to the next election. State chief ministers and power ministers agree to time-bound measures when they meet in conferences, but most of them show no inclination to pursue them. It is clear that power reform cannot go ahead without full political backing. This is because the reforms impact, directly or indirectly, all sections of society. Civil society is not free from blame either. Sections of society which wield political clout by the strength of their numbers or otherwise, exert pressure to protect privileges enjoyed by them in the shape of concessional power tariff. Unfortunate as it may be, it is perhaps only a situation of crisis which will sensitise the community and the leadership of the country to the urgency of corrective action to restore the health of the power sector and foster its growth.

In the long term, as in any market economy, private capital has to be the main source of investment funds for the power sector in India and this will happen once the electricity industry turns the financial corner and the investment climate in the country improves. The reality is that investor perception of India today is lower than before. The AT Kearney/FOREIGN POLICY Magazine Globalization Index 2003 (based on thirteen variables covering economic, political and other factors), which has just been released, ranks India 56$^{th}$ among 62 advanced economies and key emerging markets. In the last two years, India held the 49$^{th}$ position. It is therefore imperative that we maximise public sector investment in power programmes in the next few years. For the central sector, the target should be to reach the outlay projected in the Tenth Plan within the next four years. As for the states, the Planning Commission should ensure that there is adequate allocation to the power sector while finalising the Tenth Plan of each state, as well as during Annual Plan discussions.

As mentioned earlier, one of the expert groups set up by Ministry of Power is reported to have suggested disinvestment of existing power stations as a possible way of raising funds for investment by Government. This is not a desirable course of action. In the first place, the sale will obviously not be at book value; public assets cannot be gifted away to private parties. It will have to be at market value, but this could mean converting a low-cost power source into a high-cost source, as the consumer who had already paid for the capital cost will have to pay for it all over again (Purkayastha 2001). This will result in a heavier burden on the consumer without any benefit in return. Second, it is likely that in a situation in which the industry is running at a loss, the assets may not fetch a good price. A point could be made that the foregoing scenario may not be valid, as other countries, notably U.K., sold their power facilities for a good price without any adverse effect on consumer tariff. With freedom from licensing and possibility of third party sales available under Electricity Bill 2003, it is urged, there is no reason why this course of action should not be resorted to in India. Attractive as it may appear, this argument cannot be accepted. At the time of denationalisation in the 80s, the British power industry was a well-run industry, both technically and financially. As it happened, there was excess capacity in the power system and abundant supplies of North Sea gas, which was a cheaper and cleaner fuel, became available during that period. The U.K. electricity market soon became competitive and consumers benefited by lowering of tariff. Present conditions in our country are, needless to say, different; that the power industry is in poor shape with supply shortages and high technical and financial losses needs no elaboration. At the same time, capacity to pay is a real issue for large sections of consumers; it is essential to retain low-cost generation sources so as not to aggravate the subsidy problem. There is even a suggestion that such sources should be segregated into a separate system for supply to poor households and agricultural consumers (Sankar 2002). In any event, tariff rebalancing and efficiency improvement (which calls for substantial investment) can be achieved only over a period of time. Our focus should be on fresh investments that add capacity in all segments of power systems.

Presently, we are in a situation where private investment in the power sector is not forthcoming on its own and the capital budgets of Governments, Central and State, are limited. For the transition period necessary to set right the financial viability of the power industry, we need to leverage available public funds by establishing strategic partnerships with the private sector so as to mobilise funds of the order needed to avoid a further widening of the power supply-demand gap, which will have serious consequences for the national economy. Power generation offers good scope for joint ventures. As it happens, Union Finance Minister has introduced in this year's Central Budget the concept of viability gap funding in the context of infrastructure development — principally, roads, railways, airports and

seaports. To quote from his Budget speech, 'The essence of the new funding mechanism is to leverage public money through private sector partnership, wherever possible'. He has made it clear that there would be no open-ended guarantees at any stage. This concept is not altogether new — generally, it translates into a one-time capital subsidy or an annual revenue subsidy until the break-even level is reached. Taking roads as an example, what this means is that there will be private investment on toll roads under a BOOT arrangement, in which Government will make good any shortfall in annual revenue on an agreed basis. It is a variant of the 'cost plus guaranteed return' approach, which can be justified on the ground that roads partake largely of the character of a public good. This model will not, however, be suitable for power projects. Even if gold plating of capital cost is avoided through competitive bidding, it will amount to an indiscriminate subsidy from the exchequer to all electricity consumers. The pattern of joint ventures in power generation projects will have to be different. These projects should be based on investment sharing; automatically, this means risk sharing as well. The Central PSU, which co-promotes the project, should remain a minority shareholder, preferably with not more than 26 per cent equity capital. A few mega projects may be identified and for each of them, the joint venture partner may be selected through a competitive process. The presence of PSU nominees in the higher echelons of management will ensure that capital costs are not inflated. Power tariff may be determined on the pattern set by Central Electricity Regulatory Commission (CERC) in the last couple of years for bulk supply tariff payable to NTPC. CERC has laid down clear parameters for determination of a two-part tariff; these include norms of technical performance, operational expenses, depreciation, etc. as well as the methodology for arriving at the availability-based capacity charge. The tariff provides for a return of sixteen per cent return on equity at the stipulated level of availability, together with some incentive for better performance. We believe that the CERC prescription is fair to both the supplier and buyer of power and could be the benchmark for negotiating PPAs with the beneficiary state utilities. The period of the PPA may be limited to ten years so as to cover the loan amortisation period and the PPA will be subject to regulatory approval. Payment security may be by way of adjustment of central resource transfers to states. Power supply from new projects should be conditional on the states accepting this mode of payment security. It will take four years or more to commission a large power station at a greenfield site. Hopefully, rationalisation of retail tariffs would have made good headway by then and occasions for resorting to the security mechanism would be few and far between. Unless some such arrangement is made, the Tenth Plan target will not be reached.

Thus, in the short-term scenario that we are looking at, the main responsibility for addition of new generation capacity will devolve on the central government. It is desirable that state governments also play a part, including that of partners in joint projects.

Restrictions on captive generation may be lifted. This is already visualised in the Electricity Bill 2003. We should remember that this is a sub-optimal solution, but has to be accepted as a short-term measure.

Funds for transmission lines and related facilities will also have to sourced almost wholly from the public sector; here, the states will be the major players, the central role being limited to inter-state transmission.

Though distribution is not as capital-intensive as generation and transmission, this segment also requires inflow of investment funds, if system losses are to be brought down and efficiencies improved. As mentioned earlier, this component of the power system has been neglected in the past and there is a backlog of investment, which needs to be made up. Universal metering is a prime necessity to establish base line operating parameters, such as the precise extent of technical loss, non-technical or commercial loss and the proportion of energy consumed by different categories of consumers (this information is required for tariff rebalancing). Unless conductor and transformer capacities are upgraded in keeping with load growth and the ratio of high tension lines to low tension lines is increased, technical loss cannot be controlled. Apart from the electricity meter, which is the basic instrument for ensuring that power consumption is recorded and paid for, IT-based applications are now available for monitoring and accounting power flows in the distribution system. How will the required investment funds be sourced? This will depend on the reform and privatisation strategy of the State Government. Reportedly, some state governments do not contemplate privatisation at all, in which case the responsibility for investment in power distribution will squarely be on them. However, in the majority of states, privatisation is on the reform agenda though the time frame and route to be followed have not yet crystallised. One option is to devote the next few years to preparing the ground for privatisation by completing the installation of meters, taking vigorous action against stealing of power, tightening up billing and collection, and reducing tariff distortions. Naturally, the state government will have to provide the necessary funds to the SEBs or their successor entities. So far, most of the states appear to be following this path but, as pointed out earlier, the scale of fund flow has been dwindling. The other option is to privatise quickly, following a methodology that is the best possible under the circumstances.

Only two states, Orissa and Delhi, have so far privatised their distribution systems. Orissa was the pioneer, but the results have been disappointing. While we need not go into the reasons for this outcome, we should note that the Orissa experience has lessons to offer to states planning to go ahead with privatisation, namely, the need for reliable baseline data, realistic valuation of assets and multi-year regulation. These aspects appear to have been taken care of by Delhi (Government of the National Capital Territory of Delhi) while carrying out privatisation of power distribution last year. Assets were valued by the Business

Valuation Method. Regulatory uncertainty was eliminated by issue of a policy directive by the state government to the Regulatory Commission. The state government also gave a clear commitment on the quantum of financial support over the five-year period, within which the private operator is required to achieve the agreed percentage reduction in the 'aggregate technical and commercial loss' (difference between units supplied and units for which payment is received). There are incentives and penalties related to the level of performance. It is too early to assess the impact of the Delhi privatisation, but the signs are encouraging. Delhi had some advantages: being primarily an urban conglomeration, it did not have a large proportion of agricultural consumers and unmetered supply. These favourable factors cannot be replicated in most states, which makes the process of privatisation more complex.

Karnataka is considering adoption of the 'Distribution Margin' (DM) approach for privatising its distribution system. In its essence though not in detail, it is similar to the Delhi model. Under the DM methodology, the Distribution Margin, calculated to cover operating cost and capital recovery cost, will be payable to the private party as a first charge on the revenue collected, subject to the agreed 'minimum collection requirement' being achieved. There is provision for different incentive rates and performance benchmarks. The DM arrangement is intended to apply for an interim period, which will end when defined conditions are met. Thereafter, the conventional regulatory system will apply. Here again, the Regulatory Commission is expected to play a prominent role in defining the initial structure of the DM methodology as well as the conditions of switching to a more conventional regulation.

Interim arrangements of the kind mentioned above have to be tailored to suit local conditions. As far as investment is concerned, one cannot expect the private operator to expose himself to capital risk beyond what is needed to reach the minimum level of performance required to get his guaranteed return or payment. Continued support of the state government under APDRP will be necessary. If a minimum level of investment is insisted upon as one of the bid conditions, the operator may ask for government guarantee for his borrowing, since it will be difficult for him to get non-recourse third party financing on account of the perceived high level of risk. What this adds up to is that though there may be some supplement from the private operator, the primary responsibility for investment will remain with the state government. The main criticism of such ad hoc models of privatisation is that risk allocation is tilted heavily in favour of the operator. This has to be weighed against the gains in terms of better management, improved efficiency and benefit to the consumer. It is desirable that the states accelerate the reform process by adopting models of privatisation, which may not be ideal but are best suited to their situation, rather than drift in a directionless fashion. The problems of the

power industry in the country are worsening day by day and demand corrective action on the distribution front.

As indicated at the outset, this paper has focused on issues pertaining to power sector investment in the short run, covering essentially the transition from a vertically integrated monopoly to a deregulated regime, in which private capital will play an increasingly important role. This period is crucial as it should signify the upturn of the power industry and set it on the path to its emergence as a technically efficient and financially healthy component of India's infrastructure.

None of the steps suggested above for augmenting investment in the power sector during the next few years is new, much less innovative. Over the years, the Indian power sector has been the subject of a large number of studies by individual scholars, expert groups set up by governments at central and state levels and financial institutions, and all that can be said has been said. What is badly needed is the willingness to act. This is where the political factor comes in. The role of the central leadership in carrying the states with them in the reform effort is important. Equally, it bears responsibility for developing a consensus in favour of reform among the major political parties. As we look round, we see that reforming states do not have a common political affiliation; the multi-party democratic system we have in the country is not a hurdle. A great deal will depend on the capability of the national leadership to push the reform agenda at the state level. It is only through vigorous and determined effort that there is hope of the Indian power sector being set on an even keel and sustaining the country's ambitious plans for a high growth rate of the economy and rapid reduction of poverty.

## Note

1. There have been two developments since writing the paper. First, Planning Commission has issued the final version of the Tenth Plan. Second, Electricity Bill 2003 has been enacted as Electricity Act 2003, effective from June 10, 2003. However, these do not affect the views expressed in the paper.

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# Rural Household Characteristics and Health Expenditure in India: An Analysis

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## Abstract

The main objective of this paper is to analyse the rural household characteristics and health expenditure in India. The study uses a national-level household survey and finds that health expenditure of the members of rural households in India is sensitive to changes in their income levels. The elasticity of health expenditure with respect to income is largest for high-income groups with the income elasticity of health expenditure more than 1 in absolute terms. It indicates an income elastic situation for spending on treating both short-term morbidity (STM) and long-term morbidity (LTM) by the upper income groups. It is also true in the case of drugs and medicine expenditures. The results also suggest that households incur higher total health expenditure and higher expenditure on drugs and medicines for getting treated from formal health care providers in the rural areas.

In recent times, studies on new household behaviour have assumed greater importance among researchers in the field of health economics (Pollack and Wales 1981; Russo et al. 1993; Deaton 1987; Deaton et al. 1989; Parker and Wong 1997). Indeed, one of the basic reasons for measuring household cost is to understand user behaviour. Knowing the costs borne by the household members for using the service helps to predict the quantum of services utilised or in ascertaining why services are not used. Seeking health services in a household depends mainly on various demand and supply side factors. From the perspective of society, both the cost of obtaining primary health care services and the cost of producing services are important. It implies that the demand side of health service utilisation is as pertinent as the supply side. Several factors appear likely to influence the anticipated satisfaction that patients receive from health services. They include availability of drugs, qualification of the staff, and the level of sophistication of equipment and technology, all perceived as success of previous contacts with the service (Mathiyazhagan 1999). Some studies suggest that the perceived quality of services is more important than fees paid in determining the choice of health service (Gilson et al. 1994; Wensing et al. 1994; Mathiyazhagan 2003). Thus, user behaviour is an

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important factor in learning about the household cost pattern. Individuals, on their part, try to minimise the cost of health care by using the scarce resources effectively, thereby revealing the household costs on health. Thus, rural household characteristics and health expenditure in India are important in the Indian context.

## Framework for Household Health Expenditure Function

Household economics assumes that households derive utility or satisfaction from consuming commodities and services, and household members must produce many of the commodities desired for consumption. In order to maintain good health status, in general, the households in rural areas face constraints of time and monetary resources. In this context, it may be observed that households derive utility mainly from their members' health and other consumption. In order to consume health, households produce it by combining inputs such as health care services and the household members' time. In this sense, the utilisation of health services is assumed to be a derived demand from the production of health. It could be formulated through a simplified household utility function, which represents all members and assumes that households derive utility from overall consumption and health, which is controlled by the household composition (i.e., demographic factors) and constrained by its social and economic context (socio-economic characteristics). In fact, the derived demand for health care is a function of the level of income of the households, prices, and preferences for health relative to other items of consumption. It is important to note that price is considered a vital variable for estimating demand or expenditure functions. However, the price variable was considered unobservable in most empirical research studies on expenditure functions (Deaton 1987, Deaton et al. 1989). In this context, budget share equation has been used as an alternative approach in determining the expenditure functions instead of estimating demand equations for health care. Parker and Wong (1997) propose another approach using expenditures and quantities to derive the estimates of prices. It is important to recognise that the prices of health care are mostly unobserved. This is because in principle, health care services in India are offered free of charge through the public health care system. The available data present severe limitations because of lack of price information and quantities of health services availed of, and hence it is only possible to approximate an expenditure function for health care demand among the rural households through socio-economic and demographic factors.

A regression equation for household expenditure could be formulated as follows:

$$\ln(h-\exp)_i^* = \alpha + \beta_1 \ln\left[\frac{Y_i}{n_i}\right] + \beta_2\left[\ln\frac{Y_i}{n_i}\right]^2 + \sum_{k=1}^{K}\beta_k n_{ik} + \delta z_i + e_i$$

where,

$(h\text{-}exp)^*_i$ are the expenditures on health care by household i
$Y_i$ is the household income
$n_i$ is the number of household members
$n_{ik}$ is the number of household members in age-group k
$z_i$ represents a vector of other household socio-economic and demographic characteristics and
$e_i$ is a random error term.

It is better to use the logarithmic transformations of expenditures and income in order to capture possible non-linearity in the relations. It is assumed that (h-exp)* is the unobserved desired level of expenditures by the household. It only observes (h-exp) when it is positive beyond a certain threshold, otherwise it is zero. As is common in these types of specifications, we estimate the expenditure equation including only those households with positive expenditures, using a Heckman correction for the selectivity bias by this convention (Maddala 1983).

In order to estimate the expenditure functions in health, the study uses total health expenditure of the households in relation to other determinant factors taken together. First, it divides the sample into households of short –term morbidity (STM) and long-term morbidity (LTM) expenditures. Second, for each of these two groups, two income groups (upper $50^{th}$ percentile and lower $50^{th}$ percentile) are formed, as it is important to measure the demand for health care among higher income households separately, which is less elastic (Gertler et al. 1987). It is also important to note that expenditure on drugs and medicines is the main component of total health expenditure of the rural households. It accounts for nearly 70 per cent of the total health expenditure of the households (Mathiyazhagan 2003). Therefore, it is important to estimate separate expenditure functions for drugs and medicines in view of their implications on drug pricing in India.

The total monetary health expenditure of the households or total expenditure on drugs and medicines is used as a dependent variable for the regression equations. It is important to note that standard linear regression models assume that errors in the dependent variable are uncorrelated with the independent variable(s). When this is not the case (for example, when relationships between variables are bi-directional, especially between health expenditure and income of the household in the present analysis), linear regression using ordinary least squares (OLS) no longer provides optimal model estimates. Hence, Two-stage least-squares (2SLS) regression uses instrumental variables that are uncorrelated with the error terms to compute estimated values of the problematic predictor(s) (the first stage), and then uses those computed values to estimate a linear regression model of the dependent variable (the second stage). Since the computed values are based on variables that are uncorrelated with the errors, the results of the two-stage model are optimal.

Four groups of explanatory variables are included in the analyses, viz., household income, household composition, risk, and socio-economic variables. The first group comprises household income, categorised as low and high-income percentiles. The second group includes total household size, percentage of women of fertile ages (15–49 years) and percentage of children with respect to the total number of household members. The risk variables that form the third group are health status variables such as general health conditions of the household members, number of hospital episodes in the month prior to the survey interview, the number of working days lost due to ill health, health seeking behaviour of the households and source of health care utilised. It is important to note that health condition is a subjective assessment such as perception of one's own health or proportion of people reporting one or more health problems during household survey. These health-related variables have been used in two groups, one representing the type of remedial actions taken and the other representing the adverse results of ill health. The remedial actions group includes variables such as the number of times a doctor was consulted in the month prior to the survey. Some of these remedial action variables have been considered as indicators of past utilization of health care services but they have been used here as general indicators of the health status of the respondents. Two dummy variables (i.e., private and public health care providers) are used for analysing the role of health care provider in total health expenditure, and drugs and medicines expenditure functions. The adverse effects of ill health have been measured (as proxy) here through the number of days (working) lost as a result of illness or the number of days spent in bed. The fourth group of variables comprises socio-economic variables such as whether the household head or dependents have health insurance or other benefits, and educational level of the household head. In addition, all regressions include regional dummies, to proxy for the differences in cost of living with severe morbidity across regions. In this sense, location of the states represented by zones is used as a proxy.

## Data Source

The study uses household survey data for an empirical analysis. For the data on morbidity pattern and its associated expenditure on drugs and medicine, the study uses the Household Survey Data, which has been collected by National Council of Applied Economic Research (NCAER), New Delhi, with the sponsorship of United Nations Development Program (UNDP) in 1994. It is confined only to rural households in major states in India. A stratified, multistage sampling procedure has been adopted to identify the index household for the study. The nature and number of strata of households formed in the states were different as the composition of the population in terms of attributes like age, marital status, caste, occupation, and income were different across the states in India. The households were listed

and drawn from different strata of the sample. The first stratum included households with at least one pregnant woman. Households with at least one child aged less than twelve months but no pregnant women were included in the second stratum. The remaining households were stratified according to religion, ethnic group, and occupation of the head of the household. The strata were formed in various states along with allocation of sample households. The total number of rural households selected in the sample was 35,130 spread over 1,765 villages and 195 districts in 16 major states in India. Nearly 1, 94, 486 household members were interviewed (Table 1). The data set provides morbidity pattern and health expenditure in general and drug expenditure in particular for short and long-term illnesses by controlling socio-economic characteristics of the rural people. It is important to note that the data were obtained from a household survey, using a one-month recall period for STM and a one-year recall period for LTM. Though the survey allowed three illness episodes, the study considered only the first illness episode of the recall period, as most of the households experienced only one illness episode.

**Table 1: Rural Samples by States in India**

| States | Total Number of Districts | Number of Samples | | | Households Surveyed | |
|---|---|---|---|---|---|---|
| | | Districts | Villages | Households | Households | Household Members |
| Andhra Pradesh | 22 | 12 | 113 | 2244 | 2100 | 10540 |
| Bihar | 42 | 12 | 116 | 2338 | 2155 | 12973 |
| Gujarat | 19 | 10 | 88 | 1768 | 1606 | 9239 |
| Haryana | 16 | 11 | 90 | 1808 | 1722 | 11078 |
| Himachal Pradesh | 12 | 8 | 65 | 1260 | 1225 | 7179 |
| Karnataka | 20 | 15 | 135 | 2747 | 2523 | 15001 |
| Kerala | 14 | 8 | 75 | 1500 | 1474 | 8045 |
| Maharashtra | 30 | 16 | 151 | 2998 | 2765 | 15336 |
| Madhya Pradesh | 45 | 25 | 217 | 4320 | 4162 | 25083 |
| Orissa | 13 | 11 | 102 | 2040 | 1971 | 11354 |
| Punjab | 12 | 8 | 70 | 1373 | 1303 | 7983 |
| Rajasthan | 27 | 12 | 106 | 2102 | 1984 | 12558 |
| Tamil Nadu | 20 | 8 | 76 | 1545 | 1456 | 6990 |
| Uttar Pradesh | 63 | 23 | 217 | 4251 | 4036 | 25436 |
| West Bengal | 17 | 8 | 78 | 1560 | 1515 | 8927 |
| Assam | 60 | 8 | 66 | 1276 | 1233 | 6764 |
| All India | 432 | 195 | 1765 | 35130 | 33230 | 194486 |

## Descriptive Results of Household Health Expenditure Function

An overview of the descriptive results of household health expenditures forms the basis for the empirical analysis in this paper. The analysis covers (i) proportion of health expenditure in relation to total income of the households, (ii) per person health expenditure for STM and LTM among the rural households across the states in India, (iii) per person health expenditure for STM and LTM across the socio-economic characteristics of the rural households, (iv) components of health care expenditure of the households, (v) per person drugs and medicine expenditure for STM and LTM across the states, and (vi) per person drugs and medicines expenditure across the socio-economic characteristics.

### Total Health Expenditure in Proportion to Annual Income of the Households

Despite the large role of government in the health care sector in almost every country, globally more than 40 per cent of health care is financed privately through voluntary private insurance, out-of-pocket payments, or charities and other NGOs (Gaag and Barham 1998). Further, in most of the poorer countries, private health care spending may be as high as 80 per cent. India, in particular, has one of the highest proportions of private health care financing (i.e., nearly 82 per cent) in the world (WHO 2000). It is a negative implication of health care financing under the ongoing economic reform and structural adjustment polices of most of the developing countries. It implies that the structural adjustment policies influence the health sector by reducing private income or consumption (Gaag and Barham 1998). In fact, government financing in the health sector plays a vital role in providing efficient and quality health care services especially in the rural areas of India. However, the government has not been in a position to spend more than about 3 per cent of the total plan outlays over the years, which is barely 1.7 per cent of the GDP expenditure of the country (UNDP 1999). Further, in order to control and stabilize monetary factors, the government has no means of increasing its outlay on the health sector in the near future due to the economic reform, which curtails government spending on social sectors. In this context, it is important to assess the health care expenditure in proportion to household-level annual income. Such a proportion has policy implications on whether rural people are willing to contribute towards efficient and quality health care services. In fact, these private resources are not always used on the most effective interventions. In many countries, it has been suggested that emphasis be placed on reforming the health sector through effective utilisation of both public and private resources (World Bank 1993). In this rationale, it is essential to estimate the private health expenditure out-of-pocket payments in rural India as it has implications for the potential role of private health insurance schemes in India.

The estimation of total health expenditure of rural households is presented in Table 2. In general, the cost of medical treatment can be viewed as the cost of either providing or obtaining health care. The cost of providing health care is the sum of all inputs such as wages and salaries of workers, cost of equipment and drugs, hospital maintenance and other items. The cost of obtaining care includes not only the fee charged but also the opportunity cost of travel and waiting time for the health care facility. This study considers only the direct expenditure for obtaining health care services for STM and LTM. It was found that there were variations in the total health expenditure of rural households across the states in India. The proportion of total health expenditure in relation to the annual income of the rural households across the states ranges from 10 per cent to 35 per cent (Table 2).

**Table 2: Total Health Expenditure in Proportion to Annual Income of the Morbid Rural Households across the States in India**

| States | Total Health Expenditure to Income (%) |
|---|---|
| Andhra Pradesh | 19 |
| Bihar | 17 |
| Gujarat | 25 |
| Haryana | 10 |
| Himachal Pradesh | 15 |
| Karnataka | 20 |
| Kerala | 33 |
| Maharashtra | 18 |
| Madhya Pradesh | 11 |
| Orissa | 13 |
| Punjab | 13 |
| Rajasthan | 29 |
| Tamil Nadu | 29 |
| Uttar Pradesh | 35 |
| West Bengal | 20 |
| Assam | 15 |
| All India | 18 |

It implies a significant proportion of total income of the rural households, accounting on an average for nearly 18 per cent of total income being spent on health at the all-India level. People who live in Uttar Pradesh recorded the highest percentage (35 per cent) as compared with 10 per cent for people in Haryana. It is important to note that nearly eight states accounted for a higher proportion of health expenditure of rural households as against the all-India average of 18 per cent. It includes states

such as Andhra Pradesh, Gujarat, Karnataka, Kerala, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. It is important to analyse how private health care expenditures actually responded to the trends in government spending of the states in India. It is often suggested that with the higher proportion of private health care spending of the households, there could be a reduction in government health care spending across the states in India. However, there is no strong evidence for this kind of pattern in government health care spending across the states in India (Mathiyazhagan 2001).

It is important to analyse the per person health care expenditure of STM and LTM by rural households across the states in India. This is presented in Table 3. The estimates show that on an average, health expenditure per person of rural households for STM was around Rs. 48 as compared with Rs.1,230 for LTM at the all-India level (Table 3). The health expenditure per person for both STM and LTM of the rural households also varies significantly across the states in India. The rural households in Andhra Pradesh accounted for the highest expenditure, Rs.78 per person, for treating STM as compared with the lowest expenditure, Rs.32 per person,

**Table 3: Per Person Health Expenditure of STM and LTM among Rural Households across the States in India**

| States | Per person health expenditure for | |
|---|---|---|
| | STM | LTM |
| Andhra Pradesh | 78 | 1020 |
| Bihar | 53 | 1019 |
| Gujarat | 72 | 2124 |
| Haryana | 32 | 1083 |
| Himachal Pradesh | 41 | 1116 |
| Karnataka | 57 | 1275 |
| Kerala | 46 | 1526 |
| Maharashtra | 47 | 1310 |
| Madhya Pradesh | 35 | 754 |
| Orissa | 32 | 492 |
| Punjab | 56 | 1744 |
| Rajasthan | 53 | 1995 |
| Tamil Nadu | 58 | 1718 |
| Uttar Pradesh | 54 | 2205 |
| West Bengal | 52 | 1046 |
| Assam | 69 | 894 |
| All India | 48 | 1230 |

in Haryana and Orissa, respectively. It may be observed from Table 3 that there is no standard pattern of government health care spending across the states in India. Most of the states in India exceed an all-India average of health expenditure per person of the rural households. The few states such as Haryana, Himachal Pradesh, Kerala, Maharashtra, Madhya Pradesh and Orissa recorded the lowest spending on treatment of STM as compared with the all-India average. There is a consistency between the lower spending on treating STM and the pattern of STM prevalence in these states in India (Mathiyazhagan 2001).

The per person spending on treating LTM of the rural households, on an average, amounts to nearly Rs.1,230 per person, and varies significantly across the states in India (Table 3). The per person expenditure of the LTM for rural households in Uttar Pradesh was the highest (i.e., Rs.2,205) as compared with the lowest of only Rs.492 per person in the case of Orissa. Most of the households incurred higher expenditure in treating LTM per person than the recorded all-India average of Rs.1,230. It ranges between Rs.1,310 and Rs.2,205. The states that spent more for LTM per person include Gujarat, Karnataka, Kerala, Maharashtra, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh. The higher prevalence of LTM of rural households was recorded for only four states, namely, Andhra Pradesh, Himachal Pradesh, Kerala and Rajasthan**.**

**Per Person Health Expenditure of STM and LTM by Controlling Household Characteristics in India**

The analysis of per person health care expenditure of STM and LTM of the rural households by given household characteristics shows a contrasting picture for different states in India. The class structure in rural society in India plays a vital role in determining the health status and its expenditure. The per person health expenditure of STM and LTM by social status in terms of caste of the household members indicates lower spending by the socially backward classes such as SCs and STs as compared with the others in society (Table 4). It records an expenditure of Rs.40 per person on treating STM and Rs.586 for the treatment of LTM in the case of members of STs, while those who belong to the socially forward class in rural society accounted for nearly Rs.50 and Rs.1,389, respectively for STM and LTM.

There is a well-known postulate that at higher and higher incomes, people spend proportionately less and less. This was not valid in the case of per person spending on treating the STM and LTM of rural households in India. The average per person spending on treating STM was around Rs.45 for the lower income group (i.e., first 20 per cent of household income quintiles), as against Rs.48 for the higher income group (i.e., last 20 per cent of household income quintiles). In the case of per person spending on treating LTM, it was nearly Rs.1,457 and Rs.1,057 for higher

and lower income groups respectively. It implies that the higher income groups were spending more on health in rural India, but relatively less vis-à-vis income levels. The same pattern has been depicted in the case of per person health expenditure of STM and LTM by poverty status of the members of the rural households (Table 4).

Household size is an important indicator influencing per person health expenditure of rural households in India. Households with a large number of members (say, more than eight) were able to spend smaller amounts on treating STM and LTM, as shown in Table 4. The table shows that households of a larger size account for only Rs.37 per person spending on treating STM as compared with Rs.58 among households with fewer members (i.e., less than four members in the household). In this case, per capita spending on treating LTM was around Rs.1,111 among households of smaller size than among households with more members (Rs.1,389). It is important to note that households of smaller size spend more on treating STM and less on treating LTM.

Occupational status is another factor in per capita health expenditure of rural households in India. The estimates illustrate that there is not much of a difference in spending on treatment of STM among occupational groups of the household members (Table 4). The professionals spent marginally less (Rs.46) than agriculturists and others (Rs.48). However, spending on treatment of LTM was marked by major differences among the occupational categories of the household members. The salaried and professional members of the rural households recorded the highest per person spending on treating LTM, amounting to Rs.1,421. It is also important to note that daily wage earners of the households spent only Rs.1,087 per person for LTM, which was the lowest among the occupational categories.

It was found that ownership of land and landholding size influenced spending behaviours among members of the households on health. The results indicate that all the non-land owners of the household incurred higher spending per person for STM and lower for LTM, amounting to Rs.51 and Rs.1,186 per person for STM and LTM, respectively. As far as the link between landholding size and per person health expenditure of the members of the rural households is concerned, it shows that the larger landholding size group spent more on treating STM while the medium landholding size group spent more on treating LTM.

**Analysis of Components of Health Expenditure of the Household Members in Rural India**

It is evident from the analysis in the last section that there was a variation in per person health expenditure of the household members in rural India as a whole. It is useful to identify the major components of health expenditures in relation to the total of the households. Table 5 analyses the components of per person health expenditure of the household members in rural India. The major

**Table 4: Per Person Health Expenditure of STM and LTM for Rural Households across the Household Characteristics in India**

| Household Characteristics | Per person health expenditure for | |
|---|---|---|
| | STM (Rs.) | LTM (Rs.) |
| **Caste** | | |
| STs | 40 | 586 |
| SCs | 46 | 1096 |
| Others | 50 | 1389 |
| **Household income quintiles** | | |
| Poorest (20 %) | 45 | 1057 |
| 2nd quintiles | 40 | 1131 |
| Middle (20 %) | 46 | 1180 |
| 4th quintiles | 56 | 1311 |
| Richest (20 %) | 48 | 1416 |
| **Poverty groups** | | |
| Below poverty line | 43 | 1111 |
| Above poverty line | 51 | 1293 |
| **Household size groups** | | |
| Up to 4 | 58 | 1111 |
| 5-7 | 49 | 1199 |
| 8 and above | 37 | 1389 |
| **Occupational groups** | | |
| Wage earners | 49 | 1087 |
| Agriculture | 48 | 1215 |
| Salaried, professional & self-employed | 46 | 1421 |
| All others | 48 | 1317 |
| **Land ownership** | | |
| All land owners | 46 | 1250 |
| All non-land owners | 51 | 1186 |
| **Landholding size groups** | | |
| Landless wage earners | 45 | 1178 |
| Marginal | 48 | 1147 |
| Small | 50 | 1367 |
| Medium | 42 | 1713 |
| Large | 54 | 1154 |
| Landless others | 49 | 1214 |

components of total health expenditure considered in this analysis were: (a) Fees paid to medical practitioners, (b) payments towards drugs and medicines and (c) other costs (OITSD) such as clinical test, surgery, tips (i.e., in order to get a favour from the medical professionals), transport, special diets and rituals. Other costs excluding (OETSD) transport and special diets also were considered in order to analyse the opportunity costs of seeking health care in the rural areas. The results indicate that payments towards drugs and medicine were larger in proportion to the average total health expenditure on treating STM and LTM of the household members in rural India (Table 5) amounted to Rs.30 and Rs.713 per STM and LTM episode respectively.

**Table 5: Components of Per Person Health Expenditure of the Household Members in Rural India (in Rs.)**

| **Types of STM** | Fees | DM | OITSD | OETSD | Total |
|---|---|---|---|---|---|
| Diarrhoea | 11 (12) | 57 (64) | 21 (24) | 8 - | 89 (100) |
| Cold and Cough | 4 (13) | 19 (61) | 8 (26) | 3 - | 31 (100) |
| Fever | 4 (13) | 20 (63) | 8 (25) | 3 - | 31 (100) |
| Total | 6 (12) | 30 (62) | 12 (24) | 5 - | 48 (100) |
| **Types of LTM** | | | | | |
| Epilepsy | 107 (8) | 764 (60) | 429 (32) | 233 - | 1330 (100) |
| Hypertension | 115 (9) | 835 (64) | 364 (28) | 221 - | 1313 (100) |
| Diabetes | 227 (12) | 1110 (58) | 580 (30) | 317 - | 1917 (100) |
| Heart diseases | 196 (8) | 1402 (59) | 761 (32) | 483 - | 1360 (100) |
| Mental illness | 225 (9) | 1432 (57) | 877 (35) | 466 - | 2534 (100) |
| TB | 162 (6) | 1302 (50) | 1125 (43) | 733 | 2589 (100) |
| Leprosy | 129 (15) | 459 (52) | 291 (33) | 137 - | 878 (100) |
| Cancer | 319 (8) | 2256 (59) | 1232 (32) | 750 - | 3807 (100) |
| Any other | 115 (8) | 820 (59) | 437 (32) | 269 - | 1372 (!00) |
| Total | 111 (9) | 713 (58) | 677 (34) | 401 - | 1230 (100) |

*Notes*: DM= drugs and medicine; OITSD = other expenditure includes charges paid for transport and special diet; OETSD= other expenditure excludes charges paid for transport and special diet.

Figures in parentheses are percentages.

It is important to observe the average per person health expenditure of the rural household members in terms of types of STM and LTM with its expenditure components. An average per person's health expenditure of rural household members for diarrhoea was Rs.89, out of which 64 per cent was spent on drugs and medicine. However, as compared with diarrhoea, the average per person health expenditure was much lower for cold and cough, and fever, amounting to Rs.31, respectively for both cold and cough and fever.

The average per person health expenditure of the household members for LTM indicates a high variation (Table 5)**.** Treating cancer was more expensive than treating other major diseases. In the case of cancer, it was around Rs.3,807 per person followed by Rs.2,589 for TB, Rs.2,534 for mental illnesses, Rs.1,360 for heart diseases, Rs.1,917 for diabetes, Rs.1,330 for epilepsy and Rs.1,313 for hypertension. The lowest per person health expenditure was accounted for by the treatment of leprosy.

## Results from Multivariate Analysis for Health Expenditure Function

Tables 6 and 7 present the Two stage least squares (2SLS) selection-bias corrected estimates of the log of household health expenditures. Table 6 presents the estimates of the determinants of the total health expenditure function for STM and LTM across income groups (i.e., lower and upper percentiles). The results indicate that health expenditure for the upper income percentile groups of LTM is positively and significantly related to per capita income. It implies that higher the levels of income, the greater is the tendency to spend on treating LTM. The results show that every Re.1 increase in income levels will cause a Rs.1.69 increase in the health expenditure of LTM. Contrary to this, for the lower income group, there is a negative association between the per capita income and household health expenditure of LTM. Though this negative association has not been statistically significant at 5 per cent level of significance, it supports the view that lower income people spend a higher proportion for health in rural areas in India. In the case of health expenditure of STM, there is a significant negative relationship between per capita income and health expenditure of the higher income group. However, in the case of the lower income group, there is a positive relationship between per capita income and health expenditure.

It is often observed that health expenditure tends to rise less rapidly in the lower income group than in the higher income ones. To accommodate this possibility, the regression model uses the squared incomes of the household members. The results of the influences of logarithm of squared per capita income on health expenditure are opposite to the other form of per capita income (i.e., logarithm of per capita income) of the household members. The results indicate that the upper income group spends less on treating LTM, which implies a significant negative relationship between them. It shows that for every Re.1 increase in income, there is a reduction of Rs.1.60 in health expenditure of the household members on treating LTM (Table 6). However, the lower income groups spend more on health expenditure. It shows that for every Re.1 increase there is a marginal increase (i.e. 8 paise) in the total health expenditure on treating LTM. It is also important to note that the influence of squared per capita income has a significant positive relationship with health

**Table 6: 2SLS Regression Results for Total Household Health Expenditure Function**

| Variable | STM | | LTM | |
|---|---|---|---|---|
| | Lower 50 % | Upper 50% | Lower 50 % | Upper 50% |
| (Constant) | 5.27 | -22.99 | 5.60 | 35.73 |
| | (1.72)* | (10.11)** | (1.44)* | (9.23)* |
| Logarithm of per capita income | 0.48 | -1.37 | -0.08 | 1.67 |
| of the Household members | (0.25)* | (1.13)* | (0.22) | (1.03)* |
| Square of logarithm of per capita | -0.03 | 1.40 | 0.08 | -1.60 |
| income of the household members | (1.31) | (6.76)* | (1.12) | (6.17)* |
| Percentage of fertile women in | -0.15 | -0.13 | -0.05 | -0.04 |
| the household | (0.08)* | (0.05)** | (0.04) | (0.03) |
| Percentage of children in the | 0.11 | 0.06 | 0.02 | 0.01 |
| household | (0.02)* | (0.01)* | (0.10) | (0.03) |
| Number of times doctors | 0.06 | 0.09 | 0.12 | 0.18 |
| consulted | (0.02)* | (0.04)* | (0.02)** | (0.05)* |
| Dummy for private health | 0.20 | 0.23 | 0.02 | 0.02 |
| provider=1 otherwise-0 | (0.06)** | (0.09)* | (0.08) | (0.10) |
| Dummy for public health | 0.03 | 0.05 | 0.18 | 0.20 |
| provider=1 otherwise=0 | (0.09) | (0.07) | (0.06)* | (0.04)* |
| Number of working days lost | 0.10 | 0.13 | 0.09 | 0.07 |
| | (0.03)* | (0.04)** | (0.02)** | (0.05) |
| Health benefits from other | -0.06 | -0.09 | -0.03 | -0.02 |
| sources of the households | (0.03)* | (0.04)* | (0.07) | (0.08) |
| Occupational categories of the | 0.00 | 0.04 | 0.01 | 0.03 |
| household members | (0.01) | (0.01)* | (0.01) | (0.01)** |
| Literacy level of the household | 0.01 | 0.01 | 0.01 | 0.01 |
| members | (0.05) | (0.06) | (0.05) | (0.05) |
| Residing locations of the | -0.11 | -0.02 | -0.15 | -0.06* |
| household members | (0.01)* | (0.01) | (0.01)* | (0.01) |

*Notes*: Figures in parentheses are standard errors. * Significant at 1 per cent level of significance.
** Significant at 5 per cent level

**Table 7: 2SLS Regression Results for Expenditure on Drugs and Medicine Function**

| Variable | STM | | LTM | |
|---|---|---|---|---|
| | Lower 50 % | Upper 50% | Lower 50 % | Upper 50% |
| (Constant) | 3.34 | -9.94 | 4.92 | 34.39 |
| | (1.57)* | (7.64) | (4.92)* | (9.19)* |
| Logarithm of per capita income | 0.02 | -0.82 | -0.10 | 1.64 |
| of the Household members | (0.22) | (0.85) | (0.21) | (1.03)* |
| Square of logarithm of per capita | -0.01 | 0.87 | 0.10 | -1.57 |
| income of the household members | (1.19)* | (5.10) | (1.09) | (96.14)* |
| Percentage of fertile women in | -0.08 | -0.08 | -0.02 | -0.02 |
| the household | (0.01)* | (0.01)* | (0.01) | (0.00) |
| Percentage of children in | 0.09 | 0.12 | -0.03 | 0.01 |
| the household | (0.01)* | (0.01)* | (0.00) | (0.00) |
| Number of times doctors | 0.18 | 0.21 | 0.80 | 0.31 |
| consulted | (0.005)* | (0.09)** | (0.12)* | (0.09)* |
| Dummy for private health | 0.04 | 0.08 | -0.03 | -0.03 |
| provider=1 otherwise=0 | (0.02)* | (0.14)* | (0.08) | (0.09) |
| Dummy for public health | 0.10 | 0.60 | 0.27 | 0.71 |
| provider=1 otherwise=0 | (0.04)** | (0.16)** | (0.10)** | (0.19)* |
| Number of working days lost | 0.22 | 0.10 | 0.30 | 0.18 |
| | (0.08)** | (0.02)** | (0.11)** | (0.07)** |
| Health benefits from other | 0.04 | 0.03 | -0.03 | -0.01 |
| sources of the households | (0.02)* | (0.26)* | (0.07) | (0.08) |
| Occupational categories of the | 0.02 | 0.03 | 0.02 | 0.03 |
| household members | (0.01) | (0.01) | (0.01) | (0.01)** |
| Literacy level of the household | 0.01 | 0.01 | 0.01 | -0.001 |
| members | (0.04) | (0.05) | (0.05) | (0.05) |
| Residing locations of the | -0.09 | 0.04 | -0.14 | 0.08 |
| household members | (0.01)** | (0.01)* | (0.01)** | (0.01) |

*Notes:* Figures in parentheses are standard errors. * Significant at 1 per cent level of significance ** Significant at 5 per cent level

expenditure on treating STM for the upper income group and a significant negative relationship for the lower income group on treating LTM (Table 6).

The estimates also reveal that the presence of children in the household has a significant effect on both the income groups. It is positively related to the higher probability of making health expenditure in the cases of treating STM as revealed by the positively significant coefficients. However, this relationship has not been portrayed in the cases of treating LTM for both the income groups.

The higher proportion of fertile age group women in the households has a significant negative influence on health expenditure for all income groups on treating STM but the same relationship is not significant in the case of LTM (Table 6). The other variables such as percentage of children in the household, other sources of health benefits such as insurance of the household, and literacy level of members of the household do not have any significant influence on the health expenditure of LTM for both income groups. However, these variables play a vital role in the household health expenditure determinant function in the case of STM. The results indicate that the high percentage of children in the household resulted in a positive and significant impact on total health expenditure on treating STM for both low and high income groups. Contrasting with this result, a significant negative relationship is established between the other sources of health benefits of the household and total health expenditure on treating STM. It is also important to note that occupational status plays a significant role in determination of household health expenditure of the upper income groups on treating STM and LTM. The estimates for the household members' residing location show that there is a significant negative relationship with household health expenditure. It implies that there is a significant health expenditure variation among the household members living in the different states (represented as a zone in this context).

The number of working days lost due to illness, which is the proxy for the health status of the rural household members, is positive and significant for both total health expenditure and expenditure on drugs and medicines functions. The results reveal that the frequency of doctor's consultation has significant positive responses in both the total health care expenditure function, and expenditure on drugs and medicine function (Table 6 and Table 7). However, the degree of positive responses between frequency of doctor's consultation and expenditure on drugs and medicine is higher than the total health expenditure for both STM and LTM. This implies that much of the total health expenditure of the household members in rural India is due to higher expenditure on drugs and medicines. It could also be due to non-availability of essential drugs at subsidised rates in the government health care providers in rural India. It is also explained by the choice of health care provider of the rural households. The choice of private provider having a negative relationship with expenditure on drugs and medicine is due to LTM of the household members (Table 7).

Table 7 shows the analysis of expenditure on drugs and medicines of STM and LTM for lower and upper income groups. The estimates illustrate the same pattern of aggregate health expenditure of the household members of rural India for most of the cases, albeit, the lower degree of coefficients for drugs and medicines expenditure function. However, two important variables, namely, treatment from formal health care provider and health benefits from other sources of the households

in this function, yield different results especially for income groups of STM and LTM. In the aggregate health expenditure function, these two variables explain the negative impacts on health expenditure, whereas they play a positive role in the determination of drugs and medicines expenditure function. It suggests that a household spends more money on drugs and medicines to get better treatment from the formal health care provider in the rural areas. It also reflects the negative implication on the quality of health care in the existing government health care provider, where drugs and medicines are provided free of cost. In this sense, it is assumed that there will be a negative impact in the determination of drugs and medicine expenditure function. The positive influence of this variable on the drugs and medicine expenditure function establishes the fact that most of the people in the rural areas have to pay for drugs and medicine.

Tables 8 and 9 show estimates of the elasticity of total health expenditure, and drugs and medicine expenditure of household members respectively with respect to household income, derived from the regression results[1]. The table includes estimates regarding the changes in the probability of making health care expenditure with respect to income of household members. The income elasticity of health expenditure function represents the ratio of the percentage change in health expenditure to the percentage change in income. Overall, the elasticity estimates are plausible, ranging between –1.37 and 1.67 (Table 8)**.** It is important to note that the elasticities of upper income groups range are -1.37 and 1.67 for STM and LTM, respectively. The income elasticity of STM expenditure equals –1.37, which means an increase in income leads to a decrease in health expenditure of the household members, i.e., a 10 per cent increase in the upper income group causes a 13.7 per cent decrease. Income elasticity in the case of LTM is positive, which means that an increase in real income leads to an increase of health expenditure among the household members of the upper income group in treating LTM. The income elasticity of this group equals 1.67; this means a 10 per cent increase in income causes the health expenditure to increase by 16.7 per cent. Thus, the estimates indicate an income elastic situation for spending on treating both STM and LTM by

**Table 8: Impacts of Household Income on Total Health Expenditure for STM and LTM**

| Household Income | STM | | LTM | |
|---|---|---|---|---|
| | Lower 50 % | Upper 50% | Lower 50 % | Upper 50% |
| Elasticity with respect to household income | 0.48 | -1.37 | -0.08 | 1.67 |
| Change in probability of health expenditure with respect to household income | -0.03 | 1.40 | 0.08 | -1.60 |

**Table 9: Impacts of the Household Income on Drugs and Medicine Expenditure for STM and LTM**

| Household Income | STM | | LTM | |
|---|---|---|---|---|
| | Lower 50 % | Upper 50% | Lower 50 % | Upper 50% |
| Elasticity with respect to household income | 0.02 | -0.82 | -0.10 | 1.64 |
| Change in probability of health expenditure with respect to household income | -0.01 | 0.87 | 0.10 | -1.57 |

the upper income groups as it exceeds the income elasticity of health expenditure by more than 1 in absolute terms. It is also important to note that there is an income inelastic situation for spending on treating both STM and LTM for low-income groups, which means that no change occurs in health expenditure when the income of the household member changes. However, the estimates show that the income elasticity of spending on treating STM is 0.48, which means a 10 per cent increase in income leads to an increase of 4.8 per cent in the health expenditure of the household members of the low-income group. However, the case of income elasticity of spending on treating LTM is –0.08, which implies that every 10 per cent increase in income of the household members leads to a 0.80 per cent decrease in total health expenditure.

Contrary to the aggregate health expenditure with respect to income of the household members, the analysis includes change in probability of health expenditure with respect to income of the household members (Table 8), which displays the same pattern of aggregate health expenditure function notwithstanding the lower degree of changes. It is also important to note that the analysis of the impacts of income of the household members on drugs and medicines expenditure explains income elasticity only for the higher income group in treating LTM (Table 9). It is also significant to observe that the income elasticity of spending on treating STM is 0.02, which indicates a 0.20 per cent increase of the drugs and medicines expenditure for every 10 per cent increase of income of the household members in the rural areas.

## Discussion

The principal findings suggest that health expenditure of the household members of rural India is sensitive to changes in household income levels, and the elasticity of health expenditure with respect to income is largest for high income groups. It indicates an income elastic situation for spending on treating both STM and LTM by the upper income groups as the elasticity exceeds by more than 1 in absolute terms. It is also true in the case of drugs and medicine expenditure function.

This suggests that at times of economic crisis and recession, these household members proportionately reduce cash expenditures on health care more than the low-income group. One of the more interesting questions concerning this research has to do with health care as a luxury good. Economists define a luxury good as one that has income elasticity above + 1.00. Health care is considered to be a luxury good for upper income people only in the case of treatment of LTM. If the aggregate income elasticity of health expenditure, and drugs and medicines expenditure are above + 1.00, this may provide a demand-side explanation as to why health care expenditure as a proportion of household income has increased at any point of time. As the household economy grew over the years and real per capita income expanded, the households allocated a greater proportion to health care because it is a luxury good especially for the upper income group in treating LTM.

Health care could also be considered a normal good since the values of income elasticity are positive for the upper and lower income groups on treating LTM and STM, respectively. It means that even with the values of an income inelasticity, increase in income leads to an increase in health expenditure of the upper and lower income groups on treating LTM and STM, respectively. The results also indicate that with macro-economic shocks, households are likely to adjust their total health care expenditure, and expenditures on drugs and medicine. The pattern of adjustment will differ by income group and by health-benefit coverage of the population. The findings also indicate the importance of health benefit from other source of the household members determining drugs and medicines expenditure on health care for treating STM, which is an indication of the determination of labour market participation in the formal or informal sector of employment.

The results also suggest that households incur more total health expenditure in general and spend on drugs and medicines in particular to get treated from the formal health care provider in the rural areas. It is an important issue in health care planning and financing such an income inelastic situation of the lower income rural households in relation to total health expenditure and expenditure on drugs and medicines in India. It is important also because of the low availability and accessibility of drugs in the rural areas in India. Thus, there is a need for providing protection to the lower income people in terms of supplying quality health care by the government. The much discussed policy options of recent governments are social security schemes for the rural poor and opening up of the insurance sector to private partnership, which includes more options to the voluntary health insurance schemes in India (Krishnan 1996; Mathiyazhagan 1994, 1995; GOI 2003). The successive central governments failed to design effective social security schemes for the rural poor. However, the government of India has opened up the insurance sector to private partnership for providing voluntary health insurance

schemes. Indeed, currently sixteen private partnership insurance companies along with government traditional insurance companies are competing with each other to attract more people into the insurance fold. The voluntary health insurance through existing government insurance companies and ensuing recent private health insurance companies will concentrate only on the economically powerful segment of the population in India. The socially and economically deprived population in the rural areas will not gain more from this kind of scheme. In this context, government should recognize the willingness of the people to pay for the rural health insurance scheme through community participation with the help of NGOs and Panchayat (village) level administration, which proved to be feasible in rural areas of Karnataka State in India (Mathiyazhagan 1998). Indeed, there is a need for a national-level rural household survey in order to assess the viability of the rural health insurance scheme through community participation in India, which could be managed at the decentralised level (i.e., village panchayat administration). This may enhance the accessibility and availability of quality-oriented health care services to the lower income households, who are working in the unorganised sector in the rural areas.

## Notes

1. The expression for the elasticities is: $\beta_1 + 2\beta_2(\ln x)$, where the regression coefficients correspond to those of the log-income and the squared log-income terms in the equation respectively. The elasticity is obtained by evaluating the expression at the mean value of ln x.

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# Negative Impacts of Emerging Informal Groundwater Markets in Peninsular India: Reduced Local Food Security and Unemployment[1]

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## Abstract

In peninsular India, water remains an extremely critical and valuable resource because of its scarcity. Being a semiarid region, demand for irrigation water competes with increasing demands from other sectors such as domestic and industrial uses. This paper analyses the impact of groundwater transfer from rural to urban areas on local food security and employment. We argue that groundwater trading from peri-urban to urban centres has led to 'overdraft of groundwater,' inflicting damage to the local economy such as unemployment, out-migration of labourers, and local food insecurity. Based on the results, we propose some policy measures to regulate groundwater extraction and use via water allocation management plans which issue permissible annual extractions, pricing of water on a pro-rata basis to reflect true cost of water, and encouragement of users' participation in groundwater conservation through watershed development programmes. These regulations should be embedded in local State-based policy evolved under the National Water Policy.

## Introduction

Surface and sub-surface water bodies are hydrologically interconnected and the extraction and use is subject to competition from different users and uses. There is tremendous pressure on water, leading to both physical and economic scarcity in India and adverse consequences for ecology, environment and equity. The number of regions in the world where human demand exceeds local water supplies is growing. Global water use has been growing at more than twice the rate

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of population increase during the last century (United Nations 1997). Thus, water scarcity could be one of the major factors limiting our ability to increase food production to feed the growing population.

Groundwater has contributed significantly to the development of Indian agriculture, particularly during the last three decades. It has been responsible for attaining food security through the green revolution and commercial farming and promoting equity. Its exploitation in India is largely in the hands of private individuals and its development has grown explosively over the years. Besides irrigation, groundwater is also an important source of potable water both in urban and in rural areas (Nagaraj et al. 1999).

In peninsular India, water remains an extremely critical and valuable resource because of its relative scarcity. As India is a semiarid region, demand for irrigation water competes with increasing demands from other sectors such as domestic and industrial uses besides meeting the ecological needs, thus exacerbating the tensions between rural and urban interests. In both urban and rural areas, water is highly subsidized, not reflecting its true cost. Hence, there has been large inter-temporal and interspatial misallocation of this scarce resource. Owing to the massive subsidies to the private individual well owners, groundwater is extracted on a large scale and supplied to the competing users in the urban areas, resulting in 'groundwater overmining.' This unsystematic and rapid development of well structures has led to adverse direct and indirect effects from water transfers, leading to serious overdraft implications — a classic common problem (see McKay 2003). In addition to direct impacts on agricultural production, water transfers can negatively affect business activities, local government fiscal capacity and the quality of public services in areas from which water is being transferred because of the reduction in irrigated area or production and associated reduction in agriculturally linked economic activities (Rosegrant 2000).

The focus of this study is to analyse the economic implications of groundwater transfer from rural to urban areas and its impact on local food security and unemployment. The specific objectives of the study include: (i) Identifying the interplay of factors promoting water transfers from rural to urban areas; (ii) Assessment of the impact of water transfers through groundwater markets on local food security and unemployment, and (iii) Analysis of the impact of rural-urban water markets on groundwater sustainability. The scope of this paper is to draw the attention of policy makers to regulate the transfer of water through appropriate economic instruments such as pricing, taxation as well as regulatory instruments via issuing of permits. There is a need for statewide policy plus regulation of water markets in each state. In addition, the study emphasises the need for strong and effective institutions to manage the water resources at the national and state levels. These bodies should promote groundwater recharge measures to conserve the

water resources. We assume that the social benefit is higher if the water is used in agriculture, the assumption being that it ensures food security in this context[2]. The hypotheses were made based on the objectives of the study and are presented in the following table.

**Objectives and Hypotheses**

| Objectives | Hypotheses | Reasons |
|---|---|---|
| (i) Identifying interplay of factors promoting water transfer | (i) Water trading is more lucrative than irrigated agriculture.<br>(ii) Access to modern technology for drilling deeper wells has promoted water transfers.<br>(iii) Subsidized electricity has promoted water transfers. | (i)The profit per unit of water sold is higher than profit from irrigated agriculture.<br>(ii) Farmers have responded to advent of modern drilling technology. If farmers owned traditional dug wells they might not have resorted to water transfer.<br>(iii) Marginal cost of extraction of groundwater is zero, which leads to unlimited volume of groundwater extraction. |
| (ii) Assessment of the impact of water transfers on local food security and employment | (i) Water transfer affects the local food security and employment opportunities for labourers depending upon agricultural linked activities. | (i) Due to water transfer to urban centres agricultural activities are lower leading to unemployment for agricultural labourers.<br>(ii) Reduced area under agriculture leads to decline in food grain production affecting the local food security.<br>(iii) People would depend on city markets for their food grain requirements, i.e., 'dependency syndrome.' |
| (iii) Analyse the impact of rural-urban water market on groundwater sustainability | (i) Groundwater overdraft has led to unsustainable use of groundwater resource. | (i) Overdraft of groundwater is due to unlimited extraction of groundwater. This leads to unsustainability. |

This paper is based on a case study conducted in Bangalore rural district of Karnataka state, which is a typical hard-rock area representing the peninsular parts of India. The study area is located about 10 kilometres from Bangalore city. There is evidence that on account of massive exploitation of groundwater in the peri-urban area the depth of bore wells has been increasing. Over the last five years this has resulted in a decline in well yield (Figure 2). The number of bore wells has

been increasing rapidly (Jagadish 1999) for the last two decades in Bangalore rural district especially in and around Bangalore city. Further, there has been an increase in the growth of bore wells as the rate of annual growth of bore wells was 2.7 per cent (Figure 3). This rapid expansion reflects the signs of overexploitation of groundwater resources.

A reconnaissance survey was conducted to identify the intensity of water markets in the urban hinterlands and to assess the ground realities regarding the width and functioning of groundwater markets among the water sellers in the area. A sample of 30 respondents was chosen randomly for this study. The field data were collected by primary survey through personal interviews using an open-end questionnaire. The primary data pertain to the year 2001. Information relating to investment on wells and infrastructure required to supply groundwater to commercial establishments in the city was elicited.

Groundwater exploitation entails a lumpy investment that has to be amortised in order to compute the annual water extraction charges. Accordingly, the investments on well, pump set and conveyance structures have been amortised to arrive at the annual cost of water supply to which the variable costs are added to get the total cost. The amortisation cost is calculated as follows:

$$\text{Amortised Cost} = \text{Cost of Assets}/\ 1-(1+i)^{-n}/\ i$$

where, Assets = Bore well, Pump Set and Conveyance Structure, $n$ = the life spans of well, irrigation pump set and conveyance structures, $i$ = the interest rate. The annual cost of water supply is calculated by adding the variable costs like electricity charges to the amortised cost. The cost per unit of water is calculated using a formula as follows:

$$\text{Cost per unit of water} = \text{Total cost}/\ \text{Total volume of water extracted}$$

In this study the average life span of the bore well and the submersible pump set was considered as 10 years and 20 years respectively. In order to supply water from source to destination, the water sellers own vehicles embedded with a tanker having a capacity ranging from 5,000 to 6,000 litres. The investment on water conveyance has also been amortised by using an interest rate of 10 per cent [3] and considering 20 and 25 years as life span of the vehicle and tank respectively. The economics of groundwater used in agriculture is also worked out.

## Rapid Urbanisation and Industrialisation: Pressure on Groundwater

Although groundwater use is mainly confined to the agriculture sector, in recent years the demand for groundwater use has been increasing at a fast rate due

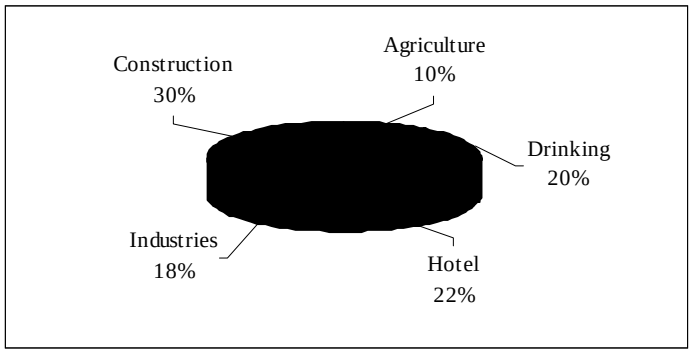
to rapid urbanisation and industrialisation. Consequently, there has been intensive pressure on this vulnerable resource for different uses and users such as construction activities, municipal use, urban drinking water needs, and industrial use, and so on. Thus, groundwater markets provided access to the water needs of the urban community. With the emergence of groundwater markets, there has been a rapid expansion of groundwater development both for irrigation and for other uses. Even though groundwater is considered a renewable resource, due to the indispensable nature, absence of substitute sources, and ever-increasing demand for agricultural and urban needs, the rate of extraction is surpassing the natural rate of recharge in most of the semi-arid areas[4]. In areas where there is no assured source of surface water it has led to the depletion of this valuable resource.

## Results and Discussion

### Allocation of Groundwater for Different Purposes

In the recent past, demand for groundwater use has been growing at a faster rate due to rapid urbanisation and industrialisation. Consequently, water users are competing between activities such as construction, hotel, drinking water, and industrial use. Considering the proportion of groundwater allocated to different purposes, a large proportion of the groundwater has been allocated to non-agricultural purposes (90 per cent). Thus, there has been a paradigm shift in the water allocation in peri-urban areas from agricultural to non-agricultural use. It was evident that only a small proportion of groundwater extracted was allocated to agriculture (10 per cent). It has also been observed that non-agricultural activities are competing with agriculture for groundwater use around urban centres. This clearly indicates that rapid urbanisation has led to increased groundwater demand from the urban community. Thus, the groundwater markets served as an instrument for the water needs of the urban community (Figure 1).

**Figure 1: Allocation of Groundwater for Different Purposes**



According to Rosegrant (2000), increasing demand for water from urbanites has led to a situation called 'water farming' in Arizona (USA) wherein municipalities and other entities are purchasing land in rural areas for groundwater extraction. These areas face problems in maintaining their populations and economies once water is exported for use in other areas. The situation in India is similar as most of the farmers in rural areas are investing on wells to supply water to the urban areas to meet the water requirements of the urbanites (Moench 1991). This indicates that in the absence of new sources of water supply, the reallocation of water from agriculture to domestic and industrial uses is imperative. According to Kemper (2001), reallocation of water through water trading is a means of getting compensated especially when the water is transferred to high value use.

**Factors Promoting Rural Water Transfer**

The key factors that promoted water markets in the study area include (i) profitability, (ii) risk associated with agriculture, (iii) untimely availability of labourers (iv) crop failure (v) subsidized electricity and (vi) access to modern technology for drilling deeper wells and pumping (Table 1).

**Table 1: Factors Promoting Water Transfers from Rural to Urban Areas**

| Factors | Number of respondents | Percentage of respondents |
|---|---|---|
| Profitability | 30 | 100 |
| Risk associated with agriculture | 17 | 56 |
| Untimely availability of labourers | 10 | 33 |
| Crop failure | 15 | 50 |
| Subsidized electricity | 15 | 50 |
| Access to modern technology for deeper drilling of wells | 25 | 83 |

As the table shows, all respondents have indicated that profitability associated with water selling has promoted the water transfers from rural to urban areas. About 83 per cent of the respondents have attributed such transfers to access to modern technology for drilling deeper wells; 56 per cent cite risk associated with agriculture; and 50 per cent cite crop failure and subsidized electricity. This clearly indicated that selling water represents a survival strategy for well owners.

**Impact on Local Food Security**

Our hypothesis was that water transfer has affected local food security[5] in the study area. As is evident from Table 2, the proportion of the area under food crops (paddy and finger millet) has been drastically reduced between the two periods.

The productivity of food crops has reduced to the extent of 63 per cent, reflecting the loss of income from agriculture to the extent of 77 per cent respectively. It also indicated that the agricultural labourers have lost employment opportunities to the extent of 65 per cent owing to reduction in the area under cultivation (Table 2).

**Table 2: Impact of Water Transfers on Local Food Security**

| Particulars | Before water transfer (acres) | After water transfer (acres) |
|---|---|---|
| **Food crops** | | |
| Area (acres) | 4 | 1 (25) |
| Yield (quintals) | 80 | 30 (37) |
| Labour employment (man days) | 100 | 35 (35) |
| Income from crops (Rs.) | 29,999 | 4,972 (23) |
| **Commercial crops** | | |
| Area (acres) | 2 | 0 |
| Yield (quintals) | 20 | 0 |
| Labour employment (man days) | 50 | 0 |
| Income from crops (Rs.) | 10,000 | 0 |
| **Perennial crops** | | |
| Area (acres) | 1 | 1 |
| Yield (Number of nuts) | 2,000 | 500 |
| Labour employment (man days) | 50 | 15 |
| Income from perennial crops (Rs.) | 8,000 | 2,000 |

*Note:* Figures in parentheses indicate percentage of the total.

This has severe implications for the equity and employment opportunities for the agricultural labourers in this area. In addition, there has been out-migration of the labourers to the urban areas in search of employment opportunities. Income from crop enterprise has drastically fallen as a result of the groundwater transfer. Similarly, the irrigated area under commercial crops (tomato and brinjal) has fallen drastically. Thus on account of water transfers, the area under both food and commercial crops has reduced. Owing to this, farmers in the area are fully dependent on urban markets for food grain requirements, causing local food insecurity in the area. With the dipping of agricultural activities in the locality, there has been a greater degree of 'dependency syndrome' for food. The groundwater transfer also affected the agriculturally linked activities. A study by Rosegrant (2000) indicated that groundwater transfer negatively affects business activities; local government fiscal capacity and quality of public services in areas from which water is being transferred because of the reduction in agriculturally linked economic activities. In

addition, it may limit future economic development and induce out-migration. Nagaraj and Chandrakanth (1996) have reported similar results in the study area.

**Relative Economics**

The relative economics of crops vis-à-vis water trading is worked out to arrive at profitability. It was evident that, before water trading, on an average, farmers extracted groundwater to the extent of 20, 00,169 gallons per year in order to cultivate field crops of 4 acres (2 acres of paddy and 2 acres of finger millet). Out of this, 18, 87,114 gallons of water (94 per cent) has been allocated to paddy crop alone. On an average, the cost of irrigation works out to Rs.54.6 per 1,000 gallons of groundwater used for paddy as against Rs.68.73 per 1,000 gallons for finger millet (ragi). On an average, the net profit per 1,000 gallons of water used from paddy is Rs.74 as compared with finger millet, which yielded a return of Rs.55.57 per 1,000 gallons. The benefit-cost ratio of water use for paddy was 1.35:1 as compared with finger millet with 0.80:1. Contrary to this, in water trade, a water seller extracted and supplied 19, 99,950 gallons of groundwater to the urban area. The comparison between agriculture water uses with water trade shows that farmers allocating water to agriculture extracted and used 219 gallons more than the water trading.

**Table 3: Relative Economics of Crops *vs.* Water Trading in Bangalore Rural District**

| Crops Grown | Amount | Crops Grown | Amount | Water Trading | Amount |
|---|---|---|---|---|---|
| Crop (Paddy) | | Crop (Finger millet) | | Water sales | |
| Area (acres) | 2 | Area (acres) | 2 | Total volume of water sold (gallons) | 19,99,950 |
| Total volume of water applied (gallons) | 18,87,114 | Total volume of water applied (gallons) | 1,13,055 | Total expenditure (**) (Rs.) | 1,22,685 |
| Expenditure per year (*) (Rs.) | 10,000 | Expenditure per year (*) (Rs.) | 2,000 | Cost per 1000 gallons of water sold (Rs.) | 61 |
| Cost per 1,000 gallons of water(Rs.) | 54.6 | Cost per 1000 gallons of water (Rs.) | 69 | Gross returns per year (Rs.) | 44,996 |
| Net profit per farm per year (Rs.) | 30,000 | Net profit per farm per year (Rs.) | 6,400 | Net returns per year (Rs.) | 3,27,332 |
| Net profit per 1,000 gallons of water (Rs.) | 74 | Net profit per 1,000 gallons of water (Rs.) | 55.574 | Net returns per 1,000 gallons of water sold (Rs.) | 163 |

*Note*: (*) Includes the cost of production of paddy crop and the amortised cost of water for irrigation.

(**) Includes the amortised cost and the variable cost.

The average cost per 1,000 gallons of water extracted for water trading is Rs.61 (including the amortised investment on well) and a net profit of Rs.163 per 1,000 gallons was realised. The benefit cost ratio was 2.67:1. This clearly indicates that farmers supplying water to urban areas are realising substantially more net profit compared with farmers allocating groundwater for growing crops. This indicated that water trading has been more lucrative than irrigated farming. Though the return per unit of water is high in the case of water trading compared with agriculture, the true cost of water is not reflected in the water price[6]. As indicated by Rosegrant (2000), water markets have been facilitated through broadening markets for water to urban areas, leading to a secular decline in the water table, inflicting economic damage to the production system. However, it is not groundwater markets alone that are responsible for over-extraction but also agriculture, which demands more water for growing crops, as indicative from the results, as a large quantity of groundwater has been allocated for paddy crop alone.

**Economics of Water Trade**

The economics of water trade in Bangalore rural area (Table 4) indicated that on an average the amortised cost of well and vehicle and conveyance structures was Rs.72,540 per year. Out of the total investments on well development, the cost of exploration forms a meagre 3 per cent. Similarly, electricity service forms 4 per cent, pump set 4 per cent and pump house 3.2 per cent, and investment on overhead tanker forms 8 per cent. The investment on vehicle forms 84 per cent of the total investment made. This indicates that though water trading is capital-intensive, the return per rupee of investment is quite high compared with the returns per rupee of investment from agriculture. This was one of the reasons for water trading. The variable cost incurred for water trading is Rs.54,147.60 (including electricity charges, salary to driver and helper required for a water tanker, and vehicle and pump repair, painting of vehicle, diesel cost and road tax).

It was evident that the average groundwater extracted per day was about 13,333 gallons (60,000 litres). The total investment made was Rs.6,17,565 per water seller. On an average, the cost incurred to extract and supply 13,333 gallons of water per day works out to Rs.370 (including Rs.125 salary of a driver + Rs.35 salary of a helper + Rs.210 towards electricity charge).

During a calendar year, groundwater sellers have been actively involved in water trading for 150 days and the peak period of water selling has been during the summer mostly to meet the urban water demand for drinking, construction and industrial uses.

**Table 4: Economics of Water Trade in Bangalore Rural Area: Investment Particulars on Bore Wells of Water Sellers (in Rupees)**

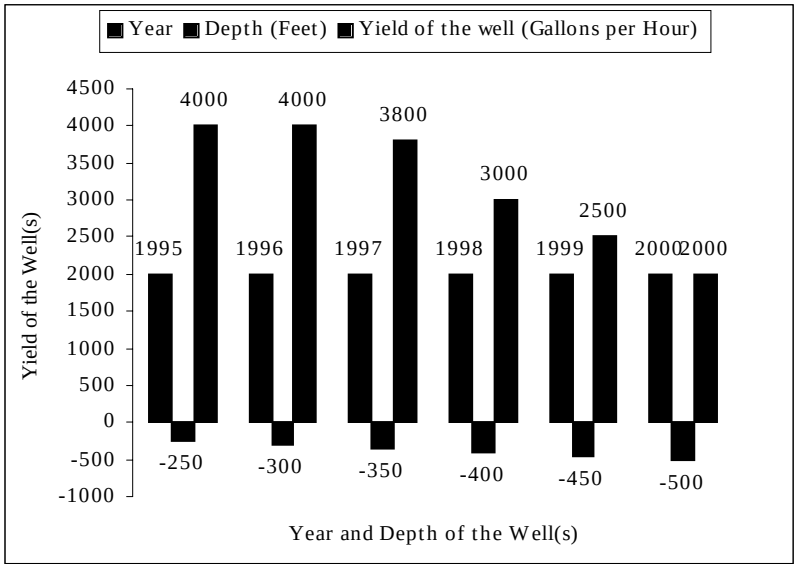
| Particulars | Average Cost | Amortised Cost |
|---|---|---|
| **Fixed Cost** | | |
| Cost of GW exploration | 18,273.93 (3) | |
| Cost of Casing | 7,999.87 (1.3) | |
| HDPE pipe cost | 11,999.81 (2) | |
| Pipeline cost | 2,999.58 (0.5) | |
| Electricity Service | 24,999.95 (4) | |
| **Total** | **66,273.67** | **10,785.93** |
| Pump set cost (*) | 24,999.97 (4) | 4,068.67 |
| Pump house cost (**) | 19,999.68 (3.2) | 1,222.65 |
| Overhead tanker (***) | 49,999.95 (8) | 5,507.77 |
| Vehicle (**) | 5,22,580.90 (84) | 61,381.61 |
| **Total** | **6,17,580.60** | **72,540.90** |
| **Variable Cost** | | |
| Electricity charge per day | 146.25 | |
| Salary (driver + helper)/month | 4,777.50 | |
| Vehicle and pump repair | 1,998.75 | |
| Painting of vehicle | 1,998.75 | |
| Road tax | 5,996.25 | |
| Diesel cost/day | 341.25 | |
| Opportunity cost of labour (For 150 days @ Rs.52.65 per day) | 7,507.50 | |
| **Total Variable cost** | **22,766.25** | |

(*) Assumed 10 years as life span of well and IP set
(**) Assumed 20 years life span for pump house and vehicle
(***) Assumed 25 years life span for overhead tanker
Total variable cost Rs. 22,766.25
Interest on variable cost @ 10 % is Rs. 2,276.62
*Note*: Figures in parentheses indicate percentage of the total.

**Expansion of Groundwater Withdrawals**

The emergence of groundwater markets has intensified the exploitation of groundwater in many parts of the world. In the study area the depth of the wells has been increasing over the years due to the lowering of water tables. The yield of the wells has also been declining. This has severe implications for area under irrigation. In turn, this has clear implications for food production in the area. The unsystematic development and extraction of groundwater has led to the overdraft, resulting in a secular fall in the water table (Figure.2). There is evidence that the heavy pumping of groundwater has reduced the water table.

**Figure 2: Expansion of Groundwater Withdrawals**




*Source*: Jagadish (1999)

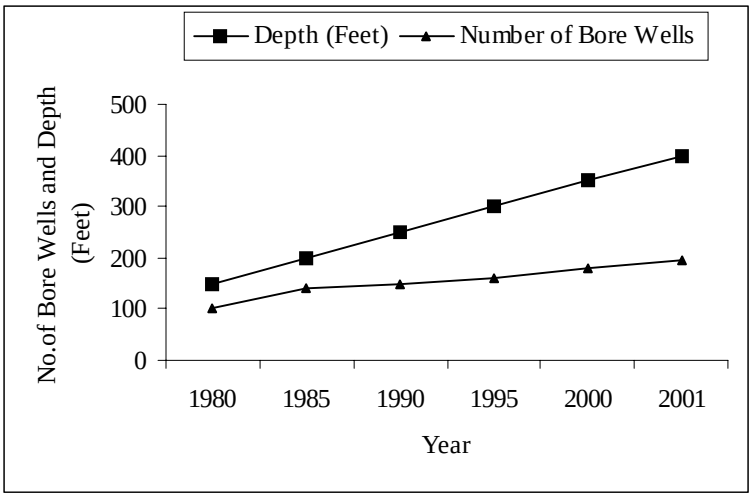
According to Palanisami (1994), in Tamil Nadu state, heavy pumping has reduced the water levels by as much as 25–30 metres in a decade, and in the western Indian state of Gujarat, overextraction in the coastal areas has resulted in salt water intrusion into the aquifer, contaminating village drinking supplies. This indicates that the negative externalities are pervasive in the areas facing groundwater overdraft. There is evidence that owing to the growing demand for groundwater and substitution of labour-intensive water lifting methods by capital-intensive electrical irrigation pump sets, there has been large-scale exploitation of groundwater, leading to a high rate of well failure and loss of investment on well irrigation (Nagaraj and Chandrakanth 1995). According to Reddy and Gopal (2001), owing to increased extraction of groundwater and tapping of deeper aquifers, most of the shallow wells, dug wells and bore wells in the over-exploited taluks have become dry. As a result, around Rs.2 billion invested on dug wells, pump sets and other developmental works by individual farmers has become infructuous. Further, depletion of shallow aquifers by excessive withdrawals has increased the unit cost of bore well drilling. They have indicated that in view of deeper groundwater levels, high-energy pumps have been installed to draw water from deeper levels. Owing to overexploitation of groundwater, the majority of marginal and small farmers were unable to invest on deeper bore wells. As a result, the land has become unproductive. The study further indicated that, owing to increased demand for domestic, industrial and

agricultural needs and limited surface water resource, there has been explosive development of groundwater resource. This has led to a critical situation, manifesting as declining groundwater levels, shortage of water supply, and so on.

**Dynamics of Rural-Urban Water Markets and Groundwater Sustainability**

It was evident that the number of well owners selling water has been increasing over the years to meet the growing water needs of urban areas, and the depth of wells has also been increasing. The dynamics of rural-urban water markets was reflected in terms of increased demand for water in urban areas for different purposes. This indicated that there is a competitive race for groundwater exploitation even in urban areas for commercial uses. As a result, shallow wells have dried, and bore wells have been emerging, spurred by access to modern groundwater exploration techniques. Thus, unsustainability in groundwater development has been evident in the peri-urban area (Figure.3).

**Figure 3: Dynamics of Groundwater Supply in Bangalore Rural District**




*Source:* Jagadish (1999)

Groundwater markets have both negative and positive impacts. In the study area the emergence of groundwater markets has led to depletion of aquifers with long-run ecological implications such as drying up of tanks, village ponds, and surrounding flora. As indicated by Rosegrant (2000), over-drafting, or the overmining of groundwater at a rate higher than recharge, increases pumping lifts and cost of extraction because of the lowered water table, and this affects the ecology and environment in terms of land subsidence (sometimes irreversibly damaging the aquifer), and induces saline water intrusion and degradation of water

quality in the aquifer. In contrast, groundwater markets increase the access to groundwater of those who lack such access.

In areas where groundwater scarcity is acute and monopolistic situation prevails, farmers use this precious resource in a sustainable manner by opting for different water management strategies. Thus, groundwater markets could be useful instruments for users to conserve water. Briscoe (1997) argues that it may not be appropriate at this stage to advertise that the groundwater markets are 'silver bullets', which affect sustainability, but groundwater markets are one of the strategies to increase the access to water resources.

## Conclusion and Policy Implications

The key factors that promoted water markets include profitability from water selling, risk associated with agriculture, untimely availability of labourers, crop failure, subsidized electricity, and access to technology for drilling deeper wells and pumping. The water markets are informal and localised, and the nature of competition resembles an oligopoly.

The irrigated area under food crops has drastically reduced, causing local food insecurity. There has been out-migration of labour to the urban areas owing to loss of employment in the agriculture sector. There has been a secular decline of the water table owing to groundwater overexploitation, resulting in land degradation, drying of lakes and irrigation tanks with severe implications for the ecology and environment.

The benefit-cost ratio of water use for paddy was 1.35:1, whereas in groundwater sale it was 2.67:1. Considering the alternative uses of groundwater, farmers would prefer groundwater sale to urban commercial establishments over irrigated agriculture. This clearly shows that water trading has been more lucrative than irrigated farming in view of associated risks in agriculture. The positive aspect of water transfer from rural to urban areas is that farmers are earning relatively more profit from water trading than from agriculture. Though this increases the farmers' ability to purchase the required food grains from the urban centres, the plight of the agricultural labourers who depend on agriculturally linked activities will not be resolved. Therefore, there is a trade-off in rural-urban water transfer. This trade-off has resulted in converting agriculture to a situation called 'lucrative water selling' business to reap the larger net returns per gallon of groundwater extracted.

Based on the results, we outline the policy implications of the study. The groundwater transfers from rural to urban centres have large negative impacts on rural economy in terms of unemployment to agricultural labourers, out-migration of labour to the city in search of employment, and local food insecurity problems. At present there is no appropriate regulation for groundwater extraction and use in

India. In this regard, there is a dire need to regulate groundwater extraction and use through appropriate policy measures such as

- issuing permits to drill wells. Given the scarcity of groundwater resource especially in peninsular India, permission to drill wells is a challenging task. The responsibility of issuing such permits could be with the state groundwater board or state groundwater authorities,
- issuing annual permissible extractions; this can be done through water resources plans or water allocation management plans. There is evidence in Australia for water allocation management plans (WAMP). For instance in Queensland, the WAMP is designed to provide a framework for clearly establishing environmental flows, water allocations and the resource management conditions under which trading of water allocations occurs (McKay 2002). The WAMP determines the volume of water that can be allocated to an individual well owner. This would restrict farmers from extracting an unlimited volume of groundwater resource as WAMP defines the volume of water allocations,
- pricing of electricity on pro-rata basis. This is an important issue because the existing flat rate of electricity has led to unlimited extraction of groundwater. In order to promote efficiency in water use and to put scarce water to high value use the price of the water should reflect true cost. Therefore, the price of electricity should be on pro-rata basis,
- defining clear property rights to groundwater resource use. At present, there is no single regulation in India defining property rights to groundwater resource. In the absence of clear property rights to groundwater the sustainability of groundwater resource cannot be achieved. It is apparent that groundwater development is under private ownership regime and the legal status in terms of *de jure* rights is not transparent. Singh (1995) indicated that India initiated the Groundwater (Control and Regulation) Bill in 1970 and revalidated it in 1992 to regulate and control the development of groundwater. This draft bill has been presented in the legislature of several states (except Gujarat and Maharashtra) but has never been approved (Nagaraj et al. 1999). This indicates that for obvious political reasons water policies have failed to make a discernible impact. At present, the only mechanism for the state to check overexploitation of groundwater resource is the imposition of restrictions on finance through National Bank for Agriculture and Rural Development (NABARD) for well development in overexploited areas. However, this fails to check privately financed wells. In this direction, there is a dire need for Federal government to enact appropriate regulation to define the property rights to groundwater resource,
- encourage users' participation in groundwater management programmes through formation of water users' associations and co-operatives and

- conservation of groundwater resource; keeping in view the sustainable use of groundwater, there is a need to conserve the scarce resource through joint efforts to achieve intra- and inter-generational equity. This can be achieved through watershed development programmes. Regulations so devised will then be able to serve a larger section of the community (equity) and will enable sustainability of groundwater resource use. We propose that these regulations be embedded in the national water policy.

## Notes

1. This research paper was presented at the 11th Stockholm Water Symposium, Stockholm, Sweden, during August 2001. The authors would like to thank an anonymous reviewer for valuable comments on an earlier draft of this paper. Our thanks are due to Jagadish, K. N., Department of Agricultural Economics, UAS, GKVK, Bangalore, for his help during our primary data collection. We also thank Prof. Jennifer McKay, Director, Water Policy and Law Group, School of International Business, University of South Australia, for her valuable comments, and Dr. Lalith Achoth, University of Agricultural Sciences, Bangalore.
2. This assumption may not always be true. However, our understanding is that if the groundwater was used in agriculture it would have resulted in higher food grain production, which ensures local food security.
3. The opportunity cost of capital is considered as 10 per cent.
4 This clearly indicates the unsustainability of groundwater resource use. Nagaraj, et al. (1999) defines unsustainability of groundwater thus: 'when there is mining of groundwater beyond the natural rates of recuperation, it would lead to unsustainability of the resource in the long run.'
5. Food security is defined as 'access to food' and one's ability to afford it. However, there is more to this as we argue that, though farmers who sell water are enjoying higher benefits (private benefits), they depend on the urban centres for their food grain requirement. This 'dependency syndrome' affects the people depending on agricultural activities for their livelihood such as agricultural labourers. Given the low wage rates they cannot afford to get their food from cities. This has resulted in local food insecurity.
6. Because the marginal cost of groundwater extraction is zero due to flat rate of electricity charge. This has led to unlimited extraction of groundwater, which is sold to urban entities, and no environmental costs.

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# Environment and Natural Resources in Orissa

**Shibalal Meher** *

## Abstract

The environment of Orissa has been adversely affected by the degradation of natural resources in the state. Not only have the different patterns of development in the state led to the degradation of these natural resources but also other factors like growth of population, poverty level, and unsustainable activities adopted by the poor and the rich have become crucial for the degradation of valuable natural resources in the state. The adoption of unsustainable activities is, however, driven by the market, institutional and policy failures.

## Introduction

The environment of a region depends on the status of its natural resources. The growth process causes continuous depletion and degradation of natural resources. As long as economic activities in a region are below the regenerative capacity of the natural environment, there is no secular decline in the quality and quantity of natural resources. The problem arises, however, when these limits are crossed and when secular decline in the quality and quantity of natural resources takes place. The problem can arise in two respects: First, when natural resources are overused, that is the rate of use is more than the rate of regeneration, and second, when the discharges from economic activities are more than the abating capacity of nature (Hirway and Mahadevia 1999). In both the cases, natural resources are depleted, degraded or polluted, which puts a limit on the sustainability of the growth process. This limit is more in the case of non-renewable natural resources than in the case of renewable natural resources.

The natural resources of Orissa, a poor and backward state in India, have been degraded over time. During the last 30 years, the state has lost its forest cover, its agricultural land has been degraded, and rivers and lakes have become polluted. In short, Orissa's environment has been under attack. While economic development has created some dynamism, the state has at the same time become less ecologically diverse, and more environmentally vulnerable. After giving a brief account of different ecological regions and their diversity, the present paper attempts to present the current state of Orissa's environment and to examine the causes of degradation.

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## Ecological Regions and Diversity

Orissa, located on the east coast of India, is surrounded by West Bengal to the north-east, Bihar to the north, Madhya Pradesh to the west, Andhra Pradesh to the south and the Bay of Bengal to the east. The state has an area of 1,55,707 sq. kms (4.74 per cent of the total area of the country) and ranks tenth in the country. It lies in the tropical zone and can be broadly divided into four distinct natural/ ecological regions, viz. the Coastal Plains, the Central Tableland, the Northern Plateau and the Eastern Ghat region.

The coastal plains are the gifts of six major rivers, which bring silt from their catchment and have reclaimed this area from the depths of the Bay of Bengal. About one–fourth of the state's total area lies in this region. The districts (undivided) in this region are Ganjam, Puri, Cuttack and Balasore. Owing to a number of deltas formed by rivers, this region is characterised by high agricultural productivity and well-developed infrastructure. The climate of this region is greatly influenced by the sea and, therefore, differs from that of the other three regions. Alluvial soil is mainly found in this region. This soil has high agricultural potentiality.

The Northern Plateau consists of three districts, viz., Mayurbhanj, Keonjhar and Sundargarh. It slopes from north to south, is undulated and frequently intersected by hill ranges. The land of this region is not fertile but minerals are found in plenty. The uplands are the plateau, hilly and thickly forested. The climate here is hot, with high humidity and well-distributed rainfall during the monsoon period. This region covers less than one-fifth of the state's total area. The main types of soil in this region are red and yellow soils. Red soil is comparatively less fertile than alluvial soil.

About one-fourth of the state's total area lies in the Central Tableland region. This region covers three undivided districts, viz. Sambalpur, Bolangir and Dhenkanal. This tract lies between the Northern Plateau and Eastern Ghat and has a number of isolated hills, which rise abruptly from the plains. The climate here is extremely hot and dry in summer, hot and humid in the rainy season, and dry and cold in winter. Three types of soils, viz., red, black, and yellow, are found in this region.

The Eastern Ghat region covers three undivided districts, viz. Koraput, Kalahandi and Phulbani, and about one-third of the state's total area lies in it. Thick and valuable forest covers the region, and hills of this tract have the highest peaks in the state. Most parts of this region have an elevation of 900 metres acting as watershed of the two sets of river, one set (namely the Nagabali and the Vansadhara) flowing directly into the Bay of Bengal, and the other set feeding the Godavari and the Mahanadi system. The main types of soil in this region are red, laterite, black and brown forest soils. Brown forest soils, which are formed in association with forest growth, are usually acidic and rich in organic matter.

The state experiences tropical monsoon climate with variable rainfall often resulting in floods, droughts and cyclones. Average rainfall of 1,482.2 mm is derived mainly from the Southwest monsoon, from June to October, with the average number of rainy days in the state exceeding 70. The spread of rainfall is not uniform over the state; it varies in the northern plateau from 1,500 to 1,750 mm with the bulk of the precipitation falling during June–September. The intensity of rainfall gradually decreases from north to south. Local depressions cause some rainfall in the north-eastern part of the state during March-May. The annual rainfall of the coastal region is around 1,300 mm and the bulk of precipitation is received during July to September. This region receives cyclonic rainfall during September-October. Sometimes the cyclone becomes severe. During October 1999 it was so severe that more than 10,000 people died while lakhs of people were affected.

December and January are the coldest months with average temperature varying between $12^{O}$C and $15^{O}$C. The coastal plains experience moderate climate owing to their proximity to the Bay of Bengal. Extreme climate conditions are experienced in the central tableland with temperature varying between $7^{O}$C and $47^{O}$C. The eastern ghat region is comparatively cooler due to its undulating topography, which is interspersed with high mountain regions of 750 to 900 metres altitude. The year 1998 witnessed an unusual summer in the state and about 2,032 people died of sunstroke indicating a possible change in the climate pattern in future.

## The Current State of Orissa's Environment

Even though Orissa is rich in natural resources like forests, water, minerals, soils, etc., these resources have deteriorated over time, resulting in the degradation of environment in the state. The environmental problems vary from the degradation of forest and rural land to the pollution of water and air, and many others. The following paragraphs summarise the main trends.

**Deforestation**

Forests are important natural resources of Orissa. They have a moderating influence against floods and thus protect the soils against erosion. Forests also influence climate and rainfall. They provide raw materials to a number of industries. But the crisis in forest environment is manifest in the dwindling forest cover of the state. According to the estimate of the Forest Survey of India (FSI), the forest area in Orissa remains around 30 per cent (Table 1). Over the last 25 years, there has been a marginal decline in the share of forest area. But there has been a steady decline in the area under 'closed forest' both absolutely and relatively. Its share has declined both in the total forest area (by about 21 percentage points) and in the total geographical area (by about 7 percentage points). At the same time, there has been a decline in the area under 'mangrove forest', which is found in the coastal region

of the state. The decline in the closed forest area has resulted in an increase in the area under 'open degraded forest' during the period 1972–75 to 1997.

**Table 1: Area under Forest**

(in sq. kms.)

| Year | Total Geographical area | Area under Closed Forest | Area under Open Degraded Forest | Area under Mangrove Forest | Total Forest Area | Forest Area as % of Geographical Area | Closed Forest Area as % of Geographical Area |
|---|---|---|---|---|---|---|---|
| 1972–75 | 155707 | 37320 (77.13) | 10829 (22.38) | 234 (0.48) | 48383 (100.0) | 31.07 | 23.97 |
| 1980–82 | 155707 | 28812 (73.08) | 10386 (26.34) | 227 (0.58) | 39425 (100.0) | 25.32 | 18.50 |
| 1990–91 | 155707 | 27349 (57.94) | 19661 (41.65) | 195 (0.41) | 47205 (100.0) | 30.32 | 17.56 |
| 1995 | 155707 | 27163 (57.66) | 19749 (41.92) | 195 (0.41) | 47107 (100.0) | 30.25 | 17.44 |
| 1997 | 155707 | 26101 (55.60) | 20629 (43.95) | 211 (0.45) | 46941 (100.00) | 30.15 | 16.76 |

*Note*: 1. 'Closed forest' refers to forest with more than 40% crown density, whereas 'open degraded forest' refers to forests with less than 40% crown density.

2. Figures in parentheses indicate percentage share of total forest area.

*Source*: For the first two time points, Govt. of Orissa, Remote Sensing Application Centre, Dept. of Science, Tech. and Environment. For the third, fourth and fifth time points, Govt. of India, *Forest Survey of India* (the state of Orissa Forest Report), 1991, 1995, 1997.

The northern plateau region has the highest proportion (40.12 per cent) of forest cover in the state followed by the eastern ghat region (34.20 per cent) (Table 2). The coastal plain region has the lowest proportion (19.80 per cent) of forest cover. Considering the closed forest cover, with more than 40 per cent of crown density, it is found that the northern region has about 27 per cent of the total geographical area, followed by the central tableland region. The eastern ghat region, with about 34 per cent of total forest cover, has only 16.45 per cent of closed forest. The open degraded forest is found to be highest in the eastern ghat region, which is more than the area under closed forest. This shows that there is severe degradation of forest in this region. The northern plateau region, which has the highest forest cover, has also shown severe degradation of forest.

A number of factors are responsible for the degradation of forests. Earlier studies have identified the following three main activities that have contributed to deforestation in the developing countries: i) excessive fuelwood collection and logging, ii) expansion/ conversion of land to agricultural use, and iii) construction of infrastructure, especially roads and dams (Duraiappah 1996; ADB 1997).

**Table 2: District-wise and Region-wise Forest Cover of Orissa**

(in sq. km)

| District | Total Geographical Area | Forest Cover (1997 assessment) | | | | % of total Geographical area | % of closed area in Geo. area | % of open degraded area | Change of forest cover in 1997 over 1991 |
|---|---|---|---|---|---|---|---|---|---|
| | | Dense | Open | Mangrove | Total | | | | |
| **Coastal Plains** | **40191** | **3777** | **3970** | **211** | **7958** | **19.80** | **9.40** | **9.88** | **- 497** |
| Balasore | 6311 | 175 | 128 | 20 | 323 | 5.1 | 2.77 | 2.03 | - 48 |
| Cuttack | 11142 | 482 | 279 | 191 | 952 | 8.5 | 4.33 | 2.50 | - 107 |
| Ganjam | 12556 | 1894 | 2716 | - | 4610 | 36.7 | 15.08 | 21.63 | - 88 |
| Puri | 10182 | 1226 | 847 | - | 2073 | 20.4 | 12.04 | 8.32 | - 254 |
| **Northern Plateau** | **28433** | **7610** | **3796** | **-** | **11406** | **40.12** | **26.76** | **13.35** | **- 399** |
| Keonjhar | 8303 | 1739 | 1804 | - | 3543 | 42.7 | 20.94 | 21.73 | - 187 |
| Mayurbhanj | 10418 | 3237 | 615 | - | 3852 | 37.0 | 31.07 | 5.90 | - 210 |
| Sundargarh | 9712 | 2634 | 1377 | | 4011 | 41.3 | 27.12 | 14.18 | - 2 |
| **Central Tableland** | **36536** | **6519** | **4017** | **-** | **10536** | **28.84** | **17.84** | **10.99** | **- 372** |
| Bolangir | 8193 | 573 | 612 | - | 1185 | 14.5 | 6.99 | 7.47 | + 117 |
| Dhenkanal | 10827 | 2268 | 1324 | - | 3592 | 33.2 | 20.94 | 12.23 | - 74 |
| Sambalpur | 17516 | 3678 | 2081 | - | 5759 | 32.9 | 21.0 | 11.88 | - 415 |
| **Eastern Ghat** | **49827** | **8195** | **8846** | **-** | **17041** | **34.20** | **16.45** | **17.75** | **+ 1004** |
| Kalahandi | 11772 | 1592 | 1470 | - | 3062 | 26.0 | 13.52 | 12.49 | + 296 |
| Koraput | 26961 | 3308 | 4245 | - | 7553 | 28.0 | 12.27 | 15.74 | + 239 |
| Phulbani | 11094 | 3295 | 3131 | — | 6426 | 57.9 | 29.70 | 28.22 | + 469 |
| **Total** | **155707** | **26101** | **20629** | **211** | **46941** | **30.1** | **16.76** | **13.25** | **- 264** |

*Source*: Govt. of India (1991, 1997).

However, data for deforestation due to the first two activities are not available. But these activities are driven mostly by the government policies as well as population pressure. Although the earlier studies failed to identify the magnitude of these factors in deforestation, the majority of studies highlighted the prominent role played by institutional and market failure both as a catalyst and as a direct factor causing deforestation (Duraiappah 1996). In Orissa, significant forest area is lost due to the construction of infrastructure and other developmental activities (Table 3). The major activities responsible for such deforestation were river valley projects and subsequent resettlement of displaced persons up to the early 80s. But in the last two decades, mining activities were mostly responsible for deforestation. This is followed by the irrigation projects. These together contribute more than half of the total deforestation. Thus, the developmental activities of the government as well as the commercial interest and livelihood activities of the people are responsible for the deforestation in Orissa.

**Table 3: Extent and Factors Contributing to Deforestation**

| Deforestation since Independence Till 1984-85 | | | | Deforestation Between 1980 (Dec.) and 2000 (Jan.) | | | |
|---|---|---|---|---|---|---|---|
| Sl. No. | Purpose of Deforestation | Total Area (in sq. km) | % of total | Sl. No. | Purpose of Deforestation | Area (ha) | % of total |
| 1. | River valley project and resettlement of displaced persons | 1855.76 | 89.48 | 1. | Irrigation | 5616 | 23.28 |
| 2. | For industrial purposes | 34.48 | 1.66 | 2. | Mining | 7397 | 30.66 |
| 3. | For capital conservation | 20.93 | 1.01 | 3. | Industries | 2367 | 9.81 |
| 4. | For railways | 24.20 | 1.17 | 4. | Power transmission | 2270 | 9.41 |
| 5. | For minor irrigation projects | 11.41 | 0.55 | 5. | Railway line | 1910 | 7.92 |
| 6. | Public purposes | 80.24 | 3.87 | 6. | Defence | 3865 | 16.02 |
| 7. | For roads | 0.23 | 0.01 | 7. | Road and building | 216 | 0.90 |
| 8. | Miscellaneous purposes | 46.72 | 2.25 | 8. | Misc. | 483 | 2.00 |
| | Total | 2073.97 | 100.00 | | Total | 24124 | 100.00 |

*Source*: Govt. of Orissa (2000), CPSW (1994)

The devastation caused to the economy and environment by continued and excessive deforestation is indeed enormous. Reviewing earlier studies, Duraiappah (1996) identified the following major negative effects of deforestation: i) loss of watershed protection, ii) soil erosion, iii) destruction of a safety buffer, iv) shortage of fuelwood supply, and v) productivity drop. Since forests serve as important water catchment areas, loss of forest cover disrupts the hydrological cycle (Duraiappah 1996). Continued depletion of forests has affected the environment adversely by changing the rainfall and climate pattern in Orissa. This

can be well imagined by the unusual summer of 1998, which has taken more than 2000 lives because of sunstroke (Meher 2000). At the same time, the loss of vegetative cover has exposed the soil to erosion. This not only resulted in loss of soil fertility, and hence lower agricultural productivity, but also increased water run-off to lower elevation plots. This increases the risk of flooding (Adelman *et al* 1997). Vohra (1987) finds a strong correlation between floods and soil erosion, and states that the best insurance against floods is the prevention of soil losses. Further, the loss of vegetative cover affects the groundwater table adversely by reducing the retention and percolation of water. This has resulted in water scarcity in the rainfed areas. Orissa, therefore, has been facing floods and drought almost every year since 1965 (Meher 2000). The groundwater scarcity in upland areas due to the loss of soil has been observed by several studies (Bandyopadhyay 1987, Chengappa 1995).

Deforestation has also entailed increasing suffering to the rural poor and indigenous tribes who have steadily lost their traditional sources of livelihood provided by the forests. Besides the livelihood problem, increasing deforestation also causes fuelwood shortages, which have dire consequences for the poor. The loss of forest also increases the time taken to collect fuelwood as well as non-timber forest products, indicating that less time is available for both economic and other household activities. This results in productivity drop as well as suffering of the female members, who have to go long distances to collect fuelwood and non-timber forest products. Continuing deforestation, therefore, results in a major ecological and socio-economic crisis. The worst affected are the people in the low-income group.

**Land Degradation**

Land resources of Orissa have both low and high agricultural production potential. However, land is scarce in the state. Owing to increasing population, the average size of land decreased from 1.89 hectares in 1970–71 to 1.34 hectares in 1990–91. Not only is the per capita availability of land in the state low but also degradation of land is severe. During 1985, it was estimated that about 50 per cent of the geographical area was degraded (Table 4). The maximum land degradation occurred owing to soil erosion, followed by shifting cultivation and degraded forest. The degradation from these three sources combined comes to about 46 per cent of the total geographical area and 92.29 per cent of the total degraded land. The other types of land degradation were water salinity (2.6 per cent), waterlogging (0.44 per cent) and ravines (0.7 per cent).

The degradation of land declined from 50.1 per cent in 1985 to 37.3 per cent in 1994, but the proportion of land degradation remained higher than that of all-India (32.7 per cent). The estimate shows that land degradation due to soil erosion, ravines, salinity and shifting cultivation has declined in 1994 from 1985. It is

**Table 4: Status of Land Degradation in Orissa**

(Area in Lakh Ha.)

| Sl. No. | Type of Degradation | 1985 Assessment | % of Geographical area | 1994 Assessment | % of Geographical area |
|---|---|---|---|---|---|
| 1. | Soil erosion | | | | |
| | a.Water | 27.71 | 17.8 | 25.70 | 16.50 |
| | b.Wind | - | - | - | - |
| 2. | Ravines | 1.13 | 0.7 | 0.18 | 0.1 |
| 3. | Saline | 4.03 | 2.6 | 1.35 | 0.9 |
| 4. | Waterlogged | 0.60 | 0.40 | 1.42 | 0.9 |
| 5. | Mine and Quarry Waste | - | - | 0.97 | 0.6 |
| 6. | Shifting Cultivation | 26.48 | 17.0 | 1.84 | 1.2 |
| 7. | Degraded Forest | 18.07 | 11.6 | 26.56 | 17.1 |
| 8 | Total Orissa | 78.3 | 50.1 | 58.02 | 37.3 |
| 9 | All-India | 1721.75 | 52.8 | 1074.30 | 32.7 |

*Source:* Government of India (1995)

surprising to observe that land degradation due to shifting cultivation has declined significantly from 17 per cent in 1985 to 1.2 per cent in 1994. Similarly, salinity has also declined significantly (Table 4). But the degradation due to soil erosion has declined marginally and still remains high. On the other hand, land degradation due to degraded forest and waterlogged area has increased significantly. Further, mine and quarry waste has added to the degradation of land. A 1994 assessment put land degradation due to degraded forest and soil erosion together at about 90 per cent of the total degraded land and about 34 per cent of the total geographical area. At the same time, increasing land degradation due to quarry and mine waste and waterlogging has emerged as a potential threat. The waterlogging and salinisation of crop area of about 2.77 lakh ha is because of poor irrigation practices.

It is clear from the above discussion that land in Orissa is severely degraded. The degradation is, however, mostly in the shape of soil erosion and degraded forest. These two are interlinked and have cumulative effects. The most important effect of land degradation is the drop in agricultural productivity owing to loss of soil fertility. Degradation of soil fertility can be reversed in the short run. But, reversibility of soil erosion and salinisation has to rely on prevention. Once topsoil has disappeared, soil erosion becomes almost impossible to reverse. This is because, under natural condition on vegetation cover, it can take between 100 to 500 years for the formation of 1 cm of topsoil (Dasgupta and Maler 1997). Once soil has become sufficiently saline it becomes permanently incapable of being cultivated (Adelman *et al* 1997, p.166).

**Mineral Exploitation**

Minerals are an important non-renewable natural resource of Orissa. The state has nearly 20 per cent of India's total mineral resources, which include 98 per cent of chromite, 70 per cent of bauxite, 38 per cent of graphite, 26 per cent of iron ore and 24 per cent of coal (Govt. of Orissa 1998–99). During 1995, mineral reserves in the state were 54,599.9 million tonnes and their exploitation was 50.97 million tonnes (i.e., less than one per cent of the total reserve), showing a very low average rate of exploitation. Assuming that this rate (i.e., the rate of 1995) of exploitation continues, it would take more than a thousand years to exhaust all the minerals (Table 5), provided that no new reserves of minerals are discovered. But minerals like graphite and lead ore would get exhausted within two to three decades if the present rate of exploitation continues.The position regarding other minerals is more comfortable. However, the problem is that the rate of exploitation is increasing rapidly over time, posing a threat. The exploitation of minerals in the state has increased from 2.8 million tonnes in 1947 to 51.32 million tonnes in 1995–96, i.e., by about 18 times. The exploitation is much higher in the 90s than in the earlier periods. Therefore, the low average rate of exploitation cannot be a sign of relief to the state. Rather the increasing exploitation is a potential threat. Since most of the mineral reserves are in the tribal belt and forest areas of the state, they pose a danger of deforestation and livelihood of the locals.

The rapid increase in mineral exploitation is mostly due to the increasing revenue interest of the state. Besides, increase in the number of mineral-based industries in the state has attracted more exploitation. The illegal and indiscriminate mining has also added to the increased mineral exploitation. Overexploitation of these mineral resources has adversely affected land, forests, water and air.

As the demand for minerals grows, the area of mining expands at a faster rate, threatening increasingly larger areas of landscape, soil degradation, a widening circle of deforestation, air pollution and distress to the population affected. Extraction of a large quantity of minerals not only depletes the non-renewable resources but also creates problems of second and third order effects in the form of irreversible environmental reactions over both the short and the long terms.

Land is lost due to mining, both directly and indirectly. The direct loss is due to the land leased for mining operations as such, and indirect loss is caused by the area that is used for the construction of the infrastructure required for mining, namely, roads, railways, stockyards, etc. (Viegas and Menon 1989). Owing to intensive mining not only is land lost but also large-scale displacement occurs. The indiscriminate quarrying and mining by both leaseholders and public sector miners have caused irreversible environmental and ecological damage.

**Table 5: Mineral Reserves (1995), Their Exploitation (1995) and the Years Left for Exhaustion at the Current Rate of Exploitation**

| Mineral Ores | Reserve of Mineral (million tonnes) | Annual Extraction (million tonnes) | Rate of Exploitation (%) | Time Left for Exhaustion (years) |
|---|---|---|---|---|
| Coal | 46527 | 32.65 | 0.07 | 1425 |
| Bauxite | 1670 | 2.42 | 0.14 | 690 |
| Chromite | 183 | 1.65 | 0.90 | 111 |
| Copper Ore | 4.7 | - | - | - |
| Iron Ore | 3120 | 9.33 | 0.30 | 334 |
| Lead Ore | 2.6 | 0.09 | 3.46 | 29 |
| Manganese Ore | 49 | 0.63 | 1.29 | 78 |
| Nickel | 285 | - | - | - |
| Vanadium | 3.4 | - | - | - |
| China Clay | 157 | 0.01 | 0.006 | 15700 |
| Dolomite | 1171 | 1.34 | 0.11 | 874 |
| Fire Clay | 108 | 0.09 | 0.08 | 1200 |
| Graphite | 1.5 | 0.09 | 6.0 | 17 |
| Limestone | 1212 | 2.38 | 0.2 | 509 |
| Mineral Sands | 82 | 0.11 | 0.13 | 745 |
| Pyrophyllite | 8.6 | 0.03 | 0.35 | 287 |
| Quartz & Quartzite | 15 | 0.15 | 1.0 | 100 |
| Taeic/Soapstone | 0.1 | - | - | - |
| All | 54599.9 | 50.97 | 0.09 | 1071 |

*Source:* Meher (2000)

Agricultural uses of land are automatically eliminated by the mining activity, which churns up much sub-soil and dumps it on top of the ground or digs great pits deep into the sub-surface up to bedrock formations. Frequently, great piles, ridges and mounds of infertile sub-soil are left adjacent to the large burrow pits, creating a landscape far different from the original rolling or level land. The lives of thousands of people from the surrounding villages have been threatened by the debris running down the rich agricultural land, turning it into wasteland (Dwivedi, Chari and Mohapatra 1992).

The method and technology of mining has a special bearing on the environment and sustainability of natural resources. As most of the mining in Orissa is open cast, there is the danger of environmental degradation in and around the mining areas. Everything in and around the mines gets covered with dust, leading to deterioration of air quality. The severity is observed in the case of coalmines.

Huge clouds of dust with suspended particles raise sharply the atmospheric toxicity causing respiratory ailments among the inhabitants living in and around the mining areas. The respiratory dust problem has long-term effects on the health of mine workers (Meher 2000).

Orissa, being the largest repository of power grade coal (ash content of 40 per cent or more), attracts large-scale coal-based thermal power plants. As far as thermal power plants are concerned, ash disposal poses the largest environmental problem (Orissa Pollution Control Board 1998).

**Water Pollution**

Water is another important natural resource of the state. With an annual rainfall that brings 23.46 million hectare metres of water per year, 11 major rivers with a total yield of 78.19 thousand million cusecs and groundwater potential of 23.279 lakh hectare metres, Orissa can rightly be described as rich in water resources. But the water resources in the state have become polluted. While the pollution has become serious as far as surface water is concerned, it has not yet aggravated in the case of groundwater in the state.

The pollution of surface water is observed mostly in the case of major rivers, besides community resources like lakes, ponds and tanks in Orissa. One kind of river pollution is the level of suspended solids (the amount of waste suspended in the water). Organic waste is a specific kind of water pollution. The more organic waste a river or lake contains the more this waste uses up during decomposition. The extent of organic waste can be gauged by the biological oxygen demand (BOD): the higher the BOD, the more polluted a river or lake is (ADB 1997). In Orissa, the BOD of rivers Brahmani and Mahanadi, which cover a significant area in the state, is very high. Though these two rivers have been designated as class-C rivers based on designated best use classification, the water quality data show that these two rivers largely belong to class-D category, indicating that the water is not suitable for drinking and bathing without treatment (Orissa Pollution Control Board 1998, 1999). The other rivers like Baitarani, Rushikulya, etc., are also polluted, though to a lesser extent.

River water pollution has several sources. Untreated municipal sewage, industrial effluents, and runoff from urban and agricultural activity (especially from pesticides and fertilisers) are the main culprits. In Orissa, none of the 103 urban local bodies has a sewage treatment system (Dash undated). Wastewater from these sources generally contains many organic faecal matters along with disease-carrying coliforms. About 74.5 thousand kilolitres per day (KLD) of wastewater enters into the Brahmani River from 26 urban settlements (Orissa Pollution Control Board 1998), while 266.3 thousand KLD of wastewater enters into the Mahanadi River from 34 urban settlements (Orissa Pollution Control Board 1999). Besides the urban wastewater, these rivers also receive wastewater from industries and mines. While

the industries in the basin of the Brahmani River discharge about 298 thousand KLD of wastewater, the mines discharge about 29.4 KLD of wastewater into the river. Similarly, the industries in the Mahanadi River basin discharge about 66.7 thousand KLD of wastewater, and the coalmines discharge about 33 KLD of wastewater into the river. The industrial wastewater is likely to contain various types of pollutants depending upon the industrial process. Some of them are toxic and not easily biodegradable.

Many of the potential health hazards posed by such polluted surface water can be reduced by providing access to safe water through municipal water supply and sanitation services. But Orissa's record is very poor in this respect. A very small proportion of people in the state have access to safe drinking water. At the same time, access to sanitation is generally even lower than access to safe water.

The exploitation of groundwater in the state is very low, i.e., 7.1 per cent (Govt of India 1994), but in the coastal districts (except Puri) the exploitation is significantly higher than the state average. Owing to over-exploitation of groundwater in the coastal area, there is a possibility of saline intrusion. Further, groundwater with high water table in coastal districts can be polluted by leaching, containing various pollutants like fertilisers and pesticides used in the agricultural fields, organic matter from abandoned pits, wastes of industries containing toxic substances stored in unlined pits, etc. (State Prevention and Control of Pollution Board: undated). Even though groundwater exploitation in the state is very low, groundwater is found to be polluted owing to a number of factors. However, no systematic study has been done in this respect. But there are some indicators, which confirm groundwater pollution in the state. The iron content in groundwater is found to be very high in some areas of the northern plateau region (viz. Mayurbhanj, Keonjhar and Sundargarh districts). It is as high as 34 mg/lt against the recommended standard of 0.3 mg/lt. Water in shallow aquifers in deltaic and coastal areas has dissolved solids, hardness, bicarbonates and chlorides (State Prevention and Control of Pollution Board, Orissa Undated). Fluoride contamination of groundwater is a possibility in the areas of aluminium smelter and phosphoric fertiliser plant established at Angul and Paradeep respectively. Fluoride pollution of shallow groundwater in a limited area in Hirakud has already been reported — caused by the haphazard disposal of rejected pot linings of an aluminium plant in the past (ibid.). Contamination of groundwater by hexavalent chromium (which is a known toxic substance) due to the use of chromite ore by many industries in Orissa cannot be avoided. All these show that even though no systematic estimate of groundwater pollution has been made in the state, yet the above discussion brings some evidence on groundwater pollution.

**Air Pollution**

Air pollution has not posed a serious problem in Orissa. The concentration

of pollutants, like sulphur dioxide ($SO_2$), oxides of nitrogen ($NO_x$), remains below the prescribed standard. However, the suspended particulate matter (SPM) concentration exceeds the standard in some places, especially in Bhubaneswar (capital city) and other towns. This is largely due to construction work and roads with lots of dust on either side or bad roads (Dash: undated). Even though the air pollution level is low in the state, it is aggravated by the use of energy-inefficient technologies with no pollution controls and by the use of cheaper, high-sulphur contents, low quality coal and fuel oil, especially for heating and transport.

In rural areas, air pollution is in the form of particulate, organic matter and various oxides. This results seasonally from burning grasslands and from forest clearing for cultivation, grazing and collection of minor forest produce like *mohua*. Indoor air pollution from cooking with organic fuels or coal or energy-inefficient stoves without proper venting is endemic, and has led to dangerous indoor concentrations of carbon monoxide particulate and hydrocarbons (Adelman *et al* 1997). The highest concentration of pollutants actually occurs in rural indoor-environment. They come from burning bio-fuels such as wood, crop residues and dung cake, which are used by mass households in Orissa. Pollution released indoors is far more likely to reach people's lungs than if released outdoors.

In urban areas, on the other hand, the atmosphere is being polluted by discharge of gases from industries, congestion, and garbage disposal in the open. Even though the number of industries in Orissa is not too large, there are a number of polluting industries, which pose a serious concern for the state. Cement, paper, iron and steel, aluminium, and other ancillary industries emit poisonous smoke. Excessive emission of carbon monoxide, nitrogen oxide and sulphur dioxide and hydrocarbons sometimes leads to acid rains which are dangerous for the fertility of the soil. Increasing use of automobiles in urban areas of the state causes not only congestion but also air pollution. To control pollution in the state no programme with severe penalty has been launched. The state's Pollution Control Board, with its limited resources, is unable to tackle the problem. High growth in the number of motor vehicles has contributed to an increase in air pollution in two ways: First, it has resulted in increased fuel consumption, leading to increase in emissions, and second, growth in vehicles per kilometre road length has caused road congestion leading to increased fuel consumption and pollutant emissions. The major pollutants emitted by motor vehicles include carbon monoxide (CO), nitrogen oxide ($NO_x$), sulphur oxide ($SO_x$), hydrocarbons (Hc), and suspended particulate matter (SPM). The pollutants have a damaging effect on both human health and ecology.

**Disparity within Orissa**

Two indices of environmental degradation have been constructed to show the disparity among the districts. The first index is constructed by using three indicators, viz., percentage of drought-prone area, percentage of wasteland area

and percentage of open degraded forest area. The extent of environmental degradation in these respects is severe in the state. The second index is constructed by using two additional indicators, viz., percentage of groundwater exploitation and percentage share of mineral exploitation in the state total. The exploitation of these two resources is, however, low but has the potentiality to affect the environment adversely.

The first index shows that Phulbani, Kalahandi and Koraput, which are situated in the eastern ghat region, are the top three environmentally degraded districts, followed by Bolangir district (Table 6).

**Table 6: Indices of Environmental Degradation of Different Districts (Undivided) in Orissa**

| Region | District | Index | | Rank | |
|---|---|---|---|---|---|
| | | $I_1$ | $I_2$ | $R_1$ | $R_2$ |
| Coastal Plains | Balasore | 0 | 0.2 | 13 | 10 |
| | Cuttack | 0.0533 | 0.1227 | 12 | 12 |
| | Ganjam | 0.3645 | 0.3089 | 7 | 7 |
| | Puri | 0.4689 | 0.1792 | 5 | 11 |
| Northern Plateau | Keonjhar | 0.4099 | 0.3315 | 6 | 5 |
| | Mayurbhanj | 0.1045 | 0.0833 | 11 | 13 |
| | Sundargarh | 0.2703 | 0.2415 | 9 | 9 |
| Central Tableland | Bolangir | 0.4916 | 0.3491 | 4 | 4 |
| | Dhenkanal | 0.2771 | 0.4118 | 8 | 2 |
| | Sambalpur | 0.2459 | 0.2807 | 10 | 8 |
| Eastern Ghat | Kalahandi | 0.5640 | 0.3722 | 2 | 3 |
| | Koraput | 0.5078 | 0.3288 | 3 | 6 |
| | Phulbani | 0.7536 | 0.4622 | 1 | 1 |

Note: $I_1$ is constructed using % of drought prone area, % of wasteland area, and % of open degraded forest area. $I_2$ is constructed using all the indicators (i.e. indicators of $I_1$, % of groundwater exploitation and % share of mineral exploitation in the state). $R_1$ and $R_2$ are ranks in the indices $I_1$ and $I_2$ respectively.
*Source:* Meher (2000).

The districts of Puri and Ganjam are environmentally more degraded in the coastal region, while Keonjhar district is environmentally more degraded in the northern plateau region.

Using all the five indicators of environmental degradation, the second index shows that Phulbani ranks first in environmental degradation in the state (Table 6). Kalahandi, Bolangir and Koraput are ranked third, fourth and sixth respectively. Dhenkanal, which is environmentally more degraded due to mineral exploitation, ranks second. Keonjhar and Ganjam are environmentally more degraded

in the northern and coastal regions respectively.

The above indices show that the districts of eastern ghat region are environmentally more degraded than the districts of other regions. These districts are not only environmentally degraded but also economically most backward, indicating a close link between poverty and environment in the region. This is plausible as the main human use made of land, water, and vegetation in these districts is for sheer survival. Hardly any surplus is forthcoming. The degradation of natural resources often does not allow poor people to survive without frequent recurrence to large-scale seasonal migration.

## Causes of Environmental Degradation

A number of explanations are offered for environmental degradation in poor economies. The most important among them are population growth, poverty, economic growth, and institutional, policy and market failures. The validity of these explanations in the context of Orissa is examined in what follows.

### Population Growth

It is believed that population growth and environmental degradation are closely related. Rising population is highly correlated with deforestation, soil erosion, damage to local system, and other forms of environmental degradation. Closer inspection, however, reveals that this is not that simple. How a population behaves is more important than how fast it grows (ADB 1997).

In Orissa, the districts of eastern ghat region, which show higher population growth, have higher environmental degradation. At the same time, it is also observed that a district like Balasore, with higher population growth, has lower environmental degradation. Similarly, slower population growth does not necessarily bring down the rate of environmental degradation. For example, Bolangir district, with the lowest population growth, is environmentally more degraded than several other districts in the state.

Considering the density of population and its relation with environmental degradation in Orissa, it is observed that the severely environmentally degraded districts in eastern ghat region have lower density of population. Further, Cuttack, which shows higher density of population, does not show more environmental degradation. Hence, population growth or density alone does not seem to be responsible for environmental degradation. The relationship could be possible in the presence of poverty, ill-defined property rights, lack of employment alternatives, failed government policies, or others (ADB 1997).

### Poverty

The economic condition of people in the state also affects environment. Significant proportions of people in the state live below the poverty line. Poverty is

widespread in the eastern ghat and other regions, which experience severe environmental degradation. So at first sight, it seems that poverty and environmental degradation are closely linked. But poverty is not an independent cause that contributes to environmental degradation. It seems to exacerbate environmental problems in the presence of market, institutional, and policy failures.

There is a negative spiral of poverty and environmental degradation. Natural resources, such as fuelwood, fodder, fish, etc. are all open access, and the poor must capture as much of them as they can. This leads to higher fertility because children are assets in the race to capture resources. But high fertility, in turn, leads to further impoverishment as resources are overexploited and degraded (ADB 1997).

**Economic Growth**

Several researchers have identified a relationship between income and the environment that displays an inverted U-shaped pattern known as the environmental Kuznets curve. This relationship implies that as a country gets richer, its environment will get worse before it gets better (ADB 1997). This relationship reveals that since Orissa is in the initial stage of development, increasing environmental degradation is inevitable. Environmental quality will continue to deteriorate till the turning point is reached. However, the turning point of this curve remains at a much higher level of per capita income (Panayotou 1995; Islam 1997), which suggests that environmental quality in Orissa will continue to deteriorate for a very long period.

The inevitability of the U-shaped relationship is, however, questioned. Substantial evidence exists that the curve can be flattened (ADB 1997). It is argued that in the presence of policy distortions or policy failures the environment deteriorates more at low-income levels than in their absence. Similarly, improvement of the environment with income growth at higher income levels is not automatic but depends on the policies and institutions in place. This provides ground for optimism.

**Institutional, Policy, and Market Failures**

The most important cause of environmental degradation in Orissa, like most other developing economies, is institutional, policy and market failures. The failure of market, institution and government policy provides incentives to the poor to have short time preferences and the rich to exploit the resource base at an unsustainable rate. The policy failures lead to institutional and market failures, which in turn lead to degradation of environment. Owing to the lack of secure property rights in the case of forest and other environmental resources, which is a policy failure, market fails to price these resources. As a result, it is overexploited. Hence, the classic tragedy of the commons, namely that resources owned by none are overexploited by all, applies to many of the state's forest, rivers, and other environmental resources. Even where property rights exist, the prices of goods often fail to reflect the environmental cost of their production, leading to further

degradation of the environment.

## Summary and Conclusion

Orissa has plentiful valuable natural resources, which are being degraded. While forests, land and surface water resources are undergoing severe degradation, groundwater, minerals and air are under serious threat of degradation. Not only have the different patterns of development in the state led to the degradation of these natural resources but also other factors like growth of population, their poverty level and the unsustainable activities adopted by them have become crucial for the degradation of valuable natural resources in the state. The adoption of unsustainable activities is, however, driven by the market, institutional and policy failures. These provide incentives to the poor to have short time preferences and to the rich to exploit the resource base at an unsustainable rate.

The degradation of natural resources has not only reduced the economic base of the state but has also affected the environment adversely. The adverse impacts like change in climatic condition, increased flooding, productivity drop, water shortage, increased infant mortality and morbidity rate, etc. are some of the outcomes of continuing degradation. In the absence of proper measures to reduce the degradation of natural resources the problem will be further aggravated. Therefore, a policy in this regard is imperative.

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# P.R. Brahmananda: His Work, and Beyond

**T. Krishna Kumar** *

The sudden departure of P. R. Brahmananda on January 23, 2003, at the age of 76, is a great loss to the country and to the economics profession. Many English newspapers and journals did print fitting obituaries for him[1]. I chose to write this article because I think it has to be written for the social science profession in a different style than a journalistic one, or as an obituary. I will say a little about his life and work, but more importantly I will stress what needs to be done to pay a fitting tribute to him and to put his work in a proper perspective.

His end came just when in this post-reforms era, he could see that the economics profession finally appreciated his wage-goods model of 1956, as contained in his book, *Planning for an Expanding Economy*, which he co-authored with C.N. Vakil. Added to this, his views on inflation and its adverse impact on the poor were universally known. In recent times the growth in money supply had stabilized at 15 per cent with inflation below 5 per cent. This must have pleased him.

## Swadeshi Scholarship with Professionalism and Social Commitment

Brahmananda's father P.R. Ramayya was the founder editor of a popular Kannada daily *Thayinadu* (Motherland) during the pre-independence years. His mother P.R. Jayalakshamma was the deputy mayor of Bangalore. He thus grew up with a swadeshi spirit and social commitment as demonstrated by his illustrious parents. He always wore khadi and retained links with pre-independent Indian and Gandhi's philosophy/ideology. Brahmananda graduated with economics honours from Maharajah's College in Mysore. His post-graduation and Ph.D. in economics were from Bombay University, under the guidance of Professor C.N.Vakil. I knew Professor Brahmananda since 1978 in the company of our common friend and my former teacher Professor N.S. Iyengar. I came to know him better since 1991, when N.S. Iyengar and we two were associated with the Institute for Social and Economic Change (ISEC) as members of its Board of Governors. We used to commute to the Board meetings together. I was at times unhappy that he was not supporting my views in the Board meetings in public, while sharing my concerns in private. I could understand this behaviour only later as that of his desire not to harm any one, as

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some of my views that he did not support related to matters pertaining to rating academic performance of some individuals.

We were once invited to be external experts in a seminar given by a candidate for a faculty appointment at Indian Institute of Management, Bangalore. Brahmananda was interrupting the speaker with his questions and not giving the candidate a free floor to cover the topic within the stipulated time. I found it annoying. During our return journey home I told him that it was not fair. His remark was somewhat like this:

> 'Krishna Kumar, I know his work well. A seminar was not needed to make the faculty selection decision. I used the occasion to brush up my own knowledge on the topic from this youngster.'

His inquisitiveness and his eagerness to learn from the younger generation are two characteristic features that endeared him to his students and younger economists.

Brahmananda was a teacher throughout his professional career. Several distinguished Indian economists were his students. While it is difficult for me to list all of them I might cite just a few names as examples: Krishna Bhardwaj, Meghnad Desai, and Bimal Jalan. Lord Meghnad Desai, a former student of Brahmananda at Bombay University, had this to say: '… Brahmananda was a friend, an elder brother in whom you could confide.' '..he also gave us brilliant lectures. I still recall that his exposition of the basic Keynes model of the General Theory was one of the clearest I ever had and I count Lawrence Klein and Sidney Weintraub among my teachers.' ' …. the external examiners from Calcutta and Delhi had marked the students down for writing exclusively and enthusiastically about the wage goods hypothesis. The externals thought very little of all that and hence the low marks. PRB was very dejected that summer. He could feel (though he never spoke about it to us) that somehow his enthusiasm had harmed the students. So in our senior year he never mentioned the wage goods hypothesis.' (Desai 1999: v, vi)

Brahmananda attended the Board meeting of ISEC in the forenoon of January 23, 2003. As though he could predict the event to occur later in the day, he announced at that meeting that he was donating his personal collection of books, journals, and other monographs to ISEC's library. After lunch, and just an hour before he passed away, he spoke to the staff at Business Line office in Chennai about his next weekly (Saturday) column 'Economy: A Perspective.' The column was published two days after his death. It dealt with the Tenth Five Year Plan papers that had come out in three volumes. This is what he said in that contribution: 'Competition between political parties in the matter of economic performance is a good goal for the polity. Different economic objectives and differences in instruments to achieve the same can differentiate two or more parties, and the electorate should

be given the option of choosing between economic objectives and the instruments that would define the efficiency for achieving those objectives.'[2]

One should read Brahmananda's works to appreciate the width and depth of his scholarship, and the reasons for his preference to a swadeshi style of his own. He was quite open to accept ideas from the west if they helped economic theory and if they helped understanding the working of the Indian economy. Although he had a strong preference for classical economic theory it was based more on his conviction of its superiority over the other theories and not because he chose to stick to that dogma. His major concern had always been with theory and methods that helped economic policies in the Indian context. He emphasized this aspect to be kept in mind in designing the curriculum for economics in Indian universities.[3]

Brahmananda tried to blend empirical facts and economic theory with econometric methods. He was relatively weak in his mathematical and statistical methods when compared with other contemporary economists. Yet, it did not hinder his quest for knowledge that was full of high doses of both mathematics and econometrics. When one reads his scholarly discussions, it appears as though he had an underlying mathematical and analytical structure that was being explained non-mathematically, as had been the tradition until Samuelsonian revolution engulfed economics.

His understanding of Indian economics was so profound that he was highly sought after by the press to comment on budgets and major macroeconomic policies. He regarded industry as an integral and significant part of Indian economy, and he interacted with the chambers of industry and commerce quite well. But he kept a distance from government and politics. He perhaps felt that the role of a true economic policy adviser is only to suggest the policy, while it is the responsibility of the government to seek such advice from professional economists. He was invited often to the meetings of the Panel of Economists with the Union Finance Minister before the budget preparation/presentation.

## Brahmananda's Work

Brahmananda read very widely and made contributions to different sub-fields in economics. His major interests were: classical models of production and distribution, monetary economics, development economics, Indian economics, business economics, and international liquidity problems. Given the time and space constraints I will comment only briefly on some of his works.

Not very long ago when I was reviewing the evolution of plan models and planning strategies I wanted to read Vakil and Brahmananda's highly acclaimed book on the wage-goods model[4]. As that book was not available in the local libraries of major research institutions I borrowed his personal copy and read it with awe and

appreciation. Brahmananda had written most of it, that too when he was in his twenties! It was an excellent and very lucid exposition of an open economy general equilibrium model with capital and money in the classical (Ricardian/Hayekian) mode, made applicable to an underdeveloped economy. He, however, distinguished between two types of capital, physical capital and circulating capital or the wage goods, and emphasised the importance of the latter over the former in a developing country with a high degree of unemployment and poverty. He argued that unemployment in India was due to the wage goods gap and suggested that investment be directed towards producing wage goods, i.e., to agriculture and rural industries.

When I met Brahmananda next to return the book, I chose the occasion to seek an answer to a question that had been on my mind for a long time: 'As a co-author of that book and as a member of the panel of economists that was called upon by the then Finance Minister C.D. Deshmukh to discuss and endorse Mahalanobis's draft plan, why did Vakil not record a dissent?'[5] As a follow-up to my question, I proceeded to say. 'You know that some of you, including Vakil, had a definite alternative model. But by remaining silent, you made a serious professional compromise that could have adversely affected the course of India's economic development and growth?' Brahmananda was very moved when I made these harsh remarks. He admitted that he was then only a junior colleague of Vakil, and that the latter had gone along with Gadgil who drafted the memorandum approving of the draft plan document. As we could see, from his reverence to Professor Vakil in later years as well, that he had neither ill will nor bitterness towards his teacher and co-author for not supporting his wage goods model at the meeting of the panel of economists.[6]

He was one of the very few people who could foresee the international liquidity crisis of the early seventies, Robert Triffin being another. Brahmananda's explorations of the problems of international liquidity, made as early as 1968, were quite ahead of the times. He had recognised the need for proper international policy coordination through an open macro-economy model as the following quotation reveals: 'To this writer, it appears that Keynes then was, and Friedman now is, wide of the target. Both the Keynesian and Chicago School theorists neglect the vital fact that monetary (and/or fiscal) expansion would simply aggravate the disequilibrium between the demand for (real) international liquidity and the supply of such liquidity. Any country undertaking the Keynes-Friedman policy would have simply landed itself in a more severe balance of payments gap. Pigou was at least more realistic than Keynes; and Friedman simply forgets that the U.S.A. then was, and now is, a part of the international trading system.'[7]

Among the many examples of his scholarship are his explorations of the New Classical Theory of Political Economy (Brahmananda 1967, 1974). Brahmananda

said, in the preface to his 1967 book on New Classical Theory, that his critique of Sraffa was well received and appreciated or commented upon by distinguished scholars such as R.F. Kahn, Joan Robinson, Gottfried Haberler, and most significantly Jacob Viner.[8] Brahmananda must have felt very happy when the work of his student, Krishna Bhardwaj, on Sraffa became more popular than his own on the subject. Brahmananda had an immense fascination for monetary theory and policy. He was quite critical of excessive money supply through RBI credit to the Government. This was quite vividly explained in his book, *Growth-less Inflation with Stockless Money*.

As in developed economies such as U.S.A., India too experienced economic stagnation and inflation in the early seventies. As I mentioned earlier, he tried to keep a distance from the Government. However, in the seventies, when inflation was running around 20 per cent, he and C.N. Vakil felt they should influence the policy. Instead of hobnobbing with those in power they got about 140 professional economists to rally behind them to submit a memorandum to the Prime Minister. Vakil and Brahmananda formulated a plan in 1974 that came to be known as 'SEMIBOMBLA' to tackle the problems of stagnation and inflation.[9] It proposed floating of government bonds to meet the government expenditure instead of borrowing from the central bank. The latter approach followed by government would increase the money supply and would cause inflation. It was considered a significant intervention on the part of economists in the country to improve the economy.

His recent monumental work on monetary history of India in the 19$^{th}$ century and his writings on monetary economics and monetary policy in India make him India's equivalent of Milton Friedman (Brahmananda 2001a). His edited work with L.K. Deshpande and E.A.G Robinson on employment policy in India is another significant research monograph published by the International Economic Association in two volumes (Robinson *et al* 1983).

His earlier theoretical studies of the sixties and seventies were based on his scholarship starting from classical economics to marginalist revolution followed by Keynesian and Monetarist theories. He demonstrated such a scholarship once again by writing about the evolution of economic theories and methods centred around the contributions made by Nobel-prize winning economists and those of what he aptly called 'Nobel peers' who should have received such honours if the prize were to exist prior to 1969 (Brahmananda 2001b).

Brahmananda presided over the diamond jubilee meetings of Indian Economic Association in 1976 and served that Association and managed its official journal for several decades until his death.

The brief discussion above on his work explains why Brahmananda was unanimously elected as Honorary President of the International Economic

Association at its 13th World Congress held at Lisbon, in September 2002. Only three other Indian economists have earned that distinction before him: C.N.Vakil, Sukhamoy Chakravarty, and Amartya Sen.

## Towards an Ideal Professional Tribute

The life and works of Brahmananda raise several interesting questions. I wish to raise some of them and suggest ways of answering them by setting up an agenda for future research that could be a fitting tribute to Brahmananda.[10] It is now a standard part of business curriculum to study what underlying causes are behind success and failure of business organizations. Such knowledge helps businesses to benchmark their performance and excel. Perhaps this kind of thinking was behind a provocative suggestion made by the late Prof. V.K.R.V. Rao. Just a few months before his death, V.K.R.V. Rao addressed a group of college lecturers at ISEC and said: economists study how consumers behave, how entrepreneurs behave, and how investors behave, but they do not study how economists behave. He said it would be useful to take up that as a research topic.

The above remark made by V.K.R.V. Rao and a review of Brahmananda's work suggests that we must ask the following questions: (i) why did Brahmananda work and produce the research that he did? (ii) why was he not successful in getting his wage-goods model accepted by the panel of economists over that of Mahalanobis' model? (iii) how can economists work further on his ideas to make his work more significant and relevant?

Why did Brahmananda and Vakil not succeed in selling their wage-goods model? Recall my question to Brahmananda on why Vakil had not recorded his dissent. I had told Brahmananda that I was puzzled why Gadgil—who made an important observation that the draft plan document was silent on how relative prices (that determine economic incentives) were determined—had approved the draft plan. It is my opinion that effective advocacy should be a part of an economist's tools. It must be based on scientific principles of logical consistency and credible evidence. I had met Professor P.C. Mahalanobis a few times, and had read many of his writings. I have written about his life and works (Kumar 1992, 1994, 1997). In spite of the current fashion of Nehru-Mahalanobis-bashing, I am of the opinion that Mahalanobis was quite effective in his advocacy of his draft plan. He did the needed homework better than Vakil, Brahmananda, Gadgil and the host of the panel of economists.[11]

There are four different ingredients of an economic policy model. These are: (i) the social welfare function or the objective function, (ii) the institutional environment under which the economic agents function such as the market mechanism, government regulations, technology available etc. (iii) a description of how the macroeconomic aggregates are related to each other—or a macroeconomic

model, and (iv) constraints imposed on the system which are external to the economic policy model, constraints such as self-reliance, foreign exchange constraints, dependence on weather, etc. [12] A normative policy model will have all these four components, while a positive model will have all except the first ingredient, the welfare objective function.

I have demonstrated elsewhere (Kumar 1997) that Mahalanobis stated quite clearly all the four components of the policy model. Through counterfactual simulations he obtained, corresponding to alternative feasible policies, a set of income and employment targets at the end of the perspective plan period and showed empirically that one of them was the best. Vakil and Brahmananda did not have such a quantitative and empirical model to demonstrate their point of view. Had they shown empirically, through counterfactual simulations, what would be the growth and distribution of income and the relative prices under the two alternative models and challenged Mahalanobis with a viable alternative the situation could have been much different. [13]

I shall now return to Brahmananda's last comment published in *Business Line* on introducing competitive economic ideologies with differences in economic objectives and choice of different policy instruments. It must be remembered that Nehru and the leading Congress party gave the policy objectives and constraints to Mahalanobis. They were not what Mahalanobis chose from his Soviet bookshelf. The mechanical model for generating the income growth was chosen by Mahalanobis, possibly from his Soviet bookshelf. But did anyone confront him with an alternative then? One cannot judge the plan strategy of Mahalanobis with today's objectives and today's constraints and today's model of the mechanics of development. Economists cannot impose their objectives on the economy. They should interact with the political parties and advocate the desirability of having some economic objectives and pursue them by means of certain policy instruments. Different economists with different ideological leanings can attempt to influence different political parties. Finally, in a democratic set-up it is the political platform of the dominant coalition that will dictate what policy objectives are chosen and what instruments are chosen. It is this point of view that Brahmananda seems to have for the interaction between economics and politics in his last contribution to *Business Line*. It is a laudable agenda that economists and political parties must follow together.

After reading Brahmananda's work, and that of Gadgil and Asok Rudra, I strongly feel that there could have been an alternative model, ingredient (iii) in the above structure of a policy model, which could have been used to describe the working of the Indian economy at that time (1957–72).

Brahmananda was an erudite scholar, no doubt, but there were some gaps in his arsenal for effective advocacy. One might sometimes wonder, as I do, if the

arguments he advanced are logical and consistent throughout. This is due to Brahmananda's style of keeping everything that seemed to matter in his mind and not to use mathematical formulation. Brahmananda could have said that the mathematical method tries to choose an abstraction to reduce everything to symbols and equations. One is then limited in his abilities to abstract the reality by his mathematical skills. The questions to ask then are: (i) how much is lost in simplified mathematical abstraction limited by one's mathematical skills? and how much is lost in the form of logical inconsistency between parts of a more complex verbal description? His models must be examined carefully with respect to their internal consistency through a rigorous mathematical reformulation. They must be checked against the facts through econometric testing. This should be done.

There are controversies in economic theories. Theories evolve. A theory that once was rejected comes back into circulation in a different enriched form. A theory that is found to be relevant at one time and place may be found to be inadequate at some other time and place as the four components of the policy model listed above differ from place to place and from time to time.[14] We must therefore examine different theories and models continuously, try to enrich them by taking the best features of each, and come up with the best possible product that is the need of the times. Is it not what we say that characterises technological innovation? And is it not what a patent examiner looks for before awarding a patent to a new innovation?

We must learn from the past through a systematic examination of failures and successes. Brahmananda's wage goods model has elements of Hayek's production and prices. Brahmananda dealt with the Hayek-Keynes debate on production and prices in his contributions described above. That debate is still going on![15] We must have a similar debate between the alternative paradigms describing the mechanics of Indian economic growth and the economic policy strategies that arise from each.

The above remarks suggest that there is a need to establish a research programme that can benefit from economies of scale and scope by drawing the resources of different institutions with which Brahmananda was associated—Bombay University's Department of Economics, Institute for Social and Economic Change, Indira Gandhi Institute for Development Research, and the Reserve Bank of India. This can be done through formation of a consortium. The objective of this consortium should be to initiate and promote research on Theoretical and Empirical Studies on Indian Economy. As a regular feature this consortium may organise one national seminar every year around December to review the Indian economy and to present its recommendations for the budget of the following year. Its recommendations will then have a definite impact on the budget proposals of the

Government. This Centre may be named after Brahmananda. That, in my opinion, is a fitting tribute to Brahmananda and to others who participated in this giant trial and error exercise of framing economic policies for the country, both from within and outside the government. As a first step, ISEC may consider organizing a nation-wide seminar to start the debate on the relevance of Brahmananda, Mahalanobis and planning.

## Notes

1. Some of the good obituaries are written by S.S. Tarapore, former Deputy Governor of RBI, in *Financial Express*, and Jayaram Ramesh in *The Economic Times.*
2. I will return to this view of Brahmananda later to make some observations of my own.
3. See his piece 'The Study of Economics: A Revolution in the Offing?' *Business Line*, October 3, 2001.
4. *Planning for an Expanding Economy*, Bombay: Vora & Company, 1956.
5. B. R. Shenoy had recorded his dissent.
6. As I will comment later, Brahmananda was perhaps not fully convinced at that stage that he had a better model than that of Mahalanobis.
7. See Brahmananda (1969: 227). One may argue that the stagflation and Phillips' curve paradox is also due to this error of using closed economy models when countries faced price shocks on traded inputs (oil).
8. His paper 'A Ricardo-Jevons Type Critique of the Sraffian System: The Vision of a New Foundation,' a typescript, is in the Sraffa collection of papers at Trinity College, Cambridge, along with five documents showing the correspondence Brahmananda had with Sraffa.
9. SEMIBOMBLA stands for **S**cheme of **E**conomists for **M**onetary **I**mmobilization through **Bo**nd **M**edallions and **Bl**ocked **A**ssets. See Vakil (1974).
10. Although some of my comments below seem critical of Brahmananda's work, those are constructive criticisms. My ultimate aim is to enhance the significance and relevance of Brahmananda's wage-goods model by suggesting further research on the topic.
11. It must be noted, however, that Mahalanobis had much more resources than all the economists put together had. In addition, I wonder if all those economists suffered from any conscious or subconscious feeling that economics and economists are inferior to physics and physicists! For effective advocacy one must rid oneself of such a feeling of inferiority and must cultivate an ability to argue and debate with credible evidence.
12. This basic structure of a policy model is either not known to economists, who are on either side of a policy debate, or they deliberately ignore it. There are three types of economists, (i) those who change with changing views and theories of economics,

picking the best and the most relevant; (ii) those who change their views to suit those of the government and thus become the core-group economists for governmental policy; and (iii) those that do not change their views and remain either sterile or dogmatic.

13. Based on a recent conversation with eleven eminent Indian economists regarding the pre-reform and post-reform scenarios in India, the editor/moderator of those conversations says: 'The economic philosophy and policies that India's economists shaped were conditioned by the prevailing ideology and orthodoxy during the decades of the fifties and the sixties.' 'For all its faults Nehru's development strategy was not a total failure; it did deliver moderate growth with stability until the early sixties.' See Introduction in V. N. Subramanyam, *Conversations with Indian Economists*, Macmillan, 2001. Brahmananda was one of those eleven economists interviewed. Brahmananda praised Mahalanobis for his vision, while advocating the usefulness of his wage-goods model. This seems to suggest that Brahmananda was not fully convinced that his model was better than that of Mahalanobis.

14. This is why we hear people say that Keynes is not a Keynesian and that Mahalanobis would have disagreed with his own strategies in the context of India that prevailed in 1990.

15. See Volume IX of Hayek's collected works, Bruce Caldwell (Editor), *Hayek Contra Keynes and Cambridge*, 1995; John P. Cochran and Fred R. Glahe, *The Hayek-Keynes Debate-Lessons for Current Business Cycle Research*, Lewiston, New York, The Edwin-Mellen Press, 1999.

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## Book Reviews

### Maarten Bavinck. *Marine Resource Management: Conflict and Regulation in the Fisheries of the Coromandel Coast*. Livelihood and Environment – 5. New Delhi: Sage Publications. 2001. Pp.395. Rs.595 (Hardback).

In the emerging globalised, unipolar and increasingly inequitable world order, any study on the marginalised and particularly indigenous communities is not only a worthy academic pursuit but also a genuine response to the still unquenched longing for a just and humane world order. The book under review is part of the 'Livelihood and Environment' Series, which tries to 'describe the strategies adopted towards livelihood maintenance at the levels of the individual, household and other organised groups of people.'

Marine fisherfolk are a besieged lot. All around the world, from the coldest Arctic regions to the warmest tropical seas, there is a crisis in fisheries. There are too many people chasing too few fish. The coastal ecosystem in many places is close to ruin. There is now severe competition for the use of coastal areas by new entrants like ports, tourism projects and so on. Of the many manifestations of this crisis the conflict between the artisanal fisherfolk and the mechanised sector has been the most visible. Maarten Bavinck argues in this book that the inevitable collision of traditional modern fishing is not merely technological. It involves converging, antagonistic systems of sea tenure. Sea tenure issues are the core of fishermen's livelihood (p.24).

The author examines three tenurial systems, the age-old territorial claims and fishery regulations of the artisanal fishing community, the rule system established by the newcomers, the trawler owners and the legal conventions of the State. The analysis of these tenure systems is based on the assumption that sea tenure systems form a special class of legal systems and that a constellation of sea tenure systems can be analysed as a manifestation of legal pluralism. The location of the study is the Coromandel Coast of Tamil Nadu, and specifically Royapuram harbour and Chingleput District.

The study explores a relatively unexplored area. The questions raised are sharp and relevant. The question whether the inshore fisheries of the Coromandel coast actually have the three systems of sea tenure, and if so how they are structured leads to a lucid presentation of the artisanal fishing sector with analysis of occupational diversification, social stratification, sexual division of labour, the government administration and the social and cultural entity of the village under study. Along with the documentation on the artisanal economic activity and its relation to trawlers, there is a graphic exploration of the social and economic structure of the village, the story of change and transformation.

The author identifies two important components of the artisanal tenure system: a notion of open access to fishing grounds and a sense of territoriality. The restrictive measures are based on three conceptions of harm: harm to the fishing grounds, to the majority style of fishing, and to the community as a social entity. The artisanal tenurial system emphasises both the regulatory prerogative with a particular sea territory and the long-term survival of the fishing community. The panchayat set-up has demonstrated an extraordinary capacity for operating this tenure system.

However, into the relative smooth system of artisanal fishing came the mechanised boat fishermen challenging the artisanal system. In the context of legal pluralism, the second major research question is asked. What kind of relationships exist among people who identify themselves with a particular sea tenure system? And how do the systems interrelate? This question leads to an elaborate analysis of the mechanised sector in Royapuram and their rule system, though the author is of the opinion that unlike in the artisanal sector the boat-owner associations have limited control over their members as well as over the boat fishing industry.

The latest arrival on the scene is the State, through the fisheries department. The author's analysis spans the official policy and an implicit set of conventions, highlighting the fact that it is fragmentary and incomplete. He acknowledges that the situation is complex owing to the political equations, the dissonance between the Act and the enforcement capabilities, and the opposition from the surrounding boat fishing population. Eventually, the fisheries department strives to let fishermen manage their own affairs, even if their solutions contradict official marine regulation policy. Only in certain circumstances, when conflict erupts into the open, does the department intervene. The fisheries department's incidental involvement in artisanal fisheries regulation and structured participation in the regulation of mechanised boat fishing is due to a combination of external exigencies, including the two sectors' leverage in government circles.

The author argues that the three parties have, over a period of time, become accustomed to the existence of the other tenure systems. All parties have realized that the others are here to stay and they have learned to accommodate. There is a dynamic nature to their interaction. The conflict between the three actors is not necessarily the automatic result of a collision of sea tenure systems, but rather depends on a variety of conditions. The intensity with which fishing practices converge is a factor. The higher the rate of convergence, the more the conflicts that are likely to occur. A second factor is the development of landing prices for seafood. Third, the existence of positive ties between the antagonistic parties may blunt whatever conflicts may arise, whereas their absence may encourage disputes. Fourth, the duration of the conflict has some predictive value for the chance that adjustments will occur. Fifth, the extent to which the parties have organised themselves and the state of this organisation have an impact on the conflicts (p.360).

Methodologically, the author breaks new paths. His use of theory, linking of sea tenure studies and legal pluralism, mix of quantitative and qualitative data and moving away from a naïve dualistic thinking (e.g. artisanal fishermen are non-capitalist whereas boat owners are capitalist; artisanal fishermen are more conservation-sensitive, whereas boat owners are more profit-oriented and market guided; artisanal fishermen are guided by a sense of 'limited good' whereas boat owners subscribe to a 'myth of superabundance' etc.) make this study a unique contribution.

Ultimately, the issues of the fisheries sector boil down to a matter of sustainable fisheries management. Fisheries management, in the final analysis, is a political issue. And the big question that remains is whether there is enough political will in this country to put into practice the insights generated by such insightful studies.

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## Ariel Dinar (ed). *The Political Economy of Water Pricing Reforms*. New York: Oxford University Press. 2000. Pp.405.

This volume brings together edited papers from a Workshop on Political Economy of Water Pricing organised by the World Bank in 1998. They fall into three broad categories: (1) those highlighting limitations of the market mechanism for determining water prices and allocations and the need for institutional arrangements; (2) broad issues of pricing reform emphasising the importance of political-economy factors; (3) case studies of attempts at water pricing reforms and restructuring of water management institutions.

Many contributors examine why viable and efficient water markets are not feasible: The very nature of water makes it difficult to ensure well-defined and tradeable property rights; individual right holders cannot have independent control over their supply; individual water sellers cannot ensure buyers get the water according to contract; pervasive predatory appropriation of entitlements. These features are due to the fact that users get their supply from a common source marked by indivisibilities and scale economies. It is therefore necessary that water allocation and pricing be subject to administrative regulation.

Prices are obviously an important instrument for influencing user behaviour. A major reform of the pricing system to reduce subsidies and correct distortions in the pricing structure is essential to induce more efficient use of water. Some believe that water markets could play some role in rationalising water prices, and that water agencies can choose 'market mimicking' regimes. But they all recognise that pricing

has to be combined with other instruments. The choice of instruments is, however, constrained by incomplete and asymmetric information and transaction costs. These are compounded when the water agency has to address issues regarding equitable distribution of the common resource, externalities in its use and long-term sustainability, none of which can be mediated by the market. They call for collective decision making through multilateral bargaining, and negotiation involving all stakeholders.

Key issues of urban water pricing and its reform are reviewed by several papers — some in general terms and others in specific contexts. A variety of schemes are in vogue. Single and two or even multi-tier tariffs, uniform rates for different classes of users based on cost of service and various schemes of discriminatory pricing favouring poor consumers on equity considerations (increasing block tariffs), differential costs of supply and monitoring between large and small users (decreasing block tariffs) and seasonally differentiated rates (to reflect seasonal differences in supply-demand conditions). Hewitt reports that the majority of US water utilities use discriminatory pricing schemes. Increasing block tariffs are widely advocated and practised in developing countries on equity grounds. This is questioned, based on evidence from a study in Flanders, Belgium. It has also been argued (Boland and Whittington) that the equity goal can be better achieved by a simpler scheme of uniform volumetric pricing coupled with a uniform lumpsum rebate to all. Many call for better data on the price sensitivity of water consumption of different users in designing rate structures to realise the given revenue objective.

Marginal cost pricing, advocated by neoclassical economists, has not had many takers partly because of inadequate and unreliable data on costs and difficulties of allocating joint costs to different users but also because it is indifferent to distributional considerations. Hall recounts how and why the Los Angeles water authority switched over from historical cost-based design to marginal cost-based design with differential rates varying with expected consumption and by season. The paper attempts to explain both the original design and acceptance of change in terms of the relative power of different interest groups (consumers, water agency officials and the political leaders).

The case studies of the political economy of water pricing reform in specific situations are a mixed bag. In the Moroccan case, Diao and Roc argue that a strategy of combining trade reform with creation of a market in tradeable water rights has better chances of success than changing administered water prices. A general equilibrium model is used to show that trade reform will significantly alter the relative returns in favour of crops that use water more efficiently and that by introducing water market in that context will facilitate the reallocation of water to more efficient uses.

Case studies of the experience with water pricing reforms in specific

countries underline the importance of both informational and analytical basis for proposed changes, as well as of securing a broad-based political consensus among the stakeholders. For example in Dakar (Cueva and Lauria) rate revisions were limited to households and ignored the politically powerful non-household segments (gardens and public fountains) who accounted for a major part of water use. Even in the case of households, the sensitivity of consumption of public water supply of different categories of households to rate changes was ignored, thereby risking the prospects of achieving the revenue target.

In the case of Honduras, Strand lists the various interests groups concerned with water and their attitude to reform. Attitudes vary widely from mild interest to strong opposition. So do the resources they have to influence policy. But hardly any of them shows a strong interest in pushing for reform. Whatever reform was attempted was under inducement (loans) and pressure from the World Bank. But even strong external pressure will not work unless internal circumstances are conducive and a political consensus is forged through widespread, informed consultation of all interests.

This message is further underscored by the experience of attempts at pricing and institutional reforms in relation to irrigation and overall water resource management. In all the six countries reviewed in this connection (Australia, Brazil, Mexico, Morocco, Pakistan and Yemen), the need for reform, including large increases in water prices and their rationalisation, improving efficiency and sustainability are compellingly evident. In practically all of them, governments have declared their commitment to reform and also introduced legislation for radical restructuring of the organisational structure for water resource management involving the creation of unified basin organizations, stakeholder representation in management, creating 'independent' regulatory bodies, clearer definition of water rights and, in some cases, enabling trade in these rights. But except in Australia, this was a 'top-down' process led by senior officials and political leadership without any serious effort to consult stakeholders and forging a broad-based political consensus on reforms. Interestingly in all these cases except Australia, external pressure, mainly from the World Bank through loans and loan conditions, helped to set this top-down process in motion. Progress at the ground level has everywhere been slow owing to opposition from vested interests.

From the evidence cited in the papers, the impact on the water fisc and use efficiency can hardly be called significant. Politicians and water managers are loath to confront difficult issues, especially of internal restructuring of water utilities. Increasing water rates is a political hot potato. The papers on Morocco and Yemen grossly oversimplify the problem by suggesting that the needed changes in the water price structure can be wrought by combining trade liberalisation with legal changes to confer well-defined and tradeable water rights to users and permitting

them to be traded.

The Australian case shows the importance of internal pressures for reform. Environmentalists stirred up public awareness of the deleterious effects of the way water resources were being managed and priced. Attention was called to the growing strain on the governmental fisc and the realisation that water subsidies were an important factor and water sector reforms were a necessary part of fiscal strategy. Water utilities also needed more resources for investments to improve water management, check deterioration in water quality and address increasingly insistent environmental concerns. These forces were mobilised not only to educate public opinion, widen the constituency for reform, but also to get the issues and possible solutions studied by independent professionals, and have them discussed in open forums with all stakeholders to arrive at a broad enough consensus to get politicians to act. The Australian experience, like that of Los Angeles, shows that this is feasible, given concerted mobilisation within civil society; and also that the process, though tedious and protracted, can significantly improve the chances of getting wider acceptance of reforms and support for their implementation. It is also clear that this is not a one-shot affair in the face of resistance from strong vested interests.

The main message of this collection is that the scope of water sector reforms must go beyond pricing to address equity, environmental requirements and sustainability, as well as restructuring institutions for wider and meaningful stakeholder participation both in water policy reforms and in water management. Equally important is the message that the market cannot handle the tasks of efficient, equitable and sustainable water uses, and institutional restructuring must be based on the recognition of water as a common pool resource to be managed collectively through public enterprise institutions and that decisions must be the result of negotiated compromises between the stakeholders. That these messages come from the World Bank is significant and hopefully will temper the zealousness of its advocates of privatisation and marketisation of water.

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**Thomas Fisher and M.S. Sriram. *Beyond Micro-Credit: Putting Development Back into Micro-Finance*. New Delhi: Vistaar Publications. 2002. Pp.390. Rs.340.**

Microcredit has become widely accepted as a development tool all over the world and has grown significantly as a sector within India. More and more NGOs have begun to engage in microfinance, commonly understood as small loans given to women's groups, normally formed of 15 to 35 women, and referred to as self help groups (SHGs). The women members of such groups pool their savings at

weekly or monthly intervals and often rotate it among one another as small loans. They also access external finances either through a Non-Governmental Organization (NGO), Microfinance Organization (MFO) or a bank.

A large number of organizations, including NGOs, MFOs, NBFCs and formal financial institutions, have begun to add micro credit to their activities and some have become specialized MFOs. Some of these have development objectives, others aim to achieve financial sustainability through achieving scale economies and charging comparatively high rates of interest. Thus the Indian scenario spans a multitude of organizations that offer a range of financial services through diversified organizational forms, using varied methodologies and having different scales of outreach, products, and costs returns. As a result, each organization is different in the way it envisages development impact and seeks to achieve it.

The Indian scenario offers diversity and a unique set of experiences from which to learn. Equally, there are several questions that the MF sector in India has far from resolved. The book under review identifies and analyses several of these questions.

First, it raises the question of whether organizations that provide microfinancial services are also developmental, and how microfinance can be combined with development objectives. It includes several case studies along with analytical chapters. It arises from an organizational development project managed by the New Economic Foundation (NEF) in London, that involved working with Sewa Bank, PRADAN, CDF and BASIX.

The first chapter of the book outlines the aspects, which the book proceeds to address in the following chapters. It challenges a narrow focus on the 'technical' aspects of the MF sector, as well as weak performance. It challenges 'some of the ideals of local democratic organization by looking at the hard realities' (25) of how SHGs work. Also, it raises the question of collective ownership of organizations delivering microfinancial services. Chapter 2 provides a chronological account of the development of the microfinance sector in India, and the different types of organizations that it comprises.

Chapter 3 discusses the issue of social and economic security of poor women in the light of the experiences of SEWA Bank. The organizational analysis brings out the financial benefits of such linkages, in terms of access to savings of the women, as well as the major strength of the bank, which is to offer women a wide range of financial services, appropriate to the needs of the women. The financial services are offered within a coherent development framework that seeks to reduce women's vulnerability to shocks. However, important lessons derived from women's ownership of the bank, their participation in giving it direction, and how this may have changed the functioning of the bank and led to the empowerment of women, have not been touched upon.

The fourth chapter utilizes the experience of BASIX to highlight the potential of integration of provision of microfinancial services with a wider range of technical assistance and support services. As BASIX has, 'livelihoods promotion' of people as its development objective, it has engaged in projects that enhance livelihoods in different ways such as reviving rural infrastructure, dry-land agriculture productivity improvement, inter-borrower expertise exchange, and market linkage programs. BASIX has attempted several innovative approaches with the objective of making a significant impact on the local economy through multiplier effects. The book cautions, however, that disparate support activities may not add up to a coherent livelihoods promotion strategy and calls for strategic thinking about non-financial activities. The analysis does not, however, deal with WHY the innovations of BASIX have been disparate. The answer may lie in the fact that development organizations often need to make funding partnerships that are time bound and project bound, and may or may not have a link with the overall strategy of an organization. However, it may also be that MFOs are so preoccupied with attaining financial sustainability that designing a coherent and long-term strategy for clients sometimes takes a back seat to the ultimate prerogative of securing profits.

The next chapter examines the potential of MF as a tool to build social capital. The experiences of the Cooperative Development Foundation (CDF) are analyzed, and placed alongside lessons from the experiences of MYRADA and PRADAN. These lessons relate to questions of accountability, management, control and ownership of assets and profits of a MFO. The authors believe that people's ownership of a MFO should not be seen as conflicting with financial efficiency parameters.

Chapter 6 continues to examine another challenge for MFOs—environmental issues. SEWA followed a strategy to promote recognition and rights of poor self-employed women, whilst DHAN and BASIX follow a strategy of saturating an area with SHGs in order to have a significant impact on the economy. Meanwhile, Sa-Dhan, a network of Indian MFOs, seeks to influence policy and the regulatory environment, and CDF's struggle, campaigning and research, led to change in the legal environment in which cooperatives function, not only in Andhra Pradesh, but in other states as well. Indeed, the campaigning still continues. The book also cautions that organizations that begin to get absorbed in leading system-wide change tend to have less time for internal organizational issues. In addition, they must also face pressures of organizing networks and steering the diverse organizations in these networks towards cooperative relationships.

The next chapter compares SHGs with the Grameen bank type groups. It compares costs of forming and managing these groups, the products they offer, flexibility in the group mechanism and how tasks, as well as profits, are shared.

While it appreciates the democratic processes in SHGs and recognizes their potential for empowerment, it also rightly cautions that these groups are vulnerable to exploitation by local leaders or politicians. Those familiar with the IRDP experience know that the nexus between politicians, government officials, bureaucracy and banks can defeat the objectives of any development plan.

Mathew Titus discussed this issue further in Chapter 8 in an analysis of the experiences of groups in urban areas, through SHARAN, an NGO-MFO based in Delhi. He categorizes costs incurred due to losses caused by non-repayment of loans and misappropriation of savings or insurance instalments, and emphasizes the risk caused by imperfect information. He highlights the inadequacy of skills within NGOs and SHGs in managing groups as well as financial transactions leading up to a case for capacity building.

Chapter 9 the different stages of development of SHGs. The tasks, processes, leadership and traits of leaders are analyzed in the context of social entrepreneurship. The experience of PRADAN in promoting leaders in Hazaribagh and Lohardaga districts of Bihar (now Chattisgarh) is described most candidly. The author tempers the expectations from SHGs with realism and highlights the need for capacity building of both staff of NGOs and promoters/ leaders of groups. He fails to see that just as NGOs need to invest the time and effort to promote leaders, there is also a need for investment in capacity building and articulation of group members, so that they may be able to demand good leadership and hold their leaders accountable.

Frances and Sinha, in Chapter 11, summarize the experience of MCRIL in rating MFOs and of EDA Rural Systems in impact assessment. They find the financial performance of Indian MFOs rather weak and suggest that Indian MFO not only need to improve their capacity to be financially sustainable, but must also put in more effort to measure and assess the impact they make.

Titus, in chapters 12 and 13, discusses the need to address the issues raised in the book as the MF sector has a critical role to play in the country and for which stakeholders' support is crucial. He calls for the government to withdraw from the implementation of MF and concentrate on creating a conducive policy environment. He outlines the policy framework and regulatory environment in India and calls for freeing up the circumstances under which cooperatives function. He rightly points to the need for some regulation of SHGs, which are currently unregulated, making women members vulnerable to their leaders who may be incapable, inefficient or corrupt in the handling of financial affairs of SHGs. He lays down a role for apex organizations and donors. The paucity of resources for capacity building is stressed, especially for those who are facilitator NGOs and not MFOs themselves, and is in line with recent critiques of donor funding in the microfinance sector (See Premchander 2002).

The final chapter points to the need to view MF services as a means to an end and not an end in themselves, and advocates the adaptation of MF to context. It also recognizes the distinct role of NGOs in providing a value base, as well as taking up developmental tasks, for example, through attracting grant funding. It emphasizes the potential for NGOs and the need for MFOs to create a more conducive work environment and thus engage with larger systems, including economic sub-sectors and banking structures.

The book calls for an approach that combines efficient financial service provision with development objectives; for one that creates competencies among staff and SHGs and also creates space for an organization and its field staff to engage in practice and reflection. It also advocates working towards resolving issues around ownership and control, and to develop innovative ways for capacity building.

The book also outlines the current institutional structure, but does not critically analyse the lessons that the MF sector needs to take on board from the experiences of related sectors. For instance, an analysis of the experiences of the banking sector would offer several lessons regarding organizational and institutional issues. Meanwhile, an exploration of the cooperative sector would shed light on further issues such as outreach, effectiveness and system-wide change. The NGO/MFO sector has mostly sought to reinvent the wheel and learn lessons long known to the Indian banking sector about costs, risks, managerial and organizational issues in MF and so on. The mainstream is questioned and criticized but no legitimate lessons are drawn to prevent potentially wasted sector-wide efforts towards what is termed 'innovation.'

However, the book makes several valuable contributions. It examines both negative and positive experiences and draws lessons from these, for either capacity building or attention to issues like organization forms that are equitable to poor women. It adds to the debate among those involved in the MF sector and offers valuable suggestions for those concerned with its development and the path it takes in the future. It will be of interest to NGOs, MFOs, apex and formal financial organizations, government and donors.

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**Mahajan Gurpreet. *The Multicultural Path: Issues of Diversity and Discrimination in Democracy*. New Delhi: Sage Publications. 2002. Pp.240. Rs.280.**

The problems associated with the coexistence of diverse cultures and ethnic groups in democratic societies have provided a basis for vigorous scholarly debate. Multiculturalism, as an approach to addressing these issues is of relatively recent origin. In the book under review, the author makes a comprehensive analysis of the ideas and issues related to multiculturalism.

The book is divided into eight chapters, the first three of which explain the distinctiveness of multiculturalism against ideas such as liberalism and pluralism. The first chapter aims to affirm the core idea of multiculturalism, namely, that it seeks equality of diverse cultures in public arenas, not merely their plurality. The second chapter points to the problem of homogenization of state policies and argues that cultural community membership is a prerequisite for the protection of minority culture. The next chapter focuses on diversity. Making a distinction between plurality and diversity, it argues for the latter. The next chapter examines the idea of differentiated citizenship and examines different types of special rights that enable the individuals of the minority community to preserve their culture. The following two chapters represent a feminist and liberal critique of the multicultural positions. An attempt is made to respond to these criticisms in the next chapter. The last chapter attempts to put forward the agenda of replacing the multicultural reading of community identity and membership with the idea of non-conformity membership.

Multiculturalist theory is founded on the assumption that the cultural minorities are discriminated against in a democratic system and that the State, despite its claim of neutrality, often reflects the hegemony of the majority community. Based on this, multiculturalists argue that cultural diversity must be ensured. Hence it becomes imperative to provide them with cultural rights to ensure their equal participation in the public arenas and their protection and sustenance. These special rights for the communities are classified into (1) cultural rights in the form of exemptions, assistance and recognition, (2) self-government rights and (3) special representation rights.

These special provisions, especially the concept of cultural rights of multicultural theory, have attracted severe criticisms from two quarters, feminism and liberalism. While feminism agrees with the basic tenet of ensuring diversity, it has serious problems with the question of women within these minority communities. Protecting a minority culture through these cultural rights invariably means protecting the prevailing community practices, which are mostly patriarchal and against the interests of women. They maintain that multiculturalism fails to address the power relations that set and perpetuate certain traditions within the minority

community. Another front where multiculturalism fails to respond to criticism is the issue of minority discrimination within polity because the multicultural understanding of discrete minorities is far from the reality as their minority status is never static. Similarly, multiculturalism fails to understand the instrumentality inherent in minority politics where the elite of the minority community invokes these conceptions of rights for political advantages.

In chapter seven, which is devoted to responses to the criticisms, the author explains the positions of many recent theorists. For example, Kymlicka upholds the concept of special rights against group rights, which address the question of inter-group relations within the community. Another position that Kymlicka adopts is that these special rights need to be given only to the national minorities, not to the emigrant minorities. A different line of thinking discernible in multicultural writings is the position that all cultural diversities cannot be protected by the State, hence the concept of 'Limit of permissible diversity'. Bhikku Parekh, one such proponent, argues that 'operative public values enshrined in the Constitution' can be used as the basis for ascertaining whether a particular cultural practice can be permitted or not. Yet another major concern in multicultural circles is the nature of the rights to be protected. Should all the elements of minority culture be protected or selected ones? Here Mahajan examines the arguments of Carens, who recommends a contextual approach. That means the claim of each minority has to be examined individually and cultural rights may be granted accordingly.

Mahajan, in her last chapter, correctly points out one of the basic but serious features of minority discrimination that has eluded the multicultural discourse. Often it is not the nation state alone that discriminates; other majority communities can be potential discriminators. The author invokes the examples of Shiva Sena who targeted South Indians in Mumbai to prove this point. She argues that in such situations the emphasis should be on the rights of individuals as citizens. Here, State should ensure the basic rights of all citizens against any kind of violence from the other community. But the post-Gujarat riots in India seriously question this stand. What has multiculturalism to offer to minorities where State and majority communities together practised discrimination and unleashed violence by subverting both community rights and individual rights as citizens of India?

Mahajan offers another significant insight, which is pertinent to one of the basic ethics of multiculturalism—that the minority culture has to be preserved to prevent discrimination. Here, the author analyses the dynamics of cultural identity and points out that there is a distinction between valuing an identity or practices and symbols and seeking to preserve it. She explains that members of a community do develop an identity with their fundamental distinctiveness but various practices and symbols are constantly in the process of selection, omission and modification. Here, the attempt to preserve certain cultural practices by multiculturalism becomes

futile. The author brings forth the most significant argument, namely, special rights for promoting non-conformist membership. This proposition is the result of the realisation that promoting cultural diversity is not an answer to cultural discrimination. The author argues that special rights for minorities are not granted to protect minority culture or enhance diversity but with a view to sustaining options for internal members to continue with this cultural way of life. That means the special rights must be given not to the community as such but to the individuals of the minority, as they can carry on the way of life they want. The author calls this the special right to non-conformist membership. But this position raises serious questions. Do our minority communities give that much freedom to their members to carry on with the ways of life they think feasible? Even with the assistance of special rights can individuals or groups of individuals resist the hegemonic tendency from within the community? These questions assume significance in the light of the increasing power of caste and religious organisations and their tightening grip over the members. Can these cultural rights of non-conformist membership resist the process of homogenisation characteristic of the present community identities? Another impression is that though the theoretical arguments of multiculturalism start with the critique of liberalism as giving undue importance to the individual and overlooking community, it appears that the author also leans toward a liberal position in putting forward the idea of non-conformist membership.

Overall, this book is the outcome of a commendable effort to give a comprehensive overview of the theoretical debates within multiculturalism.

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## K. P. Kannan and N. Vijayamohanan Pillai. *Plight of the Power Sector in India —Inefficiency, Reform and Political Economy.* Thiruvananthapuram: Centre for Development Studies. 2002. Rs. 400.

The electricity sector in India is large (though there is nowhere a calculation available about its rupee turnover). It is fundamental to the country's economic growth and prosperity. Yet, this sector has seen little study and research by scholars from other social sciences. The book under review is an important contribution in this respect. After the Rajadhyaksha Committee Report on Power (1980), it is the first to analyse in (even greater) detail the issues that hinder the efficient development of the power sector in India. It is a useful introduction to the subject for the exploding number of electricity regulators, engineer-dominated utilities, generalist policy makers, the large tribe of consultants, merchant bankers and rating agencies.

The book is organised into four parts and ten chapters. The first part, titled 'national scenario', meaningfully introduces the basic concepts in electricity and provides useful data and analysis of the physical and financial performance of the SEBs (state electricity boards). The second part is a diagnostic analysis of the power sector in Kerala. There is also a good survey of electricity demand analysis and forecasting and of the econometric tools and techniques. It also provides an excellent framework for analysing time and cost overruns of power projects and their effect on costs, transmission and distribution losses and different pricing models. The third part is about the surge of reforms in the sector. It gives a useful review of the experiences from abroad and then discusses the reforms of the power sector in India. The final part is on political economy of public utilities. It ends with a set of proposals for improving the power sector in Kerala.

There is a marked ambivalence in the book. The data and diagnosis are thorough but the opinions and prescriptions appear to be affected by ideological bias. For example, the authors say: 'However, a further shift in the policy of capacity addition towards the private sector in line with the liberalisation drives of the 1990s has left this decade "wasted", with very little investment coming on stream in all the three sectors, Central, state and private.' This is surprising. Generation capacity additions in any sector would only have added to the woes of governments already burdened with the rising part of their financial deficits being accounted for by electricity. It would have further added to the mountains of receivables in this sector. Indeed, this chapter concludes thus: 'The Indian power sector, characterised by inadequate capacity, its under-utilisation, and high level of losses, remains poor in its supply.'

The chapter on financial performance of SEBs analyses the effects of time overruns of power projects and concludes that they involve 'manifold and thus heavy costs—besides incurring the cost escalation of the projects and the power purchase costs'; 'the system also is forced to forgo additional sales revenue obtainable'. The book gives an interesting calculation (Page 90) that estimates the unit costs savings from efficiency improvements on account of operational efficiency improvement resulting in reduced power purchase, reduction in over-manning, resulting in savings on establishment and administration expenses, and in interest payments by introduction of a 1:1 debt-equity ratio. They show that in 1997–98 the all-India system would have gained Rs.94,588.25 million.

They question the value of simple extrapolation of historical trends in forecasting electricity demand growth, better explained as an 'econometric function of four "causal" factors; population, per capita personal income, and the prices of electricity and natural gas.' These factors ignore one more. In recent years, developed economies have shown significant economic growth accompanied by very low energy demand growth due to measures for improving energy efficiencies and

conservation in production, distribution and equipment in use. They suggest that in less developed power systems like India, 'growth of demand for power is generally assumed to be determined by the growth of number of (connected) consumers and that of intensity of their power consumption (i.e., electricity consumption per customer), as also the interaction between these two factors.' They conclude: 'Reliance on past demand data for forecasting purposes thus becomes grossly erroneous and highly questionable'. A valuable contribution to forecasters is the detailed methodology and calculations using different forecast models.

The authors cite lack of a commercial mindset and of professional management for the time and cost overruns in electricity projects in Kerala. They say: 'It is not that the government has no resources meant for power development, because it is actually overspending; the problem is in the inefficiency of management, coupled with the political economy of corruption.' They suggest some solutions: 'the construction contracts be so structured as to make the contractors liable for stringent penalties in case of non-performance such as time overruns'. They have estimated the extra energy and revenue realisable as well as the capital cost savings from timely completion of projects.

The authors appear to suggest a link between the incentives offered by the central government in 1989 for reduction of T & D losses and the manipulation of data including by concealment of these losses under agricultural consumption, in order to win awards. They submit detailed estimates of the savings realisable if T & D losses were reduced to more reasonable levels.

The authors overlook the series of consultation papers issued by the CERC and some State ERCs and their numerous Orders incorporating new principles for tariff regulation and determination. For example, the CERC has issued orders on Availability Based Tariff, which for the first time anywhere, uses a commercial mechanism to improve power frequencies and to bring a better matching of load and generation forecasts to actual demand and generation. CERC issued the first ever consultation paper on bulk tariffs and a series of papers on risk and return in electricity, depreciation norms, etc., which were then incorporated in a major order on tariff norms and principles. CERC also imposed a charge for use of reactive power with a view to bringing voltage levels under some control. Similarly, some SERCs have attempted to estimate the costs of serving different consumer categories and determined tariffs for each. They have used performance-based tariff regulation to target for efficiency improvements especially on reduction of T & D losses. It would have been useful to review this work and see whether there are principles for general application.

One 'of the most pronounced effects of liberalisation of the power sector' that the authors cite from these country experiences is the 'improved power supply position in those countries where power shortage as a major problem was one of

the primary causalities for the opening up of the power sector to IPPs'. They find the evidence on efficiency inconclusive, but fail to support such a conclusion. The chapter gives an excellent analysis of competition in the power sector, a subject on which there is little knowledge in the state-owned monopoly situation of India.

However, the chapter on reforms in the power sector in India again pays scant attention to the role of the regulatory commissions. Not to discuss their performance, assess their powers and evaluate their effectiveness is a major gap in an otherwise comprehensive study.

The book ends on an ideological note: 'Privatisation of electricity sector in the Indian context is obviously ominous of disaster. ..The whole assets, accumulated by two generations of tax payers over a period of half-a-century, would be lost for a one-time paltry payment to the then government to squander.' The authors do not say how the many excellent measures that they suggest on Pages 443–450 for improving the electricity sector are likely to be given effect to under government ownership since governments have shown no ability to introduce any such measures in the past. The results of half a century of government ownership are well documented in the book. The authors allow their hope that the same government ownership will suddenly do the right things to overcome the excellent analysis in the book. Further, they make no effort to look at the different privatisation models, even in India, to evaluate whether there are safeguards against the dangers that they fear.

This is an excellent and timely book. It brings scholarship and hard work to bear on a sector hitherto neglected by competent economists. It is a valuable addition to the literature and deserves to be studied by anyone connected to and interested in the power sector.

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## Amitabh Kundu and Alak N. Sharma (eds). *Informal Sector in India: Perspectives and Policies*. New Delhi: Institute for Human Development. 2001. Pp.440. Rs.650.

With the adoption of economic reforms in India in 1991 and following a sharp decline in employment growth as a consequence, informal sector has emerged as an important source of employment to the poor and the not so poor. Hence, academic attention is being focussed on this sector in recent times. The interest in the study of informal sector dates back to the early seventies when the ILO carried out extensive studies in Africa and Latin America. Subsequently, a number of studies were completed by researchers and doctoral students in South Asia including

India. But many of these studies were city-based using primary data; not many attempts were made to carry out national and state-level studies using the vast secondary data available. That explains why rigorous policy making was not attracted by the informal sector.

The focus of earlier studies was primarily on definition, identification and size of the informal sector, its linkages with the formal sector and the nature and structure of the urban informal labour market. But subsequent studies have focused on many other issues such as wages, productivity, employment, support system for the growth of the sector and social security for workers. The book under review, which contains largely the papers presented in a seminar held in December 1997 in Delhi and edited by two eminent economists — one being an expert in urban economics and the other in labour economics — makes a comprehensive effort to cover the various issues relevant to the informal sector. The papers included in the volume are brought under several thematic groups such as those which deal with:

- conceptual and methodological issues relating to definition and identification of the informal sector;
- trends and structure of informal sector growth;
- wages/earnings, productivity, macro-micro linkages including prospects of growth of informal sector;
- nature of labour market discrimination including gender discrimination;
- the support system needed to develop the informal sector; and
- the social protection system for the benefit of the workers engaged in this sector.

As for the identification and size of the informal sector, the two papers included in the volume rightly point to the need for resorting more and more to the secondary data sources like the economic census, NSS, NIC and EMI. They also understandably refer to the limitations of these sources and the need for improving their coverage and precision. The suggestion of the editors that if to the household sector under the system of National Accounts the enterprises of informal employers are added it is possible to arrive at a rough national-level informal sector profile is worth considering. For, that will to a great extent coincide with the so-called residual approach followed to identifying the informal sector.

Notwithstanding the limitations of data, many writers had concluded that the informal sector in India had a significant size, employing well over 90 per cent of the total work force and contributing over half of the GDP. But an unfortunate position taken by some that this sector was only transitory and as such would eventually disappear had stalled a serious support system for it. The editors rightly hold that this was an untenable position and that with the liberalisation process this sector has grown in size. It may not be out of line to mention that this reviewer, as far back as 1984, based on his Bangalore city study, had argued that the informal

sector would not only stay but also grow for various reasons. Hence, a plea had been made then for a supportive policy in favour of this sector.

The macro-level papers on informal-formal sector linkage come out with a startling finding that the proportion of informal sector workers varies inversely with urbanisation as well as with industrialisation. This questions the proposition that the unorganised sector is strongly linked to formal industries. Many of the earlier studies had affirmed the strong linkage. Then, where did things go wrong? The answer is simple. That is, as urbanisation and industrialisation go apace, the formal segment (i.e., registered informal sector enterprises) expanded at a much faster rate. As these enterprises do not get captured in the counting, it gives the impression that the informal sector employment as a whole is declining in proportion!

It is a known fact that due to low levels of capital and skills the wages/ earnings in the informal sector are lower. But the fact that the wages are much lower than the minimum wages needs to be explained. The micro-level papers included in the volume refer to factors that contribute to extremely inadequate remuneration. These factors are: the presence of exploitative traders and merchant manufacturers on the one hand and lack of organisation among workers; the increased vulnerability of workers due to debt borrowing from employers, prevalence of such contract work to own account workers who lack alternative job opportunities, presence of a large number of housewives who are too willing to use their spare time for even a small wage and the like.

The increased vulnerability of women to labour market exploitation following reforms is vividly brought out by the papers dealing with women workers in the informal sector. It is quite revealing that there has been feminisation of labour force with a rising proportion of women workers. But on the negative side, we notice casualisation of work among them, leading to increased uncertainty in work and income, and increased resort by women to take up home-based outsourced employment as a survival strategy, which is exploitative in monetary terms. It is also found that in some lines of activity women are subject to social deprivation insofar as they are expected to work for long hours and are assigned jobs of lower social status than those which men are unwilling to take up.

The problems of the informal sector, particularly those of low productivity and the consequent low wages and earnings, are attributed to the prevalence of a poor support system. The support system both on the demand side, like lack of proper and adequate market, and on the supply side, like skills, technology and credit, make the informal sector enterprises vulnerable to the vicissitudes of the market forces. Hence the set of papers on the support system make a fervent plea for providing institutional finance, skills and capabilities, and market support. The role of NGOs in creating awareness and building skills and capabilities is also emphasised. But what the authors seem to have missed is the role of input and

output interlinkages between informal and formal sectors that may reduce the vulnerability of the enterprises in the former.

The exploitative market system, which has produced extremely low wages and earnings, certainly calls for efforts at organising the informal sector workers with a view to improving their bargaining strength. But considering their widespread scatter, low educational levels, etc., the task of bringing them under an organisation is an extremely difficult job. The suggestion that the Kerala model of organising the unorganised workers is welcome. But to say that the State should take some initiative in this effort does not make any sense to this reviewer. The emphasis on a comprehensive social security system to meet contingencies like ill health, maternity, loss of work, and retirement is welcome. Apart from Kerala, other states like Karnataka are on the way to providing social security to the unorganised workers. As stated by the editors, the coverage of these benefits must be extended even to the contract labourers and those attached to small enterprises.

On the whole, the book under review is an excellent compendium of well researched and well thought out papers which give a detailed account and analysis of the various dimensions of the informal sector. For the development and labour economists reading of this book is a must. The policy maker too will get useful insights into the problems of the informal sector workers, and that will facilitate formulation of appropriate policy measures for ameliorating the working and living conditions.

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## Angus Maddison, D. S. Prasada Rao, and William F. Shepherd (ed). *The Asian Economies in the Twentieth Century*. Cheltenham, U.K.: Edward Elgar Publishing Limited. 2002. Pp. 250. Hardback.

Development strategies governing economic growth of nations have undergone considerable change in the twentieth century. It is from one of market-led growth until the Great Depression in the 1930s to the supremacy of state-led growth until the mid-twentieth century and to the resurgence of market-driven growth in the later part of the century (World Development Report 1996). The world is currently tending towards one global economic entity with opening up of economies, and major policy changes across nations. These changes have had far-reaching consequences. Some countries have had rapid economic growth. An understanding of growth processes, factors responsible for such growth and its measurement is of benefit to other countries engaged in similar pursuits. The book under review captures the long-term growth experience of some of the successful economies in the twentieth century.

'The Asian Economies in the Twentieth Century' is an edited volume with nine chapters. Maddison, one of the editors, provides a brief introduction, which is somewhat disappointing. This is especially true of the papers on six Asian economies. It briefly states the broad focus of each of the papers without providing an adequate overview of the important issues emerging from them. While measurement aids in understanding growth performance and needs to be studied, the factors that hamper measurement cannot be ignored. In this regard, an important omission is the discussion on the dataset referred to in the papers. Accuracy of measurement largely depends on the statistics used for the purpose. The paper on China extensively discusses the data problems and the strong assumptions made in lieu of it. As a result, the author himself is not very sure of the accuracy of the new estimates made. He states '…it is possible that there have been changes in the aggregate input-output ratio for industry in the 45-year period covered. If the ratio of value added to gross output has been falling over time, our estimates will overstate the growth of value added and if the ratio has been rising, they will understate it.' (Wu 2002, p.93)

Measurement issues apart, there are certain interesting observations made in most of the papers that growth is more due to input accumulation. Whether such growth is sustainable is an issue that needs to be adequately addressed. These issues completely escape the attention of the editor in the introduction.

Three of the essays that follow dwell at length on the methodology and issues of international comparisons of aggregate as well as sectoral (agriculture, industry and services) real output. Measurement issues attain special significance in all comparative studies. Nations are not comparable for their national economic indicators (GDP, sectoral aggregates) with those of other nations. In this context one recognises the need for a common monetary unit to facilitate meaningful inter-country comparisons. The book has devoted three full-length papers to a discussion of the methodology and its application to arrive at some empirical results. The authors have given a detailed outline of the methodology adopted, and the estimates are done proficiently. In this regard the book is very helpful to researchers undertaking comparative studies.

Four essays address the issues of economic performance in the twentieth century in Asian economies: China, India, Indonesia, and Japan; the fifth essay compares South Korea and Taiwan.

Harry X. Wu's paper assesses industrial output and labour productivity in China during 1949–94. It subscribes to the prevailing view that reforms have helped in the improvement of China's industrial performance. The author has constructed an independent growth index for the industrial sector and makes it compatible for international comparison of output and productivity. This effort is welcome, as it is widely held that official estimates are upward biased and a need is

felt for accurate estimation. However, whether the author's new estimates have helped serve this purpose remains a big question. The estimates are based on unrealistic assumptions such as ratio of gross value added to gross value of output remaining constant over a long time. Value addition can be influenced by factors such as size of the firm, technology, etc. In addition, Chinese industry experienced structural shifts from heavy industry to light and labour-intensive industry. These changes also impact upon value addition. Though the author is aware of these constraints, this does not ensure flawless estimates.

The paper on Indian economic performance by Siva Sivasubramonian covers the period 1900–97. This is a division of time period in terms of pre-1946 and post- 1947. Comparison of India between these two periods is not meaningful since the former refers to undivided India and the latter to contemporary India. The author takes the readers on a tour of Indian growth performance from that of a stagnant economy in the colonial period to that of high growth. However, the discussion is restricted to a mere description of growth by sectors rather than an analysis of the factors or an explanation of differences in the performance over time or regions. To elaborate, the paper reports an impressive performance of the manufacturing sector between 1913 and 1938, which was considered better than the world average. Issues such as the factors responsible for such growth and the reasons why the manufacturing sector trailed behind during other times are very important to draw policy lessons from the growth experience within the country. Discussion on the growing inter-state imbalances lacks clarity and is better addressed by using simple statistical tools like coefficient of variation.

Pierre van der Eng's discussion on Indonesia's economic growth performance for 1900–1997 deals with the issue in a comprehensive manner. By examining the consistent real GDP data for the period 1990–97 the paper identifies different patterns in growth: the slow growth (1900–29) and high growth phases (1967–97). Further, it explains the differential growth phases by examining the possible sources of growth on the output and demand side and addresses issues of regional discrepancies. Some important lessons emerge from Indonesia's growth performance, although not explicitly stated by the author. One such lesson pertains to the pattern of educational attainment levels and its importance in the growth performance. Indonesia had immense gains from primary education initially and secondary education later in response to the changes in the demands of the labour market. This pattern is observed to be prevalent in the other successful Asian economies also (Mingat 1995). Thus, the sequencing appears to be of considerable importance in the pursuit of growth. Another lesson pertains to the increased participation of the Indonesian government in the development of infrastructure. Government productively used increased revenue on account of flow of resources from oil and gas exports during 1967–98 to promote infrastructure development. In turn, it helped

improve the mobility of factors of production and goods, thus laying open more avenues for development. The paper also brings out clearly the role of economic policy in attracting foreign investment. The evidence had it that it was only during the 1980s that net foreign direct investment increased remarkably under the conditions of reduced inward looking stance in economic policy.

The long-term performance of the Japanese economy is dealt with at length in chapter eight by Dirk Pilat, covering the period 1885 to 1997. The paper identifies factors that have contributed to the peaks and troughs in the economic performance. An interesting finding of the paper is that the rapid growth phase in Japan was characterised by positive saving in the government sector. This finding supports the current thinking that high levels of fiscal deficit of respective governments can hamper the economic growth of a nation. This is observed to be true of some other Asian economies too such as China, Korea etc., wherein their restrained public expenditure coupled with surplus or low deficit budgets have helped them maintain low levels of inflation (Rao 1995). There are also important lessons that emerge from the discussion such as the role of state in building appropriate economic and social infrastructure in promoting growth.

Bart van Ark and Marcel P. Timmer attempt analysis of the long-term growth performance of South Korea and Taiwan in a comparative perspective. They use growth accounting framework to understand the factors responsible for the growth in these nations. Growth in these nations is observed to be more an outcome of the input accumulation rather than that of total factor productivity; however, this is more so in the case of South Korea than Taiwan.

To sum up, the papers are a good addition to the existing literature in terms of discussion on the growth processes and its measurement. The book is particularly useful to academicians and policy makers for the methodology related to growth comparisons and the statistics for long periods made available in one place. However, by enhancing the scope of the study, the value of the book can be substantially enriched. This can be attempted by addressing the lessons that each of the countries can learn from their own past achievements/ failures which in turn would help in identifying the policy prescriptions for promoting/sustaining growth. This is not a difficult task given the long period that each of the papers has considered.

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## Kunibert Raffer and H.W. Singer. *The Economic North-South Divide: Six Decades of Unequal Development.* Cheltenham, UK; Northampton MA, USA: Edward Elgar. 2001. Pp. ix + 291.

This is a distinguished book written by two distinguished analysts of, and commentators on, the outcomes and processes that have dominated the evolution of the global economic order over the last sixty years. The picture that emerges — one of immiserization and illfare for the vast majority of the earth's population, and an increasing relative concentration of power, wealth and welfare in the hands of a few countries — is as unflattering to a romantic view of humanity as it is familiar. The polarisation of the world into 'North' and 'South' is well enough known for it to be ignored, by perpetrators and victims alike, as an ever-present and routine aspect of the Facts of Life. The great contribution of the book under review is its success in forcing attention on, and engagement with, the unsavoury realities of international economic relations which have simply been taken for granted, for reasons of the common tendency to be blind to what is staring one in the face, or weariness, or resignation, or complaisance, as the case may be. The book achieves its end through patient scholarship, an implacable insistence on detail, and an untiring exploration of facts and issues governing the sorry state of the political economy of the world.

The UNDP's annual *Human Development Report,* the UNICEF's *State of the World's Children,* and many allied manuals of data and commentary, are — for those who would care to consult them — continuous and major sources of information on the economic and social dimensions of how the world is faring. Consider the following aspects of global deprivation and disparity towards the end of the millennium. A little over a fifth of the world's adult population is illiterate. The adult illiteracy rate is as low as 1 per cent in thirty countries of the 'North,' and in excess of 50 per cent in twenty-six countries of the 'South.' The under-5 mortality rate describes a spectrum from around 4 per 1,000 live births in the Scandinavian countries to a corresponding figure in excess of 300 in Sierra Leone and Niger. The average per capita global GDP, in purchasing power parity dollars, is in the region of 6,000. Take one half of this — PPP$3,000— as a global relative poverty line. Then, 68 countries, accounting for 39 per cent of the world's countries, turn out to be income-poor. Poverty can be wiped off the face of the earth if only 1,070 million of the people inhabiting the poor countries of the world would understandingly curl

up and die. The Gini coefficient of inequality in the cross-country distribution of incomes (measured in PPP$) is of the order of 0.55: equivalently, it is as if the world were divided into two entitites, 'North' and 'South', of which 'North' claims 77 per cent of the world's income, and 'South' is permitted to retain 23 per cent.

Nearly 80 per cent of the 68 poor countries of the world have had a history of colonialism. A major instrument of post-colonial imperialism has been international trade, as an unfolding of the histories of GATT and WTO will reveal. The burdens of international debt and unproductive military spending have cripplingly cemented the fate of those countries of the 'South' which emerged into 'freedom' from colonialism. That famous model of Crime and Punishment, more polysyllabically known as Structural Adjustment and Macroeconomic Stabilisation, has added an impressive number of nails to the coffin. International aid, in respect of quantum, caprice, and intent, has been a joke in bad taste.

Raffer and Singer chronicle the outcomes and processes reflected in the above selective, capsule picture of global poverty and inequality, by submitting to careful analysis a number of issues relating to the global experience of economic development and policies, divergence between the 'North' and the 'South', the understanding — or rather lack of it — of these phenomena yielded by different strands of 'establishment' development thinking, neoliberalism and the Washington Consensus, the oil crisis, the Asian Tigers' debacle, colonialism and 'reparation,' and the role of institutions like the Bretton Woods twins and the WTO in the scheme of things. The authors also suggest specific ways and means of mitigating the severity of the 'North'-'South' divide. The tone is cool and the treatment dispassionate, avoiding the excesses of stridency and predictability. This book possesses a virtue rarely to be found in contemporary academic writings: the virtue of wisdom.

The authors end with the hope that their ideas for rectification of a deeply flawed global economic order are not as 'utopian' as they had feared at the outset. 'utopianism' typically fails to respect feasibility. 'Feasibility', in turn, is a matter of what agents can do, and what they *are willing* to do. Judged in terms of the 'can' category, there is nothing utopian in the authors' prescriptions. But judged in terms of the 'willingness' category, one is up against a bleak and forbidding wall. This book, if one is to put it bluntly, is a chronicle of the arbitrary exercise of power by a few over the many, in the cause of deception and theft. We are now so far removed from a willingness on the part of the powerful to engage in sane moral reasoning that even the fig-leaf of anti-colonial modernism has been dispensed with: the US-UK attack on Iraq, driven by the desire to commandeer oil resources, is an atavistic return to outright violation of territorial sovereignty through forceful and violent occupation. It is the arbitrary exercise of power in the cause of deception, theft *and*

murder. Against such brute unwillingness, and without the countervailing force of public moral outrage, *any* counsel of sanity must be seen to be utopian.

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**N. V. Varghese and Arun C. Mehta. *Investment Priorities and Cost Analysis: A Study of Upper Primary Education in India.* New Delhi: Vikas Publishing House Pvt. Ltd. 2001. Pp. 200. Rs. 275 (paper).**

The book under review looks into a less explored area in education, viz., upper primary education. Within the context of universalization of elementary education (UEE), examining investments and costs relating to the upper primary stage assumes significance with almost universalization of enrolment and schooling provision at the lower primary level becoming a reality in India. The present book is an outcome of a study conducted by Dr. N. V. Verghese and Dr. Arun C. Mehta at the instance of the DPEP Bureau, Department of Education, MHRD, Government of India. The book deals mainly with empirical analyses of both secondary data from phase-1 and primary data under phase-2 collected from eight blocks across four districts of Kerala, Madhya Pradesh, Maharashtra, and Uttar Pradesh.

The book has nine chapters. Chapter 1 deals with introduction wherein the authors present arguments in favour of investments in basic education using economic, social and human development paradigms. Later, while discussing the implications of UEE for the upper primary level, the authors rightly argue that universal enrolment at this level is more a function of the successful completion of the lower primary level of education (Class I-V). In this chapter, the authors describe the methodology used for the present study in terms of objectives, data source and sampling design.

Chapter 2 presents district profiles wherein certain demographic, economic and educational characteristics of each sample district are discussed. Perhaps a study of shift in educational scenario during the pre- and post-DPEP stages would have enriched the district analyses. In Chapter 3, the authors analyse schooling provisions at the upper primary stage by examining patterns of expansion of the upper primary schools across sample districts. It would have been better if the authors had examined the expansion of the upper primary stage against population norms and demand ratios as upper primary schools are by and large upgraded primary schools and not necessarily independent schools, as the authors themselves reveal (Table 3.8). The authors present viewpoints of teachers with regard to

viability of having upper primary classes either in primary or secondary schools. However, it would have been better if the authors had also looked into another important management issue — teacher-class ratio in the context of a large majority of teachers in upper primary schools engaging in higher primary classes rather than lower primary classes, thereby resulting in poor instructional quality at the lower levels. Similarly, transition rates could also have been examined with respect to single-sex and mixed-sex schools in order to obtain a better picture of gender differentials in the same.

In Chapter 4, the authors examine the infrastructural facilities in the sample schools across the four districts as well as within the sample blocks. The presence of a large number of untrained teachers and gross underrepresentation of women teachers (Table 4.9) within the DPEP context is a worrisome issue. It would have been better if the authors had attempted analysis of the academic facilities in terms of classrooms, physical and academic facilities and teaching-learning facilities separately for upper primary schools in the sample schools in order to arrive at certain distinguishable patterns.

In Chapter 5, the authors examine the patterns of student enrolment and transition rates in upper primary classes with respect to certain variables. From the analysis, the authors infer that the repetition is a bigger problem at the upper primary level than dropout and that there are better chances of survival if children are 'enrolled' in upper primary classes. What needs to be noted here is that there is no such thing as enrolment at the upper primary level; rather it is the retention and survival of children from primary classes.

In Chapter 6, the authors present teacher profile based on a sample of 1,391 teachers as against a total of 1,792 teachers working in the sample of 285 upper primary schools across four districts. While examining the professional background of teachers, the analysis reveals that almost all teachers have some kind of teacher training qualification in all the districts (Table 6.16). However, it is not clear whether the questionnaire was administered to only trained teachers in the subsample as elsewhere it is noticed that less than half the teachers in Moradabad and only 69.3 per cent in Bilaspur were trained (Table 4.9). In this section, one also notices a sort of correlation between specialization of teachers (Table 6.15) and subjects taught by teachers (Table 6.19). The percentage of teachers with specialization in Mathematics is notoriously small in all the districts. Similar is the case with Science specialization, with Moradabad and Aurangabad revealing a mere 3.4 per cent and 7.1 per cent of Science teachers respectively. This could also be one of the reasons for allocating less instructional time in the school curriculum for these two subjects. Although the authors do reveal that teachers at the upper primary stage also teach primary and secondary classes to a small extent, yet the analysis fails to point out how many teachers teach more than one class and more than one

subject within the upper primary stage.

In Chapter 7, the authors discuss the pattern of school management across four sample districts. Considering the heavy administrative responsibilities for teachers at this stage, the authors argue not only for a separate head teacher at the upper primary stage, but also for a lesser teaching load. In Chapter 8, the authors examine the cost pattern with respect to management types (Table 8.1). However, the tables indicate neither the periodicity nor the reference year. The higher expenditure incurred by private unaided schools for 'other' items (31.18 per cent) in the case of Bilaspur and for 'student incentives' (7.79 per cent) in the case of Moradabad needs further explanation. Although the authors attribute low per-student cost in private unaided schools to lower salary rates as compared with government schools, one tends to think that such a general pattern also indicates that private unaided schools are least expensive as compared with government and aided schools. Perhaps if the authors had also attempted to estimate the private cost incurred by students across different management type schools, deeper insights could have been obtained. However, a basic question that remains is, how is it possible to estimate the cost/expenditure exclusively for the upper primary stage, when the majority of the schools are integrated either with primary or secondary?

In Chapter 9, the authors conclude that the cost of universalizing upper primary education is less in less educationally developed centres and that integrated upper primary schools are least expensive as compared with independent upper primary schools. In this context they argue for additional investment for creation of additional school facilities rather than opening of new upper primary schools.

In sum, the authors deserve compliments for their exhaustive analyses. The book is indeed a significant addition to the literature on primary education, and would be of interest to both scholars and functionaries in education.

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