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CONTENTS

Globalization, Development and Displacement

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Abstract *: Industrialization as a route to development is inevitable. There is interaction between globalization and development while globalization entails displacement not only of small scale industries by large scale ones but also of (old) labour-intensive technology by modern capital-intensive technology. Following A.K.Sen the example of China where the market system has been pressed into service to create additional channels of social and economic opportunities for eliminating mass deprivation is referred.*

Keywords : Industrialisation, globalization, development, displacement, technology, deprivation.

This paper consists of three sections: In section I we shall deal with the inevitability of industrialization as a route to development. In section II we shall focus on the interaction between globalization and development keeping in view that globalization entails displacement not only of small scale industries by large scale ones but also of (old) labour intensive technology by modern capital intensive technology wherever possible. Finally in Section III we have, following A.K.Sen, referred to the example of China where the market system has been pressed into service to create additional channels of social and economic opportunities for eliminating mass deprivation.

I

Phyllis Deane, former Professor of Economic History in the University of Cambridge in his book "The First Industrial Revolution (2nd Edn, July, 1978) writes at the very outset, "It is now almost an axiom of the theory of economic development that the route to affluence lies by way of an industrial revolution. A continuous, some would say, self-sustaining process of economic growth whereby (wars and natural disasters apart) each generation can confidently expect to enjoy higher levels of production and consumption than its predecessors is open only to those nations which industrialize. The striking disparity between the standards of living of the inhabitants of the so-called developed or advanced countries of the mid-twentieth century and the standards of living in today's underdeveloped or backward countries is essentially due to the fact that the former have industrialized and the latter have not" (p. 1)

A pre-industrial economy is one in which the principal economic activity is agricultural production. To quote a modern writer (viz., Hans Singer) on economic development, "An Under-developed country may be defined as a country with 80 per cent of its people in agriculture and a developed country as one with 15 per cent of its employment in agriculture" (p. 13). At the time North America had attained independence, 50 percent of its people were engaged in agriculture. This figure has now come down to nearly 1 percent. This is, however, an extreme example because North America is a country with a very high land-man ratio even today. But the fact remains that in most of the now developed countries the

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percentage of population engaged in agriculture is well below 10 percent.

The British economy of the mid-eighteenth century displayed a member of the features, which we now recognize as characteristics of a pre-industrial economy. It was poor, though not without some economic surplus; it was relatively stagnant though not completely static; it was based on agriculture as its main economic activity though commerce and industry were important sectors. The mass of the people lived close to economic disaster and unless they were unusually lucky or hardworking they had little prospects of enjoying an appreciably higher standard of living within their lifetime. Most of the community's economic decisions were taken by family-based units of production, whose output per member of the work force depended largely on the extent of their holdings in land (and other assets). It might be described as a 'traditional society' in the sense defined by Rostow as the first of his stages of economic growth. That is to say, it was an economy in which something like a ceiling existed on the level of attainable output per head. In an industrial economy, on the other hand, there is regular and systematic application of modern science and technology, which ensures a continuous improvement in methods of production (p. 18).

What role should agriculture play in the process of Industrialization?

Opinion ranges from those, at one extreme, who believe that all that is required of agriculture is that it should efficiently contract and so release labour and resources for modern industry: and, at the other extreme, those who claim that a revolution in agricultural techniques and methods of organization is an essential prerequisite to modernization of the manufacturing and transport industries. Professor Rostow, for example, in elaborating his theory of the stages of economic growth has claimed that "revolutionary changes in agricultural productivity are an essential condition for successful take-off". According to this view it is on agriculture that the pre-industrial economy must depend for the additional food, the raw materials, the markets and the capital, which permit industrialization to proceed (p. 37). It may be mentioned in this context that practical experience shows that while a growth rate of 4 per cent per annum is considered fairly high for the agricultural sector, a growth rate of over 10 per cent is not uncommon and feasible for the industrial sector.

One important question is: Can there be industrialization without tears? Here comes the role of opposition as well as of the ruling party or parties. A compromise needs must be made between personal interest and common interest, between personal loss and social gains (The simple Pareto criterion for judging improvement in social welfare is admittedly a myth)

II

The industrial sector of many a late developing country including India has of late started emerging out of the cosy nook of government protection into the scorching rays of stiff global competition. The inward looking import substituting industrialization policy or for that matter the outward looking export promotion strategy has yielded place to the new concepts of liberalization and globalization which entails invocation of the once popular ideas of laissez faire and free market. Some would say, Adam smith, the father of Economics, has been brought back to life. Government intervention in the free play of the forces of demand and supply in the form of subsidies, administered prices as well as government participation in directly productive activities, it is said, has resulted in inefficiency and hence higher costs putting burden on consumers in the form of higher prices. This is only one part of the story. The protagonists of this new outlook would say that all sorts of barriers to free trade across national boundaries should

be dismantled to open up the world market before any and all producers located anywhere in the globe. All this is supposed to expedite growth.

The problem with this policy is that the concerned economy as a whole may do well but its people at large may fare badly as a former Brazilian President had put it. In simple terms, the GDP may grow satisfactorily but the growth benefits may not percolate so that the 'pull-up' strategy does not work. Such a situation runs counter to the concept of development as proposed by Amartya Sen, Amit Bhaduri and many others. For alleviation of mass poverty, government intervention is urgently necessary. Govt. must do something directly for the benefit of the poor.

Economic growth was once supposed to be an instrumental variable for achieving the ultimate objective of removal of poverty in all senses - income poverty, human poverty and all that. But growth in these days of labour-saving technological progress has failed as an instrument for reduction of the pool of unemployed in the LDCs and hence removal of income poverty of the masses. From "Jobless growth" we have already entered into the age of 'Jobloss growth'. Globalization and withdrawal of government from directly productive activities have made the debate on choice of techniques (in areas where there exists such a choice) meaningless. There is a common belief that the latest is the best in the world of technology. Thus labour productivity is fast growing in the secondary sector (and to some extent in the primary sector as well) with very little reduction in the volume of unemployed labour force. In some LDCs the rate of growth of population exceeds the rate of labour absorption in the manufacturing sector. This explains the disproportionate growth of the tertiary sector in the labour surplus economies.

In order to take care of the bulging unemployed pool, small-scale industries should be encouraged, assisted, and protected by the government. But even this has become difficult under pressure from International agencies like WTO. Hence the need is there for direct government intervention in the form of various poverty alleviation programs. Perhaps the picture is not that dismal, as it may seem from the above discussion. There are examples, at least one example, of a country which has introduced globalization, and at the same time been able to reduce income poverty and deprivation of the masses.

III

Professor Amartya Sen in a monograph co-authored by Jean Dreze, entitled "India: Economic Development and Social Opportunity (Chapter 4, Section 9) writes,

There are many things to learn from China's experience. The first and most obvious lesson is that it is possible to make excellent use of the market system in a poor economy without losing the commitment to economic development and elimination of mass deprivation. People moved by the intensity of poverty in India often remain sceptical of what the market mechanism can do. To some extent that sepeticism is justified, and indeed... the market mechanism on its own may not take us very far in eliminating deprivation in India, if liberalization goes hand in hand with a continued neglect of other conditions of social progress. But the Chinese experience convincingly demonstrates that, properly supplemented, a thriving market economy can help a great deal to lift the masses out of poverty and transform their living conditions.

China's experience also brings out the complementarity between two essential bases of expansion of social opportunities, namely (1) supportive public intervention, especially in fields such as education, health care, social security and land reforms, and (2) the market mechanism –an effective basis of trade

and production arrangements.

China's liberalization programme has certain pragmatic features that distinguish it from some other attempts at surging towards market economy. The market mechanism has been used in China to create additional channels of social and economic opportunities without any attempt to rely on the market itself as a surrogate social system on its own. There has been no breathless attempt at privatization of state enterprises and no sacrifice of control over them; instead the focus has been on opening up new possibilities for the private sector together with reforming management practices in state owned enterprises. Having said all this, Sen observes that even with that pragmatism, China's market oriented reforms have been much more successful in raising income levels and in reducing income poverty than in expanding social services (notably in the field of health care) and the social opportunities that depend on these services.

Development Revisited

*Alok Kumar Mukhopadhyay**

Abstract : *Professor Amit Bhaduri in his book titled "Development with Dignity"(2005) speaks about employment guarantee which ensures dignity of the individual and also of the nation. Having considered both the demand side and the supply side of the employment issue simultaneously he suggested that an appropriate programme for employment guarantee should be designed with domestic strength even by resorting to deficit financing and this task should be left to the panchayats and municipalities with necessary financial provisions.*

Defining development in terms of expansion of social opportunity was a seminal piece of contribution by Professor Amartya Sen in association with Jean Dre'ze to the literatute on economic development. With the publication of "India: Economic Development and Social Opportunity" in 1995, the authors captivated the non-specialist readers, and we thought all that had been said there was to it. A layman, not educated on the tradition of capability deprivation through the technique of exchange entitlements, could also see the difference it made in conventional wisdom on development literature, and in the process was simply fascinated. This, however, does not necessarily represent the specialists' views.

One, again a person with nothing more than little common sense had yet to be bewildered in course of a period of ten years. Professor Amit Bhaduri has now come up with a new dimension – the concept of dignity.

Professor Bhaduri in his latest book titled "Development with Dignity" (November 2005: National Book Trust, New Delhi) emphasises the need for an understanding of the importance of the concept of full employment as a layman understands it – a concept which ensures sensible economics whthin a structure of feasible politics. Expressed in a different language, Professor Bhaduri speaks about employment guarantee which will come not as a matter of favour or patronage, but as a matter of right for an individual to be claimed on the strength of feasibility and also in return for a duty to contribute to social production. It is the latter that ensures dignity of the individual. National dignity will also be preserved if this is pursued with a sound policy of economic management which is not obsessed with the one-track run for international competitiveness.

What is novel in Professor Bhaduri's approach is that he has suggested an alternative path without calling for any radical change in our polity. You can do it without waiting calling for any radical change in our polity. You can do it without waiting for a revolution to come in any sense of the term. One need not overtly antagonize the forces that control the social order and at the same time one can take care of oneself without being a beggar who cannot have any claim to dignity. The only change that is called for is a change in the outlook for a proper appreciation of what the country needs. Once this is identified, all that is required is for the economic managers to act, and act with a little more self-confidence. Thus the logic in his argument is both simple to understand and strong in assertion. He has made out a case

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for a system that ensures dignity, while tracing the path of development, both for the individual and the nation.

At the macro level, India's growth rate can be accepted as satisfactory. There is an annual growth rate of 7 to 8 percent for the economy as a whole. Unfortunately, this is also coupled with a miserable existence of the vast majority of the potential labour force who has no meaningful employment. The growth rate of the economy, therefore, becomes meaningless for this section of the population who cannot really see India shining. For , they do not know what an arithmetic mean is; even if they did, that would have hardly expanded an inch any of the social opportunities we have so fondly cherished during a decade since 1995. It is one thing to parrot the ideas of Professor Sen because of the compulsion of the Nobel Prize for economics going to an Indian in 1998; it is entirely a different matter to translate those ideas into action with necessary provisions for finance with our heads held high.

In a country like ours, we have to step up our growth rate without fail. Professor Sen, while listing the avenues for social opportunities, has also started with the need for a rise in income per individual. What he has not done is to indicate the process of financing the projects. It is possible that was not within the overall framework of the book or that it could have involved a lot of unpleasant issues. Professor Bhaduri has taken up that unpleasant task of suggesting the method of financing the programme for expansion of those social opportunities with supporting economic policies.

It is not difficult to appreciate that much of the rise in the growth rate of the economy is accounted for by the organised portion of the tertiary sector together with huge expansion in the informal sector at a very poor rate of growth of income. The fellow who washes cars or cleanses dishes in a restaurant has also an income that enters into the national income accounting analysis. At the end of the day, they, however, end up with less than what is even prescribed by the officially endorsed poverty line. The question that remains is to bring these people at least to the subsistence level.

In order to do that, if that is within the national priority, a good deal of funding will be necessary. The number would be a little more than 300 million. The amount required to ensure employment for these people, even at the subsistence level would be in neighbourhood of Rs. 60000 crores per year. Where do we get the funds from?

There are two known sources

i) you can look to the international funding agencies, either for grants or for loans,

ii) Domestic borrowing.

For the international case, one has to accept a lot of conditions (conditionalities, if you want to begin by borrowing a term from the lender). After all, beggars can not be choosers. The change in the system of economic management in the country since the early 1990's has also coincided with a shift in favour of the openness in the economy for international competitiveness. This has yielded results in terms of growth rate of the economy. Unfortunately, the growth rate of employment fell sharply.

The outcome is very simple: we grow at the expense of millions of people who are not meaningfully employed.

The problem is that we have confused micro economic management of individual enterprises with macro economic conditions of the economy. For a firm, economizing on the wage cost is a priority because that brings in a profit. In a macro situation, some people being thrown out of employment, or kept out

of it for cost efficiency, will mean reduction in the aggregate demand. This implies that nearly 300 million people will demand less of clothing, shelter, housing and other essential items of decent standard of living. What is lost sight of is that there is also a supply side game. In case the increase in demand as generated through the rise in wage costs is matched by a rise in the output market, a student of the first year course in economics of an undergraduate class will accept this as an equilibrium. Unfortunately, our economic managers have not considered both the demand side and the supply side of the employment issue simultaneously.

The inevitable result was to place undue reliance on international funding, both loans and subsidies. Since international funds do not normally come unconditionally, we had to gulp down a fair measure of it. These are seldom well advertised, but one can feel that they are there. The change in the economic policy which has preceded an ever increasing degree of openness of the economy may be a case in point. No one knows for sure whether this is the outcome of some of the conditionalities. The country, therefore, grows and so grows the degree of deprivation.

According to Professor Bhaduri, the logical course seems to be to finance one's own development programmes as far as possible through domestic strength. The domestic market in a country like ours should not be underestimated, however luring the international market may be. Both for the demand side and the supply side of the economy, we should have greater faith in the former one.

This is not to suggest that we should have our eyes shut. We do not recommend a closed economy which is an absurd proposition, liberalization or no liberalization. There is also need for foreign involvement by way of collaboration. What is stressed is that all this should be done without compromising individual and national dignity, and not at the dictates of those who pretend to help us and in the process force us to accept terms which are far from being sensible even in a liberal democratic set-up. And as you know in democracy, chairs change more frequently than ideas!

What is implicit in Professor Bhaduri's logic is that we should be very careful about our priorities. We very definitely need six-lane roads, shopping malls, industrial and housing complexes, a lot of flyovers over our cities. But on top of everything, we need means of livelihood for millions of people who do not and can not care for the amenities of an urban life as listed above. For those millions, larger in size than that of the population of the USA, the access to social opportunity begins with a cry for a minimum level of income.

What is, therefore, needed is a scheme for employment guarantee. An appropriate programme for this purpose should be designed with domestic strength that can ignore conditionalities. If there is any dearth of funds, the economy can resort to deficit financing which, essentially implies borrowing from the people through the Reserve Bank. Here, you can borrow even to repay your earlier loans without any external compulsions, for every citizen is likely to have more faith in its own government than any international funding agency.

This is much about availability of funds. Much remains to be said at the implementation level. We have seen enough of the National Rural Employment Programme, Rural Landless Employment Guarantee Programme, Intergrated Rural Development Programme, Jawahr Rozgar Yojana, Employment Assurance Scheme and so on and so forth. The result is the three hundred million plus poor according to the Government's own estimate. There is an elaborate guideline based on a principle of uniformisation to the complete disregard of the concept of unity in diversity that epitomizes the idea of the nation known as India.

Professor Bhaduri, therefore, recommends that the task should be left to the panchayats and municipalities with necessary financial provisions. It is they and they alone who can take care of area-specific needs. They are bound to make mistakes, corruption not excluded; but they can not afford to produce another Harshad Mehta. Moreover, they are accountable to the people, not only at the end of the term, but also in their daily life.

The additional strength, Professor Bhaduri feels, comes from the fact that there is now the Right to Information Act, 2005. This will doubly ensure the transparency and accountability of the functionaries of the local bodies. There is an elaborate scheme of social audit ensured by the 73rd and the 74th amendments to the Constitution, and the instant Act will only strengthen them. Make them responsible with adequate power and watch what they do. Some of them will, no doubt, fail but not all. Those who fail will learn by experience through social and financial audit and also by the success stories of their neighbours.

At the end, I have two observations. For a long time, we have tried our local bodies with agency functions allowing very little space for independent thinking. If we transfer the entire task, so big as this, the pressure may be too much for them. Secondly, the Right to Information Act, which is undoubtedly a must for a democracy, is more likely to be a weapon in the hands of the upper class of the society than the vast majority of the people for whom the new economic order is contemplated. But in spite of this, there seems to be no other alternative. Let there be a beginning in the right direction. We are grateful to Professor Bhaduri for setting the tune which by no means can be called utopia.

Approaches to Rural Development and Theoretical Bases of Rural Development Programmes in India

*Sachinandan Sau**

***Abstract** : A number of approaches to rural development, namely Tagore approach, Gandhi approach, general economic development approach, neoclassical approach, structural approach, target group approach, decentralized planning approach, system approach, integrated rural development approach, participatory decentralised planning and participatory development approach and micro-finance/self-help group approach are available in the existing literature on rural development. While these approaches have merits of their own and also limitations some of these approaches form the bases of the rural development programmes adopted in India since 1951.*

Keywords : rural development, economic development, target group, integrated development,decentralized planning, micro finance.

1. Introduction

Development is a comprehensive concept which implies not only economic but also social, cultural, infrastructural, political and organizational development. The expression 'rural development' denotes all aspects of development that occur in a rural society. The World Bank recently, however, defined Rural Development as '....a strategy to improve the economic and social life of specific group of people – the rural poor'. The World Bank and UN agencies instituted 'new strategies' for development planning during the late 1970s. This strategy came to be formulated as a result of the general disenchantment with previous approaches to development planning at national and sectoral levels, and it is defined by its concern with equity objectives of various kinds – especially the reduction of inequalities in income and employment, and in access to public goods and services, and the alleviation of poverty. It is this distributional issue which has marked out 'Rural Development' as a distinct field, because an overwhelming majority of poor people in the developing countries of Africa and Asia live in rural areas. Thus rural development is at once broader and more specific than 'agricultural development'. It is broader because it entails more than the development of agricultural production. It is more specific in the sense that it focuses (in its rhetoric and in principle) particularly on poverty and inequality. The expression rural development is also used to refer to processes of change in rural societies, not all of which involve action by governments (Harriss 1983 : 15-16).

There are two broad approaches to rural development (that refers to both materialist and non-materialist development of rural areas) with varying degree of accent on materialist development. Oriental philosophy conceives rural development to be development of self and all of rural people with accent on their cultural and spiritual development. Rabindranath Tagore and M.K. Gandhi as prominent oriental philosophers emphasized the development of villagers in all aspects to make complete men, not being

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confined to materialist development alone though they did not elaborate the process of rural development. On the other hand, western philosophy puts emphasis on materialist development with accent on individual. Western philosophers like Adam Smith and Karl Marx with their emphasis on materialistic development, i.e., multiplications of productions of different commodities and arts delineated the process of economic development and capitalist development through accumulation of capital and technological growth which were conceived as engines of the same.

Against this brief backdrop the present note discusses different approaches to rural development starting with a brief discussion of ideas of Rabindranath and Gandhi concerning rural development to switch over later to discussion of approaches as developed by western philosophers, economists, anthropologists and sociologists.

Such discussion on different approaches to rural development is relevant while rural development has acquired a central role in the theory and practice of development during the last three decades and a half and has emerged as a distinct field of policy and practice, and of research. Despite an impressive economic growth in most of the developing countries during the last half-a-century, problems of poverty and unemployment in rural areas remain pervasive, intense and intricate. Though rationale for rural development is quite substantial and high, the basic lacuna in the rural development literature is that it suffers from a theoretical vacuum. Rural development as a discipline still remains largely an unexplored area. It continues to be complex, without an adequate theory, analytical framework and reliable database (Rao 1989).

2. Ideas of Rabindranath Tagore and M.K.Gandhi on Rural Reconstruction

India has predominantly been the land of rural people whose economy was seriously affected by the British imperialism in India. There was a paramount need for rural reconstruction for which Tagore and Gandhi developed substantial ideas and made experiment over the same. While Gandhi emphasized sustainable development of villages and establishment of *gram swaraj* Tagore focused the need for modernization of agriculture and rural industry through development of technology and he himself experimented with what is known as Sriniketan model of rural development. Both of them tried to achieve self-reliance in the villages. Both of them put maximum importance on education, mainly basic education and tried to develop co-operation in different aspects of village life. Both of them were concerned with sanitation and public heath in the villages.

Tagore emphasized development of agriculture and cottage industries that served as two pillars of rural reconstruction in his Sriniketan experiment where he emphasised improvement of technology. In his programme of Sriniketan he included two items, namely agricultural science education and work education. Improved farming was the first and foremost of the programme. Agricultural extension services were introduced. Technical or skill training was another important scheme of the Sriniketan programme so that cottage industries could revive. He observed that de-industrialisation that occurred during the British rule was its main defect. Another important aspect of Sriniketan experiment was development of mind and beauty as well as culture. He hoped eagerly that rural crafts and their development would charm immensely the minds of the people of the country.

Tagore emphasized overall rural development, development of all sectors of the rural society and economy. He observed that it was possible for teachers and doctors to establish close contact with the

villagers. If they along with their profession enjoin to do welfare of the villagers the problems of the villages will find solution. A group of youths, he desires, be prepared to this end. To quote from Banerjee (1981),

"Tagore more than half a century ago urged his countrymen to discard the 'politics of begging', reminded them of the initiative, the vitality and the flexibility of the old social organisation, and pleaded for making the villages the centres of organised social work. He thus anticipated very largely the Gandhian programme of enthusing the teeming millions of the villages, - a programme that has subsequently been taken up, though in a different form by free India's government. Tagore urged that to rural India should be restored not only her self-respect, but also the cultural, economic, and physical opportunities and the fullness of life."

Tagore started his Sriniketan programme to develop a model rural society where rural masses would work in co-operation for their economic and cultural well-being with the aim of achieving self-reliance and self-respect. The programme was initially started with the help of Mr. and Mrs. Elmhirst. He felt that the villages of India are resourceful enough to produce more than what is required for their people. What is needed is prudent use of these resources and this could be done only by the villagers themselves.

Sriniketan was developed basically as a comprehensive institution with an extension service for the villagers. It held an agricultural farm, a dairy, an industrial workshop with power house, a new scheme of primary education, or social welfare department and the most valuable section of socio-economic research which kept latest data of progress of village economy and society. It trained a group of young people, called the 'Brati Balakas'. They learnt the lesson of service and unity, that of co-operation and mutual well being etc. At the village level he introduced 'gram sevaks' who would work for the villages. He felt that social works would be undertaken by the students so that they could develop a good morality.

Tagore's approach to rural reconstruction was largely internationalist while Gandhi's approach was mainly *Swadeshi*. While Gandhi emphasized development of self and individual with inner qualities of tidiness and austerity Tagore put stress on cooperation that would make complete man. While revivalism was the accent of Gandhi, Tagore emphasised renaissance.

To Gandhi, "the final consummation of all wealth is in producing as many as possible, full-breadthed, bright-eyed and happy human beings." Instead of high speed production as an impact of modern industrialisation resulting in destruction of human dignity and individuality and making human being a mere cog in the machine and contaminating environment with prisons of many kinds, thus inviting unforeseen natural disasters, humankind should, Gandhi said, decentralise and simplify production in such a way which will help promote human creativity and develop individual personality which alone can achieve harmony between man and his environment. The Gandhian model of development has potentialities for offering remarkable opportunities for social reconstruction for perennial social and human progress locally, nationally and globally (Unnithan 1997 : 220).

The Gandhian perspective is non-materialistic, non-violent, harmonistic, egalitarian and value-driven. These values highlight the virtue of simplicity, of social and inner peace, the sanctity, necessity and dignity of manual labour, and the valuation of the spiritual and the moral over the sensual and the material planes. The central unit is the eternal village and villagers, who are deemed to be reservoirs of what is intrinsically valuable in society. Village-level self-sufficiency is an objective.

Gandhi was in search of individual as well as social development, particularly of the rural areas, which will be lasting. Sustainable development really refers to human development and not to economic development per se. The latter is the means, not the end; at best, it is a component, not the whole. Besides, it is participatory in nature, that is, it is achieved, not given. It is again based on equity and justice (Misra, 1997:112). Gandhian model of social development rests essentially on the values of Truth and Non-violence and the goal of Sarvodaya

If development is accepted as human centred process of change it includes not only the economic aspects of human life but also the blossoming of the cultural, intellectual, spiritual and other non-material aspects of it. In Gandhiji's 'grand model' of human development and human progress, economic development and progress appears as an important sub-model (Haq, 1997:91).

Gandhi did not want to divorce Economics from Ethics (Gokhale, 1961:72). The philosophy of 'Savodaya, Non-violence and Truth' is the foundation of the Gandhian model of economic development. 'Sarvodaya' implies the welfare of all and welfare, in the Gandhian model, is a composite of material, moral and spiritual welfare. Gandhi was thinking of basic needs of man (Datta, 1997:66). In his model economic development which makes provision for basic needs like food, shelter, clothing and shelter is a means to achieve the moral and spiritual development of man. The primary micro unit of development in the Gandhian model is the individual. Development of the individual -- economically, morally and spiritually – is the essence of development from the Gandhian perspective. Sarvodaya, Non-violence, Non-Possession, Trusteeship, Swadeshi, Bread labour and Decentralisation – all these Gandhian doctrines are designed to mould the process of growth of the individual, and the growth of the village economy. Trusteeship means all money and property belongs to society and those who are possessing it are only the trustees of the society whose duty is to increase the earning and value of the trust property. He should charge only that much from the trust property as is absolutely essential for his subsistence and honourable living. Excess of one's income over and above one's living is a social surplus to be employed for the benefit of the society.

Gandhi believed that the economic good of all lay in adopting the principle of swadeshi or self-sufficiency. His belief that India lived in villages led him to propound the concept of village swaraj which, among others, envisaged village sufficiency. In extreme form, village sufficiency not merely meant non-dependence of the village on other villages for its needs but also meant self-sufficiency among households. This meant that each household would produce its own requirements – food, clothing and other things -- and never depend on others for its economic needs (Maharajan, 1997 : 19).

Village self-sufficiency serves as a basis of economic development. To him, the concept of village sufficiency implies that production and consumption should be as proximate as possible, and based on the proper use of local resources. He emphasised time and again that 'the first concern of every village will be to grow its own food-crop and clothes' (Jain, 1988 : 311).

Rural industrialisation forms a central plank in the Gandhian model of non-violent development, which is itself drawn from a holistic prescription for the social and individual construction of the good and virtuous life (Saith, 2001:88).

Village and cottage industries support the villages, self-sufficiency and improvement in the level of living. Gandhi repeatedly expressed the view that such industries should be in the hands of the masses (Desai, 1989:15). Decentralisation of production would lead to decentralisation of economic as well as

political power. According to Gandhi decentralisation is one of the means to create classless, unexploited and egalitarian society. The word decentralised sector in economics is used to refer to the cottage industries located in the rural areas (Maharajan, 1997: 62).

He was opposed to modern industry because it tends to create unequal distribution of money and exploitation of the persons who worked for their masters, and it would create unemployment in a very populated country. He welcomed tools and instruments, which lightened the burden of the millions of cottages, such factories should not work for profit but for the benefit of humanity, love taking the place of greed as motive. More than any other evil, it brought about displacement of labour and it was followed by social evils. On the contrary to it, decentralisation of production in the form of cottage industries in the village, was linked with the decentralisation of political power that was basic to Gandhi's ideal of non-violent society. A non-violent society could be organised where inequalities and tensions were removed by a just distribution of things and money (Sharma, 1997:97). Gandhiji's saying that "the earth provides enough for every man's need but not for every man's greed" has proved to be true in the fast growing consumeristic culture throughout the world. Corruption goes with consumerism.

Village industries, especially khadi, which are seen as employment–friendly, environment–friendly and hinterland–friendly, occupy an important place in such a scheme. Large-scale mechanised production methods producing for distant markets, an extensive division of labour, modern industrialisation, are all viewed as conflicting with the essential Gandhian perspective. Swadeshi becomes an aggregation of the principle of self-reliance and self-sufficiency. All basic needs deserve to be satisfied (Datta, 1997: 67).

Gandhiji's khadi stands for humanity. His khadi was based on philanthropic ideals, rather than pure economics in modern terms. He introduced it to find work and wages for millions of villagers who were fast losing the will to work, to think and even to live. It gave them hope, money to live and removed their blank despair of long past years. Khadi economics are based on patriotism, purity, sacrifice, non-violence, justice, and love for the poor, truth, purity of soul and body and humanity (Sharma, 1997:148). There is a provision for ecological balance – a balance between resource consumption and conservation in an appropriate pattern of development of small-scale rural industries.

Gandhi clearly comprehended that production alone does not ensure its proper distribution. To this effect the production model would have to be so structured or organised as to absorb all the working people. His famous statement "not (only) mass production but production by the mass" also shows the concern for just distribution (Sing, 1997:193).

To him, the concept of 'village self-sufficiency' implies that production and consumption should be as proximate as possible, and based on the proper use of local resources. Gandhi observes, "I am aiming not at the eradication of all machinery but limitation" (Gandhi, *Cent percent Swadeshi*", p. 104). He also added, "My machinery must be of the most elementary type which I can put in the homes of the millions" (*The Harijan*, dated November 2, 1933}. He observed that in situations where works are huge and hands are few mechanization is possible. But in a country like India, where hands are many compared to works, mechanization is fatal. "The problem with us is not how to find leisure for the teeming millions inhabiting our villages. The problem is how to utilize their idle hours equal to the working days of six months in the year." (quoted from Tendulkar, *Mahatma*, Vol. 1, p.327).

Gandhiji's idea of rural reconstruction and regeneration of rural industries was considered the basis of a number rural development programmes in the post-independence period. It was proved true that with

such rich rural resources India could do havoc if those resources are properly utilized and if the rural heritages are properly regenerated.

Both Tagore and Gandhi realised the importance of land reforms but did not think of radical land reforms. Gandhi emphasized trusteeship while Tagore security of tenure and agricultural credit cooperative society.

3. Approaches of Western Philosophers, Economists and Sociologists to Rural Development

John Harriss (1982) in his edited volume "Rural Development Theories of Peasant Economy & Agrarian Change" discussed and distinguished three approaches to the understanding of agrarian change of a rural economy, namely Systems approaches, Decision- making models and Structural / historical approaches. M. P. Todaro (1989) distinguished three approaches to economic development, namely the Linear Stages Approaches, Neo-Classical Structural Change Model and International Dependency Model. In the recent rural development literature we have got certain approaches to rural development that are rarely examined. The present note tries to make a critique of the available approaches to rural development that have been developed to understand the process of manifold development in the rural areas, starting with economic development approach that developed in the classical era of development.

A.General Economic Development Approach

There is a school of thought that is of opinion that general economic development would benefit all sections and sectors of the society. Adam Smith, Ricardo and Malthus were the main economists of the classical school who, in the late eighteenth and early nineteenth centuries, attempted to discover the causes of economic progress. The classical school believed that the problem of growth centered on the ability to accumulate capital. Economic development propelled by capital accumulation and stimulated by technological progress (division of labour in Smithian sense), they opined, extends its benefits to all sections of the people.

In the work of Adam Smith we get some hints of the percolation theory. To quote from his work 'The wealth of Nations'

"It is the great multiplication of production of all the different arts, in consequence of the division of labour, which occasions in a well-governed society, that universal opulence which extends itself to the lowest rank of the people."

Adam Smith here seems to propagate two things. First, economic growth caused by capital accumulation and technological improvements trickles down to the poorest. Second, he alludes to 'the great inequalities of poverty' in the modern civilized societies.

General economic development approach to rural development is based on the assumption that there is initial even distribution of assets and there is no structural imbalance of the economy. But this assumption is not valid when we come across uneven distribution of land and other productive resources across rural families and there are other structural rigidities in the economy. Therefore, rural development is not an automatic fall-out of economic development in general.

In recent years, however, economic experts like Mahabubul Haq (1976), V.M. Dandekar and N. Rath (1971), David Lehman (1974), R.S.McNamara (1972) and M.L. Dantwala (1973) in their studies of the late sixties and early seventies observed that whereas economic growth might be able to raise per capita

income in developing countries it might not be accompanied by a reduction in poverty as well as of unemployment and underemployment. Rather the process of economic growth in third world countries has benefited relatively developed areas and better off people. In other words, the percolation of benefits of economic growth to backward areas and the poor people has not taken place or the percolation of the increased income to the poor who were largely resourceless and unskilled wage-earners was a thin trickle, if at all.

B. Neo-Classical Approach

Neo-classical economists believe in the efficiency of unrestricted free enterprise based on the market mechanism. They argue that a properly functioning market system will stimulate both economic efficiency and economic growth. They also maintain that the market does this automatically, since it requires no central decision-making or administrative apparatus. Johnson (1970) stated the case for the market mechanism. The free market will be responsible for economic growth. It will 'release the energies of million of able, active and vigorous people who have been chained by the ignorance, custom and tradition.' This is also the reason why the North countries have developed so rapidly following the destruction of the despotic rule of the kings and queens in the seventeenth and eighteenth centuries.

Hence the government shouldn't intervene and the free market should not suffer the 'tyranny of controls'. In their book, *Free to Choose*, the Friedmans argue that the tyranny of controls by the government is responsible for India's underdevelopment, while the absence of such controls in the post-Meiji Japan delivered economic development. They argue that the 'resource' differences should have favoured India rather than Japan.

"The explanation is the same as for the differences between West and East Germany, Israel and Egypt, Taiwan and Red China. Japan relied primarily on voluntary cooperation and free-markets - on the model of Britain of its time. India relied on central economic planning - on the model of the Britain of its time".(p. 82)

This approach emphasises the question of efficiency in the internal micro-economic framework. It concentrates on the micro issues underlying the development process (and of course to a marketist stand in this micro discussion). It emphasises that in perfect competition there shall be efficient allocation of resources and increase in investment will lead to rapid economic growth whose benefit should percolate even to the lowest rank of the society. This approach is illuminating, particularly in view of the fact that in the large private sector of agriculture, manufacturing and tertiary activities, decisions are taken at the individual level. This approach has a great merit in being an academic, analytical, and growth-oriented approach. This neo-classical position has been echoed in the IMF and World Bank documents of recent years.

Neo-classical economics is concerned with economic growth and its approach is ahistoric and based on the concept of aggregate production function a logical time. A complete set of markets for the purchase or sale of goods contingent on each possible combination of time, space and the state of nature together with the concept of rationality is assumed to exist.

This approach suffers from several limitations in the rural economies and societies of developing countries. First, in a large subsistence sector of a rural society this approach is hardly applicable and in a semi-capitalist production relation (as is observed) in the rural industrial sector, this approach has almost

no relevance. Secondly, neo-classical writers in general, and the Fund Bank economists in particular habitually and wholly illegitimately ignored the demand constraints because to them a capitalist market economy spontaneously overcomes any possible deficiency of aggregate demand. Thirdly, this approach faces the problem of market failure which ought to be corrected through institutional mechanisms which are completely ignored in the neo-classical approach. Fourthly, the pattern of relationship of the individual with the society is not brought out here. Neo-classical economists tend to ignore social complexities and stratifications, simplifying their analysis by concentrating on the behaviour of automistic individuals in a class-less universe[4]. Given the economic and social stratification in the LDCs, market imperfection is the natural outcome which tends to erode the vital basis of the neo-classical approach in the form of the assumption of perfect competition. But the distributional and structural aspects are completely ignored in the neo-classical approach. Lastly, in this approach the system which is external to micro approach and the rural society is left out in the analysis. As Apthorpe (1977) puts it, these kinds of social science studies have become quite good at explaining 'the success or failure of the individual within the system' – but in this case 'the system' itself is left out of the analysis.

Where once orthodox economic theories reigned supreme in the 1950s and 1960s, Marxists and Neo-Marxists theories have challenged the validity of those theories in developing countries.

C. Structural Approach

This approach is concerned with the relationships of people in the process of production. It places the ownership and control of resources at the center of relationships. The structures of social relationships and conflict – of the social classes – which are based upon differences in the ownership and control of resources by different groups of people, are critically important in studies of this kind, and may be seen as one of the major source of change (Harriss 1982:22). This approach emphasises the existing mode of production and power relations, structural, organizational and institutional factors, taking cognizance of the question of equity. This is a political-economic-historical and ideological approach and is inter-disciplinary. The great merit of this approach is that it gives accent on the question of equity. Institutional reforms including land reforms and credit reforms emanate from this approach.

One school of thought, which has some grounding in parts of Marx's writing, holds that it is of the very nature of capitalism to absorb or abolish other forms of production. Other scholars argue that there are often circumstances in which capitalism does not destroy other forms or modes of production, and they speak of the 'articulation' of capitalism with other modes of production. 'Articulation' here means rather more than simply 'linkage', and it implies that there is some intervention by the social practices of capitalism within those of the other mode or modes of production, and vice versa. Sometimes the relationship has been seen purely in functional terms – and the persistence of pre-capitalist forms has been explained in terms of the functional requirements of capitalism (such as the supply of cheap labour, of cheap raw materials). But there are serious logical and theoretical objections to this way of conceptualizing the relationship (see Bernstein in Part Two); and it should be seen rather in terms of processes of struggle between conflicting classes.

But this approach also considers exchange and the sales of inputs and marketing of products within the agrarian economy, and a strong historical theme is that of the 'commoditization' of production and of the incorporation of small-scale producers into markets (whereby instead of producing mainly for their

own use or to satisfy the requirements of those with political authority, small producers begin to produce for exchange, and come to depend upon purchases for at least some of the things that they require: see Bernstein in Part Two for a discussion of this process, and Bharadwaj in Part Three for an account of the implications of the different market relationships of different groups of rural producers). The process of commoditization and the development of capitalism, or the linking up of rural household producers with capitalist production in various ways is perhaps the dominant process of change in contemporary agrarian societies.

'Structural / historical' studies which would probably not be called 'Marxist' by their authors include Hill (1972; 1977) on Nigeria; Hopkins (1973) on West Africa in general; and Washbrook (1976, ch. 1) on South India. On Africa, in more explicitly Marxist vein, see also Bundy (1979); Heyer, Roberts and Williams (eds.) (1981); Kitching (1980); Meillassoux (ed) (1971); Palme and Parsons (des) (1977); and for a more introductory treatment, Mabogunj (1980 Part Two). On Indonesia see Kahn (1980).

D. Structural Internationalist Approach

This approach emphasises international factors for the promotion of rural development. In recent years globalization has become a buzz world in the development discourse. Globalization implies opening and liberalizing trade in capital and technology and is emphasized as a strategy of development, even in the rural areas while we come across the concept of global village. This approach emphasizes the functioning of the market and positive gains from trade which may be shared by all sections of the society. While the orthodox trade theory demonstrates that the liberalization of trade is beneficial to all trading partners, the realities of the world economy belie this free trade ideal.

The limitation of this approach is that there are uneven initial distribution of resources, market imperfection, power asymmetry and uneven distribution of benefits of development. For the maximization of economic gains and welfare from trade this approach also results in ecological problems all over the globe, particularly in the developing countries.

While orthodox trade theory demonstrates that the liberalization of trade is beneficial to all trading partners, the realities of the world economy belie this free trade ideal.

E. Target Group Approach

There are failures of trickle down effects in most developing countries though the orthodox theorists argue that there is no crisis in developing countries. The rate of growth has been respectable in these countries during the last two decades, especially by historical standards. Both the low and middle-income developing countries have achieved significant rates of growth. Viewed in historical perspective, these rates of growth for developing countries may be considered respectable and represent an improvement upon the economic stagnation that characterized the colonial periods. Nevertheless, they fall far short of the objectives of economic development as well as the aspirations and needs of the masses in developing countries. They have not made any serious dent on the problems of mass poverty, malnutrition, disease, illiteracy and lack of medical care. The basic problem is poverty which needs to be alleviated. The poor form the target group.

The target group is defined as a group of persons or households who constitute the target for poverty alleviation programme of the Government. The target group approach emphasises that the

Government should take special measures for the alleviation of poverty of the target group people. This approach has developed on recognition of the fact that general economic development may bypass the poor and the benefits of economic growth may not percolate to the poverty stricken people. The great merit of the approach is that it involves direct attack on poverty. World Bank advocates this approach to rural development.

This approach assumes that there is no problem of implementation of measures for poverty alleviation. The limitation of this approach is that there is Government failure in implementation of poverty alleviation programmes. Another limitation of this approach is that there is lack of adequate planning of poverty alleviation programmes.

F. Systems Approach

Amongst the 'system' approaches we may include studies which emphasize environmental, technological and demographic factors and which seek to explain their inter-relationships within farming systems. A notable example of such an approach is Boserup's *The Conditions of Agricultural Growth* (1965) which presents the bold thesis that increasing population density explains the development of increasingly intensive systems of cultivation, involving also changes in technology and in social institutions. This has been found to be a powerful model, even though it was originally built up on the basis of quite flimsy evidence, and it has influenced a good deal of subsequent research. In a modest way, for example, Chambers and Harriss (1977) sought to explain variations between villages in a small region of South India in terms of the inter-relations of environment (especially the availability of irrigation water) and ?population density, and found creation fairly distinct patterns of variation of wage rates, labour relationships and rural livelihoods that could be related to the basic dynamic of environment and population. Geertz argues that the physical conditions of Java have allowed production to be increased so as to keep pace with the rapidly growing population, though at constant levels of output per head. This has required the use of more and more labour-intensive cultivation practices and also some 'sharing of poverty' – as in the sharing out of access to land or of opportunities for wage work. He describes this whole pattern as one of 'involution' – in the sense that there has been increasing elaboration of existing social and economic structures – in contrast with the kind of transformation of older structures, and increasing inequality, which has occurred in pars of the Outer Island.

Kjekshus has developed the ecological / demographic approach with reference to East Africa (Kjekshus. 1977); while the relationships of environment, technology and population have long interested geographers, and some of the best geographical writing seeks to explain agrarian change in terms of the relationships of the natural environment of the natural environment and economic and social factors. A classic is farmer's study of the agrarian development of Sri Lanka (1957); and for Africa there is a valuable collection edited by Prothero (1972).

'Systems' approaches include those concentrating on socio-technical systems, or on the social systems of agrarian communities, and which imply a form of holistic analysis.

Djurfeldt and Lindberg (1975) describe land-use problems in South India; and Blaikie, Cameron and Seddon (1980) explain an ecological crisis in Nepal. In Africa, studies of the Sahel draw out the theme of the relationships between forms of ownership and environmental damage. See: Glantz (ed) (1976); Meillassoux (1974).

This approach emphasizes factors like environment, technology and demography. It is basically techno-environmental demographic approach. In this approach the question of sustainable development is important. But the limitation of this approach is that the question of equity remains unanswered in this approach.

F. Integrated Rural Development Approach

It is a holistic approach that emphasizes sectoral, sectional and environmental integration of the economy and the society. It also aims at bringing an integration among government, research ,academic and training institutions and the common people. It emphaises the need of people's cooperation and the appropriate application of science and technology so that the optimum utilization of available local resources is made. This calls for creation of an appropriate institution. Vertical integration for achieving coordination among central, state and local governments is also its aim. The great merit of this approach is that it emphasizes sectoral, sectional and environmental, political and technological development in the rural areas and thus the overall development of the rural society.

In India, Mrs Indira Gandhi, the then Prime Minister, called for an integration of science and technology in agriculture and other rural sectors. In the 1976 Indian Science Congress M.S. Swaminathan, the Director General of the Indian Council of Agricultural research (ICAR) asked scientists for integration.

The limitation of this approach is that the questions of efficiency and equity remain to be addressed. This approach has won currency in recent years.

G. Participatory Decentralised Planning and Participatory Development Approach

It gives accent on accelerated development of rural areas based on people's participation. Thus approach gives adequate emphasis on efficiency in utilization of resources and also equity in distribution of gains from economic growth. There are, however, several issues to be addressed in this approach, namely level and pattern of people's participation, planning unit, database, finance, integration and co-ordination in planning and also the issue of impact assessment. There is also the limitation of this approach in the form of 'community failure' (Bardhan 2002), i.e, failure of the community (Gram sansad, Gram sabha etc.) in arriving at proper decision making in respect of selection of beneficiaries. The World bank gives accent on this approach. This approach is being followed in India following the 73rd Amendment of the Constitution of India.

8. Micro-Finance / Self-Help Group Approach

This approach emphasizes self-development of families, particularly poor families and thus their poverty alleviation. The role of micro credit in the eradication of poverty was stressed by the United Nations in agreed conclusions 1997/1 adopted by the Economic and Social Council on 25th July 1997, in which the Council called for strengthening the institutions supportive of micro-credit and recognized the importance of access of micro credit of people living in poverty to enable them to undertake micro enterprises to generate self-employment and to contribute to achieving empowerment, specially women. Micro-finance through SHFs for the poor and women has received extensive recognition as a strategy for poverty reduction and economic development. In this approach Government, panchayat and non-government organization play the role of facilitator and thus the role of the state in poverty alleviation

is minimized. It emphasizes holisticism to achieve rural development and poverty alleviation. But the limitation of this approach is that the questions of market power, particularly of oligopoly market and uneven power relations and human development are ignored in this approach.

3. Relevance and Applicability of Rural Development Approaches

Various approaches to rural development have been developed based on a variety of assumptions. Relevance of these approaches to rural development depends on socio-economic conditions of a developing country.

In India, following the Second World War and emancipation of the underdeveloped country from colonial fetters rapid and sustained development of the country became the coveted goal and economic planning following the then Soviet model came to be adopted since April 1951. The international institutions like the World Bank championed the cause of rural development and poverty alleviation.

Orthodox economic theories reigned supreme in the 1950s and 1960s. Since the beginning of the Sixth Plan (1980-85) the target group approach is being followed.

The Community Development Programme (CDP) of 1952, National Extension Service (NES) of 1953, Integrated Agricultural District Programme (IADP) of 1960, Intensive Agricultural Areas Programme (IAAP), and High Yielding Variety (HYV) Programme (also known as Green Revolution) of 1965 were adopted by the Government of India for development of rural India under General Economic Development Approach and Neoclassical Approach, and these programmes were sponsored and promoted by the World Bank. These programmes emphasised mainly agricultural production and socio-economic changes having accent on the holistic and market-oriented approach to development and were based on the percolation theory of economic development. The CD programme was gradually degenerated into and limited to group development – the development of a particular class, i.e., the rich farmers. The problem of poverty of rural people and whole areas lacking in productive resources came to the surface. In fact, the first half of the decade of the 1970s in India was dominated by the widespread concern by the large-scale poverty in rural India.

India's anti-poverty strategy is based on target group approach and it comprises a wide range of poverty alleviation and employment generation programmes that create productive assets, impart technical and entrepreneurial skills and raise the income level of the poor. Under these schemes, both wage employment and self-employment are provided to the people below the poverty line. Individual beneficiary-oriented programmes included Small Farmers Development Agency (SFDA) and Marginal Farmers and Agricultural Labourers (MFAL) programmes, and special area-based programme like Drought Prone Area Programme (DPAP), all of which got merged in Integrated Rural Development Programme (IRDP).

The Government of India initiated the IRDP during 1978-79 while Mr. V.P.Singh was the prime minister of India to alleviate rural poverty under the target group approach. It involved multi-pronged attack on the problem of rural development. 'Integrated' here covers four principal dimensions: integration of sectoral programmes, spatial integration, integration of social and economic processes, and above all, the policies with a view to achieving a better fit between growth, removal of poverty and employment generation. More specifically, it involved a sharp focus on target groups comprising small and marginal farmers, agricultural labourers and rural artisans, and an extremely location-specific planning in rural areas. The Draft Sixth Plan 1978-83 (revised) of the Planning Commission, Government of India conceived

Integrated Rural Development as a resource-based total development plan for a block into which the specific beneficiary-oriented schemes of poverty eradication was integrated and proposed to start with the latter schemes only pending the formulation of block level plans. The Draft Plan proposed to start the programme in 2000 blocks and in fact, the IRDP was initiated in 1978-79 in 2,300 development blocks already covered by special programmes like SFDA, MFAL and DPAP.

The Sixth Five Year Plan (1980-85) was formulated two years after the Draft Sixth Plan 1978-83 had been initiated. It was categorical in stating that the "IRDP has been conceived essentially as an anti-poverty programme." 'Rural Development' thus came to be viewed not as a total development process involving both the economic and socio-political development of rural areas as a part of the modernization of the entire society, but as a strategy specifically designed to improve the economic and social life of a specific group of rural people, viz., the rural poor.

The new IRDP was conceived and adopted after Smt. Indira Gandhi became prime minister of India and this was done as per instruction and philosophy of the World Bank. As the World Bank Sector paper entitled 'Rural Development' published in 1975 pointed out, "rural development is a strategy designed to improve the economic and social life of a specific group of people – the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas. The group includes small-scale farmers, tenants and the landless." It was thought that the rural poor – small and marginal farmers, landless laboureres and artisans – were poor because they mostly did not possess any productive assets other than their labour, nor did they, as workers, possess any special skills. Therefore, the Plan document says, "Any development strategy which aims at improving the lot of the poor must aim at creating new productive assets for them". These assets would include sources of irrigation for those with some land, bullocks and implements besides inputs like seed and fertilizer, animals for dairy and other animal husbandry activities, tools and training for cottage industries and handicrafts, etc. The basic strategy was to promote self-employment of the rural poor households with the help of these assets so that they might earn incomes above the poverty line.

The IRDP was extended to all the 5011 development blocks of India in October 1980. The basic objective of IRDP was to enable identified rural poor households to augment their incomes and cross the poverty line through acquisition of credit-based productive assets. The programme was financed by subsidies provided by the government and term credit by the financial institutions for income generating activities. As a centrally sponsored proramme, its expenditure was shared equally by Government of India and state governments. The stipulations under IRDP were that at least 50 per cent of the assisted families should be from SC/ST communities, at least 40 per cent should be women and at least 3 per cent should be physically handicapped. About 535 lakh families have been covered upto November 1998 since 1980-81 under the programme out of which coverage of SC / SF families had been 45 per cent. The level of per family investment was about Rs 17.5 thousand.

The individual beneficiary-oriented projects under IRDP are broadly classified into three broad categories, namely primary (agriculture and agri-allied), secondary (manufacturing, construction, water supply, power etc) and tertiary (trade, transport, communications and other services). The Fifth Concurrent Evaluation Report on IRDP provided information on net income from different schemes of primary, secondary and tertiary sectors. From the survey results it is found that income generation was the least in the primary sector while it was highest in the tertiary sector.

The share of income from IRDP schemes in total income of the beneficiaries is found to be approximately one fifth of the total income of beneficiary households. It may be observed that in general the percentage share of income from IRDP asset increases with total income of the beneficiaries.

Of the three sectors, in secondary sector number of families crossing poverty line is the lowest while in tertiary sector this proportion is the highest. For more income generation it is necessary that there should be some co-ordination and integration of various development schemes. The secondary sector failure is mainly due to lack of skill development and marketing support. On the other hand, success of tertiary sector depends more on the initiative and entrepreneurial ability of the beneficiary concerned.

The outlay on IRDP during the Sixth and the Seventh Plan period accounted for hardly 1 per cent of the total plan outlay of the country. It is too small in relation to the size of rural poverty to make sizeable dent on rural poverty. Besides, there was huge default in respect of repayment of bank loan of IRDP beneficiaries, which acted negatively on the prospects of the programme. Moreover, large number of individual bank accounts of the IRDP beneficiaries the banks had to maintain acted as a deterrent to the management and profitability of the banking organization. The question emerged as to the sustainability of the programme.

IRDP and its allied programmes of Training Rural Youth for Self-Employment (TRYSEM) and Development of Women and Children in Rural Areas (DWCRA) remained, however, as major self-employment programmes for poverty alleviation. It was well recognised fact that the IRDP alone could not cure all ills. Convergence of other poverty alleviation programmes with IRDP was very much expected. The benefits of different schemes did not converge on a single family so that this family could go beyond poverty barrier on sustainable basis. Both in West Bengal and India very few women beneficiaries (less than 1 per cent as per Fifth Concurrent Evaluation Report) who received IRDP assistance were found to be brought under DWCRA. As per this Report hardly 1 per cent of the IRDP youth beneficiaries were receiving training for self-employment and about 6.3 per cent of them were having assistance from JRY. It is a realised fact that the implementation of programmes in isolation could not deliver the goods necessary for poverty amelioration.

Swarnajayanti Gram Swarozgar Yojana (SGSY), a holistic self-employment generation programme, was launched from April 1, 1999 by restructuring the earlier IRDP and allied programmes. The emphasis of the SGSY is on (a) focused approach to poverty alleviation, capitalizing advantages of group lending and overcoming the problems associated with a multiplicity of programmes. It aims at promoting micro enterprises and to bring the assisted poor families (Swarozgaris) above the poverty line by organizing them into Self Help Groups (SHGs) through the process of social mobilization, training and capacity building and provision of income generating assets through a mix of Bank credit and Government subsidy. The scheme is being implemented on a cost-sharing ratio 75:25 between the Centre and the States. Since the inception of the Scheme upto December 2006, 24.38 lakh SHGs have been formed and 73.25 lakh swarojgaries have been assisted with a total outlay of Rs 16443.66 crore.

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(SHGs) through the process of social mobilization, training and capacity building and provision of income generating assets through a mix of Bank credit and Government subsidy.

Jawahar Rozgar Yojana (JRY) was launched with effect from 1st April, 1989 by merging the then two existing wage employment programmes, viz. National Rural Employment Programme (NREP) and Rural Landless Employment Guarantee Programme (RLEGP). JRY has two objectives : (i) to generate additional gainful employment for unemployed and underemployed persons both men and women living below the poverty line in the lean agricultural seasons in the rural areas and (ii) to create durable community and social assets. The significant aspect of the scheme is that it is implemented by the Panchayats at the village, block and district levels in the ratio of 70: 15:15 respectively. From 2nd October 1993 EAS was launched in 1752 identified backward blocks of 257 districts where the revamped public distribution system was in vogue. Subsequently the scheme was extended to all the rural blocks of the country in April 1997. The main objective of the programme is "that those who are in need and are seeking employment will get assured wage employment to 100 days during the lean agricultural seasons."The Sampoorna Grameen Rozgar Yojana was launched on September 25, 2001. The scheme of Jawahar Gram Samridhi Yojana (JGSY) and Employment Assurance Scheme (EAS) have been fully integrated with SGRY. The objective of the scheme is to provide additional wage employment along with food security, creation of durable community, social and economic assets and infrastructure development in the rural areas. National Rural Employment Guarantee Scheme (NREGS) is the latest introduced scheme for poverty alleviation in rural India through generation of self-employment. In 2004, the government of India introduced a National Employment Guarantee Act to provide a legal guarantee for at least 100 days of employment to begin with on asset creation public works programme every year at minimum wages for at least one able-bodied person in every rural and urban poor and lower middle class household. The government of India passed the Act in 2005. The scheme has been introduced in 200 districts to begin with, but to be extended to the whole of India in five years. The NREGS with a legal guarantee of work seeks to remove many of these weaknesses of earlier wage employment programmes. It is a historic measure towards the implementation of 'Right to Work'. Its success will depend on the quality of implementation. If properly implemented, this will provide employment in lean periods to the rural people on the one hand, and create really productive assets in the form of infrastructure on the other. The scheme also has the potential to direct strategic use of surplus labour for promoting sustainable development and for mainstreaming the poor in the economy.

It may be recognized that rural development / poverty alleviation programmes have definitely important role to play in reducing the percentage of the rural people below poverty line from 45.76 in 1983 to 37. 26 in 1993-94 and further to 29.18 in 2004-05 (Dev, 2007). It may also be noted that both poverty alleviation programmes and economic growth measures have been at work in rural India and both of them have their impact on rural poverty. Reduction in rural poverty is attributable to both economic growth factor and special rural development / employment generation/ poverty alleviation programmes.

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On Expectation, Variance and Covariance of Products*

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Abstract : *In many situations we face random variables which are products of other random variables. Expressing expectation, variance and covariance of products in terms of expectation, variance and covariance of the elementary variables help in explaining an outcome which is the product of several causes. It also helps in evaluating the expectation, variance and covariance of statistics which are products of other elementary statistics. Some expressions of expectation, variance and covariance of products are available in the literature. This paper critically evaluates them and develops new ones that are more relevant for the purpose. An application of the expressions is also given at the end.*

Section-1

Expressions for the expectation and the variance of the sum of two variables are very useful, well defined, frequently used and known almost to all. For any two variables X and Y the expectation and the variance of their sum are given respectively by

$$E(X+Y)=E(X)+E(Y) \tag{1}$$

and,

$$V(X+Y)$$

$$=V(X)+V(Y)+2COV(X,Y)$$

$$=V(X)+V(Y)+2E(XY)-2E(X)E(Y) \tag{2}$$

Now if X and Y are uncorrelated (or if they are independent and so uncorrelated) the covariance term vanishes and then

$$V(X+Y)=V(X)+V(Y) \tag{3}$$

Similarly, the expectation and the variance of the difference of Y from X are given respectively by

$$E(X-Y)=E(X)-E(Y) \tag{4}$$

and,

$$V(X-Y)=V(X)+V(Y)-2COV(X,Y) \tag{5}$$

The covariance between the two sums X + Y and U + V is not so popular (as is not used frequently) but can be derived easily. It is given by

$$COV\big((X+Y),(U+V)\big)=E\big((X+Y)(U+V)\big)-E(X+Y)E(U+V)$$

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$$= E(XU)+E(XV)+E(YU)+E(YV)$$
$$-\left(E(X)E(U)+E(X)E(V)+E(Y)E(U)+E(Y)E(V)\right)$$
$$= COV(X,U)+COV(X,V)+COV(Y,U)+COV(Y,V) \qquad (6)$$

Thus, the covariance of the sums is the sum of the covariances. However, COV(X,Y) or COV(U,V) have no role in determining the covariance of two sums.

On the other hand, expressions for the expectation and the variance of the product of two variables are also very useful, but are not frequently used as they, at least the variance, are not well defined. For any two variables X and Y the expectation of their product is given by

$$E(XY) = E(X)E(Y)+COV(X,Y) \qquad (7)$$

as, $$COV(X,Y) = E(XY)-E(X)E(Y) \qquad (8)$$

However, the variance of their product cannot be derived easily. Similarly the covariance of two products XY and UV is not also well defined and cannot be derived easily.

Section-II

Efforts to derive expressions for the variance of the product and the covariance between the two products are observed in Anderson (1958), Goodman (1960), Bohrnstedt and Goldberger (1969) etc. It is Goodman (1960) who develops, though under some assumptions, the exact expression for the variance of the product of two variables whereas Bohrnstedt and Goldberger (1969) make the derivation simple and unconditional. As intended by Goodman and as derived by Bohrnstedt and Goldberger the expression for the variance of the product of two variables is obtained in the following way. For any two variables X and Y the product

$$XY = \left[\left(X-E(X)\right)+E(X)\right]\left[\left(Y-E(Y)\right)+E(Y)\right]$$
$$= \left(X-E(X)\right)\left(Y-E(Y)\right)+E(Y)\left(X-E(X)\right)+E(X)\left(Y-E(Y)\right)+E(X)E(Y)$$

On the other hand, $$E(XY) = E(X)E(Y)+COV(X,Y)$$

Therefore, $$XY-E(XY)$$
$$= \left(X-E(X)\right)\left(Y-E(Y)\right)+E(Y)\left(X-E(X)\right)+E(X)\left(Y-E(Y)\right)-COV(X,Y)$$

Thus, $$V(XY) = E\left(XY-E(XY)\right)^2$$
$$= E\left[\left(X-E(X)\right)^2\left(Y-E(Y)\right)^2\right]+2E(X)E\left[\left(X-E(X)\right)\left(Y-E(Y)\right)^2\right]$$
$$+2E(Y)E\left[\left(X-E(X)\right)^2\left(Y-E(Y)\right)\right]+\left(E(Y)\right)^2V(X)+\left(E(X)\right)^2V(Y)$$

$$+2E(X)E(Y)COV(X,Y)-\left[COV(X,Y)\right]^2 \qquad (9)$$

The first term of the expression is a 4th order central product moment in X and Y with order 4 equally distributed between X and Y. This can also be interpreted as a particular type of nonlinear covariance between the two variables. The second term contains an expression $E\left[(X-E(X))(Y-E(Y))^2\right]$. It is a 3rd order central product moment in X and Y with order 3 distributed by 1 and 2 between X and Y respectively, or it is another type of nonlinear covariance between the two variables. The third term contains the other 3rd order central product moment in X and Y with order 3 distributed by 2 and 1 between X and Y respectively. It is also another type of nonlinear covariance between the two variables.[1] Goodman further shows that if X and Y are independent, the first term reduces to the product of V(X) and V(Y) whereas the second and the third, and the last two terms vanish. Automatically, V(XY) becomes

$$V(XY)=V(X)V(Y)+(E(Y))^2 V(X)+(E(X))^2 V(Y) \qquad (10)$$

Thus, variance of product of two variables is equal to the product of their individual variances adjusted by two other terms only when the variables are independent.

Anderson (1958) in a different context shows that if X and Y follow bivariate normal distribution then third order central moments vanish and $E\left[(X-E(X))^2(Y-E(Y))^2\right]$ becomes equal to $V(X)V(Y)+2\left[COV(X,Y)\right]^2$. Automatically, we have

$$V(XY)=V(X)V(Y)+(E(Y))^2 V(X)+(E(X))^2 V(Y)$$

$$+2E(X)E(Y)COV(X,Y)+\left[COV(X,Y)\right]^2. \qquad (11)$$

Now along with this if X and Y are uncorrelated then also $V(XY)=V(X)V(Y)+(E(Y))^2 V(X)+(E(X))^2 V(Y)$. It is not needed to make the assumption of independence of X and Y.

Bohrnstedt and Goldberger (1969) show that neither the stronger assumption of complete independence nor the strong assumption of bivariate normality along with uncorrelatedness are necessary. They prescribe a set of weak assumptions, viz., expectation-independence and variance-independence of X and Y that lead to the same result[2] that $V(XY)=V(X)V(Y)+(E(Y))^2 V(X)+(E(X))^2 V(Y)$.

The general expression for the variance of the product as developed by Goodman and as derived by Bohrnstedt and Goldberger (Equation (9) above) contains some terms (the first three terms) that are not only functions of E(X), E(Y), V(X), V(Y) and COV(X,Y), but also functions of higher order moments of X and Y. Moreover, the expression does not contain V(X)V(Y) term directly but is embedded in the first term. Thus the expression fails to express fully the impact of changes in E(X), E(Y), V(X), V(Y) or COV(X,Y) on V(XY) for which the expression is intended. However, if X and Y are bivariate normally

distributed or are independent, then the problem disappears. The situation is complex in the general case. Bohrnstedt and Goldberger (1969) then extend the expression for the variance of the product to that of the covariance of products. They derive the expression for the covariance of XY and UV as the following

$$\begin{aligned}
&COV(XY,UV)=E\left[(XY-E(XY))(UV-E(UV))\right]\\
&=E\left[(X-E(X))(Y-E(Y))(U-E(U))(V-E(V))\right]\\
&+E(X)E\left[(Y-E(Y))(U-E(U))(V-E(V))\right]+E(Y)E\left[(X-E(X))(U-E(U))(V-E(V))\right]\\
&+E(U)E\left[(X-E(X))(Y-E(Y))(V-E(V))\right]+E(V)E\left[(X-E(X))(Y-E(Y))(U-E(U))\right]\\
&+E(X)E(U)COV(Y,V)+E(X)E(V)COV(Y,U)\\
&+E(Y)E(U)COV(X,V)+E(Y)E(V)COV(X,U)-COV(X,Y)COV(U,V). \qquad (12)
\end{aligned}$$

They further observe that if X, Y, U and V follow a multivariate normal distribution, then all third order moments vanish and the fourth order moment

$$E\left[(X-E(X))(Y-E(Y))(U-E(U))(V-E(V))\right]$$

becomes

$$COV(X,Y)COV(U,V)+COV(X,U)COV(Y,V)+COV(X,V)COV(Y,U),$$

and $COV(XY,UV)$

becomes $E(X)E(U)COV(Y,V)+E(X)E(V)COV(Y,U)+E(Y)E(U)COV(X,V)$

$$+E(Y)E(V)COV(X,U)+COV(X,U)COV(Y,V)+COV(X,V)COV(Y,U) \qquad (13)$$

Here the first five terms in the general expression (12) contain moments of 3rd and higher orders. Moreover, all second order product moments, viz., COV(X,Y), COV(U,V), COV(X,U), COV(Y,V), COV(X,V), and COV(Y,U) are also embedded in those terms (as becomes explicit in (13) under multivariate normality). Like that in the covariance of two sums, COV(X,Y) or COV(U,V), have no role in determining the covariance of two products. But it holds only under the assumption of multivariate normality and this is not the case in general here. Thus the effects of changes in the first and second order moments cannot be evaluated completely from the above expression. This paper is intended to remedy these lacunas in the expressions for the variance of the product and the covariance of products.

Section-III

First, consider the case of variance. Here we are interested to express V(XY) in terms of V(X), V(Y), COV(X,Y), E(X) and E(Y). The straight forward expansion of V(XY) gives us

$$V(XY)=E\left(XY-E(XY)\right)^2=E\left(X^2Y^2\right)-\left(E(XY)\right)^2$$

Or, $$V(XY)=E\left(X^2Y^2\right)-\left(E(X)\right)^2\left(E(Y)\right)^2$$

$$-\left(\mathrm{COV}(X,Y)\right)^2 - 2E(X)E(Y)\mathrm{COV}(X,Y) \qquad (14)$$

The main problem with the expression in (14) is that it contains a 4th order ordinary product moment (the first term) which has no direct interpretation. Moreover, the expression fails to explain how V(XY) is determined by V(X) and V(Y). Actually V(X) and V(Y) are embedded in $E(X^2Y^2)$. On the other hand, the expression in (9) though contains only central moments, the central product moments of order greater than 2 have only difficult interpretations. To overcome both the problems a third expression is tried in the following way.

$$\mathrm{COV}\left(X^2,Y^2\right) = E\left(X^2Y^2\right) - E\left(X^2\right)E\left(Y^2\right)$$

$$= E\left(X^2Y^2\right) - \left(V(X) + E(X)^2\right)\left(V(Y) + \left(E(Y)\right)^2\right)$$

$$= E\left(X^2Y^2\right) - V(X)V(Y) - V(X)E(Y)^2 - V(Y)E(Y)^2 - E(X)^2E(Y)^2 \qquad (15)$$

Therefore, $E\left(X^2Y^2\right) = \mathrm{COV}\left(X^2,Y^2\right) + \left(V(X)\right)\left(V(Y)\right)$

$$\left(V(X)\right)\left(E(Y)\right)^2 + \left(E(X)\right)^2\left(V(Y)\right) + \left(E(X)\right)^2\left(E(Y)\right)^2$$

And, $$V(XY) = \mathrm{COV}\left(X^2,Y^2\right) + \left(V(X)\right)\left(V(Y)\right)$$

$$+\left(V(X)\right)\left(E(Y)\right)^2 + \left(E(X)\right)^2\left(V(Y)\right) + \left(E(X)\right)^2\left(E(Y)\right)^2$$

$$-\left(E(X)\right)^2\left(E(Y)\right)^2 - \left(\mathrm{COV}(X,Y)\right)^2 - 2E(X)E(Y)\mathrm{COV}(X,Y)$$

Or, $$V(XY) = \mathrm{COV}\left(X^2,Y^2\right) + \left(V(X)\right)\left(V(Y)\right) + \left(V(X)\right)\left(E(Y)\right)^2$$

$$+\left(E(X)\right)^2\left(V(Y)\right) - \left(\mathrm{COV}(X,Y)\right)^2 - 2E(X)E(Y)\mathrm{COV}(X,Y)$$

(16)

This is our expression for the variance of product that contains the expectation, the variance and the covariance terms only and all of them have straight forward and well known interpretations. To have such an interpretable expression neither the assumption of complete independence nor the assumption of bivariate normality is needed. The expression shows that V(XY) depends directly on $\mathrm{COV}(X^2, Y^2)$, V(X) and V(Y). The directions of dependence of V(XY) on E(X), E(Y) and COV(XY) are uncertain and dependent on their values. E(X) and E(Y) are generally positive, whereas COV(X,Y) may be positive, negative or zero. If COV(X,Y) is positive V(XY) depends inversely on COV(X,Y), whereas the directions of dependence of V(XY) on E(X) and E(Y) are uncertain. On the other hand, if COV(X,Y) is negative V(XY) depends directly on E(X) and E(Y), but the direction of dependence of V(XY) on COV(X,Y) becomes

uncertain.

Now let us consider the case of covariance of products. Covariance between two products XY and UV are expected to be composed either of COV(X,U) and COV(Y,V) or of COV(X,V) and COV(Y,U). It is also expected that COV(X,Y) and COV(U,V) have little role in explaining the covariance of their products. Moreover, E(X), E(Y), E(U) and E(V) are expected to have only indirect role.

Here again the direct expression of the covariance is

$$\begin{aligned}COV(XY,UV) &= E\left[(XY-E(XY))(UV-E(UV))\right] = E(XYUV)-E(XY)E(UV)\\ &= E(XYUV)-E(X)E(Y)E(U)E(V)-E(X)E(Y)COV(U,V)\\ &\quad -E(U)E(V)COV(X,Y)-COV(X,Y)COV(U,V) \qquad (17)\end{aligned}$$

On the other hand,

$$\begin{aligned}COV(XU,YV) &= E(XYUV)-E(X)E(Y)E(U)E(V)-E(X)E(U)COV(Y,V)\\ &\quad -E(Y)E(V)COV(X,U)-COV(X,U)COV(Y,V) \qquad (18)\end{aligned}$$

Therefore,

$$\begin{aligned}E(XYUV) &= COV(XU,YV)+E(X)E(Y)E(U)E(V)+E(X)E(U)COV(Y,V)\\ &\quad +E(Y)E(V)COV(X,U)+COV(X,U)COV(Y,V) \qquad (19)\end{aligned}$$

Thus,

$$\begin{aligned}COV(XY,UV) &= COV(XU,YV)+E(X)E(Y)E(U)E(V)\\ &\quad +E(X)E(U)COV(Y,V)+E(Y)E(V)COV(X,U)\\ &\quad +COV(X,U)COV(Y,V)-E(X)E(Y)E(U)E(V)-E(X)E(Y)COV(U,V)\\ &\quad -E(U)E(V)COV(X,Y)-COV(X,Y)COV(U,V)\end{aligned}$$

Or,

$$\begin{aligned}COV(XY,UV) &= COV(XU,YV)+E(X)E(U)COV(Y,V)\\ &\quad +E(Y)E(V)COV(X,U)+COV(X,U)COV(Y,V)-E(X)E(Y)COV(U,V)\\ &\quad -E(U)E(V)COV(X,Y)-COV(X,Y)COV(U,V) \qquad (20)\end{aligned}$$

The other expression may also be useful in some cases.

$$\begin{aligned}COV(XU,UV) &= COV(XV,YU)+E(X)E(V)COV(Y,U)\\ &\quad +E(Y)E(U)COV(X,V)+COV(X,V)COV(Y,U)-E(X)E(Y)COV(U,V)\\ &\quad -E(U)E(V)COV(X,Y)-COV(X,Y)COV(U,V) \qquad (21)\end{aligned}$$

Expression (20) shows how COV(XY, UV) is composed of COV(X,U) and COV(Y, V). On the other hand, expression (21) shows how it is composed of COV(X, V) and COV(Y, U). COV(XY, UV) can also be expressed in terms of COV(XY, U), COV(XY, V), COV(X, UV) and COV(Y, UV). It is the purpose that dictates what expression of COV(XY, UV) will be used. Under multivariate normality COV(XU, YV) of

expression (20) takes the value E(X) E(Y) COV(U,V) + E(X) E(V) COV (Y, U) + E(Y) E(U) COV (X, V) + E(U) E(V) COV (X,Y) + COV (X, Y) COV (U, V) + COV(X, V) COV (Y, U) and COV(XY, UV) takes the expression E(X) E(U) COV (Y,V) + E(X) E(V) COV (Y, U) + E(Y) E(U) COV (X,V) + E(Y)E(V)COV(X, U) + COV (X, U) COV (Y, V) + COV (X, V) COV (Y, U). Thus COV(XU, YV) in expression (20) includes the effects of COV(X, V) and COV(Y, U) that becomes explicit under multivariate normality. Similarly COV(XV, YU) in expression (21) explains indirectly the effects of COV (X, U) and COV (Y, V) that becomes explicit under multivariate normality.

Thus if COV(X,U) and COV (Y,V) are more important and COV(X,V) and COV(Y,O) are not that important in explaining the COV(XY,UV), expression in (20) is preferred to that in (21). In the opposite case, expression in (21) is preferred to that in (20). But if all four covariances are important any one of the two expressions may be used. The thing will be clearer when we shall view the things in terms of a suitable example in the next section.

Section-IV

In a Research Report Hazell (1982) gives a very good example where the expressions for variance of product and covariance of products are applicable. He tries to explain inter-temporal variation in annual agricultural production of different food-grains in India during the period between 1954-55 and 1977-78. He shows that production of any food-grain in any year is the product of area under that food-grain and yield of that food-grain in that year. He then uses the sample counterpart[3] of the expression (9) above that runs as

$$V(XY)=\frac{1}{2}\sum\left(X-\bar{X}\right)^2\left(Y-\bar{Y}\right)^2+2\bar{X}\frac{1}{n}\sum\left(X-\bar{X}\right)\left(Y-\bar{Y}\right)^2$$

$$+2\bar{Y}\frac{1}{n}\sum\left(X-\bar{X}\right)^2\left(Y-\bar{Y}\right)+\bar{Y}^2v(X)+\bar{X}^2v(Y)+2\bar{X}\bar{Y}\,\mathrm{cov}(X,Y)-\left(\mathrm{cov}(X,Y)\right)^2.$$

where X stands for area under the food-grain and Y stands for yield of the food-grain; v(X), v(Y) and v(XY) are sample variances of X, Y and XY respectively so that $v(X)=\frac{1}{n}\sum\left(X-\bar{X}\right)^2$ etc., cov(X,Y) is the sample covariance of X and Y so that $\mathrm{cov}(X,Y)=\frac{1}{n}\sum\left(X-\bar{X}\right)\left(Y-\bar{Y}\right)$ and, $\bar{X}$ and $\bar{Y}$ are the sample means of X and Y respectively. He finds that change in variance of production of any food-grain in the sub-period 1967-68 to 1977-78 over the sub-period 1954-55 to 1964-65 can be explained by changes in different components and sub-components of v(XY). He uses the effects of changes in v(X), v(Y), cov(X,Y), $\bar{X}$ and $\bar{Y}$ and, their interacting effects on v(XY) and puts the effects of changes in other terms in a residual term and ultimately ignores that. Our discussion of Section-III establishes that in a situation like this equation (16) is more relevant than equation (9). The decomposition of change in variance of production by using equation (9) fails to give complete and correct impact of changes in v(X), v(Y), cov(X,Y), $\bar{X}$ and $\bar{Y}$.

In the same Report he explains that variance of production of total food-grains is the sum of the variances

of individual food-grains plus twice the sum of the inter food-grains covariances of production. Thus change in variance of production of total food-grains between two sub-periods can be explained by changes in variances of production of individual food-grains and by changes in inter food-grains covariances or by changes in the components of variances and covariances. When the change in covariance of production of two food-grains is tried to be decomposed into changes in different components of it, the expression (12) is of little use because the first five terms in it contain moments of 3rd and higher orders. In this situation expression (20) developed by us seems most useful. Covariance of production of two food-grains is expected to be explained mainly by covariance of areas of two food-grains and covariance of yields of two food-grains, partially by covariance of area of one food-grain with yield of other and marginally by covariance between area and yield of two food-grains. Expression (20) helps us in separating out the first two components from the total.

Section-V

Different expressions for the variance of product of two variables and the covariance of two products can be derived. Anderson, Goodman, Goldberger etc. develop some expressions. In this paper some other expressions that are appropriate in expressing variance of products in terms of variances of the elementary variables and the covariance of products in terms of elementary covariances are derived. An example from the existing literature is used to illustrate the cases.

Notes

1. For a very good discussion Dodge and Rousson (2001) may be consulted.
2. Conditions of expectation-independence and variance-independence are only two sub-conditions of independence between X and Y that are required to make

$$E\left[(X-E(X))^2(Y-E(Y))^2\right] = V(X)V(Y) \text{ and } E\left[(X-E(X))(Y-E(Y))^2\right]$$

$$=\left[(X-E(X))^2(Y-E(Y))\right] = COV(X,Y) = 0 .$$ For details Bohrnstedt and Goldberger (1969) may be consulted.

3. Hazell indicates to use the theoretical expression developed by Bohrnstedt and Goldberger but actually uses the sample counterpart of that.

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Rabindranath's Approach to Agricultural Development and Rural Industrialisation

*Kanailal De**

Abstract : *Rabindranath adopted humanitarian approach to rural problems including poverty of common people and engaged himself for their all-round development through modernization of agriculture and expansion of rural industries. He set up a model institution to modernize agriculture and improve its productivity and also to develop industries including factories to meet varied wants of man involving scientists' participation based on the experience he acquired in Russia. He was quite aware of the danger of the use of machines that came from the greed of the owners of the factories, which ought to be wiped out. Tagore preached the need of reconstruction of the economic, social, and cultural life of the village and drew up a programme for the purpose. The work he initiated in the villages around Santiniketan was perhaps the first conscious effort to develop agriculture, industry and community life in an organized manner in modern India and thus to alleviate rural poverty. Tagore was one of the earliest advocates of cooperation in India through which men and women could satisfy their economic needs as well as create conditions of social well-being and cultural progress. Tagore stood for a society in which individuals would find the fullest opportunity of self-expression through creative and cooperative activities.*

Key words : development, modernization of agriculture, industrialization, poverty, reconstruction, well-being, cooperation.

Rabindranath's approach to rural problems is humaniranian. His thought centered round happiness, sorrows and sufferings, and poverty of the common people. He made constant effort with humanitarian approach to relieve them of their economic plight. Thus Tagore engaged himself for the all-round development of common people living in the villages through modernization of agriculture and expansion of rural industries so that their standard of living through economic renovation improves.

According to him, an economy provides means of living to people, and industry as an economic sector gives immense scope of livelihood while agriculture cannot provide perennial guarantee of employment to the farmers. He welcomed any sort of positive approach to development of industry and commerce for the emancipation of poverty, and to improve the well-being of the mass. He established a model institution when he observed that that mere farming in traditional way was not sufficient enough to meet the increasing needs of growing population. It was revealed to Tagore when he visited houses of farmers at *Bolpur*. Once a farmer requested him to give employment in his school to one of his young sons, who was surplus labour in the field. The concerned farmer revealed that agriculture could not provide what his family needed.

There was no denying the fact that productivity in agriculture was low, which needed to be improved so as to remove the deplorable condition of the farmers and to provide food to the people of the

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country. In his article '*Bhumi Laxmi*', Tagore has emphatically said, 'More production is to be made for certain in the land. Those days are gone when farmers alone can do everything for production of food in the field. Today science and scientists' participation can not be ignored'.

Tagore realized that social life could not function in a healthy way without a balanced economy. Since the dawn of history the Indian economy has been predominantly rural and the self-sufficient village provided scope for development of a number of cottage industries. The combination of agriculture and industry and craft served to meet the major requirements of life for the vast majority of the people.

During his fifteen days' stay in Russia he acquired a lot of experience and on the basis of that he advocated the establishment of factories which he thought to be the prime need of civilization and economic prosperty. He expressed in his letters to the friends that for want of sufficient factories accumulation of capital on a larger scale would not be possible. Tagore had been highly impressed by the soviets in Russia while he found them to put agriculture and industry on equal footing to accelerate development.

Tagore recognized the importance of handicrafts and freely opined that the manual labour and skill could produce the most beautiful objects. He also recognized if we were to provide necessary goods and services to all the members of society, machine would have to be increasingly used. Properly used, it can not only increase the sum total of material wealth but also liberate man from the burden of daily toil and drudgery. Tagore not only welcomed the increasing use of machine but also was conscious of the dangers that followed from the indiscriminate use of machinery. That the machine must be used as man's slave, not as his master, was the theme of many of his poems, plays and essays. The danger of the use of machines, he observed, came from the attitude of the owners of the factories as they were always in the habit of incurring more and more profit, but simply for this reason we should not discard the use of machines. In Russia this greed of profit was not there. Rabindranath was very much exalted to see the policy of the Soviets. He wrote, 'Russia is trying to wipe out the root of greed forcibly while they do not like to stop using machines. On the other hand, they have been trying to distribute the products of machines among all removing traces of greed' *(Bangalir Kaparher Kar-Khana o Hater Tanth)*.

Tagore noticed that farmers did not gain from cultivation in the traditional way. Whatever gain had been there from production was spent for paying off loans from moneylenders and paying cess, as a consequence of which they became feeble in health and mind eroding ultimately the very base of village economy. He rightly observed, what should be the main task was to renovate village economy and to make the social system self-reliant. Tagore stressed the matter with great importance, 'We shall have to take up our administration at our hands. We shall save the farmers, teach their sons and daughters. We shall improve our agriculture.'

Tagore thought, land should belong to those who ploughed it; those who never treaded the plot of land, never ploughed and only enjoyed the products of agriculture should not be its owners. But he also added the problem. If land was offered to the farmer, his problems might not be solved or financial capacity might not be improved since as soon as the ownership of the plot of land would be conferred to the farmer, land might be transferred to the money-lender as mortgage while the farmer could not cultivate the plots without receiving credit from them to piurchase seed and fertilizers; as a result the condition of the farmer might further worsen *(Rashiyer Chithi)*.

Tagore was the first to point out that the migration of rural able men and women to the town would stop only when the amenities available in the town were created in the villages and people would find these

attractive amenities of life in the villages and adequate opportunities for life, growth and expression. Tagore not only preached the need of reconstruction of the economic, social, and cultural life of the village but also drew up a programme for the purpose. The work he initiated in the villages around *Santiniketan* was perhaps the first conscious effort to develop community life in an organized manner in modern India.

Rabindranath thought seriously about eradication of poverty of villagers, and he did not confine himself to the philosophical thought. The applied side of agriculture was very well in his mind and he extended his programme of action in that direction. Science and technology might have many things to contribute for the development of agriculture as he believed that there was no other way out than to depend on science. His belief was so deep and his thought was so penetrating that he sent his son Rathindranath abroad for studying agricultural science. He also thought that science should be applied for the welfare of poor people.

He did not support any way short of small-scale and large-scale industries. In 1936 Bata's factory had been established in *Mirpur* village with help of foreign capital. On 10th November, 1939 the great poet visited the factory sitting in wheel chair. He was so glad to see the factory that he paid warm welcome to the investor, 'I am glad to find people from different parts of India working together and getting skillful training in the management of machinery which our country needs.' It shows that the great poet was very much in favour of setting up factories for the development of the country.

Rabindranath emphasized science education. In "*Palliprakiti*" he observed thst Science had given man great power which would be utilized for the good of society. In a notice of *Loksikshagranthamala* he wrote, 'In order to make knowledge free from old ideas and to warn about the serious outcome of this, cultivation of science is the prime need of the day.' For the development of agriculture he suggested that science had been necessary for the increase of productive power.

He discussed in many articles the horrors of mechanical operation in factories but he did not negate the use of machines. He observed, 'this machine is also a part of our vitality. It is completely a thing of man..... we should try to make it subservient to our way of living (*Palliprakiti*). When we enlarge our marking capacity with the help of machine, we practically lead science triumphantly in our way of life' (*Samabay Niti*).

In '*Samabay Niti*' he observed, 'New age demands new offering from people; those who want to stop the process are gone ..... history shows that some community of people does not want to proceed in the new path, does not want to accept new idea, rather they try to stick to the old idea; they would like to remain stagnant turning their faces back to the new scheme or idea; they are worse than the dead thogh they are alive in the present context'. Tagore's wise advice was not only well thought out but also pragmatic.For development of agriculture and advancement of industry farmers, he thought, should not hesitate to cooperate with the government as these were in the interest of farmers and economic development of the country. They were advised not to be misguided. In 1322(Bengal year) in the meeting of the welfare committee he pleaded for development of commerce and industry and called the patriotic youth and students to support industrialization, if it was for the welfare of the country.

Tagore was one of the earliest advocates of co-operative farming in India, and declared that the principle of co-operation should flow over from economic channels into sphere of community life. He observed that society itself was a great co-operative endeavour and it is through co-operation that mankind survived and triumphed over all other living beings. He held that through co-operation men and women could satisfy

their economic needs as well as create conditions of social well-being and cultural progress. Tagore stood for a society in which individuals would find the fullest opportunity of self-expression through creative and cooperative activities.

He observed that there would be no improvement of agriculture if it was not done through *Samabay Nithi*. He emphasized "*Atmashakti*" and *"Shakti-Samabay."* He observed that self reliance and co-operative strength would arouse the villagers so that they could accept the responsibilities of their own lives.

Rabindranath wrote in 1919: "We are faced with two stupendous problems; the first about our poverty of intellectual life; the second, about our poverty of material life." His suggestions for tackling the two problems are equally true and significant even today. He said, 'For the protection of our mental life the co-ordination of our material resources is necessary.' For the solution of India's material poverty he observed, 'Our centre of culture should not only be the centre of intellectual life of India, but the centre of her economic life also.' His observations were made with particular reference to the need for an ideal centre of education. To achieve this objective he stressed much on the 'co-ordination of material resources' and 'co-operation of individual powers'. His conclusion was: 'Our material poverty, ...can only be removed by the co-ordination of our material resources through the co-operation of our individual powers'. The optimum utilization of material resources and of human resources has been the chief objective of economic plans in independent India. So what the poet-philosopher observed about a century ago is still relevant today.

Tagore observed, what lay behind the immense sufferings of villagers were superstition, want of education and reciprocal co-operation. He thought that the solution to the problem lay in the reconstruction of village or rural economy because it was the main basis of social life (*Sasadhar Sinhda*, 1962:4-5).That Rabindranath loved men from the core of his heart was the main reason for being very dear to them. It was evident from his search for reconstruction of villages from *Silaidaha* to *Surul. Zamindar* Rabindranath was lover of farmers and villages.

An interlinking of village life and academic experimentation was an integral part of Tagore's line of thinking. So he extended his sphere of work from Viswa Bharati to *Sriniketan* to embark upon a programme of rural reconstruction activities. He knew that the best approach to the problem of generating growth of a rural economy would be to arouse self-confidence of the villagers. The primary objective of *Sriniketan* was to promote the spirit of self-reliance among the villagers. In the programme of work of *Sriniketan*, importance of research on social and economic problems of the villages was recognized from the very beginning. The idea of community development was first conceived and tried out here. Tagore had abiding interest in poverty-stricken millions of India. His deep concern was the changing fortunes of the Indian village community under the impact of modern civilization. His insight into socio-economic reality was profound and penetrating. We are amazed at the range of his prognostications, the incisiveness of his exposition, and the striking modernity of his ideas.

One of the main objectives of Tagore's constant endeavour for reconstruction of villages was to reach the doors of the villagers with touch of happiness and for this end in view he wished to make *Srinekatan* an emblem of his great activities. During *Swadeshi* movement the tide that renovated the village and cottage industry was accepted by Tagore in high spirit. For this purpose through *Shilpabhavan* of *Sriniketan* he made continuous effort to improve the cottage and small-scale industries so that villagers would become self-reliant.

Rabindranath stood firmly for the establishment of cotton mills. The *Bangalaxmi*, the Mohini mills

etc. were very popular for production of clothes. The weavers did not suffer for the reason. He gave a call to the people of the country for their protection, 'The cotton mills are to be saved at any cost. Indifference of the *Bengalees* is to be removed, if necessary, forcibly' *(Bangalir Kaparher Kar- Khana o Hater Tanth).*

What was Tagore's observation and experience about a century ago is equally relevant even today. Indispensability of industrialisation cannot be neglected or overruled. What Tagore cautioned in the context of agriculture and industry is relevant.

Conclusions

Tagore is the great pioneer in rural economic thinking. Santiniketan is the very place he chose as the center of his experiment in rural reconstruction with accent on agricultural development and industrialisation. Being a great experimentor Tagore advocated self-reliance as the prime mover of any programme to revitalize life and living in the villages. Humanism was the keynote of Tagore's philosophy and he developed his vision to bear upon economic problems. The process of industrialization was usually given the highest priority and the importance of agricultural development and hence of the rural economy was also emphasized for balanced development of the rural economy. In the work programme of Sriniketan, importance of research on social and economic problems of the villages was recognized from the very beginning. Tagore never conceived of his programme as a static one. He modified it in the light of his studies and experiments and changed it as the situation changed.

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Gender and Participation in Low-Cost Irrigation Schemes: A Case of AKRSP(India) Intervention in Tribal Gujarat

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Abstract : *Both women and men have and can take equal opportunities to manage their agricultural productivity in gender-balanced mode of irrigation scheme practices. AKRSP (India) facilitates small irrigation services through Water User Association / groups for enhancing multiple livelihood possibilities. The study draws cases from three Mahila Vikas Mandals located in Badtal, Sathvav and Bhatkahi villages under Mahila Jagruti Manch, Mandavi, AKRSP (India) managing low-cost irrigation (group-well) schemes.*

"Our AKDN experience has taught us that development is an integrated phenomenon that must be approached and implemented within an integrated framework, covering simultaneously the material, social and cultural requirements and desires of citizens. Work, good health, knowledge and the access to knowledge, security, faith and spiritual life, the arts, pleasing and stable built and natural environments, physical activity – all go hand in hand in creating a life which is full, which is rewarding "

A quote from Prince Amyn Aga Khan, Kabul 2007

In the new millennium, the importance of water as a gendered resource has emerged as never before. There has been rapid expansion in international and national initiative, civil society and government services including the establishment of Gender and Water Alliance, World Water Forum and International Water Management Institution. This reflects a growing recognition that managing water as much as land and biomass is going to be a critical challenge for future economic growth and agricultural sustainability. The debate in the field of small irrigation services relevant to this paper is that promotion of livelihood relates to economic, social, cultural and political growth. This in turn promotes men's as well as women's well-being and agencies. A judicious use of land and water resources is crucial for agricultural growth. The World Bank defines Participatory Irrigation Management (PIM) as "the involvement of irrigation users in all aspects of irrigation management, and at all levels". This implies that water users participate in planning, design, construction, operation and maintenance. Also, these aspects include their participation in financing, deciding on rules and norms, monitoring and evaluation of irrigation systems.

From the livelihood promotion perspective, the irrigation management programme is an effective and equitable instrument for productivity enhancement (Shah 1993, Zwarteveen 1997, Oza 2006) as farmers have a sound role in collectively deciding the aspects of their livelihoods. Another goal of this Participatory Irrigation Management (PIM) programme would be providing and enabling institutional environment to tap both women's and men's productive potentials in an equitable manner.

Working from a sustainable livelihoods perspective, NGOs have been largely kept out of PIM when

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sponsored by the State Irrigation department. Major problems in irrigation sector in the state are: Inadequate allocation for Operation and Maintenance (O&M), inequitable distribution of water, lack of incentives for saving water and low recovery of water rates. The problem is compounded by lack of any effective institutional check on the management. The ability of the local communities and governments to deal with water management is constrained by the absence of reliable data and tools, information networks and the professional and institutional capacities. Study by R. Parthasarathy, and Apoorva Oza (2006) on PIM in Gujarat and elsewhere observed that the farmers with small size of landholdings have derived highest benefit in crop productivity through the PIM association. The present government's emphasis on irrigation is in the right direction. Institutional reform issues are important, particularly in inputs, marketing, and land and water management. These are more important than price and trade policy reforms. However, policy-making has hardly designed and implemented the gender equity considerations and the recognition that non-exploitative gender production relations foster agricultural growth. This study shows that NGOs in Gujarat concern benefit for the deprived and marginalized of the backward areas such as tribal women, and tail-enders have contributed to the debate over agricultural growth and gender equity. Studies on small scale irrigated agriculture have confirmed that the productivity of women farm decision-makers is equally efficient and have a greater impact on family well-being to that of men (Koopen et al. 2001, Zwarteveen 1997).

The Aga Khan Rural Support Programme India [AKRSP(India)] has been promoting PIM for more than fifteen years in the tribal areas of Bharuch, Surat and Narmada districts in South Gujarat. This programme aims at stimulating the PIM schemes by grassroots institution building into Water User Associations (WUA) for water management and providing agricultural training, inputs, and market provision and redesign and rehabilitation of infrastructure. The role in facilitating the capacity building of the WUA including land holding operations till the WUAs acquire competence to become self-managers in these districts of South Gujarat can not be ignored. Out of the 770 villages at present, AKRSP (India) works with 366 tribal villages of these three districts. AKRSP (India) is concerned not only with aggregate levels of production or employment but also poverty alleviation and equity in terms of the distribution of income and benefits. This paper concerns gender-balanced mode of irrigation scheme practices in which both women and men have and can take equal opportunities to manage their agricultural productivity.

Next section discusses the geographical condition of the study areas in which AKRSP(India) facilitates small irrigation services through Water User Association/groups for enhancing the multiple livelihood possibilities.

Overview of the Study Area

Scarcity of surface water coupled with poor management of resources by tribal poor of Bharuch, Surat and Narmada districts in the semi-arid region in South Gujarat imposes a serious threat to agricultural production and off-farm economic activities. The main tribal people living here are the Vasavas and Chaudharis. Previously used to hill slope cultivation and forest based livelihoods, they have shifted to subsistence agriculture and pockets of commercial farming since last four generations. The Narmada Canal Project Network and local canal irrigation system allow for good production from the fertile soil. However, agricultural productivity remains largely rain-fed owing partly to inclining and undulating land with run-off of top soil and bad canal management practices and partly to deficiency in effective management of land and water harvesting techniques, lack of financial services, agricultural inputs and market.

Marginalised communities, such as landless tribal and those who lack year-round livelihood options from agriculture and allied activities often accept entrenched poverty, deprivation and exclusion as a way of life. While factories in Surat and farmyard are drawing the maximum attention for male wage workers or contractual labours, women bear a major role in the household economy and agricultural production activities. Today, agriculture is the major livelihood option, having expanded into forest areas, and in some places barren forest land has been converted into fodder land. Given the nature of monsoon rainfall in India, the key to meeting the country's growing demand for water for domestic and agricultural use is to more effectively harness rainfall which is the ultimate source of all freshwater resources.

Small Irrigation Scheme and Tribal Water User Association

While irrigation from canal that taps the reservoirs formed by large dams is an option, there are other alternatives to canal irrigation like the tube/bore well that taps the ground water drilled by the new machines for the large commercial farmers and cash crop growers of South Gujarat. For example, it has been observed in the field while Sathvav canal dried up since the Month of April 2007 the Group Well (GW) around is effectively supplementing water for the land under cash crop (sugarcane and vegetable) in this area. However, extensive use of this sort for sugarcane farming in this region for the marginal and small farmers is a relatively recent phenomenon. In fact, the concept of a user group formed around a well was introduced by AKRSP(India) specifically to cater to the needs of these marginal and small farmers (Agarwal et al. 1998, Koopen et al. 2001, Oza 2006).

Given the performances of AKRSP(India) on integrating the interest of the small and marginal landholders into large and small scale PIMs in the command areas, Tribal Sub Plan of Government of Gujarat supported small water irrigation scheme such as Group Well since 2001. Setting up a GW becomes cheaper and innovative when investment became participatory. The tribal small landholders who lack access to water for irrigation canal contribute labour, cash and commitment for management of water for agricultural productivity, livestock keeping and survival. Table 1 (see annexure 1) provides an overview of the GW managed by women from 2002 to 2006 (as shown in bold), which was sponsored by Tribal Sub Plan (TSP) Scheme through AKRSP(India) for Mandvi Cluster. In the year 2006, Japanese Fund for Poverty Alleviation and Government of Gujarat sponsored to set up 30 integrated GW package for 300 users divided among 30 villages. It helped expand AKRSP(India)'s operations in a large scale. The expected outcome is to reduce the migration and increase the income from Rs. 3000 to Rs. 18000 per year for Below Poverty Line (BPL) level 300 people. The post-development era perception about water management and agricultural productivity is thus characterised not so much by a 'retreat of the state', as by radical restructuring of relations between the discursive and institutional regimes of the state and civil society. An innovative component of this enabling environment is the best utilization of the subsidy policy for the support of small-scale agricultural water use of the TSP and ADB, especially by women members. Regarding governance, such a PIM process represented a partnership between government, NGOs and water users. It creates the environment for collective action and dialogue between users, agencies and governments. This, in turn, leads to better opportunities for equity, better management and improved collection of water charges. Moreover, irrigation management through active participation of farmers helps ensure the sustainability of irrigation system.

In the next section, I describe the experience and perception of female group members managing group-well and their perspectives often narrated orally to shed light on new challenges to what overtake as

"farm women". Before this, a general understanding on the extent to which access to ground water services addresses women's practical daily needs (economic impact) as well as creates an enabling environment to reflect their strategic (social change) gender interests is discussed in the next section.

An understanding of the integration of the marginalized tribal community people and especially women into the ground water management can deepen our understanding of gender participation in agrarian productivity in many parts of semi-arid region. First, ground water used and managed is a useful lens through which one can examine long-standing debates over the dynamism of gender and agricultural practices in India. The labour and capital embodied in agricultural landscape include not only building and cultivating physical structure – group-well, check-dams and crops – but also the work of creating, sustaining and altering relations between women and men, structural conditions and places. This investment in the discursive and symbolic practices of imagining landscapes through narratives and cases may seem subtle but it yields real effects (Mohanty 1991, Acharya and Lund 2002).

Second, investment in the ground water extraction is one such potent agricultural productivity enhancing opportunity. Ground water enables multiple cropping, productions of new crops, and the use of fertilizer to boost yields. However, access to ground water is often tied to access to credit. By involving SHGs and WUAs watershed development holds a great promise for tribal people and mitigating the severity of migration in this region. The trajectory of ground water management by women provides insights into the two dominant factors governing gender equity in agrarian change: social and spatial relationship of gender and new forms of livelihood possibilities.

Third, struggle to maintain access to source of ground water not only requires group effort but also has given rise to new forms of social organization. These schemes involve collaborations between NGOs, villagers, and state agencies, yoking communitarian identities and sentiments together with the cause of resource conservation and green revolution such as water user and maintenance association, Pani Panchayat, Participatory Irrigation Management association and so on. Those new forms of community organization shape and reshape the struggle to maintain access to it and our understanding of economic and social change in agrarian tribal society. Beyond the celebratory hype, these processes articulate change in the economic policy on the one hand, and inculcate the ethos of political decentralization in local panchayat on the other. The role of new form of women's groups and association in the creation of a new sphere that transacts temporal and spatial scales demands a closer scrutiny (Agarwal and Sivaramakrishna 2001, Agarwal 2003).

Study by Tushaar Shah (1993) pointed out that the market in groundwater in Gujarat is highly competitive, efficient and individualized, bearing all the marks of what economists define as "economic rationality". The politics of water scarcity and price fixing in the community cut across the issues of caste, class, gender, leadership and so on (Dubash 2002, Hardiman 1998). Fourth, cultural politics of water offers the analytical framework within which we examine questions of power and inequality, conflicts and compromises, as they shape the waterscape and agricultural productivities. While AKRSP(India) facilitated the male and female group-well users to manage water to enhance agricultural productivity, older patron-client relationships between the dominant and subordinate still exist as the latter still depended heavily on the former for employment as labourers or as sharecroppers on the more productive irrigated land. This paper attempts to chart this ground, narrating new forms of engagement that blur the boundaries between gender, water and agricultural productivity.

CASE STUDY

This study draws cases from three Mahila Vikash Mandals located in Badtal, Sathvav and Bhatkahi villages under Mahila Jagruti Manch, Mandavi, AKRSP(India) managing low-cost irrigation (group-well) schemes. Table 2 gives an overview of the women's participation in the water harvesting projects in Mandvi Cluster.

Table 2 Overview of the women's participation in the Water Harvesting Projects in Mandvi Cluster

Type of Project	Total No of Project	Managing by Women (MVM)	Major performances
Lift Irrigation	1		Women join as a nominal member. Gradually they had been taking various responsibilities like implementation part as an EV and Cost Committee member
Pump Irrigation	11	1	
Group Well scheme	41	13	The MVM has been actively participating in all phases of project activities, especially for planning, implementation and asset management.
Check Dam	5	1	Asset managed by women members
	3		Women involved in directly in all phases of project
Group Well work ongoing		2	In thess two projects, the good women involvement model is set up by MVM
Canal Irrigation	3		Presently the 50% membership of women in Kevdi Project. Similarly three women are chosen in committee of CIs Issar

Source: Mandvi office, Netrang 2007.

The case study explores how gender-equitable low-cost irrigation processes not only shape the distribution of production factors and production relations per se male's control over cheap female family labour but also reshape women's and men's motivation to invest their efforts. As shown in Table 3, 10 GWs out of 53 group-wells in the Mandvi cluster (see Table 1 annexure 1) are managed by the 83 female members till 2007.

Table 3 Group Well Irrigation Water User in the Mandvi Cluster

Name of the village	No. of GW	No. of women members	Net area under cultivation (in acre)	Year of start
Badtal	1	7	20	2003-04
Sathvav	1	8	15	2005-06
Bhatkhai	2	13	16	2005-06
		6	12	2006-07
Devgiri	2	12	14	2002-03
		7	16	2003-04
Bedada	2	6	20	2002-03
		8	18	2003-04
Ghantili	1	6	14	2006-07
Total	9	80		2003-2007

Source: Mandvi Cluster office Netrang 2007.

This study argues that mainstream gender concerns in low-cost irrigation project such as agricultural productivity, sustainable operation, and maintenance of infrastructure and effective women's participation are prerequisite for a gender-balanced mode of agricultural production. This study emphasizes that a pattern of gender balance agricultural growth can not afford to ignore such an egalitarian mode of production practice within which tribal women in Gujarat are farmers in their own right and exercising their full human potential to contribute to their household food security and negotiating their identity (ies). Agricultural policy-makers and intervention agencies including irrigation agencies and practitioners that seek to promote agricultural growth would foster women's access to and control over such factors both in the household and institutions.

BADTAL

My conversation with Kamuben, one of the para-workers and a well-known leader of Jagruti Mahila Manch, Mandvi took place on a February afternoon in 2007. Kamuben aged about 55 years dropped out of the 9th level of schooling. Well-known for her activism she works as a member of the Arogya Samiti (health committee), as a member of the Social Security Committee she deals with the widow issues. She has coordinated several padyatra (foot march) and mass movement[1] for awareness on "sustainable agriculture" and gender sensitization for the Mandavi Women's Federation. She lives with daughter and son in Godan fadia (hamlet) of Badtal village. Kamuben represents the post-structural socio-economic reform generation of women for whom commercial farming and social activism offer realistic opportunity as a form of occupation and affirmation. Kamuben told me her story how widowhood changed the mode of her feminine roles and agriculture has become an important part of her way of life and not simply an occupation. Kamuben recalled how difficult and embarrassing it was to live in in-laws home:

When my husband died, my brother in-law took advantages of controlling joint family land and assets, without considering my children's future. I had returned from Rajasthan boarder where my husband was working as a teacher to in-law's home at Maritha located 5 kilometres away from my parents' home at Badtal. That time my elder son was five years old, daughter was 3 years and youngest son was only one year old. From early morning to bed I did house chores for in-laws and children without hesitation, but still I was living a life of great fear. My brother-in-law frequently used to bite me in the back and dragged my hair, all to show their aggression and control by using vulgar language. Typically, therefore, when tribal girls marry, they not only belong to the in-law's place but are also married to all extended family members. My father who was staying with me sometime has witnessed such brutal living conditions.

Kamuben's in-laws hold a patriarchal kinship structure. She left in-law's house within a year while vulnerable situation of her obstructed her equal access to the land productive. She stayed with her parents to provide a space for her children to grow up well. Not until her son grew up did Kamuben fail to acquire her share of her land from in-laws home.

Badtal is a small village of just over sixteen hundred inhabitants, divided among three phadias (hamlet) with 365 households. Kamuben lives in Godan phadia (hamlet) consisting of around 450 inhabitants divided among 115 households. The area receives a 646 mm of rainfall, 72 percent of which falls during the three monsoon months. Drawing from information gathered in the group discussion in 2006-07 I found that land is extremely limited with an average of 1.2 hectors per household. The village is substantially agricultural, although the diamond polishing industry in nearby Surat town, textile industry in Surat and Ankaleswar also attract a good proportion of the village men, while women work increasingly outside the village as agricultural labour for wealthy families. Patels, who are the dominant community have left the land for more productive engagement[2].

I will be showing how Kamuben resisted constructions of an incapable self when she acquired a piece of land and left her in-law's place in order to combat drudgery. She used to help her father with some money required to pay bank interest or tax for their land from the pension money Rs. 250/ she draws for her ex-husband. She said that altogether those worked in her favour. After ten years of her stay in parent's home, realizing her struggle, her father then extended four acres of rain-fed land as a contingency. Her situation brought her father to think about other two married daughters' future as well. Father then divided their parental property equally among other two brothers and two sisters. Kamuben said that this is not normal, if father have more land and brother did agree may provide a portion to their married daughter. Only when her son grew up did she petition for land from her in-law through Grampachayat meeting. In the first meeting her brother in-law agreed to provide two acres of land but that was rain-fed. Kamuben's youngest son bore the

[1] A five-day long mass awareness campaign on "Sustainable Agriculture" was held at Mandvi Cluster of Surat District. The message of Sustainable Agriculture has been delivered through different communication materials viz. Padayatra, Skit and Audio-Visual to around 5,500 farmers of 13 PIM villages. This awareness campaign was culminated in a form of large gathering at Isar village in a ceremony participated by 3,000 farmers, of which, 75 per cent were women. In another five days Padyatra, approximately 200 to 300 people joined daily while travelling from one village to other. The contribution of Padayatra team towards the success of the event was remarkable, especially the women in the sense, since they had to set aside their household responsibilities for greater social and environmental cause. Around 20 per cent of the total cost of the awareness campaign was borne by different Canal Irrigation Societies and member institutions of Mahila Manch. Renowned development activists and academicians associated with the promotion of "Low External Input Sustainable Agriculture" and "Organic Farming" have addressed the issues.

expenses of death ritual of her father in-law. In the Panch, third time when Kamuben demanded for a piece of irrigated land, her brother in-law did exchange an acre of land located near Nala (small tributary). Her second son is cultivating that land since five years. Since landownership was the primary source of collateral for credit, well-ownership closely followed contours of control over land. Only relatively wealthy people were able to mobilize capital to drill tube well.

The story abounds effort to obtain access to ground water by the partners of Kamuben's groups. Kamuben recalled how these households did not have access to agricultural input, technology, loan or marketing arrangements and even their participation was ineffective in the Gramsabha. In Badtala, often dalit and poor tribals were deprived to have a well of their own and unable to mobilize their effort to make a well on their own. Kamuben said that Jyamatiben from AKRSP(India) inspired us to attend the meeting held in Jagruti Mahila Manch in 2000. 15 women from our village attended that meeting. Back home we formed 3 female SHGs with 35 members. We worked on watershed project and set up bio-gas plants in the village. They found that with the help of AKRSP(India) and Tribal Sub Plan (TSP) scheme group of dalit male smallholders have constructed GW around Mandvi. In the year 2002, seven members with 11 acres of land came together and approached AKRSP (India) through Jagruti Mahila Manch (JMM women's federation), Mandvi (see Figure 3 as below) to construct a GW. The idea of female GW was organized around contignity of land holding of different SHG members and kinship rather than around peer group members of one SHG.

Mahila Jagruti Sangathan (Federation) Mandvi

Federations are supra village institutions (see APR 2006) which increase the functioning space available to its members in terms of access and leverage cohesiveness and share their experiences related to social life, capacity building, livelihood enhancement etc. The Women's Federation (WF) is initially promoted as a structure to create bondage among the women Self Help Group members and male members of various village institutions. WF functions as an apex institution for Mahila Vikas Mandals (MVMs) which are run by the women members at the village level and also reach out to form new MVMs. However, gradually WF is institutionalising with the objective of increasing the awareness among women regarding their rights, along with promoting greater participation and for being an agent of change in economic, social and political processes.

JMM was formed in the year 2000 in Mandvi block of Narmada district and was registered in 2005. The structure of the federation shown in Figure 1 reflects that WF has adopted a comprehensive approach which would be instrumental for dealing with the livelihood finance. Federation is composed of 15 members committee with 1500 women members divided among 35 villages. The President and the Vice-President along with the management committee retains all sanctioning powers. The Secretary is responsible for accounts (auditing) and record keeping. Its members work on honorarium and are selected during the annual general meeting. Presently Jagruti Mahila Manch has three issues-based sub-committees such as health committee, social security committee and liaisioning committee and two service provided group which provide NRM-based services and Economic base services. In the NRM-based services, women members from various Mahila Vikas Mandal have actively engaged in the small water irrigation management and are enhancing agricultural productivity, animal husbandry and to help in experiment and scaling up of those activities. The Kamuben said that with regular visit to JMM office Mandvi we collected information on group well irrigation and shared our interest to construct a GW of our own. It was decided among the committee members to

construct the well at the most appropriate site. The GW[1] member from JMM reported to me that internal visits were arranged for the new group members and that learning process from the previously managed GW scheme reshaped the new ideas for future management. Kamuben's group organized 8 to 10 meetings and finalized their priorities, formed User Groups and delegated responsibilities prior to the GW scheme implementation and decided the way they would contribute their labour. The site (36 sq feet) identified for the purpose was to become a group property and no rent whatsoever would be charged by the owner. The tasks like the selection of Extension Volunteer, construction committee, arrangement of material, labour, transportation etc. were decided.

Kamuben recalled how for the whole day Bhatifadia women and their family members grappled with the appropriate site for the source of abundant ground water moving around the drilling machine. The bore machine checked six sites, but failed. In one site actually there was no hard rock but the men group took a wrong decision. At last when water burst out from beneath the dry field, almost 50 persons (women, men and children) present there were dancing with happiness and cheered up. Kamuben said that:

"Since generations we know the sky showers water, but underneath our land we have another source, which is going to back our equal standing with the big farmers and cultivate our land during summer season. Such a dream inspired the group to plan and manage our digging and cleaning work in such a manner, we would be very quickly internalizing this source for crop production. Meanwhile three female members split out and joined the male group in thought of relaxation from the hard rock head load. However, unfortunately the group-well dug by male SHG found long depth rock than ours".

Morom rock blocked their path to dig depth after 17 feet and two blasts were used to dig another five feet. The final outcome was a well with 23 feet depth having 6 kundis (small square tanks made for networking the pipe line where pumped water can be stored and canalised to the field). The demonstrated success helped the group to convert their 11 acres of rain-fed land into year-round irrigated land since two years.

This input has brought change in women's cultivation pattern. Now they grow onion, mugfadi (Groundnut), Ganhu (Wheat) and Sherdi (Sugarcane). Besides the cultivation of rice, Tuar (lentil) and Makai (Maize) in the kharif (rainy season), Kamuben has been able to take Sugarcane in three acres of land and wheat (two quintal) and Tuar (two quintal) in one acre by irrigating land in summer. She shared that the grosses cropped areas has doubled and the productivity has increased three-fold. One group member has cultivated one acre of sugarcane and others cultivated Mungphadi (ground-nut) in other seven acres of land. Each acre of Groundnut provided them with Rs. 8000/- net profit. Sugarcane gives twice the production in two year. Second year investment per acre is one fourth of the first year. Kamuben is able to produce 75 tons (six trucks) of sugar cane, but the first year profit for Kamuben is only Rs. 15,000, while in the second year, she

[1] Of the 115 hhs, 15 households are landless out of which 5 SHG members[2] have got one buffalo each on loan from AKRSP (India). 15 have got Biogas and 25 have been producing Vermin compost for their agricultural field and few also sell it. Chaudhry is the dominant caste, but people take different dharma. One primary school is available at the village, but to continue high school and college children have to travel Ghantuli Ashram or Sarkoi or Mandvi which are five kilometres by auto rickshaw (which is not affordable) or by bicycle. Such a situation compels most of the girl dropped out from higher education. There are 12 hand pumps and four wells available for drinking water which is also use for bathing and animal drinking in Badtal. Kamuben also rears few countryside chickens from which she earns Rs 1400.00 per year. She has 2 vermin compost beds (Size 3 feet by 10 feet). Before she used to sell it to the big farmers, now she used all the vermin in her agricultural field. She has a bio-gas plant attached with the toilet. Yearly she gets one quintal of manure by product, which fetches her Rs 3-4 a Kg.

would get a net profit Rs. 62,000. She found sugarcane is a profitable crop to continue for the next sowing.

Kamuben like most of the poor tribe relied on the monsoon for cultivating mainly subsistence crops. Because of this uncertainty, they did not try to grow any cash crop. They shared that their experience of growing a cash crop was first of its kind, so crops were inferior to the large landholder. Moreover, since this was the first time they were experimenting with a cash crop, it took women to adapt to the system. They are expecting that given the management skill, a third crop can be produced. Group well water brought food security for these families though they found the availability of water in summer is still insufficient. Actually, Kamuben bore a loss of another 15 tons of sugarcane when the member on whose land the well was dug did not allow irrigation at a crucial moment. Not only that, three other families cultivating groundnut are sharing the scarce water. Negotiation for the use of scarce water in turn rule has been violated by the groups. "Well-boring is expensive for us" said Kamuben. Groups have discussed such issues at the Federation office and AKRSP(India) staff has provided support for blasting morom for another seven feet depth. They would start digging, cleaning and mason activities by this end of May 2007.

The group's struggle to maintain access to ground water throughout the year made me to trace the average depth of the wells around. Kamuben's group gave me a rough estimation of tube-well around their

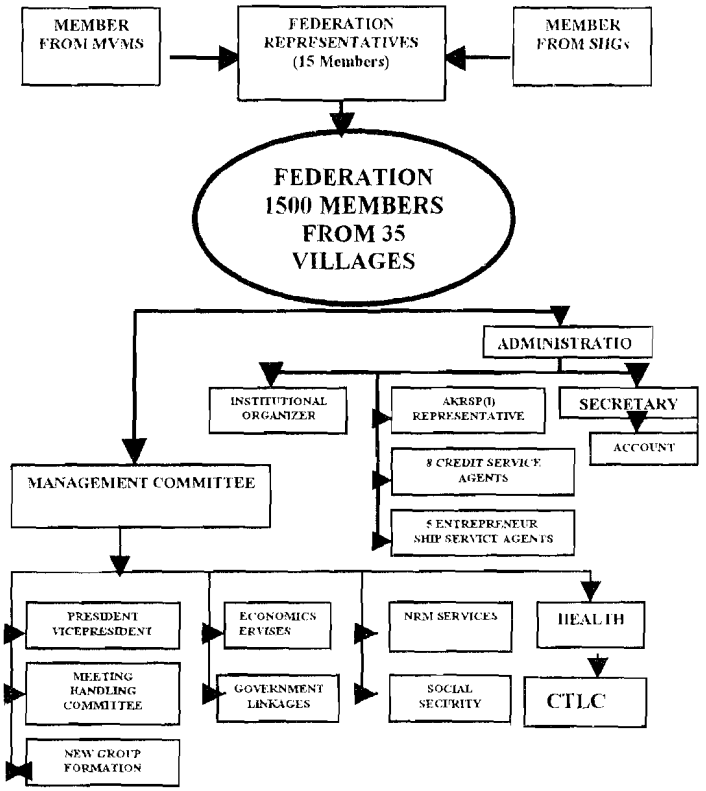

Figure 1 : Structure and Management System of the Mahila Jagruti Sangathan (women's Federation Mandavi

Source : Developed by the author with due consultation with the MANDVI staff 2007.

well used for irrigation. There are 10 bore wells (five run with diesel machine and five with electric motor) and five open wells (run with either electric or diesel) on the Godan fadia side of the road and five bore well and three open wells on the right side of the main road. Altogether they provide water for approximately 30 hectors of land around. Unsurprisingly, while other machines are either five or ten HP, efficient to pump water to distant land, Kamuben's group has a 5HP machine. The highest depth of well is forty ft but the average depth varies from 25 ft to 32 ft each, and all are found deeper than Kamuben's GW.

Kamuben argues that wells hardly dried up, this had not been such a problem in the past, even in years of severe drought. Only with the advent of new pumping technology, has it become possible to bore deep wells and extract water in such quantities so as to cause a seasonal drying up of wells with less depth. At the same time, an insatiable demand for water has been created by Green Revolution agrarian movement of cultivating high-yielding hybrid crop varieties. These are cultivated by the medium land holders in her community which need sufficient watering. Those who have access to land have access to credit and construct deep tube-wells with submersible pumps to use and sell water to their neighbours. This has led to an over exploitation of ground water resource, and it is likely to lead in time to deepen Kamuben's group to dig deeper and deeper. The phenomenon appears no "tragedy" for those who have the resources to drill deep rather put in advantage position to benefit from the wider scarcity.

Kamuben has decided to divide her land equally between her son and daughter. When I asked if such a land distribution is a normative practice in the tribal family Kamuben said to me that you know, a widow excluded from cultivated land of in-law and living with children to grow up can only explain to you how crucial agricultural productivity and hence control over a piece of land can be for her daughter[2].

Although there are no deeply entrenched taboos and restrictions ascribed on Vasava tribal widows, being debarred from a normal life, they generally find themselves isolated and at the receiving end. Research in male farming system in India and elsewhere indicates, women wanting to farm by themselves, are in a minority[3] –as the definition of a 'male farming' system and often 'taboos' (Agarwal 1994 a, b) implies – facing deep-rooted sexist cultural and developmental norms. Given the command over land Kamuben's performances ensure her better livelihood, food and social security. She said, 'I hardly listen to the patriarchal division of ownership over land practices or thought of living with the mercy of them. I and my daughter do most of the strenuous labour in our field then tell me why men only legitimize their rights to land holding. Yet, my daughter and son-in-law have performed a more responsive role in farm activity; my son takes care of milching cows and buffalos and is a member of community dairy board'.

In the process of Kamuben's engagement with the Women's Federation in AKRSP(India), and within her lifestyle she has certainly found as the self lived and enlightened rather than other widow women in her community and around. She found herself as a down-to-earth farmer and social activist. Kamuben's conviction for equal distribution of land among daughter and son is also supported by the fact that women took over the traditional male role of farm manager bringing an egalitarian distribution of resources. A higher

[1]A study done by Agarwal et al. in 1998 on the Group well in Moskut and Sanjavan suggests that GW members were taken in 1995 to observe how Gawali village people manage one old well to supply water to households through pipes, both for drinking water and also for irrigation on the homestead land. Another study done by Koppen et al. 2001 documented that the option to deepen the well and use it for irrigation purposes by installing a mechanized pump was discussed independently in the male GVM and in the MVM in Sagbara. With some hesitant it was decided to give the charge to women to manage the irrigation scheme. Then Jambar group women offered a visit to Hazaribag in Bihar to experience how women group successfully manage a mechanized pump scheme with the support of the NGO PRADAN.

chance of survival of agricultural productivity is more frequently tied to women farm heads who need to be recognised by the registration of land rights and formal lists of farmers. The next story is about the female GW manager of Sathvav village.

SATHVAV

Sathvav village consists of seven phadia (hamlet). Ambaben aged about 28 is one SHG member and GW manager. She belongs to Bhati phadia consisting of 2000 inhabitants divided among 300 households. The main caste of the villages is Harijan and Vasava. With the inception of 3 female SHG in the year 2001 with a total of 36 members the Mahila Vikas Mandal (MVM) in Bhati phalia took over the old Gram Vikash Mandal. Presently, MVM has its own savings of Rs. 10,000/-. Of the three SHGs, Gayatri Juth had savings of Rs 30,000, out of which they leased four acres of land for Rs. 25,000 for five years. It has facilitated to get a credit of Rs. 25,000 from Baroda Bank. Gayatri Juth women members' performances, roles and responsibility have qualified for an investment for GW. SHG members borrow money from their own revolving fund and bank credit for a direct investment in the agricultural productivity. They would pay back the money within six months. Such loan practices save them to pay the interest rate to the bank and not to borrow money from the local money lender with high interest rate.

Ambaben, the GW leader, said that apart from their labour contribution, members for the GW were paid Rs. 500/- as cash contribution towards the construction of the group well. Two members from each household came to contribute their labour till the well work done. For another 17 ft depth they used 8 time blast, which cost Rs. 17,500. Ten truck loads of stones were cleared out from the well, which were sold to the Vanias for Rs.600 each. Five Kundies were set up with 800ft length pipe networking. Ambaben said that women engaged in digging had to come after completing their household chores, such as cooking, cleaning, childcare, serving the old and animals and so on, while this was not the case for men. Ambaben said that our finger paralysed and shoulders ached, and then once we returned home we had to clean all dirty clothes. This group planned a step ahead. The have started a collective farming and cultivated ladyfinger and grass in the 4 acres of land they leased in last year. The water from this well was also provided free of charge for the GW members for cleaning and cattle drinking.

These group members started using water since November 2006. The 8 beneficiaries have 8 acres of land around this well. They pay Rs. 5 per hour, while for other users they charge Rs. 25 and therefore, they have saved Rs. 1500. Previously, members used to purchase green grass in groups and distribute it among the members. This used to save them the transportation cost and the material obtained would be relatively cheaper. Now, four members used irrigation water to cultivate grass sufficient for milching cows and buffalos and to continue the supply of four litres of milk to the milk society in this 42 degree centigrade summer heat. Now, they have started purchasing cattle feed and other items in a group. The productivity increased two-fold from jowar and mung and from mungfadi. GW members hope that their first experiment with the field as a whole taught them to cultivate better next year. In their families, seasonal migration has been reduced.

Members informed me that 10 percent of the households in this fadia consume liquor regularly. All the members discussed this vexing problem on how to stop the every day torture against women and their ignorance towards children. They decided that initially they might not stop liquor making and selling in the entire village, but they would intervene such violence against women in these households. They also put this issue in the Gramsabha and with little hesitance Sarpanch came forward and now women atrocities have

reduced. The members also work as watchdogs for the cleanliness of the village road and sewerage, and have made the tube well function.

BHATKHAI

Bhatkhai consists of 105 households. In the year 2000, there were 3 SHGs but by 2003, four new SHGs were formed with total members of 71. Miraben, the leader of the GW members said that they started with a savings of Rs. 30 but now, each member saves Rs. 50 per month. Jayamatiben said, three SHGs have been linked to the bank credit programme, four into Vadi project (horticulture), and 46 members received the bio-gas benefits till 2006. Of the 13 members from Vandana SHG, six members with 8 acres of land constructed the GW sponsored by TSP and AKRSP(India). They have dug the well and drained 1,560 feet to set up the pipeline to channel water to five Kundis (distributaries point). Two persons from each household worked for two months to complete this GW work. They have started using water since December 2006. Of the Rs. 3,655 savings obtained from selling irrigation water, Champaben has alone bought water for Rs. 1,255 for this rabi (summer crop) season for 3 acres of land. The price and terms across the groups are couched by labour contribution terms.

The sugar factory from Surat would pay Rs. 1,200 per ton for 150 tons of Sugarcane Champaben produced this year. Now, Champaben takes decision on crop farming and investment in her home. Besides, group members have been cultivating vegetables and maize and planted good variety of mangos. The cultivated land nearby now has become a place for bathing, cleaning, cow and buffalo keeping. Group members who have less than one acre of land experimented with vegetable farming and found that though it is time consuming it brings higher return than any other crops. Bhanuben, another group member shared how in the forest conservation committee all 105 members are male though there are 13 women headed households. She gave a description of how the pattern of spending her loan money from the revolving fund has changed. For example, before she had borrowed Rs. 500, Rs. 2,000 to pay school fees, Rs. 3,000 for daughter's illness, and now she has borrowed Rs. 5,000 for buying a Motorbike for her husband and Rs. 3,000 for cultivating vegetable.

Out of the savings from water-selling, Miraben said that they have thought of buying a Gharghanti (machine for grinding wheat floor and Jawar) for the village people. They would charge Rs. 3 per one KG for member and Rs. 4 to the villagers. Miraben said that "you know this would be in high demand as villagers would not have to walk long distance in the hot summer and muddy rainy season".

Wider Social Impact of Group Well

I conclude with some observations drawn from the above group and individual conversation and

[2] Legally though daughter has equal claim over land and even daughter plays a key witness role on family land and property distribution among the brothers still as a daughter or daughter in-law her say on her need is little considered. Lack of in-depth research on the kinship-support system, social and security such as life insurance, benefits or pension and on the changing status of widows for example Kamuben's life story are need rigorous analysis.

[3]Like widows, single, divorced and whose husband engaged in factory work or non-farm activities, or women who have inherited land rights in their own name face many problems. As in a highly skewed gendered organization of farming, agricultural growth requires not only more gendered-balanced agricultural external support but also, and certainly more difficult, profound challenging of the economic, political and cultural gender discrimination intrinsic to male monopolization of production factors, including women's labour.

with other seven GW members in the field. Kamuben, Ambaben and Miraben have shown how the designing and implementing of a gender participatory intervention in small irrigation approach helps us understand the current systems of agricultural growth. They found that mainstream gender concern in the factor of production (land, labour, capital, water, technology, inputs, credit and markets) has enhanced their agricultural productivity, sustainable operation, and maintenance of infrastructure and effective women's participation.

The development of rural India will have to go beyond patriarchal mode of farming and agricultural activities. Women's contribution to manage farm, small irrigation schemes, water harvesting technology and a strong focus on their decision making in agri-based livelihood and agricultural productivity must get equal focus. As I have shown, SHGs are the most eloquent examples of the new "agricultural economy" emerging in India today. We have seen GW users represent a model of participatory development with a high level of social mobilization, capacity building of the women to manage small irrigation schemes. This enabled increase in agricultural productivity and helped Village Institutions stay stable in all its dimensions. The unique thing about the GW users is that they are members belonging to the different SHGs of one Mahila Vikas Mandal further collectivising their capability to manage various farm and non-farm livelihood. They are proving themselves to be effective instruments of income generation (micro-credit users), agri-production and empowerment of women.

The emerging field of agricultural production in the semi-arid region of tribal belt is being continuously expanded by integration of women into new mode of agricultural practices.

Impact on Agricultural Productivity

We should bear in mind that rural women who generally bear the primary responsibility for the food security and nutrition of their children are the poorest and the most vulnerable. Whilst pre-capitalist production relations were unfavourable to the marginalized farmers, it was the awakening of social relations that favoured economic growth, which enabled women cultivators to enhance productivity. Agricultural productivity of the marginal women farmers in Mandvi only occurred following concentrated AKRSP(India) efforts to facilitate TSP and Mahila Manch to diminish moneylender power, and provide alternative source of irrigation and extension services. In all the cases, a lack of land ownership and knowledge of technical know-how may have been a primary explanation for the late adoption of GW irrigation by women. Case studies suggest that investment in general increased only after women gained access to revolving fund. Small farmers who fell below a minimum landholding threshold for collateral for a bank loan had to make do with smaller amount of credit available from revolving fund. However, this opportunity was by no means equally available to the poor non-members.

The Badtal, Bhatkhai and Sathvav experiences suggest that while access to ground water substantially transforms economic relations and spurs growth, the organizational and management capability of women can guarantee profit-making opportunities. The group members share with me that such small irrigation schemes are able to engage them in the small agricultural field throughout the year, and hence migration has stopped in small families. However, in a large family, if adult members are more than that of the labour required for the land, or to supplement the investment in the agricultural field they migrate for better livelihood options. Traditionally, women wanting to farm by themselves are those who are widowed, single, divorced or destitute, but that is a minority. However that trend has changed.

On participation and decision-making

While participation of women tenants in the community canal irrigation management association was found to be low, in case of women GW they have been directly involved in implementation and supervision of construction and set their own priorities for emergency supply and maintenance. Another spontaneous trend observed in three Group well irrigation schemes in Mandvi was that women farmers increasingly engage in collective action and decision-making. They participate in irrigation water distribution, machine maintenance, accounting and crop production as well as in organizing meetings for practical irrigation affairs, mass awareness, servicing the women cultivators and livestock keepers. The extents of participation of committee members are able to deliver better services and avoid political interventions. Input provision, agricultural training, agri-business, rotation schedule and cropping calendar and organizing meetings on practical irrigation affairs with different stakeholders (irrigation dept. Sarpanch, officials and AKRSPI staffs) are other pre-requisites for profitable farming and are necessary conditions for sustainable productivity and direct engagement. Women leaders and WU committee members are to receive sufficient accountancy, negotiation, leadership and agricultural extension services training in order to catch up with the commencing demand from the new generation of women farmers.

The GW programme commenced with an objective of "improving the agricultural productivity" and hence training programmes and capacity building exercises have been geared towards water distribution and not water management. Group well women perceived that WUA for water management can be strengthened through agricultural training, inputs, and market provision, redesign and rehabilitation of infrastructure. Self-monitoring and evaluation processes and government liaisons are other prerequisites.

Staging women in various sites of interventions/struggle (Mohanty 1991, Acharya and Lund 2002), AKRSP (India) have shown them to chose right possibilities ahead. This study emphasizes that a pattern of gender balance agricultural growth can not afford to ignore such an egalitarian mode of production practice within which tribal women in Gujarat are farmers in their own right and exercising their full human potential to contribute to their household food security and negotiating their identity (ies). GW association has a better impact on the agricultural productivity and gender equity but still is a peripheral body in the gramsabha or grampanchayat. Sustaining the enabling environment, GW has the potential to promote women farmers' association that could function as responsible and self-reliant in the best interest of the tribal women's rising prosperity and gender equity within the community and beyond. Agricultural policy-makers and intervention agencies, including irrigation agencies and practitioners that seek to promote agricultural growth would foster women's access to and control over such factors in both the household and institutions.

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Annexure 1

Table 1. Group-Wells managed by women from 2002-2006 (as shown in bold) sponsored by Tribal Sub Plan Scheme through AKRSP(India) for MANDVI Cluster

2002-2003		2003-2004 (work continued till 2004-2005)		2005-06	
Sr.	Project	Sr.	Project	SrNo.	Project
1	Gw-Vahar-1	1	Junwan Gw	Junwan Gw	1 Badtal Gw - 2
2	Gw-Vahar-2	2	Badtal-1 Gw (B)	Badtal-1 Gw (B)	2 Bhatkhai Gw – 2 (A)
3	MP-Vahar	3	Bedada- 2 GW (B)	Bedada- 2 GW (B)	3 Soli Gw - 1
4	Gw-Kadvidadra-3	4	Devgiri-2 GW (B)	Devgiri-2 GW (B)	4 Sathvav Gw – 1 (A)
5	Gw-Kadvidadra-4	5	Gondaliya Gw	Gondaliya Gw	5 Khareda Gw-1
6	Gw-Khabhabangli	6	Kalijaman-2 Gw	Kalijaman-2 Gw	
7	MP-Khabhabangli	7	Vahar-3 Gw	Vahar-3 Gw	6 Khareda Gw -2
8	Gw-Kalijaman	Total	12	7	Soli Gw - 2
9	Gw-Katkuwa-2				8 Pipalwada Gw-3
10	Gw-Katkuwa-3				9 Gangapur (H)-Gw-3
11	Gw-Piplwada-1			Total	17
12	Gw-Piplwada-2				
13	Gw-Bedada-1 (B)*				
14	Gw-Devgiri -1 (B)				
Total		24		Grand total GW 24+12+17=53	

*B / A are the Grade assigned to the Group based on their overall performances so far.

Measuring Capacity Utilisation: An Evidence from Indian Chemical Industry

Mihir Kumar Pal & Sarbapriya Ray***

Abstract : *The present study attempts to estimate rate of capacity utilization in Indian Chemical Industry at aggregate level and analyses its trend during a period of 25 years. In this paper, optimal output is defined as the minimum point on the firm's short run average total cost curve and the rate of capacity utilization is merely ratio of its actual output to capacity output level. We use a model to determine the optimal capacity output. Our results show that economic measure of capacity utilization is always higher than engineering measure and at times greater than unity and varies widely relative to engineering measure. A declining trend of capacity utilization is noticed after mid-1990's due to slow increase in actual output resulting from stagnated demand and rapid expansion of capacity output as a result of abolition of licensing rule consequent to economic reform.*

I

Introduction :

As a part and parcel of self-appraisal, each and every industry is constantly engaged in search of tools for assessing its own current performance. The performance can be judged suitably by comparing it with the various targets, past achievements and operative capacity. Business decision- making and policy formulation by and large depend on economic indicators. Manufacturing capacity utilization is such a key indicator of economic performance which explains changes in investment, inflation, long run output growth etc. In view of severe scarcity of capital resources in any under developed country like India, capacity utilization is a crucial factor that not only affects growth but also indicates the level of resource utilization in an economy. Higher unutilized capacity implies slower growth rates. Therefore the estimation of capacity output and its utilization will be very useful to evaluate the variations in the performance of an industry over a period of time.

In order to achieve greater openness of Indian economy due to trade liberalization, industrial licensing was abolished in 1991 so that and private sector can build and expand capacity without any regulation. There had been an investment boom in manufacturing sector in the first half of 1990s (Uchikawa 2001). The policy reforms have had objectives to make Indian industry more efficient, technologically up-to-date and exposing firms to a competitive environment where efficient firm thrives with a view to achieving rapid growth.

In this backdrop, this paper attempts to measure capacity utilization (CU) of Indian Chemical Industry econometrically and technically and analyzes its trend over a period of 25 years. This study is

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conducted for the aggregates of an industry where CU has been taken as yard stick in measuring performance assuming that all the firms in an industry behave alike and therefore industry level characteristics could be attributable to all the firms operating in that industry.

The rest of the paper is organized as follows: Section II makes a brief overview of chemical industry and deals with concept of capacity. Section III provides database and methodology. Section IV estimates capacity and its utilization and interprets the results. Section V presents summary and conclusion.

II

Concepts and Measurements

The Indian chemical sector comprising basic chemicals and chemical products, paints and varnishes, dyes and dye stuff, drug and pharmaceuticals etc has made good progress during the last 10 years and turned from a net importer during the 1990s to net exporters. The fiscal concession granted to small- scale sector during the mid-1980s led to the establishment of a large of number units in the small scale industry sector. Currently, Chemical sector is in the midst of a major restructuring and consolidation. The production of major chemicals increased by 6 – 8 % in 2003-04 and 4 - 8 % in 2004 – 05. This sector accounted for about 17.6 % of output of manufacturing sector, 13-14 % of total exports and 8 – 9 % of total imports of the country in 2005 – 06. This well diversified sector covers more than 70, 000 commercial products and is intensive in knowledge capital and power. During 2005 – 06, there is a deceleration in the growth rate of the sector to 8.2% from 14.5 % in 2004 – 05.

Concept of Capacity

Simply, capacity output is defined as the maximum feasible level of output of the firm. Klein defined capacity as the maximum sustainable level of output an industry can attain within a very short time, when not constrained by the demand for product and the industry is operating its existing stock of capital at its customary level of intensity. Although several methods have been used in the literature, our study applies the choice theoretic approach to estimate capacity output. We also estimate capacity output by a traditional engineering method, namely, minimum capital- output method.

We prefer choice theoretic model[1] because it is firmly based in the behavioural concept of economic theory. The choice theoretic approach defines capacity output as the long run desired level of output given capital stock and input prices. The difference between engineering and economic capacity can be termed as intended excess capacity and that between economic capacity and actual output as unintended excess capacity.

III

Database and methodology

This paper covers a period of 25 years from 1979 – 80 to 2003 – 04. The entire period is divided into two phases as pre reform period (1979 – 80 to 1990 – 91) and reform period (1991- 92 to 2003 – 04). Viewing variations in CU as a short-run phenomenon caused by the quasi-fixed nature of capital, an econometrically tractable short-run variable- cost function which assumes capital as a quasi-fixed input has been used to estimate CU.

Econometric Specification :

Considering a single output and three input framework (K,L,E) in estimating CU, we assume that firms produce output within the technological constraint of a well behaved [2] production function.

$Y = f(K, L, E)$ where K,L and E are capital, labour and energy respectively. Since capacity output is a short-run notion, the basic concept behind it is that the firm faces short-run constraints like stock of capital. Firms operate at full capacity where their existing capital stock is at long-run optimal level. Capacity output is that level of output which would make existing short-run capital stock optimal.

Rate of CU is given as

$$CU = Y/Y^* \quad \ldots\ldots (1)$$

Y is actual output and Y^* is capacity output.

In association with variable profit function, there exists a variable cost function which can be expressed as

$$VC = f(P_L, P_E, K, Y) \quad \ldots\ldots (2)$$

Short run total cost function is expressed as

$$STC = f(P_L, P_E, K, Y) + P_K K \quad \ldots\ldots (3)$$

P_K is the rental price of Capital.

Variable cost equation [3] which is variant of general quadratic form for (2) that provide a closed form expression for Y^* is specified as

$$VC = \alpha_0 + K_{-1}\left[\alpha_K + \tfrac{1}{2}\beta_{KK}\frac{K_{-1}}{Y} + \beta_{KL}P_L + \beta_{KE}P_E\right] + P_L(\alpha_L + \tfrac{1}{2}\beta_{LL}P_L + \beta_{LE}P_E + \beta_{LY}Y) + P_E(\alpha_E + \tfrac{1}{2}\beta_{EE}P_E + \beta_{EY}Y) + Y(\alpha Y + \tfrac{1}{2}\beta_{YY}Y) \quad \ldots\ldots (4)$$

K_{-1} is the capital stock at the beginning of the year which implies that a firm makes output decisions constrained by the capital stock at the beginning of the year.

Capacity output (Y^*) for a given level of quasi-fixed factor is defined as that level of output which minimizes STC. So, the optimal capacity output level, for a given level of quasi-fixed factors, is defined as that level of output which mininizes STC. So, at the optimal capacity output level, the envelop theorem implies that the following relation must exist.

$$\frac{\partial STC}{\partial K} = \frac{\partial VC}{\partial K} + P_K = 0 \quad \ldots\ldots (5)$$

[2] Cassel (1937) first suggests that a firm's capacity output is at the minimum of the long run average cost curve. Klein and Friedman suggest capacity output as that output level at which long run and short run average cost curves are tangent. Concept of economic capacity is a short run concept. The fixed nature of some inputs like capital characterizes short run. For any amount of fixed input like capital, the output which can be obtained with the minimum long run cost method is capacity output which will require a higher cost method of production and therefore short run average cost of output is above the long run average cost curve except at the capacity output level. In the short run, higher cost methods are required to obtain additional output since only variable inputs may be increased. Therefore, a firm with fixed capital may choose to operate in the short run at a level of output that differs from the long run desired level and variation in CU is viewed as a short run phenomenon due to quasi-fixity of capital.

In estimating Y*, we differentiate VC equation (4) with respect to K_{-1} and substitute expression in equation (5)

$$Y^* = \frac{-\beta_{KK}.K_{-1}}{(\alpha_K + \beta_{KL}P_L + \beta_{KE}P_E + P_K)} \quad \ldots\ldots\ldots\ldots (6)$$

The estimates of CU can be obtained by combining equation (6) and (1).

This study also estimates utilization rates on the basis of minimum capital output ratio (Sastry 1984). Fixed Capital output ratios are calculated. A bench-mark year is then selected on the basis of the observed lowest capital-output preferably from 1990s because market conditions have changed after economic reforms.

Considering lowest observed capital-output ratio, the estimate of capacity can be obtained by dividing real fixed capital stock by minimum capital-output ratio. The utilization rate is given by actual output as proportion of capacity output. Therefore,

$$CU = \frac{Q}{CQ}$$

CU = Capacity utilization.

Q = Actual Output

CQ = capacity output

$$CQ = \frac{C}{C/Q\ \min} \quad C = GFCS.$$

Description of data and variables :

Difficulty faced by researchers in conducting studies on CU in Indian industries is that available official data on Industrial capacities are quite unsatisfactory. The present study is based on industry-level time series data taken from several issues of Annual Survey of Industries, NAS and Economic Survey , Statistical Abstracts (various issues), RBI bulletin etc covering a period of 25 years commencing from 1979-80 to 2003-04. Selection of time period is largely guided by availability of data [4]

Output and Variable cost :

Details of methods employed for the measurement of variables are given in Appendix. Output is measured as real value added [5] produced by manufactures ($Y = P_L L + P_K.K_{-1} + P_E.E$) suitably deflated by WPI for manufactured product (base 1981 – 82 = 100) to offset the influence of price changes variable cost is sum of the expenditure on variable inputs ($VC = P_L L + P_E.E$).

[2] A production function is considered to be well behaved if it has positive marginal product for each input and it is quasi concave and also satisfies the conditions of monotonicity. Quasi-concavity requires that the broardered Hessian matrix of first and second partial derivatives of the production function be negative semi-definite.

Labour and price of labour :

Total number of persons engaged in chemical sector are used as a measure of labour inputs. Price of labour (P_L) is the total emolument devided by number of labourers which includes both production and non-production workers (Goldar & other 2004) [6]

Energy and Price energy :

Deflated cost of fuel [A1] has been taken as measure of energy inputs. Due to non-availability of data regarding periodic price series of energy in India, some approximation becomes necessary. We have taken weighted aggregative average price index of fuel (considering coal, petroleum and electricity price index, suitably weighted, from statistical abstract) as proxy price of energy. [7]

Capital stock and price of capital :

Deflated gross fixed capital stock at 1981-82 prices is taken as the measure of capital input. The estimates are based on perpetual inventory method. [A2] Rental price of capital is assumed to be the price of capital (P_K) which can be obtained from the ratio of interest paid to capital invested.

IV

Empirical Estimation of capacity and its utilization :

This section presents the results of a multiple regression analysis applied to measure capacity output. The regression equation given above has been estimated by the ordinary least square method (OLS). In tables 1 and 2, we reproduce two alternative measures of capacity utilization – technical measure under minimum capital output method and economic measure for Indian chemical industry at aggregate level during pre-reform and reform period respectively. From the estimate, we get a broad picture regarding variation in CU ratios.

[5] Similar functional form has been previously estimated by Denny et al (1981). The variable cost function is based on the assumption that some input like capital can not be adjusted to their equilibrium level. Therefore, the firm minimizes variable cost given the output and the quasi fixed inputs.

[6] Till 1988-89, the classification of industries followed in ASI was based on the National Industrial classification 1970 (NIC 1970). The switch to the NIC-1987 from 1989-90 and also switch to NIC1998 require some matching. Considering NIC1987 as base and further NIC 1998 as base, chemical industry has been merged as (241 + 242 + 243) and (2411 + 2412 + 2413, 2421+2422+2423+2424+2429,2430) respectively. For price correction of variable, wholesale price indices taken from official publication of CMIE have been used to construct deflators.

Table – 1 : Trend in utilization of capacity of Indian chemical industry at aggregate level.

(Pre-reform period)

Year	Economic capacity (Cr. Rs) output (Y*)	Actual output (Y) (Cr. Rs)	Economic CU = Y/Y*	Growth in capacity (%)	Growth in output (%)	CU under minimum capital-output measure
1979-80	3027	2265	0.7483	-	-	0.5416
1980-81	3178	2668	0.8395	4.98	17.79	0.6006
1981-82	3609	3238	0.8972	13.56	21.36	0.6936
1982-83	3784	3535	0.9341	4.85	9.17	0.7377
1983-84	3863	3972	1.028	2.08	12.36	0.7634
1984-85	4205	4210	1.001	8.85	6.0	0.7793
1985-86	4405	4175	0.9478	4.76	0.83	0.7188
1986-87	4668	5223	1.119	6.30	25.10	0.8527
1987-88	4856	5872	1.209	6.22	12.42	0.9128
1988-89	5162	6094	1.180	8.35	3.78	0.8892
1989-90	5483	6384	1.164	11.33	4.76	0.8375
1990-91	5941	6862	1.155	5.40	7.48	0.8228
Average			1.019	6.97	8.57	

[5] Griliches and Ringstad (1971) have preferred GVA to gross output and reasons for imposing preference have been mentioned in their study.

[6] One serious limitation of this assumption is that this does not not take into account variations in quality and the composition of labour force.

[7] To compute the price of energy inputs, some studies have aggregated quantities of different energy inputs using some conversion factors (say British Thermal units or coal replacement etc.) and then take the ratio of expenditure on energy to the aggregate quantity of energy. This method is criticized because it assumes different types of energy inputs to be perfect substitutes.

Table – 2 : Trend in utilization of capacity of Indian chemical industry at aggregate level.

(Post-reform period)

Year	Economic capacity (Cr. Rs) output (Y*)	Actual output (Y) (Cr. Rs)	Economic Cu = Y/Y*	Growth in capacity (%)	Growth in output (%)	Cu under minimum capital Output measure
1991-92	6614	8533	1.290	11.33	24.35	0.9756
1992-93	6954	9580	1.378	5.14	12.27	0.9987
1993-94	6057	9020	1.489	-12.90	-5.85	0.8713
1994-95	8837	9293	1.052	45.90	3.02	0.8100
1995-96	9464	10980	1.160	7.09	18.15	0.8267
1996-97	11438	12056	1.054	20.86	9.80	0.8710
1997-98	11726	12566	1.072	2.52	4.23	0.8194
1998-99	13240	12846	0.9702	12.91	2.23	0.7368
1999-00	14286	17424	1.219	7.90	35.64	0.9006
2000-01	16492	17371	1.053	15.44	-0.30	0.9060
2001-02	16956	17387	1.025	2.81	-0.09	0.8651
2002-03	17405	11433	0.6568	2.65	-34.24	0.5693
2003-04	17855	16725	0.9367	2.59	46.29	0.8025
Average			1.10	9.56	8.88	

A number of points are worth mentioning.

First, it has been noticed that if capacity output is taken as engineering capacity, the CU ratio which is defined as actual output to capacity output is always less than unity(<1) during both pre-reform and reform period. On the other hand, unlike the traditional CU indices, if capacity output is taken to be the economic capacity derived from optimization process, the CU ratio could exceed one in more general cases indicating that production is to the right of the minimum point of short-run average total cost curve inducing cost-reducing net-investment. Economic measure of CU are always found to be higher than engineering approach of CU since installed capacity in latter method is always greater than capacity output in economic measure. The implication of economic CU exceeding unity is that when there is a sudden increase in demand immediate rise in price may not be feasible and in the short run, it might be necessary to operate at a point beyond the cost minimizing or profit maximizing point. This may so happen when firms attempt to maintain their reputation or market share, bear some of the cost burdens in the short run and oblige their customers through an increased supply of goods at unchanged prices. Our study shows that excepting a few years, almost all the years, both in pre-reform and reform periods, have shown CU exceeding one. This finding induces us to conclude that engineering approach understates the true economic CU and the firms could have reduced their production cost by moving to the minimum point of short run average cost curve.

Second, economic measure of CU shows much more variation than traditional engineering measure. It is apparent from our study that in minimum capital- output measure, it ranges between 0.54

and 0.99, the economic CU index ranges from about 0.65 to 1.489. Standard deviations of economic CU during pre-reform and reform period are 0.196 and 0.219 respectively and standard deviations of the engineering CU during those periods are 0.107 and 0.063 respectively, which signifies greater variation of economic CU than engineering CU in both segments of time period.

Third, Economic CU measure indicates relative peak in 1983-84, 1987-88, 1993-94, 1995-96, 1999-2000 whereas peak years for minimum capital output measure are 1981-82, 1983-84, 1989-90, 1993-94, 1995-96 and 1998-99 having three common peak years along with economic CU.

Fourth, the estimate in tables-1 and 2 shows that industry's average economic CU rose from 1.019 to 1.10 during the reform period and similar trends have been noticed in the average growth rate of capacity and output during those two periods. During pre-reform period, capacity expansion was poor probably due to licensing restriction and demand deficiency but abolition of licence raj during the reform period paved the way for expansion of capacity abruptly.

Now, we analyse how capacity expansion of chemical sector over time is correlated with past CU rates and production level and whether there is any correlation between actual and capacity output over time.

Table – 3 : Correlation Analysis

Correlation between CE and CU_L	Correlation between CE and Q_L	Correlation between Q and CQ
0.60	0.41	0.94

CE = Capacity expansion $CQ_t - CQ_{t-1}$

CU_L = Lagged capacity utilization ratio = CU_{t-1}

Q_L = Lagged production = Q_{t-1}

Q = observed output

CQ = capacity output

No. of observation = 25 years.

Table 3 exhibits that correlation coefficient between actual and capacity output is quite-high (0.94) for Indian Chemical sector implying major part of under-utilization of capacity is intended and high correlation (0.62) between capacity expansion (CE) and past utilization seems to suggest that under-utilization, if any, is mainly of the intended nature, capacity expansions move in line with past utilization rates and it also indicates that abolition of restrictions on licensing due to trade liberalization helps industry to expand capacity dramatically. On the other hand, low correlation between capacity expansion (CE) and lagged output (Q_t) indicates that intended excess capacity is varying from year to year in an unsystematic manner.

V

Summary and findings :

This paper aims at measuring capacity utilization and analyzing its trend of Indian Chemical

industry. The trend in capacity expansion reflects that capacity expanded more rapidly during reform period than during the pre-reform period. Abolition of industrial licensing might have encouraged the entrepreneurs to invest more and expand their plant capacity. Actual output being indicator of public demand was expanding gradually upto first half of 1990s and thereafter demand did not expand as much as increase of capacity. Consequently, utilization rate fell after 1995-96. Moreover, the high correlation observed, in chemical sector, between the actual and capacity output suggests that a substantial part of capacity could have been kept unutilized by the firm to cope up with the unforeseen excessive demand shock. However, correlation between capacity expansion and lagged output does not show any systematic relationship. In conclusion, the application of CU framework econometrically indicates the importance and usefulness of economic CU measure and offers a rich basis for future applied economic research in Indian context.

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APPENDIX

A-1 Energy Inputs : Industry level time series data on cost of fuel of Indian chemical sector have been deflated by suitable deflator (base 1981-82 = 100) to get real energy inputs. An input output table provides the purchase made by manufacturing industry from input output sectors. These transactions are used as the basis to construct weight and then weighted average of price index of different sectors is taken. Taking into consideration 115 sector input – output table (98 – 99) prepared by CSO, the energy deflator is formed as a weighted average of price indices for various input – output sectors which considers the expenses incurred by manufacturing industries on coal, petroleum products and electricity as given in I-O table for 1998 – 99. The WIP indices (based 1981 – 82) of Coal, Petroleum and Electricity have been used for these three categories of energy inputs. The columns in the absorption matrix for 66 sectors belonging to manufacturing (33 – 98) have been added together and the sum sp obtained is the price of energy made by the manufacturing industries from various sectors. The column for the relevant sector in the absorption matrix provides the weights used.

A2 Capital Stock : The procedure for the arriving at capital stock series is depicted as follows :

First, an implict deflator for capital stock is formed on NFCS at current and constant prices given in NAS. The base is shifted to 1981-82 to be consistent with the price of inputs and output.

Second, an estimate of net fixed capital stock (NFCS) for the registered manufacturing sector for 1970-71 (benchmark) is taken from National Accounts Statistics. It is multiplied by a gross-net factor to get an estimate of gross fixed capital stock (GFCS) for the year 1970-71. The rate of gross to net fixed asset available from RBI bulletin was 1.86 in 1970-71 for medium and large public Ltd. companies. Therefore, the NFCS for the registered manufacturing for the benchmark year (1970-71) as reported in NAS is multiplied by 1.86 to get an estimate of GFCS which is deflated by implicit deflator at 1981-82 price to get it in real figure. In order to obtain benchmark estimate of gross real fixed capital stock made for registered manufacturing, it is distributed among various two digit industries (in our study, chemical industry) in proportion of its fixed capital stock reported in ASI, 1970-71)

Third, from ASI data, gross investment in fixed capital in chemical industries is computed for each year by subtracting the book value of fixed in previous year from that in the current year and adding to that figure the reported depreciation fixed asset in current year. (Symbolically, $I_t = (\beta_t - \beta_{t-1} + D_t) / Pt$) and subsequently it is deflated by the implicit deflator to get real gross investment.

Fourth, the post benchmark real gross fixed capital stock is arrived at by the following procedure. Real gross fixed capital stock (t) = real gross fixed capital stock (t – 1) + real gross investment (t) . The annual rate of discarding of capital stock (D_{st}) is assumed to be zero due to difficulty in obtaining data regarding D_{st}.

Millennium Development Goals: Reflections from West Bengal's Achievement

*Dilip Kumar Ghosh**

Abstract : *On the basis of the existing status of different 48 indicators of the Millennium Development Goals, West Bengal is likely to miss the goals. The State may achieve the goal of universalisation of primary education, but where is the guarantee that the gender-equality can be ensured in the matter of enrolment of students. On the basis of the existing trend of coverage of institutional births, it is very difficult to enhance the coverage to a respectable proportion (say, from 50 percent to 70 percent). In recent years, the State Government has initiated a number of measures to link up the panchayats and the functional departments for effective delivery of services.*

Keywords : millennium development goals, universalisation of primary education, gender-equality, enrolment of students, infant mortality rate, institutional births, safe drinking water, delivery of services.

The launching of Millennium Development Goals (MDGs) is a commitment of the international community to have a comprehensive vision of development throughout this planet. The centerpiece of this global agenda is the human development. The goals have been ratified at the United Nations Millennium Summit and accepted as a yardstick for measuring progress of development across the countries in the world. The Human Development Report 2003 expressed the importance of this commitment in the following way :

> "In 2000 the United Nations Millennium Declaration, adopted at the largest ever gathering of heads of state, committed countries – rich and poor – to doing all they can to eradicate poverty, promote human dignity and equality and achieve peace, democracy and environmental sustainability. World leaders promised to work together to meet concrete targets for advancing development and reducing poverty by 2015 or earlier".

All the issues raised in the Millennium Summit are crucial for achieving sustainable human development and call for priority attention of all engaged in policy-making process of the respective countries. Millennium Development Goals are not an all on a sudden designed product of the United Nations. In fact, "they are the product of many national, regional and international consultations that involved millions of people and represented a wide range of interests, including those of governments, civil society organizations and private sector actors" (HDR, 2003). The Millennium Development Goals contain 8 goals, 18 targets and 48 indicators. Before making any discussion on the goals, it will be helpful to have a first hand idea about them. Following eight goals are in Millennium Declaration under the broad heading of Millennium Development Goals (MDGs) :

(i) Eradicate extreme poverty and hunger: The purpose of development is to improve people's

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lives by expanding their choices, freedom and dignity. The target of this goal is (a) to halve, between 1990 and 2015, the proportion of people where income is less than one dollar per day, and (b) to halve, between 1990 and 2015, the proportion of people who suffer from hunger.

(ii) Achieve universal primary education: Lack of education is a disability for any human being. The target is to ensure that by 2015, children everywhere in the world, boys and girls alike, will be able to complete a full course of primary schooling.

(iii) Promote gender equality and empower women: Gender quality is central to all the development processes going on within a country. When women are discriminated against the benefits of development, it is likely that the impact of development will be jeopardized. Target is to empower women in all sectors of development and to unleash synergies in different sectors through achieving gender equality.

(iv) Reduce child mortality: Children are considered as the future citizens of any county. According to HDR 2003, every year more than 10 million children die of preventable diseases – this indicates 30000 deaths per day throughout the world.

(v) Improve maternal health: The target is to reduce the maternal mortality ratio by three quarters by 2015. Maternal mortality is the death of women from causes related to pregnancy and child birth. Promotion of safe motherhood is an essential step towards reduction of maternal mortality ratio.

(vi) Combat HIV/ AIDS, malaria and other diseases: The Human Development Report 2003 sketched the dimension of the problem – "Around the world 42 million people are living with HIV/ AIDS, 39 million of them in developing countries. Tuberculosis remains (along with AIDS) the leading infectious killer of adults, causing up to 2 million deaths a year. Malaria deaths, now 1 million a year, could double in the next 20 years". Keeping in view the intensity of these diseases, the target is to halt the spread of HIV/ AIDS, malaria etc. by the year 2015 and then to reverse the spread of the disease.

(vii) Ensure environmental sustainability: This goal itself makes contribution to the other goals because the health, income and opportunities of the poor people, in particular, are heavily influenced by the nature and its resources. For this reason, the first target under this goal is to integrate principles of sustainable development into country policies and programmes and to reverse the loss of environmental resource. The second target is to halve the proportion of people without access to safe drinking water and improved sanitation.

(viii) Develop a global partnership for development: This requires policy changes in rich countries, without which it is very difficult for the poor countries to achieve the Goals 1 to 7.

From the MDGs it can be ascertained that except the eighth goal, in all other goals, the panchayats in rural areas of our country have specific role to play. With the effect of the Constitution (Seventy third

Amendment) Act, 1992 the panchayats have got the legal sanctity to function as the institutions of local governance and to plan for and implementing programmes for economic development and social justice with respect to 29 subjects enlisted in the Eleventh schedule of the Constitution. Of the subjects listed in the Eleventh Schedule, as many as 11 are directly associated with MDGs. To cite a few, in this schedule there are matters like poverty alleviation programmes, education including primary and secondary schools, health and sanitation, drinking water, women and child development, public distribution system etc. In the present study, only the rural segment of West Bengal is considered as around 72 percent of the state's total population live in this segment. Additionality is that the State Government patronizes pro-poor panchayats and holds the election to these bodies regularly at an interval of five years. The first election to the panchayats at three tiers (district, block and village) was held in the year 1978. The State Government in different departments usually entrusts many activities to the panchayats at appropriate tier. The argument is that being nearer to the people, the panchayats are expected to deliver services in a better way than by the agencies located at far off places like the state head quarter.

With this background the present study has been taken up with some limitations. First is the coverage of the study. Within the limited space of the present paper all indicators of the Millennium Development Goals are not discussed. Second is the disability emanated from the availability of relevant data with disaggregation up to the district level. For example, district level data of infant mortality rate, under - 5 mortality rate, maternal mortality rate etc. are not available. No inter-state comparison is attempted on the plea that the focus of the present study is placed on the districts of West Bengal only. Prime indicators of MDGs, like, universalisation of primary education, safe motherhood, child immunization, provisions of safe drinking water and toilets are considered as matters for discussion. We start with the education for its uncontested superiority in the process of development. Not being educated or remaining illiterate is a disability for any persons irrespective of caste, creed and sex.

Education

In view of the Task Force Report of United Nations Millennium Project (2005), "education is about much more than children sitting in schools, acquiring skills that can be objectively tested". Education, in the present day context, is perhaps the single most important means for the individuals to improve personal endowments. The challenge of achieving universalisation of primary education so that at least the beacon light of literacy can reach everywhere in the country is not an easy proposition. Even in this sphere we are failing to fulfill the target fixed by the Constitution (in Article 45) that "State shall endeavour to provide, within a period of 10 years from the commencement of the Constitution, for free and compulsory education for all children until they complete the age of 14 years". Judging by the literacy rate of Census 2001, at the beginning of the new millennium, our country has around 350 million illiterates in the age group of 7 years and above. This is a fact after 50 years of planned development in our country. There exist regional variations also in this rate. The State like Kerala has total literacy rate of 90.92 percent as against 47.53 percent in Bihar. There prevails gender imbalances again. For example, according to Census 2001, overall male literacy rate is 75.96 percent, while female literacy rate is only 54.28. Thus, female-male ratio becomes 0.714 which is far short of parity or near parity. In Tenth Five Year Plan, targets are set to enroll all children in primary schools or in alternative arrangements by the year 2003 so that they can complete five years of primary schooling by 2007.

Enrolment in schools depicts the current flow of education and its spread. On the basis of the

enrolment figures available from 7th All India Educational Survey (2002), enrolment of boys and girls in primary schools are calculated with reference to age group population of Census 2001. In West Bengal, primary education spans over classes I to V and pertains to the age group 5 to 9 years. Primary education in West Bengal is provided free of cost to all children of this age group. The instruction of language at the primary stage is the mother tongue of a child. No detention policy has been in vogue in the State since 1981, so that the students enrolled in class I can complete the primary education, if otherwise they do not drop-out or go out of the system. Table 1 presents the scenario.

Table 1 Rural Enrolment in Primary Schooling by Age, 2002

District	Boys' enrolment	Girls' enrolment	Gender parity ratio	Rank
Burdwan	87.39	86.50	0.989	13
Birbhum	91.25	89.96	0.985	14
Bankura	86.35	82.02	0.950	16
Midnapur	79.78	81.43	1.021	8
Howrah	80.22	85.91	1.070	1
Hooghly	96.21	96.40	1.002	11
North 24 Parganas	86.33	88.95	1.030	7
South 24 Parganas	88.59	92.28	1.041	3
Nadia	100.40	103.87	1.034	5
Murshidabad	85.29	88.31	1.035	4
Uttar Dinajpur	85.47	82.07	0.960	15
Dakshin Dinajpur	96.37	99.37	1.031	6
Malda	74.67	78.79	1.055	2
Jalpaiguri	99.09	98.62	0.995	12
Darjeeling	103.44	104.20	1.007	10
Cooch Behar	100.59	102.60	1.019	9
Purulia	86.36	78.01	0.903	17
West Bengal	87.91	89.01	1.012	-

Source : (i) *Seventh All India Educational Survey (2002). (ii) Census 2001 (table C10).*

Notes: (i) Enrolment figures are in percentage.

(ii) Boy's enrolment = (Total boys enrolled in classes I – V / Total age group boys in 5 to 9 years) X 100.

(iii) Gender Parity Ratio = Girls enrolment / Boys enrolment.

(iv) Rank implies ranking of districts on the basis of gender parity ratio.

In table 1 for some districts, enrolment percentage exceeds 100. This happens due to the inclusion of over age, under age and repeated students. As age specific enrolment data are not available, the gross enrolment ratio can capture to some extent the accessibility and capacity of the education system to enroll the eligible age group boys and girls. From table 1 it can also be seen that, on an average, the state is near universalisation of primary education. The Economic Review (2006-07) of the Government of West Bengal expresses the intention of the State Government in this respect :

> "Education is one of the major thrust areas of the State Government. In order to universalize elementary education within a specified time frame, the Government has laid special emphasis on strengthening the formal as well as the non-formal education system in the state".

In the area of school education, the State Government has taken several steps to achieve universalisation of elementary education for all eligible learners in the State. Two projects are being implemented by the Department of School Education : one, is District Primary Education Programme (DPEP) and the other, is Sarba Siksha Abhijan (SSA). SSA has three major objectives with wide coverage of both primary and upper primary education in all districts. These objectives are : (i) universal enrolment by 2003, (ii) universal retention at the primary education by 2006 and (iii) universal retention at elementary level by 2010. For supplementing the efforts, the State Government in the Department of Panchayats and Rural Development (DPRD), launched a programme in the name of Sishu Siksha Karmasuchi (SSK) since 19997-98. Under this programme, Sishu Siksha Kendras (child education centers) are set up in a village where there are at least 20 eligible children not having access to any existing primary school or requiring some special dispensation not available in the formal primary schools. The features of Shishu Shiksha Karmasuchi can be described in the words of the Annual Administrative Report 2004-05 of the DPRD :

> "... This alternative system is less costly but qualitatively comparable with the formal education system. Syllabus, curriculum, text books are similar to those of the formal schools. Education is imparted by teachers called Sahayikas, who are generally women with minimum qualification of Madhyamik passed. They are engaged by the Managing Committees from among the locality. The state government provides an honorarium of Rs. 1000 per month to the Sahayikas through the panchayats. The programme is essentially a community managed initiative with strong support of the panchayats".

In *Sishu Siksha Karmasuchi*, community involvement is the key element. The immediate impact can be noticed in huge enrolment of boys and girls in the sishu siksha kendras located within the village. The possibility of gender-disparity is also less in these centres than the formal schools. According to the Annual Administrative Report 2005-06, of the just over 50 percent of all the learners in these centres are girls. Because of the community involvement in these centres, improvement in retention of the students is noticed. For each sishu siksha kendra, there is a nine member managing committee, where seven members must be from the parents of the students enrolled in the particular centre. The design of the programme has been made for generating belongingness of the parents with the centre and its functioning. In formal system, no such involvement can be noticed. Encouraged by the success in Sishu Siksha Karmasuchi, the State Government decided to take up Madhyamik Siksha Karmasuchi under the community management. The problem of accessibility of students to secondary education is the major point of consideration in this new programme. Setting up of madhyamik siksha kendras in close proximity to the villages will create opportunities for the students to continue their studies. The Annual Administrative Report 2003-04 of the DPRD, Govt. of West Bengal mentions that about 12000 secondary schools can hardly do justice to about 20 lakh boys and girls who complete primary education every year in the State. Under MSK, the madhyamik

siksha kendras are set up in the villages with four classes from class V to class VIII. Syllabus, curriculum and textbooks are similar to those of the formal secondary schools. Gender equality in education is an area which requires much more attention than at present. Without achieving gender equality and women's empowerment it will be near impossible to achieve all the Millennium Development Goals. In education, the immediate concerning issue is the strengthening of opportunities for post-primary education for girls. Task Force on Gender Equality of the United Nations Millennium project (2005) argued that 'a mother's education is a strong and consistent determinant of her children's school enrollment and attainment and their health and nutrition outcomes'. If the goal of universalisation of primary education cannot be achieved, then it will have significant consequences for girls' enrolment and completion of higher levels of education which in turn has adverse impact on the ability of women to access resources and opportunities to the same extent as men. Census 2001 provides information on attainment of educational level. In table 2, a distribution of population on the basis of the attainment as made in the Census 2001, is given separately for men and women. The sex ratio of a particular educational level amply captures the gender disparity scenario.

Table 2 Educational Level of Ppopulaiton aged 7 and above in Rural West Bengal

Educational level	Percentage of males	Percentage of females	Sex ratio	Distribution of literates	
				Males	Females
Illiterate	42.20	57.80	1369	-	-
Literate without education level	59.87	40.13	670	1.98	1.93
Below primary	55.34	44.66	807	38.96	45.64
Primary	56.65	43.35	765	25.10	27.87
Middle	61.74	38.26	619	16.87	15.18
Matric/ Secondary	68.66	31.34	456	9.04	5.99
Higher Secondary/ Intermediate etc.	74.38	25.62	344	3.76	1.88
Non technical diploma or certificate not equal to degree	88.39	11.61	131	0.01	0.002
Technical diploma or certificate not equal to degree	91.61	8.39	91	0.15	0.020
Graduate and above	80.13	19.87	248	4.07	1.47

Source: Table C-8 of Census 2001.

Notes: (i) Percentage figures and sex ratio are calculated from the data in C-8.

(ii) Sex ratio means number of females per 1000 males.

(iii) Distribution of literates for males and females are calculated separately on the basis of educational level.

(iv) The formula used is: Proportion of males = [(No. of males in particular educational level) / (Total no. of male literates)] X 100

Similarly proportion of females is calculated.

From table 2, the gender-disparity at higher level education can be noted. In case of males, 40.94 percent of total literates have education attainment below the primary level. The corresponding figure for the females is 47.57 percent. These two figures not only indicates discrimination against women, but they also indicate the general knowledge level of the population. As the education level progresses, women are marginalized and going out of the formal education system. This can be revealed from the sex ratio calculated for each level of education. Until and unless this disparity is reduced substantially, the Goal 3 of MDGs would remain unachieved. The Task Force on Gender Equality expressed their concern in this way : "... post primary education has far stronger positive effects on women's own outcomes than primary education does – their health and well being, position in family and society, economic opportunities and returns, and political participation". Higher education is directly associated with the process of empowerment of women. When women are discriminated highly in the field of education, the processes of empowering them is bound to suffer. The promotion of girls' education beyond the primary level is of utmost necessity for achieving a medicum of gender-equality.

Health

In view of the United Nations Millennium Project, "health, a fundamental human right, is a key input to economic development because it raises the productivity of the workforce and increases the attractiveness of the economy for investors, domestic and foreign" (Sachs, 2005). In reality, there exist pervasive and growing inequalities in health status and in access to the health care system. Within a country, the urban areas enjoy more amenities than the rural areas; again those who are affluent reap more benefits of the health services than comparatively less affluent. Even within the government managed health systems, rural areas have less facilities than the urban areas; and lack basic equipments, essential medicines, trained staff, specialist doctors and so on. In MDGs, there are three specific goals relating to the health sector improvement. Child health and maternal health though present very different challenges, but they are inextricably linked also. For achieving the targets of these two goals (Goal 4 and Goal 5), the Task Force on Child Health and Maternal Health (2005) urges for 'a far stronger health system than currently exists in most poor countries'. According to the Tenth Five Year Plan Document (Vol. II), India has a share of 23 percent of child deaths and 20 percent of maternal deaths in the world. Being a country with 17 percent of the world's population, these are unhealthy indicators. The Tenth Five Year Plan fixes two monitorable targets for causing appreciable reduction in both child mortality and maternal mortality. The targets are : (i) reduction in infant mortality rate to 45 per 1000 live births by 2007 (the last year of 10th Plan) and 28 per 1000 live births by 2012 (the last year of 11th Plan); and (ii) reduction in maternal mortality ratio to 200 per 1 lakh live births by 2007 and 100 per 1 lakh live births by 2012. Let us first see the programmes for child health.

For preventing six killer diseases among children, the Universal Immunization Programme (UIP) was introduced in 1986. In this programme, a system has been developed to give vaccination against tuberculosis (BCG); diphtheria, pertussis(whooping cough) and tetanus (DPT); poliomyelitis (polio) and measles. Later

on, UIP was brought under Reproductive and Child Health (RCH) programme in the year 1997. In spite of all such measures, the target of the National Health Policy 1983 to achieve universal immunisation against these six vaccine preventable diseases by the end of 2000 could not be achieved (Tenth Five Year Plan Vol. II). For having a view of the coverage of child immunization in West Bengal against these six vaccine preventable diseases during Ninth Five Year Plan and beyond, table 3 is constructed.

Table 3 Immunization of Children in West Bengal

Nature of Immunization	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	Growth Index
of coverage									
BCG	102.17	105.11	101.05	112.93	108.04	110.94	104.99	101.54	0.994
DPT	94.17	98.73	94.84	100.58	98.81	97.92	91.77	87.28	0.927
Polio	94.83	100.35	95.51	104.20	99.39	98.58	92.08	88.55	0.934
Measles	80.16	84.85	85.18	94.30	95.62	96.23	75.49	85.58	1.067

Source: Different issues of 'Health on the March', a publication of the State Bureau of Health Intelligence of Government of West Bengal.
Notes: (i) All coverage figures are in percentage.
(ii) Growth Index = (Value in 2004-05) / (Value in 1997-98).
(iii) The table includes both rural and urban areas.

Table 3 shows that except in BCG, West Bengal rarely achieved the target of 100 percent coverage of children under the immunization programme. Moreover, in case of measles, the coverage of immunization is the lowest. The situation is improving, however. A plausible reason for non-coverage may be the lack of awareness among the people in general. The field experiences tell that only during pulse polio immunization, activities are geared up on the announcement of the dates from the Government of India and UNICEF. The West Bengal Human Development Report (2004) suggested that "panchayats and other groups need to be much more actively involved in the mobilisation of people necessary to ensure complete coverage". For causing the desired changes, the State Government with substantial support from UNICEF launched a planned intervention in the health sector in the name of Community Health Care Management Initiative (CHCMI). The Department of Panchayats and Rural Development has been made the nodal department. The purpose of this initiative is 'to usher in a convergence of services at the community level'. In the words of the Annual Administrative Report 2003-04 of the DPRD, "the focus of this novel intervention is the process of promoting community involvement in health care management through awareness generation programme and capacity building exercise, while ensuring delivery of services at the community level." CHCMI has been given effect from January 2004 involving the Health and Family Welfare Department, the Women and Child Development Department, Social

Welfare Department and the panchayati raj institutions.

District or block wise assessment of health sector progress in respect of reduction in child mortality is not possible due to non-availability of district level disaggregated data like infant morality rate or under-five mortality rate. As available from the publication of the Bureau of Health Intelligence, infant morality rate in West Bengal in different years since the beginning of the Ninth Five Year Plan period are given in table 4. Infant Mortality Rate is the probability of dying between birth and exactly one year of age expressed per 1000 live births.

Table 4 Infant Mortality Rate in West Bengal, 1997 to 2005

Year	Rural	Change over the previous year (in%) (Rural)	Urban	Change over the previous year (in%) (Urban)	Disparity ratio
1997	58	-	43	-	1.349
1998	56	-3.45	41	-4.65	1.365
1999	55	-1.78	40	-2.44	1.375
2000	54	-1.82	37	-7.50	1.459
2001	54	0	37	0	1.459
2002	52	-3.70	36	-2.70	1.444
2003	48	-7.69	34	-5.55	1.412
2004	42	-12.50	32	-5.88	1.312
2005	40	-4.76	31	-3.12	1.290

Source : *Health on the March, 2005-06.*

Note: Disparity Ratio = (Rural rate) / (Urban rate).

From table 4 it can be seen that there exists rural-urban disparity in IMR, but the disparity is narrowing. From this table it can also be noticed that the total IMR shows a reasonably good trend of decrease over the years. The observations of the West Bengal Human Development Report (2004) on reduction of IMR are worth quoting here :

> " ... although the total IMR for urban areas is much less than that of the rural areas, the rate of reduction in the urban IMR has not been steady. It has not decreased significantly in the last few years, indicating a possible stagnation in the reduction of IMR in urban areas ... This suggests that the existing health service facilities in the urban areas are possibly getting stretched and that a much greater effort will be needed to bring down IMR further ...".

Better IMR in urban sector is mainly due to better health support and possibly better infant caring practices within this segment of the population. High female illiteracy rate and lack of support services from the existing health sector facilities in the rural areas endanger the lives of the newly born babies and their growth. For achieving an affordable environment, the Government of West Bengal decides to make the gram panchayats (the panchayat tier closest to the people) the main agency for implementing the initiatives in the public health sector.

Next to child mortality, maternal mortality is an important indicator for health sector development. According to the Report of the Task Force on Child Health and Maternal Health (2005), "of all the goals, maternal mortality is the one toward which countries have made the least progress". Maternal mortality is "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes" (World Health Organisation). If the risk of becoming pregnant can be reduced through more schooling years, higher mean age at marriage, avoidance of unwanted fertility etc., it can be possible to reduce the maternal mortality rate. Maternal mortality rate is accepted as an indicator of the measure of safe childbirth. Promotion of maternal and child health has been one of the most important objectives of the family welfare programme in our country. Reproductive and Child Health Programme was initiated from the year 1996 – this programme integrates safe motherhood and child health services. In rural areas, the government delivers reproductive and other health services through its network of primary health centers, sub-centers, and other health facilities. As district disaggregated data on different components of safe motherhood are not available, we use only the safe delivery data available from the Health Intelligence Bureau of the Government of West Bengal. Safe delivery includes all institutional delivery and delivery at home under the supervision of medical professionals, trained nurses and dais. In table 5, safe delivery data for the two years viz. 1998-99 and 2003-04 are presented to have a look at the progress made in this respect. According to NFHS2 survey of 1998-99, in West Bengal 40 percent of births took place in health facilities. This figure rose to 43.1 percent in NFHS3 survey (2005-06).

Table 5 Safe Delivery in West Bengal by District, 1998-99 and 2003-04

District	Safe delivery percentage in 1998-99	Safe delivery percentage in 2003-04	Growth Index of safe delivery
Burdwan	52.0	62.0	1.192
Birbhum	68.5	52.8	0.770
Bankura	66.3	66.4	1.001
Midnapur	54.8	62.5	1.140
Howrah	71.9	65.7	0.914
Hooghly	68.4	80.3	1.174
North 24 Parganas	65.0	55.1	0.847
South 24 Parganas	48.0	39.0	0.812
Nadia	77.5	76.2	0.983
Murshidabad	39.7	39.2	0.987
Uttar Dinajpur	23.6	26.9	1.140
Dakshin Dinajpur	41.6	50.0	1.201
Malda	29.7	31.7	1.067
Jalpaiguri	35.5	44.4	1.250
Darjeeling	60.4	47.5	0.786
Cooch Behar	30.3	40.1	1.323
Purulia	35.3	60.0	1.700
West Bengal	52.8	54.1	1.024

Source: Health on the March, 2005-06.

Note: Growth Index = Value in 2003-04 / Value in 1998-99.

From table 5 it can be seen that at the end of the year 2003-04, in the State there are as many as 7 districts where safe delivery percentage is even below 50 percent. In 1998-99, this figure was 8. The risk of maternal mortality is directly linked with the age at marriage. In West Bengal, the mean age at marriage for girls is 18.6 years (Health on the March, 2005-06). Only 6 districts have reasonably high age at marriage for girls – the districts are Kolkata (21.5 years), Darjeeling (20.9 years), Howrah (19.8 years), North 24 Parganas (19.6 years), Hooghly (19.5 years) and Jalpaiguri (19 years). These figures include both the rural and urban areas. It is natural that in the rural areas the mean age at marriage for girls is much below 18 years. The West Bengal Human Development Report (2004) indicates this fact and its utter consequences in following words :

> "... the average age at marriage still remains low in West Bengal, although it appear, to have increased in recent years. Since teenage marriage and pregnancy tends to be associated with low birth weight and higher infant mortality, and also higher maternal mortality, this is an issue that needs to be addressed especially through consciousness – raising measures".

For the promotion of safe delivery and bringing it within the reach of the poor people, the Government of India launched Janani Suraksha Yojana (JSY) as a centrally sponsored scheme under the National Rural Health Mission. The underlying objectives of this programme are two fold : (i) to reduce overall maternal mortality ratio and infant mortality rate; and (ii) to increase institutional deliveries in below poverty line families. Initially all BPL pregnant women of 19 years and above age group and having two live births are considered as the target group. Later on, in the year 2006, through a modification in the programme guidelines, the Government of India extended the periphery of target groups and brought all scheduled caste and scheduled tribe pregnant women under the fold of this programme irrespective of their financial status. In West Bengal, gram panchayats are directly involved with implementation of the programme.

The State Bureau of Health Intelligence Government of West Bengal made an exercise for ranking all 341 blocks of the State on the basis of estimated birth rate and female literacy rate. This has been done on the basis of data from census 2001. These two indicators are chosen because of their direct association with the maternal health and as reflection of summary measure of public health interventions in the state. The combined ranking has been made – the blocks with low birth rate and high female literacy rate are placed in higher ranks in comparison to the blocks with high birth rate and low female literacy rate. Out of this ranking of the blocks, in table 5 (a) a distribution of blocks with ranks above 200 is made to see how many blocks of this category are there in different districts. This will help to have an idea about the impact of public health delivery system in the districts. The other dimension of this distribution is to identify the districts where interventions of special nature are necessary for improving the existing scenario.

Table 5 (a) Distribution of blocks having rank above 200 on the basis of combined ranking of estimated birth rate and female literacy rate (2001)

District	Total number of blocks	Number of block (s)			Percentage vis-à-vis total blocks	Rank of districts
		201 – 250	251 – 300	301 - 341		
Burdwan	31	1	X	X	3.22	1
Birbhum	19	9	3	2	73.68	10
Bankura	22	7	2	X	40.90	7
Midnapur	54	5	2	X	12.96	2
Howrah	14	X	X	X	0	-
Hooghly	18	X	X	X	0	-
North 24 Parganas	22	4	2	X	27.27	5
South 24 Parganas	29	4	6	1	37.93	6
Nadia	17	3	X	X	17.65	4
Murshidabad	26	5	13	7	96.15	13
Uttar Dinajpur	9	X	X	9	100.00	14
Dakshin Dinajpur	8	3	2	2	87.50	11
Malda	15	X	4	11	100.00	14
Jalpaiguri	13	4	4	X	61.54	9
Darjeeling	12	X	1	1	16.67	3
Cooch Behar	12	X	5	X	41.67	8
Purulia	20	5	6	8	95.00	12

Source: Health on the March, 2004-05 published by the Bureau of Health Intelligence, Government of West Bengal.
Note: For ranking the districts, inverse ranking is followed.

From table 5 (a) it can be realised that at least five districts, viz. Uttar and Dakshin Dinajpur, Malda, Murshidabad and Purulia require special intervention on the part of the State Government for any improvement in the existing situation. The proportions of disadvantaged section of the population, that is scheduled castes, schedule tribes and Muslim, are also quite high in these districts. If female literacy rate in these districts can be improved, it is likely that birth rate will be reduced. Successive pregnancy and pregnancy at low age only enhance the risk of mothers. These interventions should be supported by an enabling policy and political environment for protecting the women's and girls' sexual and reproductive rights. Current threats to those rights require to be controlled with a view to achieving the Goal 3 of Millennium Development Goals. The panchayats can play promotive and preventive role for making the Goal 3

achievable which in turn can help to achieve Goal 4 and Goal 5 of MDGs.

Drinking Water

The WHO-UNICEF Sponsored Assessment Report of Water Supply and Sanitation in India (2002) noted that "between 69 to 74 percent of India's rural population take their drinking water from protected sources, leaving an unserved population of 26 to 31 percent". The Census 2001 made distribution of households on the basis of location of the source of drinking water. According to census definition, the source of drinking water is treated within the premises if the water source used is located within the house or within the premises of the census house where the household lives. Likewise, a source is considered to be located near the premises if a household in the rural areas has to cover a distance of 500 metres or less for fetching water from the source. In case of location of the source considered to be away from the premises, the households have to cover a distance of more than 500 metres for collecting water. According to Census 2001, in West Bengal only 1.33 percent households in the rural areas have tap as a source of drinking water within their premises; as against 33.97 percent in the urban areas.

The Economic Review 2005-06 of the State Government reported that piped water supply coverage in rural areas has increased from 30.30 percent of the rural population on April 1, 2004 to 31.05 percent on April 1, 2005. That is an increase of 0.75 percentage points within one year. Considering the total rural population of 57734690 in the State (Census 2001), the increase in estimated number of population benefited is around 4.33 lakhs. The district disaggregated analysis is now made with the help of data from Census 2001. Table 6 presents the coverage of households with safe sources of drinking water i.e. tap, hand pump and tube well. In case of hand pump, water is taken out manually by operating the hand pump. Tube well means where sub-soil water is taken out through electricity or diesel-pump.

Table 6 Coverage of Rural Households on the basis of safe sources of drinking water, 2001

District	Tap	Hand pump	Tube well	Total coverage	Rank
Burdwan	10.57	69.67	13.05	93.29	9
Birbhum	6.58	71.24	9.67	87.49	10
Bankura	4.08	54.00	12.52	70.60	14
Midnapur	7.64	63.77	13.40	84.81	13
Howrah	12.94	72.30	13.90	99.14	2
Hooghly	7.17	83.85	7.91	98.93	4
North 24 Parganas	7.64	77.27	14.03	98.94	3
South 24 Parganas	6.07	79.28	13.91	99.26	1
Nadia	4.14	87.16	7.54	98.84	5
Murshidabad	3.47	85.02	9.80	98.29	6
Uttar Dinajpur	1.88	88.16	3.55	93.59	8
Dakshin Dinajpur	2.31	88.93	4.61	95.85	7
Malda	4.31	71.41	9.47	85.19	11
Jalpaiguri	17.03	23.61	5.49	46.13	15
Darjeeling	27.30	5.95	4.22	37.47	17
Cooch Behar	3.57	73.64	7.91	85.12	12
Purulia	2.87	21.98	16.05	40.90	16
West Bengal	7.02	69.24	10.73	86.99	-

Source: Tables on Houses, Household Amenities and Assets, Census of India, 2001, West Bengal.

Notes: (i) Coverage figures are in percentage.

(ii) Ranking of districts is made on the basis of total coverage.

From table 6 it can be noticed that the coverage of tap i.e. piped water supply is the least in rural West Bengal. Rural piped water systems are either single village based or multi-village based scheme. In this system, water is pumped from the groundwater source into an overhead holding tank from which a small network of pipes for carrying water to neighbourhood is laid down. In this system, the source points are mostly erected near the premises of the households. From the health aspects, piped water is considered to be more desirable than other sources as it goes through at least secondary and usually tertiary treatment. In rural areas, hand pumps are the most popular source for getting safe drinking water. Water is drawn manually through operation of pump by suction. Generally through hand pumps water can be lifted from depths up to 7 metre. Many households in the rural areas have hand pumps installed within their premises also. Next to hand pump, open wells are the most prominent source of drinking water as they are inexpensive to construct and does not require skill and improved equipments for getting water. These wells are appropriate in the areas where the water table is high and gets recharged regularly. But open wells are susceptible to biological contamination. Hence this source is not recognized as a safe source for drinking water. In West Bengal, open well is a predominant source of drinking water in districts like Bankura, Purulia and Jalpaiguri. As digging of wells requires low expenditure in comparison to installation of hand pumps, people opt for this source. In addition open wells involve very little recurring expenses. Water quality and possibility of contamination

remain a neglected issue, however. In table 7, proportions of households in the rural areas using water from unsafe sources are depicted. As open well is an unsafe source of drinking water it is included in the table alongwith the other sources like tank/ pond/lake, river and canals, springs and any other source. Even in 2001, around 1.60 percent of the rural households consume contaminated water of tanks, ponds, rivers etc.

Table 7 Proportions of rural households using unsafe sources of drinking water, 2001

District	Well	Tank / Pond/ Lake	River, Canal	Springs	Any other source	Households using surface water
Burdwan	6.14	0.12	0.10	0.17	0.18	0.57
Birbhum	11.71	0.09	0.42	0.20	0.09	0.80
Bankura	27.50	0.20	1.10	0.44	0.16	1.90
Midnapur	14.14	0.40	0.24	0.23	0.18	1.05
Howrah	0.48	0.15	0.02	0.16	0.05	0.38
Hooghly	0.61	0.07	0.02	0.19	0.18	0.46
North 24 Parganas	0.08	0.35	0.04	0.20	0.39	0.98
South 24 Parganas	0.03	0.40	0.01	0.20	0.10	0.71
Nadia	0.40	0.04	0.06	0.18	0.47	0.75
Murshidabad	1.18	0.08	0.06	0.17	0.22	0.53
Uttar Dinajpur	6.04	0.03	0.06	0.13	0.15	0.37
Dakshin Dinajpur	3.72	0.08	0.02	0.22	0.11	0.43
Malda	14.28	0.11	0.06	0.17	0.17	0.51
Jalpaiguri	51.89	0.20	0.56	0.49	0.73	1.98
Darjeeling	34.27	0.10	0.92	25.34	1.90	28.26
Cooch Behar	13.52	0.06	0.27	0.08	0.95	1.36
Purulia	52.19	0.90	4.47	1.24	0.30	6.91
West Bengal	11.41	0.22	0.36	0.73	0.29	1.60

Source: Tables on Houses, Household Amenities and Assets, Census of India, 2001, West Bengal.

Notes: (i) Proportion of households using surface water for drinking purposes is calculated by adding the proportions of households using water sources other than wells in table 4.

(ii) All figures are in percentage.

From table 7 it emanates that barring Darjeeling district, in Purulia many people use surface water (obviously unfiltered) for drinking purposes. As a major part of Darjeeling district is in mountainous region, there are many natural springs in these areas. Local people use these as sources of drinking water. In wells and surface water, possibility of contamination is high. When water is contaminated with virus, bacteria, parasites or chemicals, chances of water – borne diseases increase. The common water borne disease are cholera, typhoid fever, bacillary dysentery, amoebiosis, giardiasis etc. In view of India Assessment Study (2002) on water supply and sanitation, "morbidity and mortality due to water-borne diseases have not declined commensurate with increase in availability of potable water supply, largely owing to the fact that quality of water is not maintained at consumer point and that safe water may become contaminated during

storage due to poor handling practices and poor personal hygiene". Expansion of safe sources of drinking water as well as awareness building among the local inhabitants can give positive results. Each and every person has the right to have access to drinking water. This is not like a relief from the state; it is an entitlement. Through its General Comment 15, the Committee on Economic, Social and Cultural Rights of the United Nations Economic and Social Council stated that "the human right to water entitles everyone to sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic uses". Therefore the governments have the responsibilities in delivering clean water to all. Judging on this yardstick, our achievement is still not at par with the target of full coverage and at door-step.

Sanitation

In case of sanitation, the general observation of the National Human Development Report (2001) is that "a majority of India's population does not have access to toilet facilities in their dwellings and lacks sanitation facilities for the disposal of waste water". The concept of sanitation however is wide; it includes not only construction of latrine, but it includes liquid and solid waste disposal, personal and environmental hygiene also. For the present we only concentrate on construction of latrines in rural areas. This limitation is mainly due to non-availability of disaggregated district level data on multifaceted aspects of sanitation. It is also the fact that the panchayats are mainly engaged with the construction of latrines under Total Sanitation Campaign (TSC). In West Bengal, TSC is being implemented in rural areas through concerted efforts of the government officials, panchayats and non-government organizations. Generally, in each block a sanitary mart is organised to produce low cost sanitary latrines and accessories on one hand and to generate awareness within the common people regarding the utility of having a sanitary latrine. Sanitary marts are visualized as social marketing outlets in the villages where on demand people can get a latrine according to their choice and capacity. In table 8, year wise formation of sanitary marts in the blocks is presented to impress upon the expansion of the TSC. So far 332 sanitary marts are formed in 341 blocks of West Bengal.

Table 8 Formation of Sanitary Marts in West Bengal and household coverage

Year	No. of Sanitary Marts formed	Cumulative number of marts	No. of households covered	Percentage change in coverage
1993-94	68	68	19,565	-
1994-95	45	113	36,940	88.80
1995-96	28	141	74,761	102.38
1996-97	23	164	1,17,053	56.57
1997-98	17	181	1,47,072	25.64
1998-99	17	198	1,96,737	33.77
1999-2000	42	240	2,31,678	17.76
2000-01	21	261	2,72,567	17.65
2001-02	27	288	3,53,605	29.73
2002-03	28	316	8,47,094	139.56
2003-04	8	324	10,99,732	29.82
2004-05	8	332	10,45,318	-4.95
	332	-	44,42,122	-

Source : Annual Administrative Report 2004-05 of Department of Panchayats and Rural Development, Government of West Bengal.

From table 8 it can be noticed that, in TSC, sanitary marts are performing a substantial role in extending the coverage of toilets among the rural households. For augmenting the implementation of TSC, the Annual Administrative Report of the DPRD for the year 2005-06 noted that "special drive has been organised for orienting and motivating the panchayat leaders and strengthening the rural sanitary marts in areas where performance was not satisfactory". But the task does not end only in construction of the toilets in the houses. The Annual Administrative Report of the DPRD for the year 2005-06 mentioned that efforts are being initiated to change the attitude of people so that they can effectively use it for their own benefit. To quote :

> "Special drive has been taken in all those areas with 100% access to toilets to change attitude and habits of the people for use of the toilets and ensuring that no body defecates in the open. The Gram Panchayats as the lowest level local government and in some cases even the Gram Sansads have come forward to ensure that and in many places public notices have been issued banning open defecation".

All out efforts are being taken in West Bengal to reach the goal of 100 percent coverage of households in the rural areas. In Census 1991, this coverage was only 12.26 percent and it rose to 26.93 percent in Census 2001. The NFHS3 Survey found that the coverage was 44.8 percent. The Government of West Bengal claims that "the estimated coverage of household toilets in the rural areas of the state at the end of the year 2005-06 is around 66%" (Annual Administrative Report, 2005-06 of DPRD). In Total Sanitation Campaign, special emphasis in West Bengal is on information, education and communication activities through the gram panchayats, panchayat samitis and non-governmental organisations having their local base in the villages.

In view of the State Government, "in fact success of the programme has depended on several factors of which the most crucial has been the interest and quality of leadership of the panchayats in implementing the programme" (ibid). Before making an end to this section, in table 9, the coverage of rural households with toilet facilities in census 1991 and 2001 are given to have a comparative view.

Table 9 Rural Households with Latrine Facilities, 1991 and 2001

District	Coverage in 1991 (%)	Coverage in 2001 (%)	Growth Index of coverage	Rural Literacy Rate (%)
Burdwan	15.32	26.97	1.760	66.69
Birbhum	6.79	11.64	1.714	60.55
Bankura	3.94	8.20	2.081	62.44
Midnapur	4.74	26.19	5.525	74.42
Howrah	13.60	35.84	2.635	73.39
Hooghly	21.34	38.15	1.787	71.52
North 24 Parganas	28.33	53.44	1.886	69.69
South 24 Parganas	13.70	32.33	2.360	68.13
Nadia	22.71	43.85	1.931	62.32
Murshidabad	8.36	17.97	2.149	52.99
Uttar Dinajpur	6.15	12.61	2.050	43.68
Dakshin Dinajpur	6.15	15.10	2.455	61.27
Malda	7.84	16.03	2.044	48.21
Jalpaiguri	15.43	27.50	1.782	59.73
Darjeeling	27.23	46.86	1.721	66.92
Cooch Behar	9.69	23.37	2.412	65.21
Purulia	3.27	4.37	1.336	53.82
West Bengal	12.26	26.93	2.196	64.06

Source: (i) Toilet coverages are calculated from Census 1991 and Census 2001 household tables. (ii) Rural Literacy rate is taken from Census 2001.

Note: Growth Index = Value in 2001 / Value in 1991.

It can be seen from table 9 that the coverage of household varies widely over the state. In census 2001, the coverage varies from as high as 53.44 percent in North 24 Parganas to as low as 4.37 percent in Purulia. With the launching of TSC in the year 1999, the concerted interventions are being made for improving access to toilet facilities. In West Bengal emphasis is being placed on participation of the people in the programme so that they can be guided by the felt need to improve sanitation practices both for prevention of diseases as well as privacy and convenience, particularly for the women members of the families. In general, the districts with better rural literacy rate have higher coverage of households regarding availability of toilets in their own houses. Midnapur district has the highest value of growth index in terms of access to toilet facilities. This became possible for the pilot project in early 1990s by the Government of India and Government

of West Bengal in collaboration with UNICEF and the Ramakrishna Mission Lok Siksha Parishad. The panchayats are also partners in this endeavour. The effort was extremely successful in construction as well as use of the toilets. More or less this model is now being replicated under TSC in other districts of the State. In this pilot project, strategy was to give due emphasis on advocacy and behavioural changes with intensive campaign and on establishment of an efficient and decentralised delivery system.

The reality is that one of the chief constraints to expanding sanitation coverage in the rural areas is the lack of political will. This indicates an absence of political leadership and commitment of the concerned functionaries. Politicians in particular respond to public pressures and demands. In practice there is very little demand from the public for toilets. There is every doubt how far the panchayats at different tiers of governance realise the necessity of having toilets within the premises of the households. The scale of the problem of non-coverage is huge. In the words of Task Force on Water and Sanitation (2005), "coverage rates in the developing world are barely keeping pace with population growth ...". It has also been seen that women tend to place a higher value on sanitary latrines exclusive for their households than do men. As women's voice is feeble both within and outside the periphery of the household, it is natural that their demands remain unmet. Total sanitation Campaign is progressing well in most of the districts; as indicated in the Economic Review of the Government of West Bengal (2006-07), "the success of the programme depends on several factors of which the most crucial has been the quality and interest of the leadership of the panchayats in implementing the programme".

In conclusion it can be said with certain amount of confidence that on the basis of the existing status of different indicators of the Millennium Development Goals, the State is likely to miss the goals. More or less half of the period has elapsed, and the time has come to guard up the loins for registering some achievement in respect of the goals. From the discussions above, the State may achieve the goal of universalisation of primary education, but where is the guarantee that the gender-equality can be ensured in the matter of enrolment of students. The role of the panchayats in appropriate tiers is very much crucial for successful IEC activities. On the basis of the existing trend of coverage of institutional births, it is very difficult to enhance the coverage to a respectable proportion (say, from 50 percent to 70 percent). If the proportion of institutional births can be raised alongwith the adequate coverage of antenatal care, there is every possibility that maternal mortality rate will improve, so also the child-mortality rate. In recent times, the State Government has initiated a number of measures to link up the panchayats and the functional departments for effective delivery of services. For the fulfillment of the goals laid down in the Millennium Declaration, it is of paramount importance that female literacy rate should be near 100. The perspective of the Task Force on Gender Equality clearly indicated that "development policies and actions that fail to take gender inequality into account or that fail to enable women to be actors in those policies and actions will have limited effectiveness and serious costs to societies". This openly calls for change in mindset of not only the policy makers at the State or Central level, but also the opinion leaders at the local level. All that is needed is action.

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Self-Reliance and Self-Governance Exploring through Village Panchayats in West Bengal

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***Abstract** : Village panchayats continue to depend heavily on the devolution of financial resources from the government. As far as the implementation of major rural development programmes are concerned they are still considered implementing agencies of the government having governed by highly centralized rules which generally do not match their own perception of local needs. It is a distant dream for the village panchayats to establish them as institution of self-government. The existing tax structure demands more efficiency in assessment and collection.*

Keywords : devolution, tax structure, assessment and collection, efficiency, non tax revenue, self-government, self-reliance.

Rural governance at local level by the rural people, though very old in concept, has got a new momentum in recent days. As far as our country is concerned, 73rd and 74th amendments of the Constitution have given a new lease of life to these institutions, known as Panchayats. As is viewed in the Constitution they are to function as "institutions of self government". They are to prepare plans and implement schemes for economic development and social justice. This has again raised a debate as to the autonomy of the Panchayats. It is agreed that there shall be minimal supervision of the government as to their functioning. Autonomy implies that different levels of panchayats should not be viewed as hierarchically organised with one unit controlling the other from above. But there is an active requirement of co-operation, co-ordination, complementation and integration. These could be attained by interactive process of consultation (Ranga Rao 2002).

Nirmal Mukarjee, a former member of the Indian Civil Service and a strong advocate of Rural Self Government argued that "self governance at a particular level means such partial autonomy as is appropriate for that level". According to him autonomy is something that is negotiated for governing space at a particular level with the levels above and below. It is further argued that the constitutional recognition of the panchayats indicate the acceptance of the policy of democratic decentralization in India. This means decentralization of political and administrative powers and ultimately leads to devolution of responsibilities and transfer of the functions of the government. (Wadhwani and Misra 1994)

Whether it is autonomy or devolution the basic question is the constitutional empowerment of the Panchayats for planning and implementation of programmes for which they need self reliance at least to a certain extent.

But the fact is that the rural local bodies were seldom very serious in their venture to mobilize the resources locally, be it in the form of Tax or non tax revenues, either statutorily or voluntarily. Since the British period the panchayats were statutorily authorized to mobilize resources locally. Village Panchayats, being the

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oldest rural institutions in India could, from time to time, levy taxes on land and buildings, octroi on animals, vehicle tax, tax on water supply, pilgrim tax, tax on commercial crops etc. on different occasions. As non tax revenues they were also authorised to impose fees and penalties etc. But the varied experience was that the panchayats were not very serious about acquiring even a small quantity of self reliance. At the dawn of our Independence "The Local Finance Enquiry Committee" constituted for the purpose of reporting ways and means to improve the financial resources of the local bodies in 1950 pointed out that the failure of these bodies to produce results was due in the main, to the inadequacy of the finances at their disposal. The Committee observed:

> "We should be failing in our duty if we omitted to draw attention to the other side of the picture, namely, the reluctance of the local bodies generally to make use of their existing financial powers and resources to the fullest extent and to impose taxation even when the need for such a step was clearly admitted. There has been failure to asses taxes with impartiality and to collect them promptly". [Venkatrangaiya and Pattabhiram]

The Committee headed by Balwant Rao Mehta to review the functioning of C.D. Programme and National Extension Service in 1957 was also of similar opinion: "one of the most important reasons for the comparative lack of success of our non urban local self governing bodies is their exceedingly limited and inelastic resources" [Venkatrangaiya and Pattabhiram].

The Committee, besides proposing to strengthen the source of income of Panchayat Samitis at the middle level, also suggested for village panchayats the items like property tax, tax from the hats and markets, tax on carriage carts, bicycles, rickshaw, boats etc. At the same time the Committee laid emphasis on collection of taxes by the Panchayats. The opinion of the Committee in this regard was that "the collection of panchayat taxes is generally not satisfactory. Arrears accumulate until they are merely written off and it is not always that the assessee fails to pay because of his inability to do so". The Committee even suggested towards ceisure of membership of panchayat members on the ground of non-payment of panchayat taxes and debarring a person from exercising his franchise in the next panchayat election if he did not pay the taxes in the penultimate year.

In the early sixties of the last century there was an another study headed by K. Santhanam whose main concern was to review the existing pattern of panchayat finances. Here again the Committee, inter alia, observed:

> "It will detract from the dignity and autonomy of a self governing institution if it is to be entirely dependent on assistance from above. It is essential for stability and growth of these institutions that they should have substantial and growing resources which are entirely within their power to exploit and develop ..... the painful fact that the total income of a vast majority of panchayats is far from adequate to give them a firm foundation". [Kashyap]

These observations were further echoed in the findings of the Committee on Panchayati Raj Institutions headed by Ashok Mehta in the late seventies of the last century. The Committee while reviewing the Financial Resources of the PRIs, unequivocally stated :

> " No democratic institution can continue to maintain its operational vitality by depending upon external resources. The thesis "no taxation, only representation" should be discouraged. For this purpose, all panchayati Raj Institutions should have compulsory powers of taxation. A select list of taxation powers should be given to the Panchyati Raj Institutions and out of them some should be made compulsory. It is not possible to have a standard list for all status. But certain taxes like house tax, profession tax, entertainment tax, special lax on land and buildings, should be levied compulsorily by the Panchyati Raj Institutions at the appropriate level."

All these observations were, perhaps, taken into consideration while amending the Constitution for the seventy third time, because, while analyzing the causes of the decline of these Institutions L.M Singhvie Committee, the architect of the constitutionalisation of Panchayats, again observed that, "there was chronic insufficiency of resources at the disposal of these institutions. Most of these institutions had to function in a hand to mouth predicament in a state of perpetual neglect and humiliated impoverishment."

We have now a constitutionally guaranteed system of panchayats which are to levy, collect and appropriate such taxes, duties, tolls and fees as would be authorized by the legislatures of the states in order to function as an institution of self govt. for ensuring economic development and social justice within its operational jurisdiction. The PRIs have now, against this constitutional gurantee, been authorized by the state legislature to levy tax, tolls, rates and fees on certain items which do not fall within the periphery of the state governments.

But the story of tax efforts by the PRIs in almost all the states depict no departure from their earlier state of functioning. Most of the State Finance Commissions viewed the poor performance of Panchayats in respect of tax and non-tax revenue mobilization at all levels. The Table: 1 below will show the per capita resource mobilization of PRIs in India in recent time.

Table 1 Per capita Resource Mobilization by PRIs, 2002-03

(Rupees)

Name of the State	Per capita own revenue
Andhra Pradesh	13.71
Assam	03.13
Gujrat	14.55
Hariyana	50.10
Karnatak	16.70
Kerela	42.82
Madhya Prodesh	36.85
Maharastra	82.33
Orissa	01.72
Panjab	60.21
Rajasthan	08.29
Tamil Nadu	18.97
Uttar Prodesh	13.09
West Bengal	05.87
All rural India	**25.87**

Source: Twelfth Finance Commission Report

Although the states like Maharashtra, Hariyana, Kerela, Punjab and Madhya Prodesh had comparatively high average of own revenue, but the states like Orissa, Assam, Rajasthan etc, are in dismal state of performance. Even in West Bengal despite its long standing commitment towards rural decentralization, this rate is far below the national average. Here again in the version of Mukarjee Bandhopadhyay Committee appointed for the purpose of reviewing the performance of PRIs in West Bengal : "the panchayats are not at all concerned about acquiring even a modicum of financial self reliance."

It is in this backdrop the present paper attempts to analyse the scope and limitations of the resource mobilization by village panchayats in West Bengal being one of the states in India that ventured to reorganize its panchayats much before the initiatives taken at the national level. We have confined our study within the functioning of village Panchayats as the scope of resource mobilization is better and diverse in this tier in comparison to other two tiers of PRIs in West Bengal. The data used in this study are derived from the reports published by the Government of West Bengal from time to time.

Sources of Own Revenue of Village Panchayats in West Bengal

A village Panchayat in West Bengal has the following sources of own revenues. These are categorized into four: a) Tax, b) Rates, c) Fees, d) Tolls.

a) Tax on land and buildings :
A village panchayat in West Bengal is the only tier which can assess and realize Tax on land and building in rural areas.

b) Rates on water, lightning, conservancy, sanitation and drainage provided that those services are rendered by the village panchayats.

c) Fees for registration of vehicles, shallow tubewell, deep tubewell, license for running trade and business, using burning ghat, granting permission for construction of building, creating/fixing hoarding or structure for advertisements, village produce sold in the village market organized by the village panchayat, making sanitary arrangements at places of worship and pilgrimage, fairs and meals, for construction of BTS Tower/Rest room for broadband network by different telephone authority

d) Tolls on persons, vehicles or animals at the toolbar on any road or bridge, in respect of any ferry under the management of village panchayat.

From Table 2, an overview of different sources of Tax and non Tax revenue of a village panchayat can be made.

Table 2 Sources of Own Revenue of a Village Panchayat

Tax	Rates	Fees	Tolls
1. on land and building	1. Water 2. Lighting 3. Conservancy 4. Sanitary arrangement 5. Drainage	1. Registration of vehicles, shallow and deep tube well 2. License for running trade 3. Using burning Ghat 4. Permission for construction of building 5. Permission for erecting/fixing hoarding or any structure of advertisement 6. Village procedure sold in village market 7. Sanitary rrangement at place of worship, pilgrimage, mela, fair etc 8. For construction / erection of tower / restroom by telephone authority.	1. On person, vehicle or animals 2. In respect of any ferry under own management.

As per provision of West Bengal Panchayat Act 1973 a village panchayat can levy tax on the 'annual value' of the land and buildings. This annual value is determined at six precent of the market value of the land and building in question. The act further provides that when the annual value does not exceed rupees one thousand the tax will be levied at one percent and when the valuation exceeds that ceiling it will be two percent. The property having annual value at Rs. 250 or below is exempted from taxation. For assessing the market value, as per provision of the W.B. Gram Panchayat Administration Rules 2004, a village panchayat is to conduct field survey and collect self declaration of individual assessees about area and valuation of land or building or both. For this purpose they are also authorized to consult the block land and land reforms officer and the district sub-register of the concerned district. They can also take the assistance of the Gram Unnayan Samiti constituted at every Gram Sansad level for this purpose.

As regards determination of scale of rates, fees and tolls every village panchayat is to adopt and publish a bye law in their areas for information of the public subject to the maximum rates prescribed by the state government from time to time.

Mobilization of Own Revenue by the Village Panchayats

We have very limited available data on district wise collection of tax and non tax revenue of the village panchayats of West Bengal from 2002-03. Whereas out of 3354 village panchayats in W.B, the data set covers 3180 gram panchayats (G.Ps) for 2002-03 and 2003-04 and that for 2004-05 and 2005-06 covers 3320 GPs. These are summarized in Table 3 below.

Table 3 Collection of Own Revenue of the Village Panchayats by district, 2002-03 to 2005-06

(Rupees in lakh)

District	Total no. of G.P	2002-03	2003-04	2004-05	2005-06
Coochebhar	128	92.93	96.64	110.86	143.62
Jalpaiguri	146	96.83	157.00	143.60	170.32
Darjeeling	134	52.54	53.26	97.28	104.06
Uttar Dinajpur	98	45.30	54.26	63.09	71.46
Dakshin Dinajpur	65	52.99	34.22	70.28	87.20
Malda	146	100.86	54.96	128.85	159.68
Murshidabad	254	96.73	111.19	186.85	204.39
Nadia	187	153.53	167.77	327.32	246.09
N-24 Parganas	200	225.63	167.37	293.68	348.28
S-24 Parganas	312	152.50	180.12	255.36	299.01
Howrah	157	135.50	148.20	181.17	209.37
Hooghly	210	280.66	335.63	470.16	498.31
Purba Medinipur	223	363.52	360.31	389.86	278.65
Paschim Medinipur	290	141.00	231.79	439.76	559.96
Bankura	190	42.43	192.95	259.59	310.92
Purulia	170	23.53	8.11	16.54	17.58
Burdwan	277	306.40	507.46	535.20	630.59
Birbhum	167	128.84	155.98	191.01	222.68
Total	3354	2490.84	3017.22	4160.28	4562.35

Source: Department of P&RD, Govt. of West Bengal

From the above table it is seen that total collection of own revenue of the village panchayats increased from Rs 24.9 crore during 2002-03 to Rs 45.62 crore during 2005-06. The growth rate in the tax revenue and non tax revenue per year were 20.62% and 26.84% respectively between 2004-05 and 2005-06. This is only because there was an enormous thrust on the part of the state government from 2003-04 to make the village panchayats adopt their own bye law for realizing the so far untapped non tax revenue. Still per capita revenue collection of village panchayats was Rs. 5.23 in 2003-04, which rose to Rs. 6.97 during 2004-05. But if we consider the tax revenues of the village panchayats during this period this depicts a dismal state of performance. During 2002-03 the per capita average tax collection of the village panchayats per year was Rs. 2.26 which rose to Rs. 3.01 during 2004-05. Table 4 summaries the district wise development of collection of Tax revenue by the village panchayats.

Table 4 Tax Collection in Districts of West Bengal, 2002-03 and 2004-05

District	Collection of Tax during 2002-03 (Lakh)	Per capita average collection Per year (Rs.)	Collection of tax during 2004-05 (Lakh)	Per capita average collection Per year (Rs)
Coochebhar	27.71	1.23	42.98	1.90
Jalpaiguri	68.64	2.45	90.31	3.22
Darjeeling	45.43	4.18	66.68	6.14
Uttar Dinajpur	22.54	1.04	29.11	1.35
Dakshin Dinajpur	17.19	1.31	28.61	2.19
Malda	45.91	1.50	52.47	1.72
Murshidabad	50.09	0.97	107.42	2.09
Nadia	87.62	2.41	113.28	3.12
N-24 Parganas	121.43	2.97	149.96	3.67
S-24 Parganas	101.01	1.73	138.21	2.37
Howrah	133.98	6.31	101.39	4.78
Hooghly	141.69	4.22	179.00	5.34
Purba Medinipur	78.19	1.76	96.35	2.17
Paschim Medinipur	107.64	2.06	178.38	3.41
Bankura	36.70	1.24	53.10	1.79
Purulia	2.35	0.10	5.24	0.22
Burdwan	157.15	3.61	213.41	4.90
Birbhum	61.18	2.22	94.96	3.44
Total	1306.45	2.26	1740.86	3.01

Source: Department of P&RD, Government of West Bengal

It is crystal clear that though the village panchayats are comparatively in better position regarding their own revenue mobilization when it is calculated taking tax and non tax revenue together but if we consider their performance regarding tax revenue alone they are far behind many other states of India. If we compare the performance of Kerala and Karnataka in respect of this property Tax Revenue, which is common for both states, Kerela collected during this period an average per capita property tax to the tune of Rs. 13.35 which is much higher than that of West Bengal. Even the state of Karnataka which is not accredited with a rich performance in respect of own resource mobilization has occupied an advanced position when compared to West Bengal having per capita property tax realization to the tune of Rs. 7.88.

Funding Support vis-à-vis Relevance of Own Revenue

Village panchayats in West Bengal receive major financial support mainly from the Panchayats and R.D department. They also get the responsibility of implementing the programmes of other line departments. We have available data on the release of fund by the Panchayats and R.D Department of the state Government both under the non plan and plan budget made available to the different tiers of PRIs. Table 5 shows the provisions in the state budget and release of funds against the budget provision by the Panchayats and

Rural Development Department along with funds actually made available to the PRIs during 2002-03 to 2005-06.

Table 5 Amount Released to PRIs against the Budget Provision, 2002-03 to 2005-06

Year	Budget Provision		Amount released	Available to		
	Head	Amount		ZP	PS	GP
2002-03	Salary & allowance	15345.88	14784.13	1807.503	1279.00	11697.628
	Implementation of scheme	22240.00	28254.015	14559.255	3992.714	9702.046
	Other grant	68728.93	3374.560	1962.930	1280.120	131.510
	Total	106314.81	46412.706	18329.688	6551.834	21531.184
2003-04	Salary & allowance	16453.00	18392.69	2209.69	1480.00	14703.00
	Implementation of scheme	12202.67	31368.41	17645.47	2715.88	11007.06
	Other grant	15666.66	6217.32	2993.36	254.30	2969.66
	Total	44322.33	55978.42	22848.52	4450.18	28679.72
2005-06	Salary & allowance	19649.91	19242.50	2462.68	1274.44	15505.38
	Implementation of scheme	39618.00	41229.67	17459.62	5628.72	18141.34
	Other grant	41169.98	46149.56	14597.19	8578.47	22983.91
	Total	100437.89	106621.73	34509.49	15481.62	56630.62

Source: Department of Panchayats & Rural Development, Govt. of West Bengal

From the above table if we calculate the share of own revenue of the village panchayats during these years it comes to 8.05%, 10.5% and 11.56% respectively. This indicates that with the huge inflow of fund from the government, the village panchayats do not bother for better mobilization of resources on their own. This is further established from the pattern of expenditure of the own revenues of the village panchayats, which is summarized in the Table 6.

Table 6 Pattern of Expenditure of Own Resources of the Village Panchayats, 2003-04

(Rupees)

District	Average revenue collection per G.P	Contingent Expenditure	Expenses on Education	Expenses on health
Coochebhar	75,000.00	41,538.20	3674.54	3321.82
Jalpaiguri	1,18,045.11	38,287.54	3422.66	4847.01
Darjeeling	40,348.48	7,409.30	207.67	487.38
Uttar Dinajpur	57,115.78	21,320.53	2231.80	2200.76
Dakshin Dinajpur	52,646.15	37,469.49	4705.16	3928.12
Malda	37,643.83	28,124.52	1584.84	2859.27
Murshidabad	43,775.59	22,200.00	1681.18	1382.67
Nadia	90,198.92	33,189.93	2452.69	2060.06
N-24 Parganas	1,11,580.00	32,989.98	4976.43	5615.95
S-24 Parganas	60,442.92	21,390.64	1372.05	-
Howrah	94,394.00	33,450.87	3327.18	5034.68
Hooghly	1,60,588.51	42,948.80	9266.43	7446.60
Purba Medinipur	1,65,279.81	27,129.77	5817.16	5497.31
Paschim Medinipur	1,11,975.84	28252.67	7790.58	3750.10
Bankura	1,10,552.63	26409.31	5896.33	5534.11
Purulia	4,770.58	1551.50	-	-
Burdwan	1,84,530.90	42529.02	13,596.77	18248.64
Birbhum	93,401.19	30935.65	2130.24	2668.96
Total	94,881.13	28686.60	4495.52	4537.87

Source: Department of Panchayats & Rural Development,Govt. of West Bengal.

From the above table it becomes clear that the largest portion of the own revenue of the village panchayats go on to meet up the contingent expenditure and only a meagure portion is spent towards education and health sector. Here lies the question, does the huge amount of secured schematic fund stand as a hindrance in the way of raising own revenue or is it that the village panchayats are very allergic about either enhancing the rates of taxes as per statutory requirement or proper realization thereof for fear of losing the existing vote bank? Although no readymade reply is still available if we go through the existing procedure of planning and budgeting of the village panchayats a separate answer may come out.

Provision and Reality of Planning and Budgeting

In conformity with the Constitutional mandate section 19 of the W.B.Panchayat Act provides that: "A Gram Panchayat shall function as a unit of self-government and, in order to achieve economic development and social justice for all, shall, subject to such condition as may be prescribed or such directions as may be given by the state government

a) Prepare a development plan for the five year term of the office of the members and revise and update it as and when necessary with regard to the resources available.
b) Prepare an annual plan for each year by the month of October of the preceding year for development of human resources, infrastructure and civic amenites in the area."

Again in terms of sec 48 of the same Act "Every Gram Panchayat shall, at such time and in such manner as may be prescribed, prepare in each year a budget of its estimated receipts and disbursements for the following year." The state government has prescribed the procedure of preparing the budget of the Gram Panchayat through the W.B. Panchayat (Budget and Appropriation of Fund) Rules, 1996.

This means a calendar of events as far as planning is concerned. The gram panchayats are likely to identify well in advance the needs and resources through the Gram Sansads and its executive committee Gram Unnayan Samitis where people and other civil society organizations are consulted. Matching the needs with resources, development projects are likely to be accommodated. It may so happen that the number of projects so formulated are too large in terms of different schematic funds are available during a particular year. Linking the priolised projects with the available schemes and programmes, the Gram Panchayats are likely to undertake the remaining projects against their own revenues or to pass on to the upper tier for necessary action at their end, if there be any. Thus once the plan is finalized ar the G.P level that is to be sent to the upper tier for necessary action. The process is to go on in respect of upper tier also upto the state or national plan.

As a part of this exercise a gram panchayat is to prepare its annual budget incorporating therein their estimated income and expenditure. The budgets stand revised and supplemented as per information from the Government regarding their approved outlay. Thereafter the budges are to be finalized in the light of the approved plan projects and their corresponding approved outlay. To strengthen this process very recently the state government have issued directives to prepare upasamiti wise (subject committee) budget at the village panchayat level. This is a mandatory provision as per statute failing which a panchayat body is not authorized to draw and disburse any amount of money from its fund. As budget provides the anticipated receipts and expenditures for the ensuing financial year, it is an important document that mirrors the policy and intention of the Village Government. As a part of this exercise there comes the question of meeting the critical gap of the budget, a sizable portion of which are likely to be managed by way of raising the own revenue, borrowing etc. as per need. Thus there may neither be a question of viewing the revenue mobilsation procedure in isolation nor can this be a static Excercise.

But the reality in the field speak otherwise. As per reports of the Examiner of Local Accounts on the panchayati Raj Institution for the year ending 31st March 2004, out of 3354 village panchayats, 82 village panchayats did not prepare, approve and adopt the budget for the year 2002-03. Again, 341 GPs altogether spent Rs 11.17 crores during the same financial year in excess of their respective budget provisions under different heads without preparing any supplementary and revised estimates. The report also reveal that the 120 GPs failed to maintain any demand and collection register for property tax and as such

no picture of its motivation to augment own revenue is depicted. Therefore it can be stated that the budget and planning have got no relevance in the functioning of the village panchayats. To quote Mukarjee Bandhopadhyay committee, "The panchayats seem to be content to remain spending agencies of money received from above..... such lopsided performance, negates the very idea underlying the panchayats for it shows that there is near zero self reliance, which means near zero autonomy and correspondingly near zero self government ..... by failing to mobilize resources the panchayats have served to increase the cost of governance at the below and district level, because now their own cost has to be added to the continuing cost of the pre-existing bureaucracy".

This observation can be better justified if we compare the total income of the village panchayats vis-à-vis salary and allowances during 2003-04 as shown in Table 5 to that of their own income shown in table 3 and tune of expenditure towards running their own establishment shown in table 6 of the same year.

Table 7 Establishment Expenditure of Village Panchayats in Relation to Total Income, 2003-04 (Rs Lakh)

Income		**Expenditure**	
Head	Amount	Head	Amount
Govt. Fund	28,679.72	Salary and other allowance	14703.00
Own revenue	3017.22	Contingent Exp	962.12
Total	31696.94	Total	15665.12

From the above table it transpires that more than 50% of the total income of the village panchayats is spent towards establishment cost, and again more than 31% of own revenue is spent towards contingent expenditure.

Conclusion

From all these exercises it is discernible that the village panchayats continue to depend heavily on the devolution of financial resources from the government. As far as the implementation of major rural development programmes is concerned they are still considered as implementing agencies of the government having governed by highly centralized rules which generally do not match their own perception of local need. As a result, instead of matching these schemes with their local need they are bound to spend and submit utilization within the given time frame for having the next allotment which is again a part of exercise of their political commitment. Thus, as they consider implementation of rural development programmes in isolation without going through the process of planning and budgeting, same is their perception about mobilization of their own revenues having no relevance in the process of planning and budgeting.

There is, however another side of the coin. The existing pattern of fiscal decentralization to village level panchayats is too meagre to expect them worthwhile planning for economic development and social justice. In an assessment by the National Institute of Rural Development (Sing 1998) it is indicated that the PRIs require Rs. 142128 crore for a period of five years only for operation and maintenance of core services.

The capital expenditure for the same period is assessed at Rs. 83,603 crore. It is, therefore a distant dream for the village panchayats to meet the obligation of the 73rd amendment of the Constitution and establish them as institution of self- government unless there is an effort on the part of the government to associate the panchayats in planning instead of implementing and go ahead for financial devolution accordingly. On the other hand, keeping in mind the existing central state fiscal relation, the village panchayats should put emphasis on mobilizing more non-tax revenue in the form of user charges against providing services to the rural people. Attention needs to be paid towards creation of more remunerative assets through different wage employment programmes and untied fund provided to the village panchayat under different national and state finance commission grant. At the same time the existing tax structure demands more efficiency in assessment and collection. It should be ensured that the tax is revised as per market value of the property as far as practicable. Thereafter an important indicator of collection efficiency is the percentage of tax collection to tax demand. Last but not the least is voluntary contribution. In the version of the First State Finance Commission, "contributions in the form of land, labour, technical advice and money came forth in many panchayats which should be widely encouraged. Apart from enhancing resources, this generates a sense of participation among the people and is an important element in sustaining democratic decentralization". All these options, however, demand an alternative vision, approach, will and capacity to mobilize the rural people at the same time. Here also we need to think afresh considering the fast changing rural scenario of West Bengal.

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Industrial Pollution Compliance in India: Status and Options

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Abstract : *Industrialisation is a very important development strategy, particularly in developing countries. Despite obvious benefits of industrial development, economic growth via industrialization inevitably causes stress upon environment. Modern approaches to environmental protection rely on three main types of interventions: command and control measures, economic instruments and social tools. Industrial pollution control in India is mainly based on command and control measures as standards. Regarding the problem of industrial pollution, the main issue is the compliance of standard by industries. The paper examines the industrial pollution compliance status in India. The paper has also attempted to identify the causes of poor compliance with some suggestions for improvement.*

Industry plays a very critical role in economic development of a country. It is a great achievement that India is one of the 10 most industrialized nations of the world (Chhokar 2004). But industrial development is frequently associated with damage to environment and human health. Industrial activities release pollutants that contaminate air, waterbodies and land. Against an economic growth of 163 percent during 1975-95, the industrial pollution load in India increased by 247 per cent during the same period (Kathuria et al 2002). An assessment study for estimation of industrial pollution load based on CSO data reveals that total wastewater generated is 82446 MLD out of which a major part of the wastewater is generated in the form of cooling water and 16% is process wastewater. The total BOD load generated is 1776 tonnes per day and total COD load generated is 5123 tonnes per day from various categories of industries (CPCB 2005). Again increased carbon emission from further industrial development will increase the average temperature leading to climate change. The climate change will adversely affect the sectors like agriculture, forestry and the human life in coastal areas. The IPCC predicts that a 1 m rise in the sea level would inundate about 1700 sq. km. of agricultural land in Orissa and West Bengal. It is clear that industrial pollution control is urgently required for sustainable development. The purpose of this paper is to investigate the industrial pollution compliance status in India and to suggest policy options for better compliance.

1. Compliance Status

Regarding the problem of industrial pollution, the main issue is the compliance of standard by industries. India can boast of being one of the few developing countries to have comprehensive environmental regulation. Though there has been a multitude of regulations, many of the units have not complied with the regulations. As on 31.12.2000, out of 1551 industries, 1326 industries have so far provided the necessary pollution control facilities, 172 industries have been closed down and the remaining 53 industries are defaulting. Legal action has been taken under the Environment (Protection) Act, 1986 for all the defaulting units and in many cases the matter is pending before the Hon'ble Supreme Court. Almost all the defaulting units are either

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in the advanced stage of installing the pollution control measures or under legal action for default.

The seventeen-category list is made for large and medium firms. There are other smaller firms. In fact, small-scale industries (SSIs) are the big players in India's economy. They provide employment to more than 19.2 million, i.e., tney provide about 86% of employment in the manufacturing sector. They account for 95% of industrial units in the country and 40% of industrial output, and their contribution to GDP is about 7%. India is incurring a heavy environmental and human cost with the mushrooming of small-scale industries as symbols of 'industrial equity and resource distribution'. The National Productivity Council, Delhi, has estimated that small-scale industries were responsible for 65% of industrial pollution in 2000. They contributed to 40% of wastewater generation in 2001 (CSE, October 15, 2002). The industry-wise generation of wastewater is presented in the table 1. It may be seen from this table that the maximum amount of wastewater is generated in the engineering industry (2125 mld) followed by paper and board mills (1087 mld).

Table 1 Waste-water generation from small-scale industries

Industry	Cluster regions	Wastewater generated (mld)
Engineering	Hand tools: Jalandhar and Locks: Aligarh Nagpur Scientific Instruments : Ambala, Ajmer Bicycle and parts : Ludhiana Brass Parts: Jamnagar Diesel Engine: Kolhapur, Agra, Rajkot, Coimbatore, Ghaziabad	2,125
Paper and board mills	Spread across the country	1,087
Textile industries	Woolen and cotton hosiery: Tirpur, Ludhiana, Kolkata, Delhi	450
Organic chemicals	Gujarat	60
Tanneries	Leather and leather products: Chennai, Ambur, Kolkata, Agra, Kanpur	50
Pharmaceuticals	Gujarat and Maharashtra	40
Dye and dye intermediates	Gujarat	32
Soaps and detergents	Gujarat	10
Paints and Varnishes		10
Petrochemicals		10
Edible oil and vanaspati		7

Source: *Pollution Control in small scale industries- Status and needs*, CPCB, January 2001, Adapted from CSE, October 15, 2002.

Gujarat has more than 90,000 industrial units. It has been reported that about 8000 units are polluting. About 70% investment in Gujarat since the 1970s has been in the chemicals sector (*Down to Earth*, April 15,

2000). The environmental problems cropped up mainly because of the fiscal incentives given to the small-scale units in the chemical sector. The major rivers and streams of Gujarat like the Kolak, the Mahi, the Daman Ganga are all in a bad state due to effluent discharged by the industry.

The share of Maharastra in the national production in the chemicals sector is about 25%. The state has been reporting the highest number of accidents related to chemicals since 1985. Out of 83,000 industrial units in the state, about 50% are in the chemicals, fertiliser and the textile sectors. The industrial growth in the state is based in the outdated technology leading to environmental degradation Maharastra generates about 195000 tons of hazardous wastes per year through 3908 industrial units

It's appalling to see the pollution abatement status of small-scale untis. Pollution abatement status of some industries in small-scale sectors can be seen from the table 2.

Table 2: Pollution Abatement by Factories, 1998-99

	Total no. of factories	% of firms taking air pollution abatement measures	% of firms taking water pollution abatement measures	ISO 9000 certified	Pollution control cost as a % of gross value of plant and machinery
Food Products	14695	9.45	9.84	135	1.55
Cotton textile	9227	14.5	16.12	140	2.01
Wood & wood products	3787	5.62	2.77	7	0.79
Paper & paper products	6304	5.65	9.47	68	2.65
Leather	1742	8.84	33.47	63	2.06
Basic Chemicals and chemical products	9357	28.34	32.66	408	2.8
Rubber plastics, petrol and coal products	7597	16.72	15.69	285	1.07
Basic metals and alloys	6915	29.9	19.12	243	18.01
Machinary and equipment	8208	7.37	7.11	436	0.35
Electricity	3644	64.9	39.63	185	0.51
Gas and steam generation	80	17.5	18.75	7	0.01
Water works and supply	293	1.02	2.73	3	0.02
Storage and warehouse services	1078	3.8	6.03	4	0.08
Repair services	1966	6.66	6.87	35	0.34

Source: CSO (2000), *Staff Papers on Environmental Pollution*, Adapted from Parikh and Radhakrishna (2002).

We see from the above table the percentages of firms taking air pollution and water pollution abatement measures are very poor. In case of paper and paper products, the percentages of firms taking air pollution and water pollution abatement measures are only 5.65 and 9.65 respectively. State-wise status of pollution control effort in terms of expenditure on pollution abatement is given in table 3.

Table 3: State-wise Pollution Abatement Measures taken by factories during 1998-99

State	No of factories	Share of pollution control in the gross value of plant and machinery (%)	Share of Pollution control in running expenses (%)
Andhra Pradesh	18794	1.7	0.27
Assam	1850	1.2	0.061
Bihar	3459	0.987	0.135
Goa	339	2.02	0.032
Gujrat	13,376	1.69	0.149
Haryana	4000	0.93	0.018
Himachal Pr	576	2.8	0.028
J & K	414	7.57	0.006
Karnataka	6826	3.23	0.027
Kerala	4910	3.32	0.127
M. P.	4220	1.14	0.07
Maharashtra	20,534	1.23	0.089
Manipur	76	0.32	0.148
Meghalaya	43	5.18	0
Nagaland	165	1.01	0.032
Orissa	1645	1.61	0.031
Punjab	6581	0.82	0.036
Rajasthan	5026	1.87	0.028
Tamil Nadu	19,610	1.89	0.06
Tripura	242	0.01	0.009
Uttar Pradesh	10,604	1.27	0.034
West Bengal	6894	0.81	0.03
Andaman	79	0.25	0
Chandigarh	338	0.5	0.008
Dadra	358	0.15	0.013
Daman	531	0.57	0.004
Delhi	3559	0.13	0.021
Pondicherry	377	0.68	0.069
All India	135,431	1.52	0.084

Source: CSO (2000) Staff Papers on Environmental Pollution, Adapted from India Development Report

Table 3 indicates that share of pollution control expenditure as a proportion of the gross value of the plant and machinery and running expenses is very low. The first one varies from 0.01 per cent to 7.57 per cent and the second one varies from 0 to 0.27.1 per cent.

2. Causes of Poor Compliance

A. Weaknesses of Command and Control Regime under Pollution Control

Boards: The success of enforcement and compliance strategy will depend upon gathering sufficient evidence and information about pollution status of firms. The evidence in the form of a sample is generally sent to an accredited laboratory for analysis and testing. Enforcement involves regular inspection and monitoring to verify compliance, investigation of any violations, and applying measures to compel compliance. Prosecution as well as conviction is the final stage in the compliance strategy. In India there is no dearth of environmental regulations. But the problem is always with the implementation level. The setting as well as revision of standards has become a political process in which the industry has a lot of weight. Barring a few most of the pollution control boards, which are entrusted with the responsibility of implementing environmental regulations, have failed miserably. The Central Pollution Control Board (CPCB), the nodal agency for overseeing the environmental regulations in the country, has no bona fide powers to enforce the laws. The State pollution Control Boards are beset with plethora of problems. A recent study by the Planning Commission reveals that out of a total of 197 members in 17 boards, 129 including 94 bureaucrats are from non-technical background. That means 65% of the members are technically incompetent to do a job that requires high technical skill. There are also complaints of corruption against officers of SPCBs. Many entrepreneurs tend to believe that bribing the department of environment is more economical than managing the environment (CSE, July 31,2001). Prasad (2006) has pointed out that decentralized system of PCBs has not been effective in ensuring internationalization of environmental concerns in the process of economic development. (i) The PCBs are handicapped to enforce standards to the violating firms because they are not empowered to use the punitive measure, though they may blacklist the polluting firms. (ii) PCBs over the years have been underfunded. They raise income through consent fees, no objection certificates, and water cess that are paid by industrialists and local authorities. These circumstances increase the possibility that PCBs may issue consents subject to conditions that favour industries rather protect the environment of the country. (iii) It is difficult to get information from a regulatory agency. The PCBs need to publish the information on firm's use, storage and release of hazardous chemicals for bringing awareness to the public. Public scrutiny can provide incentive to firms to alter their behaviour. (iv) The theory of regulation predicts that interest group always cast a shadow on regulatory activities because they are easy to capture. Since PCBs mobilize their own resources, consent is issued with conditions that are favourable to interest groups. (v) Overlapping jurisdictions often create problems with the enforcement of environmental law. For example, a regulator's jurisdiction is on the territory (state boundary), but there are other parallel agencies such as shore area regulatory authority, traffic authority etc. that delay and make confusion as the agencies debate their respective jurisdiction. (vi) Industries continue in their pollution activities even after receiving closure orders from the concerned PCB by simply changing the name of the pollution unit. There are some success stories (Jana and Roy 2006) which show that Pollution Control Board in West Bengal has played a positive role.

B. Policies towards Small-scale industries:

With the declaration of second industrial policy in 1956, the regime of protected small- scale industry came into existence. The basic logic of this protection was employment generation in small-scale industry. But the environmental and social cost of this employment generation is very high. The prevailing ceiling on investment in machinery and fixed assets discourages the SSI owners from investing in pollution control equipment. The causes of more pollution in this sector have been identified as follows: (a) SSIs lack the technical expertise or finance to invest in the pollution control technologies, (b) continued usage of outdated and inefficient technologies that generate large amount of wastes, (c) large and unplanned industrial conglomeration, (d) lack of resources for enforcement and implementation of pollution control programmes, (e) lack of public and market pressure for improving environmental performance, and (f) lack of proper siting thereby posing greater environmental risk.

C. Narrow Focus of Common Effluent Treatment Plants (CETP):

The concept of CETP was originally promoted by Ministry of Environment and Forest in 1984 to treat wastewater from a large number of small-scale industries with the objectives of treating wastewater at lower unit costs than could be achieved individually and for facilitating monitoring and enforcement by pollution regulatory authorities. But CETPs are proving themselves white elephants. Tests carried out by Green Peace in 1996 and 1999, i.e., before and after installation of CETP in Ankleshwar show that CETP has not been able to remove heavy metals (lead, cadmium, chromium, copper and mercury etc.) and Persistent organic pollutants (POPs). In most cases, CETPs are not designed to treat heavy metals in effluents. In tannery waste there is a need for separate chrome recovery units or change of the process technology. In between 1990 and 2000, more than 90 CETPS projects were approved with financial assistance coming from various sources including the World Bank. In the early 1990s CETPs were thought as a solution to the pollution from SSIs. Today the euphoria has ebbed and the CETPs are becoming proverbial white elephants. The problems with CETPs can be identified as follows. (a) Cost sharing is necessary for at least two reasons – contribution towards capital cost and recovery of operation and maintenance cost. The contribution towards capital cost should be based on trade volume and toxicity of the pollution load. But in a number of CETPs, linear cost sharing is employed where toxicity of the pollution is not being considered and thereby disregarding 'polluter pays principle'. The same procedure is being followed to compute recurring and user charges. On the contrary, recurring charges at places like Ankleshwar (Gujarat) and Ranitec (Tamil Nadu) are based on the concentration level of the effluent. (b) At a number of places, the water treated in the CETP is either much below the volume it is designed for, such as in Visharam, Tamil Nadu (around 36 percent) or much higher as in the case of Kundli, Haryana (231 per cent). Two explanations exist for total effluent exceeding declared volume. First, the vertical expansion of units is often not foreseen. Since one fifth of the capital cost of CETP is to be borne by the units, they expect capital contribution charges based on the declared effluent, thus tempting them to declare less (Kathuria 2004). (c) Managing a common requires a common purpose and an institutional and legal framework that empowers communities to take decisions. The CETP societies are not given enough powers to take punitive action against defaulters and ensure effective functioning. It has been alleged in Maharashtra that in many occasions industry fails to cough up their share of their construction

costs. Some owners do not pay up the treatment costs. They just liase with the MPCB officials to get 0 discharge certificate and show it to the CETP operator or association to avoid paying running costs. (d) The modern knowledge of wastewater treatment argues that the concept of CETP in a heterogeneous set of industries is doubtful since mixing of various chemical substances creates an unknown mixture with unpredictable toxic properties. If there are many toxins present, microbes will also be killed off making it impossible to treat even biodegradable waste properly – which would have been fairly simple to treat in isolation (Kathuria 2001). (e) There is always a problem of development of right technologies for CETPs. It is easy to build technologies for single purpose activities, but difficult to innovate for complexity (CSE, January 15, 2003). A change in the nature of effluents rendered CETPs redundant in Pali in Rajasthan, home to more than 1000 registered and unregistered textile-processing industries. The problem cropped up because the CETPs were constructed to handle the alkaline effluents generated from units processing cotton fabric. But with the change in the market demands these units shifted to processing synthetic fabric, which turned the effluents predominantly acidic. All the effluents are now going untreated to Badi river.

D. Lack of Incentive-based Policy to induce implementation

In India, the problem in controlling pollution arises from the poor enforcing of standards. It is possible for a firm to be compliant by installing abatement equipment but not operating it. Thus Pargal et al (1997) found that plant level pollution is unaffected by formal inspections by state PCBs in India, since firms probably activate the equipment only when inspections are scheduled (Sawhney, 2003). Also since plant specific standards are in terms of concentration of effluent and not volume, concentration compliance can be achieved by diluting the pollutant discharge while pollution load increases. Moreover, the fines and penalties for non-compliance are low in India, and the penalty structure is insensitive to the degree of default, since the same penalty is charged for violation of environmental standards irrespective of the size of violation (whether small or large) or the pattern of offence (occasional or repeated violations).

3. Pollution Control in West Bengal

There are about 10,000 registered large and medium factories (like thermal power plants, paper and pulp, fertiliser, textile, paints, oil refinery, petrochemicals, integrated iron and steel, bulk drug) and 40,000 registered small-scale units (like foundry, rolling mill, lead smelting, tanneries) in West Bengal (Gupta 2006). The West Bengal Pollution Control Board has adopted the following strategies to control industrial pollution in the state: (i) locational policy for entry level restriction in congested areas, (ii) decentralistion of permit procedure and monitoring of grossly polluting strategies, (iii) special attention to cluster of small industries, (iv) legal action against defaulting units, (v) Corporate Responsibility for Environmental Protection (CREP), (vi) incentives for pollution control, (vii) Environmental Excellence Award, (vii) Cleaner production and (viii) redressal of public complaints. The State Pollution Control Board of West Bengal has classified all the industries, on the basis of their pollution generating potential into three categories namely, red, orange and green (WBPCB, 2005). The red category units have maximum pollution potential, the orange category units have moderate pollution potential and the green units have the least pollution potential. The WBPCB has identified 333 grossly polluting units under its regular surveillance. These grossly polluting units are the industries identified under the National River Conservation Plan (NRCP), 17 category units, major air and

water polluting units. Out of 73 units of 17 categories in West Bengal the number of complying, defaulting and closed units are respectively 30, 23 and 20 as on March 2006 (Lok Sabha 2006). Given the constraints of resources and manpower, the Board prioritises its surveillance over the grossly polluting units instead of monitoring all the units under its administration. These units are inspected and monitored in a fixed schedule. With a view to assessing the overall environmental status of the state, the WBPCB monitors the air quality of different areas of the state. The WBPCB regularly monitors water quality of rivers such as Hooghly, Damodar, Barakar and Rupnarayan. Common Hazardous Waste Treatment Storage & Disposal facility at Haldia is being set up jointly by the Haldia Development Authority (HDA) and M/s Ramky Enviro Engineers Ltd. (WBPCB, 2005).

In order to regulate industrial pollution in the state, the WBPCB pursues the industrial units to comply with regulatory norms. The non-complying units are called for public hearing. The Board adopts strict measures such as imposition of bank guarantee – closure of the unit being ultimate step. Bank guarantees are imposed on the polluting industrial units with a condition that should they again violate the rules, the units should be closed and the bank guarantees be forfeited. Although the environmental problems of large and medium scale units have been contained by strict enforcement of emission norms, the problems of small industries needs further attention. A large number of small industries operating in heavily congested areas of the city and its immediate surroundings are using age-old energy inefficient coal fired heating installations, like boilers, kilns and furnaces, without any pollution control systems. In Kolkata these small industries contribute more than 40% of the particulate pollution arising out of the industrial pollution. In order to improve air quality in Kolkata and its urban agglomeration, the Board recently introduced in KMA stricter emission standards for particulate matter from boilers, foundries, ceramic kilns and rolling mills. The Board has commissioned a bilateral project with India-Canada Environmental Facility to provide financial assistance to those small-scale units to convert their coal fired boilers/kilns to oil or gas fired ones (WBPCB 2003).

4. Alternative Policy Options for Pollution Control

Modern approaches to environmental protection rely on three main types of interventions: command and control measures, economic instruments and social tools. Pollution control strategies in India have mainly relied on the use of command and control measures. Minimum National Standards (MINAS) are set by the Central Pollution Control Board for each industrial sector, based on the review of production process and environmental issues. While command and control regulations can, in theory, guarantee that the environmental action will be taken, weak implementation and enforcement has been stumbling block. Currently, the use of market based instruments in India is limited to the water cess aimed at raising revenue for the state pollution control boards and a range of fiscal subsidies for investment in pollution control systems. But these schemes are directed at supporting the installation of end of pipe control measures, thereby subsidizing the costs of compliance. There is no incentive and hence motivation for companies for adoption of cleaner production technologies. Recently, there has been a growing consensus amongst policy makers and practitioners that environmental policy must move from command and control to market based instruments. Incentive based policies could achieve India's environmental goals at lower social costs. It would also encourage innovation in cleaner technological processes leading to progressive prevention of pollution as opposed to pollution control through end of pipe treatment. An environmental policy portfolio with examples of country applications is given in the table 4. Out of the economic instruments, developing countries have made a relatively higher

use of subsidies for substitute and abatement equipment, rather than input-output taxes as the developed countries have.

Table 4: Environmental Policy Alternatives

Type	Function
1. Command and Control	
Engineering standards	Regulate technology
Performance standards	Require plants to operate in a specified manner
Discharge standard	Set limits on emission levels
Ambient standard	Environmental quality standard
Prohibition or sanction	Preclude certain activities
2. Economic Instruments	
(a) Price based MBIs	
Pollution charges	A tax applied per unit of pollution
	Examples: Germany, Netherlands, Sweden, Malayasia.
Product charges	A tax applied to products used in or resulting from polluting activity
User fees	Payment for public treatment facility
	Example: Singapore
Subsidy for substitute & abatement inputs	Grants, low interest loans to firms to meet the compliance cost
	Example: Netherlands, Sweden
Input taxes	A tax on productive inputs that contribute to environmental pollution
	Examples: Britain, German, Sweden, Taiwan
Deposit refund systems	A tax on unreturned environmentally harmful products
	Examples: Finland, Japan, Taiwan, USA
(b) Quantity based instruments	
Marketable Permits	Emission permits that can be used, sold and leased
	Example: USA
(c) Other economic incentives	
Non compliance fees	A fee or discharge in excess of standard
	Example: China
Performance bonds	A payment made to regulatory authorities that is returned if environmental damage does not occur

Type	Function
Liability assignment	Polluters are liable for paying victims and restoring damage
3. Social tools	
Voluntary compliance	Proactive actions by industry in response to perceived threats of stricter environmental regulations
	Example: Netherlands and Japan
Information systems	Public disclosure of polluting firms, ecolabelling
	Examples: Phillipines and Indonesia
Education and R&D	Demonstration of economic and environmental
Demonstration of Cleaner	benefits of cleaner production techniques
Production Measures	

Source: CREED (1997), Sawhney (1997)

Here we have mentioned various policies for pollution control. Of these instruments market based instruments like pollution tax are efficient in the sense that they can achieve a reduction of target level of pollution at the lowest cost (Hanley et al 1999, Pearce and Turner 1990, Ganguly and Roy 1999). But to determine tax rate we need to determine the marginal abatement cost of pollution. We then need to know the improvement of water quality because of these measures. As water quality is represented by different parameters, the water quality index based on all the major parameters will be useful. Lastly, we need to make an endevour to explain the pollution abatement behaviour of firms, as different firms make different efforts in reducing their pollution. A previous study (Jana and Roy 2006) has shown that in West Bengal formal regulations have played a significant role in abatement behaviour of the selected paper mills in West Bengal.

In the face of a fast growth of the industry we need to have more information to determine how a cleaner production path can be followed. First, we need to have information on current actions and the compliance status of the industry. Second, we need to know the cost of pollution treatment and also the cost of cleaner production measure. Thirdly, we need to find out the main drivers of abatement effort. All these information will be helpful for policymakers for tracing the policy-led path of cleaner production for paper industry.

5. Conclusion:

Pollution control in India is mainly based on command and control. This will be successful when there is a strong monitoring mechanism and implementation of the laws. Our study on pulp and paper industry in West Bengal reveals that formal regulation plays a very important role for pollution abatement efforts taken by mills (Jana & Roy 2006). But in many states where PCBs could not play an important role community actions have been effective (Thakkar 2007). Policy corrections and incentive based economic instruments need to be adopted more to induce actions by the polluters.

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Women Construction Workers
A Study in Kolkata District of West Bengal

*Sudip Gon**

Abstract : *Women construction workers belong to the unorganized sector of the West Bengal metropolitan economy. They work as daily workers, daily earning being low and they have accepted this work under poverty and other family compulsions. They suffer from all sorts of sufferings including physical abuses but they have hardly any alternaive.*

Keywords : unorganized sector, poverty, unemployment, health

1 Introduction

In all urban centers a large number of daily wage job-seekers gather in the morning and eagerly wait for prospective buyers for sale of their labour power. Some of them out of which large numbers are women get work for a day or for few days on contract basis in the construction industry. On livelihood ground they do compete among themselves even offering their labour power at lowest wage on account of excess supply of labour. On the one hand, there is the general problem of unemployment, on the other, social norms in the country are undergoing rapid changes. As a result, increasing numbers of females are entering the labour market. The buyers may be direct employers, petty or big contractors or even the middlemen. This market functions as oligopsony.

In the construction industry of the unorganized sector, women mostly work as helpers as they are basically unskilled and illiterate or only literate and come from poor socio-economic class. Generally most of them are abused at their worksite forcefully or in the solicitous way and they accept it silently for fear of losing job the next day or discontinuity of the contract or losing the wage of the day and they try to avoid social stigma silently. In this way women construction workers sorbidly accept this type of immoral atmosphere with either any fixed or multiple partners initially at their worksite and then outbreak around as in hotel, cinema, red-light areas in the City Of Joy. Quickly but silently defence mechanism of those women breaks down and they join the rank of antisocials to the elite society. Construction industry belongs to the unorganized sector.

According to Central Statistical Organization, the organized sector is one that is registered under Factory Act 1948 and covers those units using power and employing 10 or more workers or those units not using power but employing 20 or more workers. They have to abide by certain laws, minimum wages, labour welfare legislation under the Labour Act. Unorganized sector includes agriculture, cottage and tiny industry, construction and storage etc, where laws and legislations hardly apply.

According to National Commission on Labour, the unorganized sector has the following characteristics:

a) Small size of establishment with low investment per employee,

b) Casual nature of employment,

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c) Ignorance & illiteracy,
d) Scattered nature of establishment, and
e) Superior strength of employers.

According to ILO, characteristics of unorganized sectors are:

a) Fear of entry of new enterprises,
b) Family ownership,
c) Small size of operation,
d) Unregulated and competitive market,
e) No state support,
f) Skills acquired through job training,
g) Labour-intensive technology,
h) Bad working conditions with low wages (deplorable).

This sector accounts for 94 per cent of the total workforce throughout the country, according to ILO.

The National Commission on Self-employed Women in the Informal Sector reports that the informal workers face lots of tragic events on regular basis.

The Constitution of India enunciates three fundamental rights – a) Right to Equality (Art.14-18), b) Right to Freedom (Art.19-22), c) Right to Exploitation (Art.23-24). The State takes steps for eliminating inequality, removing exploitation and abuse, and maintaining social justice and equality. But in the construction industry we find the reverse. A large number of daily job seekers do not get minimum dignity, recognition and opportunity to enjoy the basic needs and facilities.

Thus they belong to the backward and vulnerable community and are treated as the marginalized section of the society. The State takes various policies & programmes for their betterment. But they remain in the same condition. In the capitalistic mode of production the promoters or contractors always try to get maximum profit but they do not bother about the Constitution or minimum welfare of the laborers, particularly in this type of informal industry.

The present study is conducted in metropolitan areas in Kolkata of West Bengal, namely Ultadanga, Dumdum and Rajabazar. The pick hours of the construction workers' gathering are 7-8.30 a.m.. Most of the sweat laborers (i.e, who are working in long hours at lowest wages) came from Bangladesh. They stay at rented or relative houses at North & South 24 Paraganas. Nadia or part of Hooghly & Howrah. Gradually they become permanent citizens of the State.

In Ultadanga and Dumdum the construction workers stand on railway station and its surroundings and at Rajabazar they stand near Raja Bazar Science College.

The objectives of the study are-

a) To examine education & marital status of the construction workers,
b) To study their socio-economic conditions,
c) To analysis their health condition, and
d) To analysis their work conditions and major problems.

The aim of the study is to make situation analysis of the women construction workers in Kolkata, which is part of informal or unorganized sector. The study tries to highlight their education, marital status, economic situation, health condition & major problems etc. 45 respondents were selected by purposive sampling for collection of information.

The study was conducted at three places in Kolkata. At Ultadanga approximately 300-400, at Dumdum

300-350 & Rajabazar 50-100 women labours generally gather in the morning. Hence the universe of the present study consists of 205 in an average in the age group 15-50 years. 15% of the universe has been taken as sample, i.e, sample size of the present study is 45. Mainly interview and observation methods have been adopted for the purpose of data collection.

2. MAJOR FINDINGS

Table 1 shows marital status of the women construction workers by level of education and age. 47% women are deserted (D) out of which 52% are only literate & illerate. 9% women are engaged in this industry at the age of 17th year but 68% women are engaged in this industry at the age group 18-28 & 29-39.

Table 1 Education & Marital Status and Age-wise distribution of the respondents (N-45)

Age group	Only literate			Illiterate			I to IV			V to VIII			Total
	M	W	D	M	W	D	M	W	D	M	W	D	
Up to 17Yers	Nil	Nil	1	1	Nil	Nil	Nil	Nil	Nil	1	Nil	1	4 (9%)
18-28	Nil	2	Nil	1	2	Nil	2	Nil	1	1	Nil	1	10(22%)
29-39	3	2	5	2	2	2	Nil	Nil	1	1	1	2	21(46%)
40 & above	Nil	1	1	1	Nil	2	1	Nil	2	Nil	Nil	2	10(22%)
Total	3	5	7	5	4	4	3	Nil	4	3	1	6	45(100%)

Note: M- Married, W- Widow D-Deserted.

Table 2 represents distribution of the respondent workers by religion. We observe that 82% come from Hindu family & the rest belongs to the Muslim community.

Table 2 Religion-wise distribution of the respondents (N=45)

Religion	Number of Respondent
Hindu	37 (82%)
Muslim	08 (17%)
Others	Nil

Focusing on age at marriage of the women construction worker we observe that 60% women solemnized their marriage in the age of 15-17 years and 18% were married before attaining their puberty and the rest of them (less 1 per cent) got married in between 18 and 24 years (Table 3). This happened due to ignorance, poor socio-economic & educational background and cultural heritage. Sometimes they admit hat they were burden to their parents and other members of their family.

Table 3 Age at Marriage of the respondents (N=45)

Age at Marriage	N. of Respondent
Up to 12	8(18%)
13-17	27(60%)
18-20	6(13%)
21-24	3(7%)
25 & above	1(2%)

Table 4 shows number of members of the families of the respondent construction workers. Only 11% has one or two members, 26% has three while 62% has more than four members in their families.

Table 4 Family members of the respondents (N=45)

No. of members	No. of Respondents
1	2
2	3
3	12
4	11
5	12
6 & above	5

The monthly income of the women construction workers is low. Daily wages of the workers vary from employer to employer, the average wages being Rs.75.00 per day. Only 7% earn income between Rs.2001 and Rs.2500 per month while 18% earn less then Rs.1000 per month and 59% between Rs 1001 and Rs 2000 per month. The women construction workers are treated as helpers basically; they work for long duration doing hard work & take minimum food or like that. The saving pattern of the workers also varies; 62% have no savings habit while 27% save a little bit per month (Table 5). Some of them say, "No work, No food". Some of them reply, all members including their parents & youngest bother & sister or her husband also depend on them.

Table 5 Month-wise income & savings pattern of the respondents (N=45)

Monthly income	No. of Respondent	Monthly saving	No. of Respondents
>Rs.1000.00	8(18%)	>Rs.300.00	12((27%)
1001.00-1500.00	12(26%)	301.00-400.0	02(4%)
1501.00-2000.00	15(33%)	401.00-500.00	02(4%)
2001.00-2500.00	7(15%)	501.00-above	01(2%)
2501.00-above	3(6%)	No saving	28 (62%)

Table 6 shows distribution of construction workers by some common diseases and use of contraceptives of the respondents. While 71% workers suffer from white discharge, 27% women feel lower abdomen pain, 11% have Pelvic Inflammatory Disease (PID), 6% Genital harp icc. All these are the Sexual Transmitted Infection (STI). This increases the chance of HIV (Human Immune Deficiency Virus) infection. 11

respondents do not say anything due to shyness or evade the fact or fear of social stigma. Only 16 individuals (35%) use permanent methods and 55% temporary methods and the rest 7% do not say anything.

Table 6 Common diseases & Use of Contraceptives of the respondents (N=45)

Common disease	No. of Respondents
White discharge	32
Lower abdomen pain	12
Pain in breast & waist	7
Genital harp ice	3
PID	5
No answer	11

Table 7 shows average working days the construction workers have in a month. None gets more than 26 days of work out of which 13% get less than 10days & 73% have 16.5 days work on an average. Almost all of them (38) say that the basic characteristic of this industry in Kolkata is sexual abuse or malpractices. 27 respondents say excess supply of labour in the market. They float across the city for getting job or work.

Table 7 Number of Working Days & Causes of Unemployment

Working days	No. of Respondents	Causes of Unemployment	No. of Respondents
< 10 days	6	More supply of labour	27
11-15	18	Unimpressive appearance	19
16-20	15	Abuse or Exploitation	38
21-25	6	Over aged	7
26 & above	Nil	Lack of reference	3

Table 8 explains why they choose this profession. 31 respondents report they have taken this work due to poverty, 24 respondents lack of work at local area and 16 workers report higher wages than at other works. 6 women report that the work has been taken to help her family or husband and 3 say easy earning because their work is not too much in the worksite. 26 respondents say that attitude of the male workers to them is very bad & 13 say only bad and other 2 keep silent & bend down their head downwards. Most of the women construction workers say that they are physically victimized by the co-workers on regular basis. This affects them as well as their family because majority of them are used to play dual role in the society.

Table 8 Factors for accepting this occupation

Factors	No. of Respondents
Poverty	31
Higher wage	16
Lack of work at locally	24
Help to family	06
Easy earning	03

Conclusion

Women construction workers do not represent homogeneity. They vary in socio-economic and cultural aspects and they having belonged to the unorganized worker community suffer from all sorts of sufferings and abuses of an underveloped economy and country.

Agriculture in India: Agenda for Growth Acceleration

*Pulak Mishra**

Abstract : *Growth performance of the agriculture sector vis-à-vis other sectors of the Indian economy during the reform era is retarded and discouraging. Rate of growth of rural employment was considerably low compared to that in the urban sector. The rate of rural unemployment increased sharply during 1993 to 2004. The slow growth in agriculture resulted in sluggish pace of reduction in rural poverty. The policy suggestions made in the existing studies to enhance growth performance of the agriculture sector refer to the supply side issues and sectoral in nature, and the issues related to demand are largely ignored. A more comprehensive and coherent approach that can address both the demand and supply side related issues encompassing the agricultural policies along with other policies for economic growth and development is necessary.*

Introduction

Agriculture sector has significant role to play in the process of economic development of a developing country like India in general and rural India in particular. While for the economy as a whole the sector provides food, enlarges export capability, contributes to capital formation and secures market for industrialization[1] , it absorbs the incremental portion of rural workforce until the non-agriculture sectors start generating sufficient employment opportunities and thus helps reduce hunger and poverty in the rural economy and rural-urban disparities[2] .

Initiation of economic reforms in 1991 focused mainly on fiscal adjustment, foreign trade and investment, industry and financial sectors to boost the process of growth and development of Indian Economy[3] and despite its significant role in national economies the agriculture sector was largely neglected. Although tariff reduction and import liberalization have reduced the cost of imported materials and make them easily

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[1]Many developing countries, especially in Africa depend heavily on agriculture for income, employment and foreign exchange. In India too, though declined over the years, the agriculture sector still accounts a significant portion of the country's GDP and it is the source of livelihood for nearly two-third of the total population. It also contributes considerably to the annual exports of the country. Besides, due to its large production base, the agriculture sector in India has an enormous impact on global food situation.

[2] Although today only a negligible portion of the workforce is occupied in the sector, the roots of most American rural communities are agriculture. Even at the turn of the 20th century, America was an agrarian economy with about 40 percent of its people being farmers and well above half living in very rural areas. The mechanization, specialization, routinization and standardization of agriculture could make it possible for fewer people to feed more people better freeing farmers and other rural people to work in new factories springing up in the cities as a result of the second phase industrial revolution (Ikerd, 2002).

[3] Persistently high rate of growth in the recent part suggests that the economy has responded to these reform programmes positively. It is also believed that the process of socio-economic transformation leading to overall development has been started in the country.

available to the Indian farmers, reduction in power, seed and fertilizer subsidies has raised the costs of cultivation.

This has made agriculture risky and costly and thereby affected growth performance of the sector adversely. A number of studies (e.g., Dev, 2003; Landes and Gulati, 2004, Sharma and Gulati, 2005, Mishra, 2005) attempted to explore the impact of these policy changes on various facets of the sector and there is a consensus that growth of agriculture sector got retarded in the post-reform period. This slow down in growth of the agriculture sector has not only threatened the sustainability of the growth process, but also raised prices of many of the essential agricultural commodities and put a question on the issue of the country's food security and eradication of rural poverty. The crises in the sector in the recent past have also led some farmers of the western and southern parts of the country to commit suicide.

However, of late, the policy makers could realize that the growth trajectory of the agriculture sector needs to be reversed on urgent basis to sustain and accelerate the growth of GDP as well as to make growth sufficiently inclusive. The Approach Paper to the 11th Five Year Plan has come out with a blueprint for faster and inclusive growth. In order to make the growth process faster the Approach Paper suggests to accelerate economic growth rate from 8% at the end of the 10th Plan to 10% by the end of the 11th Plan, yielding an average GDP growth rate of about 9% in the 11th Plan and then maintaining the rate of growth at 10% in the 12th Plan in order to double per capita income by 2016-17[4]. On the other hand, to make the growth process inclusive it recommends increasing agricultural GDP growth rate to 4% per year. The Plan also targets creation of 70 million new work opportunities to reduce educated unemployment to below 5%, raising real wage rate of unskilled workers by 20 percent and reducing the headcount ratio of consumption poverty by 10 percentage points.

In order to achieve these objectives, a number of policy measures have been taken / suggested. The present paper makes an attempt to critically analyze these policy initiatives to accelerate growth of Indian agriculture sector.

The rest of the paper is organized as follows. While Section 2 makes a brief review of growth performance of the sector in the post-reform era, Section 3 highlights the implications of the growth performance in relation to rural employment and poverty. Section 4 critically analyses the policy suggestions that have been made in the existing studies as well as in the Approach Paper. Section 5 suggests some policy directions for accelerating growth performance of the sector. Section 6 makes concluding observations.

2 Reforms and Growth of Agriculture: A Review

It is well established that growth performance of the agriculture sector vis-à-vis other sectors of the economy in the post-reform era is discouraging. Table 1 shows that the growth rate of GDP from the primary sector in general and the agriculture in particular recorded an increasing trend during 1970-71 to 1999-2000 but declined during 2000-01 to 2004-05 and the decline is drastic in case of the latter. This has resulted in a lower economic growth rate during the entire reforms period as compared to that during the 1980s. Further, during the reforms period the rate of growth of the primary sector or the agriculture sector was much lower than the rate of growth of GDP. In 2006-07 too, while the economy expanded at the rate of 9.4 percent, farm growth lagged seriously behind recording at just 2.7 percent.

[4] For the details, see, "Approach Paper to the 11th Five-Year Plan", ***Planning Commission***, Government of India, June 14, 2006.

Table 1 Trend Growth Rate of GDP at Factor Cost from Agriculture and Allied Activities (at Constant 1993-94 prices)

Period	Trend Growth Rate (%)		
	Agriculture & Allied Activities	Agriculture	GDP at Factor Cost
1970-71 to 1979-80	1.74	1.95	3.41
1980-81 to 1990-91	3.10	3.26	5.40
1991-92 to 1999-2000	3.28	3.33	6.28
2000-01 to 2004-05	2.03	1.83	6.11
1991-92 to 2004-05	2.45	2.39	5.84

Source: www.rbi.org.in

Share of the agriculture sector in GDP also declined consistently over the years. During 2000-01 to 2004-05 share of the sector constituted only around 20 percent of GDP (Table 2). Such decline in share with a very low rate of growth of agriculture only put some serious questions on sustainability of the growth process.

Table 2 Share of Agriculture & Allied Activities to GDP at Factor Cost (at Constant 1993-94 prices)

Period	Share in GDP at Factor Cost (%)	
	Agriculture & Allied Activities	Agriculture
1970-71 to 1979-80	42.8	37.7
1980-81 to 1990-91	36.0	32.8
1991-92 to 1999-2000	28.7	26.3
2000-01 to 2004-05	20.4	20.4
1991-92 to 2004-05	24.2	24.5

Source: www.rbi.org.in

A review of the growth performance of agriculture in terms of area, production and productivity shows that while area under cultivation declined, production and productivity increased only marginally (Table 3). While the overall production of the sector witnessed a statistically significant acceleration, there was no statistically significant acceleration or deceleration in the rate of growth of yield.

Table 3 Growth Performance of Indian Agriculture, 1991-2004

Variable	Crop	Growth Rate (%)	Acceleration/ Deceleration
Area	Food Crops	-0.2	NOC
	Non-Food Crops	-0.5	NOC
	All Crops	-0.2	NOC
Production	Food Crops	1.1	NOC
	Non-Food Crops	0.9	NOC
	All Crops	1.1	ACC
Yield	Food Crops	1.1	NOC
	Non-Food Crops	0.6	NOC
	All Crops	0.9	NOC

Note: **ACC – Statistically significant acceleration. NOC – Statistically significant no acceleration/deceleration**

Source: **Mishra (2005)**

Growth experience across crops not only varied significantly, but also was not encouraging. From Table 4 it is evident that while area under majority of the crops declined, yield increased for most of the crops only marginally. The experience is, however, mixed in respect of production. What is more important perhaps is that the rate of growth of production varied significantly across crops and the variation was considerably high in case of production. Further, the rate of growth in respect of area, production and yield for most of the crops stagnated, and even decelerated in respect of production for rubber and sugarcane, and yield for sugarcane.

Table 4 Growth Scenario across Major Crops, 1995-2004

Name of the Crop	Area		Production		Yield	
	Growth Rate (%)		Growth Rate (%)		Growth Rate (%)	
Cereals	-0.5	NOC	0.7	NOC	1.0	NOC
Rice	-0.3	NOC	0.6	NOC	1.0	NOC
Wheat	0.1	NOC	0.9	NOC	1.3	NOC
Coarse Cereals	-1.2	NOC	0.7	NOC	0.3	NOC
Pulses	-0.3	NOC	Neg.	NOC	0.5	NOC
Gram	-2.1	NOC	-1.7	NOC	0.5	NOC
Oilseeds	-1.5	NOC	-2.0	NOC	Neg.	NOC
Groundnut & Mustard	-3.3	NOC	-3.1	NOC	0.2	NOC
Rapeseed	-5.2	NOC	-3.0	NOC	1.6	NOC
Fibres	-1.7	NOC	-2.0	NOC	-1.0	NOC
Cotton	-2.0	NOC	-2.5	NOC	-1.4	NOC
Jute	0.5	NOC	2.3	NOC	1.9	NOC
Mesta	-0.6	NOC	-1.3	NOC	0.3	NOC
Plantation Crops	1.9	NOC	2.3	NOC	0.1	NOC
Tea	2.7	NOC	1.0	NOC	-1.8	NOC
Coffee	2.1	NOC	5.6	NOC	3.1	NOC
Rubber	0.7	NOC	2.4	DEC	1.5	NOC
Sugarcane	0.8	NOC	-0.6	DEC	-1.0	DEC
Tobacco	-4.5	NOC	-3.4	NOC	1.2	NOC
Potato	1.4	NOC	1.9	NOC	0.6	NOC
Absolute Coefficient of Variation	3.48		42.14		2.04	

Notes : **(i) Neg. – Negligible (< 0.05), (ii) NOC – No statistically significant acceleration/deceleration, (iii) DEC – Statistically significant deceleration.**

Source : **Mishra (2005).**

3. Implications for Rural Economy

Although there are several socio-economic implications of the retarded growth performance of the agriculture sector, the present section aims to highlight two major implications, viz. (i) rural employment and self-employment, and (ii) rural poverty.

Employment Scenario:

There is no denying the fact that the agriculture sector in India is over employed and the additional job creation potential of agriculture is minimal. Although according to the Task Force on Employment

[5] It should however be mentioned here that the rate of unemployment increased in urban sector also but the increase was not substantial possibly due to considerably high rate of growth of industry and service sector and higher rate of growth of self-employment in non-agriculture.

Opportunities this is due to low employment elasticity of 0.10 (GoI, 2001), The Special Group on Targeting Ten Million Employment Opportunities attributed the low possibility of job creation in the agriculture sector to low priority being accorded to this sector in the reform process. This means if adequate priorities are given and appropriate policies are taken, not only rate of growth of the agriculture sector can be increased but also growth of employment and/or self-employment in the sector would enhance and the base for shifting surplus workforce from agriculture to non-agriculture can be strengthened.

Table 5 shows that although it was marginally higher for rural female, the rate of growth of employment for rural male and for the rural sector as a whole was lower during 1993-2005 as compared to that during 1983-1994. Further, the rate of growth of rural employment was considerably low compared to that in the urban sector. As regards self-employment in agriculture, it is observed that the rate of growth was higher during the reform period for female stimulating the rate of growth for the rural sector as a whole, but it was reverse in respect of self-employment in non-agriculture. The decline was substantial for rural women but not so for the sector as a whole due to increase in the rate of growth for rural male during 1993-2005, though marginally. Significantly, while the rate of growth of self-employment in non-agriculture sector in the rural was higher than that in the urban sector during 1983 to 1994, it was reverse during 1994-2005. This means that self-employment in non-agriculture sector in the urban sector grew at a much faster rate during the reform era.

Table 5 Average Annual Growth Rate of Employment* and Self-Employment (%)

Category		Employment		Self-Employment			
				Agriculture		Non-Agriculture	
		1983 to 1993-94	1993-94 to 2004-05	1983 to 1993-94	1993-94 to 2004-05	1983 to 1993-94	1993-94 to 2004-05
Rural	Male	1.91	1.41	0.99	0.82	3.31	3.67
	Female	1.39	1.55	0.29	2.12	5.79	3.43
	Total	1.73	1.46	0.72	1.34	3.91	3.61
Urban	Male	3.03	3.10	2.08	0.99	3.23	4.15
	Female	3.33	3.07	6.88	1.03	1.81	4.71
	Total	3.09	3.10	3.76	1.01	2.95	4.25
Total	Male	2.19	1.87	1.03	0.83	3.27	3.91
	Female	1.65	1.78	0.50	2.07	4.06	3.94
	Total	2.01	1.84	0.82	1.32	3.44	3.92

Note: ***by Usual Status.**

***Source*: Unni and Raveendran (2007).**

The rate of rural unemployment also increased sharply during 1993 to 2004. While the rate of unemployment for rural male increased from 5.6 percent in 1993-94 to 9.0 percent in 2004, for rural female it

increased from 5.6 percent during the same period[5]. Further, the proportion of regular rural male and female workers in total workers is very low compared to their urban counterparts (Unni and Raveendran, 2007).

State of Poverty and Deprivation:

The slow growth in agriculture resulted in sluggish pace of reduction in rural poverty. The absolute number of poor and very poor and the proportion of very poor within the poor in rural India declined during 1993-2005. But, the rate of decline of rural poverty was not higher during the reform era as compared to that in the pre-reform period. In fact, the number of very poor declined at a lower pace during the post-reform era (Table 6). The rate of decline of poverty gap in the rural areas was also lower during the reform era (Dev and Ravi, 2007), raising the extent of income disparity between agriculture and non-agriculture and hence between rural and urban areas. Whatever rural poverty eradication data show, this may largely be due to impoverishment of rural peasantry, which forced them to move out of villages to seek some subsistence of living in town or cities. This is reflected in increase in poor or relative stagnation in very poor in urban areas.

Table 6 Extent of Rural Poverty in India, 1983-2005

Year	Poor (in million)			Very Poor (in million)		
	Rural	Urban	Total	Rural	Urban	Total
1983	252.05	72.29	324.34	140.57	38.39	178.96
	(45.76)	(42.27)	(44.93)	(25.52)	(22.45)	(24.79)
1993-94	247.18	77.38	324.55	102.03	38.02	140.05
	(37.26)	(32.56)	(36.02)	(15.38)	(16.00)	(15.54)
2004-05	232.16	83.31	315.48	76.70	38.42	115.12
	(29.18)	(26.02)	(28.27)	(9.64)	(12.00)	(10.32)

Note : Figures in the parentheses refer to the poverty ratio.

***Source* : Dev and Ravi (2007).**

Hence, despite numerous initiatives, the country still faces a major challenge to reduce rural hunger and poverty on a larger scale. Much high level of poverty and deprivation persists among the socially weaker section, especially among the Scheduled Tribes and Scheduled Castes. In fact, Scheduled Tribes and Scheduled Castes are among the poorest in India and constitute 40 per cent of the internally disprived population. These groups, and especially women, suffer from higher incidence of poverty, greater vulnerability and lower social status than others. This means that in order to reach its full development potential in a sustainable manner, it is necessary to address rural poverty, particularly among the socially weaker sections of the people.

4. Policy Initiatives – A Critical Assessment

The policy prescriptions made in the existing studies to enhance growth performance of the agriculture sector center around public investment for R&D and infrastructure, removal of restrictions, easy access to institutional credit, agriculture-industry linkages, irrigation facilities and extension networks etc. For example, Desai (2002) is of the view that the sector requires integrated farming approach with a paradigm shift in public and private expenditure on agriculture R&D. Rao (2003) also emphasized strengthening agriculture research and extension along with removal of restrictions on agricultural trade and processing, reinforcement of infrastructure and delivery of credit. Sharma and Gulati (2005) too suggested increase in public expenditure

for agriculture R&D and rural infrastructure. Mishra (2005) suggested formulation of crop specific policy resolutions, especially in respect of R&D along with increase in public investment, crop diversification and agriculture-industry linkages. Recently, on its critical assessment of the Prime Minister's remarks on the problems being encountered by the Indian farmers and the agriculture sector[6], Narayanmoorthy (2007) recommended reduction in cost of cultivation, increase of public investment in the sector, availability of institutional credit on easy terms and conditions, and improvement in irrigation facilities and extension networks.

The Approach Paper to the Eleventh Five Year Plan (2006) has, on the other hand, suggested the following strategy to raise agricultural output: "(a) doubling the rate of growth of irrigated area; (b) improving water management, rain water harvesting and watershed development; (c) reclaiming degraded land and focusing soil quality; (d) bridging the knowledge gap through effective extension; (e) diversifying into high value outputs, fruits, vegetables, flowers, herbs and spices, medicinal plants, bamboo, bio-diesel, but with adequate measures to ensure food security; (f) promoting animal husbandry and fishery; (g) providing easy access to credit at affordable rates; (g) improving the incentive structure and functioning of markets; and (h) refocusing on land reforms issues[7]."

While most of these are well-accepted much-discussed measures for revival of the sector, a critical assessment, however, points out the following:

- The policy suggestions made above refer to the supply side issues and issues related to demand are largely ignored. A supply push approach in isolation of demand pool initiatives may cause agriculture loss-making and thereby the growth process highly unsustainable.

- While it is well accepted that over-employment has led to decline in productivity of the agriculture sector, how to shift the excess workforce from agriculture to non-firm activities is not answered in the policy framework.

- The suggested policy measures refer to the agriculture sector in general. In other words, these policy suggestions are very much sectoral. It is evident from the above that growth performance of the sector varies significantly across crops, but crop-specific problems are not addressed and their solutions are not suggested. Considering that factors affecting growth performance vary across crops, such a general framework may lead to policy failure.

5. Policy Suggestions

The policy framework for the agriculture sector therefore needs a fresh look. It is necessary to have a more comprehensive and coherent approach that can address both the demand and supply side related issues encompassing the agricultural policies along with other policies for economic growth and development.

[6] The Prime Minister pointed out "One feature that stands out is the lack of any break through in agricultural production technology in recent years. There is a technology fatigue which we need to address" (GOI, 2007).

- Strengthening Agriculture-Industry Linkages

Agriculture and the industry sector of an economy are intimately related through various demand-supply linkages. On the one hand, a high rate of growth of the industry sector as a whole creates additional demand for wage goods. On the other hand, expansion of the agro-based industries generates additional demand for raw materials. Further, growth and development of the industry sector also benefit agriculture sector by supply of modern inputs[8].

Hence, enhancing growth of the agriculture sector and its sustainability requires strengthening its linkages with the industry sector in general and agro-processing in particular[9]. Emphasis should be put on agro-based industries with special attention to promoting food processing in order to strengthen agriculture-industry linkages as well as to reduce post-harvest losses. This should be supported by a strong regulatory mechanism to vertically integrate the two sectors effectively.

A closer linkage between the two sectors will also help the farmers in shifting production patterns, i.e., crop diversification which is essential to overcome various economic, social and ecological problems such as deceleration in productivity growth, drop in agricultural employment, decline in soil fertility, etc. Further, a greater degree of crop diversification will also reduce the risk of cultivating a particular crop and facilitates growth of rural non-farm sector and thereby shifts labour force from agriculture to non-agriculture in a significant way.

- Self-Employment Generation :

As mentioned above the employment elasticity of agriculture is very low. The same is true for the industry sector as well[10]. Such low employment elasticity of agriculture and industry has led to a growing 'tertiarisation' in the structure of employment in the economy[11] as the tertiary activities consist of 75 percent of informal sector (Sethuraman, 1981; Hammer and Manuel, 1989) with high employment generating capacity. The Special Group on Employment Generation (2002) identified rural non-farm activities as one of the major areas with high employment generating capacity. Such activities can also facilitate in shifting the rural workforce, particularly rural women from agriculture to non-agriculture through self-employment generation.

But, entering into and sustaining therein require possessing necessary knowledge and skills. Both the Central Government and different State Governments have launched various training programmes to enhance knowledge and skills in non-farm activities. But, centralized decision making process, absence of necessary information, preference for wage employment to training due to stringent financial conditions, long gestation lag and huge uncertainty of being self-employed after completion of training, and lack of proper integration with respective government support systems including financial schemes not only limit people's participation in the training programmes but also compel them on many occasions to leave the courses midway, raising the rate of dropouts.

Successful implementation of training programmes, therefore, requires a decentralized participatory framework with an effective information dissemination system, proper integration of the training programmes with various support systems of the government including financial schemes, emphasis on developing soft skills, an appropriate assessment and feedback mechanism, and extensive and continuous moral boosting

[7] For the details, see, "Approach Paper to the Eleventh Five Year Plan", ***Planning Commission***, Government of India, June 14, 2006.

and confidence building efforts on the part of the local governments, training institutes, and the NGOs.

- Decentralized and Participatory Framework

The policies and programmes for growth of the agriculture sector are formulated and other necessary decisions are taken centrally in isolation of local agro-climatic conditions, needs of the people, availability of resources, expertise and infrastructure, and these policies and programmes are only implemented through local level institutions and organisations. This makes the policies and programmes largely imposed rather than derived from the bottom end and, therefore, farmers' preferences are not truly represented therein.

It is, therefore, necessary to have a decentralized participatory framework to design the policies and programmes at the local level according to the needs and priorities of the local people and also to optimally utilize local resources and expertise. The panchayats should be given greater autonomy in this regard. This will not only raise people's confidence and hence their participation in the policies and programmes, but will also reduce chance of failure of the same. Such a decentralized framework will also make the panchayati raj institutions accountable and hence efficient. The approach should, however, be democratic and indifferent across political colours, economic status, caste and religion. This requires greater involvement of the Self-Help Groups, NGOs and other people's organization in the process of decision-making and programme implementation.

- Group Farming:

Considering increasing fragmentation of farmland and hence declining size of land holding, the small and marginal farmers should be encouraged to follow the approach of group farming. Groups should be formed with farmers holding land in the adjacent area. This will help the farmers not only in using modern technologies and hence enhancing productivity, but also in raising the scale of operation and therefore reducing the average costs. Further, such approach will also enable the farmers to restrict unfair practices by the middleman with greater bargaining power in the output market and distributing the risk of crop failure.

The model of self-help group (SHG) can be applied in this context. Apart from having the aforesaid advantages, such model of SHG will also provide the farmers greater access to institutional credit through group borrowing. This is quite important particularly considering that about 87 percent of marginal farmers and 70 percent of small farmers have no access to credit from a formal financial institution. This has compelled

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[8] However, growth of the industry sector also depends to a large extent on that of the agriculture sector as the latter supplies wage goods to the industrial sector as a whole and raw materials to the agro-based industries in particular. Besides, growth of agriculture also generates additional demand for the industrial products. Modeling of the linkages between agricultural and industrial growth has shown that a 10 per cent increase in agricultural output would increase industrial output by 5 per cent.

[9] Addressing this issue is also important in the context of ongoing debate on acquisition of agricultural land for setting up industrial units and farmers' resistance against such acquisitions in many of the states like West Bengal and Orissa.

[10] The employment elasticity of manufacturing output is only about 0.08 percent This implies that a 12 percent increase in manufacturing output leads to a mere 1 percent increase in manufacturing employment.

the farmers often to rely on "extortionate" moneylenders and with failing to repay thousands of farmers have committed suicide in recent years across India's sprawling western and southern plateau. Further, non-availability of cheaper credit has also prevented the farmers from adopting the latest technology, or buying quality seeds and fertilizers.

- Information Dissemination:

While the role of information in the process of development of a nation is well recognized, information network in rural India is in terrible shape. For example, as on December 31, 2005 the teledensity in rural India was only 1.81 as compared to the average urban teledensity of 34 creating wide rural-urban disparities in terms of access to information. Not only that, there exist inter-regional differences in teledensity as well. The Southern and the Western regions have rural teledensities of 3.87 and 2.34 respectively as compared to only 0.71 and 0.86 and 1.41 in Central, Eastern and Northern regions respectively. This low teledensity in rural India has restricted networking of rural people in agricultural extension services, market connectivity and hence protection from exploitation of middlemen, smooth flow of inputs to and output from agriculture, and hence slow down in the pace of growth of agriculture and eradication of rural poverty.

Similarly, Internet kiosks are expected to play a very significant role in agriculture. But, although different organizations in India started setting up Internet kiosks in villages a few years back, so far only about 10,000 such kiosks have been set-up, which is only 1.6 percent of the 630,000 envisaged to cover all villages of India[12]. Further, there have been several other efforts like use of videoconferences by bringing farmers in contact with agricultural experts and answering queries of the farmers. But all these being little so far have failed to create a sizeable impact in the field of agriculture.

Hence, efforts should be made in widening the information network and making the information dissemination mechanism effective in rural India. Not only rural teledensity should be increased substantially, more internet-kiosks should be set up as the village knowledge center to enhance the traditional knowledge system of the farmers and thus to create a significant difference in this area. However, it should be ensured that there is no intentional distortion to information. Further, language related barriers should be taken care of. There should be an appropriate assessment and feedback mechanism to facilitate further development of the information network and dissemination system.

- Crop-Specific Policies:

The policy framework should address crop-specific problems. This, however, requires detailed understanding to the crop-specific problems and formulation of policy resolutions accordingly. Requirements

[11]The sectoral composition of GDP for the period of 1950-2000 shows growing 'tertiarisation' in the structure of production also (Joshi, 2004).

[12] In this connection, it should be mentioned wherever the kiosks have been set up, the results are impressive. For example, *ITC e-choupal* has made a significant impact in the sector using Internet and Communications. It has led the farmers bypassing the middlemen and getting better prices for their produce and significant improvement in costs and quality of procurement of cash crops. ITC has also started efforts to see how other services can be offered at the existing e-chaupals.

of soil structure, climatic conditions, seeds and other necessary inputs and technologies, opportunities in the local market, exports potential, etc. should be taken into consideration while formulating crop-specific policy resolutions. This can be done on the basis of detailed crop-specific studies and in consultation with the experts and agricultural research institutes in the relevant fields.

6. Conclusions

Hence, reduction in rural unemployment and poverty and thereby transformation of the rural economy require the growth path of the agriculture sector to be accelerated. This is also necessary for making the growth process of the economy faster and inclusive. The existing studies made a number of policy suggestions like public investment for R&D and infrastructure, removal of restrictions, easy access to institutional credit, agriculture-industry linkages, irrigation facilities and extension networks etc. for accelerating the rate of growth of the agriculture sector. The Approach Paper to the Eleventh Five Year Plan has also suggested some of these measures along the measures like rain water harvesting and watershed development, degraded land and focusing on soil quality, bridging the knowledge gap through effective extension, improvement in the incentive structure and functioning of markets and land reforms. But, a closer scrutiny points out that most of these policy suggestions are sectoral and refers mainly to the supply side related issues.

In order to have a more comprehensive and coherent approach for the sector, the policy framework should, therefore, put emphasis on relating the agriculture intimately to the industry sector through various linkages to accelerate the pace of growth of both the sectors and to make the same sustainable. Importance should also be given on imparting training to the rural people to develop their knowledge and skills on non-farm activities to create greater employment and self-employment opportunities for them and thus to reduce pressure of workforce on agriculture sector. The small and marginal farmers should be encouraged for group farming to raise farm size for effective use of modern technologies and inputs, restricting unfair activities of the middlemen, raising bargaining power in the commodity markets and having greater access to institutional credit through group borrowing. These policy suggestions should be applied in a decentralized, democratic and participatory framework with a wide information network and effective information dissemination mechanism. Finally, along with these sectoral measures, the policy framework should also incorporate crop-specific policy to address the diversified problems across various crops.

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Gender Digital Divide and ICT Statistics: Where do we stand?

Supratim Chattopadhyay and Sanghamitra Jana**

Abstract : *Information and communication technologies, like any other technologies, impact men and women in different ways. One of the key elements of concern over the digital divide is recognition that women within developing countries are in the deepest part of this divide, further removed from the information age than the men whose poverty they share. Despite basic agreement on its existence, there is a wide divergence of perspectives on the causes and manifestations of and solutions to the gender digital divide. Unless special interventions are undertaken, it is likely that the majority of women will have no access to ICTs. Therefore concerns about gender equality need to be part of ICT development efforts. But initial studies reveal that there are very little statistics available that could help governments and development organisations deal with the issues. There is an urgent need for multi-lateral and bi-lateral agencies and governments to focus on women's exclusion from technology with increased access and further equal opportunities policies as appropriate solutions. To do this policy measure there is necessity of authentic and official statistical data. Inadequacy in the currently available data obstructs in drawing any structured relationship with digital divide and gender. The basic purpose of this paper is to identify the importance of bringing gender and ICT data into the realm of official statistics so that current global gaps in the data can be identified and closed. This paper maintains that one of the most important data gaps is in the area of gender and ICT statistics and indicators, which can be closed by the identification and collection of sex-disaggregated data and gender-specific indicators. Without data, there is no visibility; without visibility, there is no priority. From both observation and anecdotal evidence, we "know" that there is gender gap in the digital divide in several developed and almost all developing countries, but there is virtually no data to establish it. In order to have a clear picture of the impact of ICT on society, it is necessary to see whether and how ICT impact men and women differently. Without this data, the situation of a majority of the world's people vis-à-vis ICT may be overlooked*

Introduction

OECD defines digital divide as gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the Internet for a wide variety of activities. Thus the term "digital divide" broadly describes inequalities in access to computers and the Internet between groups of people based on one or more social or cultural identifiers.

There is a widespread hope within the international development community that ICTs could be a powerful tool of development and poverty reduction, and of achieving the Millennium Development Goals. Access to ICTs is linked with infrastructure and cost. A lack of access is linked to lack of infrastructure and relatively speaking, high costs and low incomes. Thus, the issue of access is linked to questions of development

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and poverty, as well as women and men's positions within households, communities and the labour market. Measuring access within a given society necessarily requires the identification of whether, and the extent to which, access differs for women and men.

Earlier notion of ICT are gender neutral - that gender is not a consideration in their use or in access to them. There is an increasing consensus in the international development community that this gap is a major source of gender inequality and one of the major obstacles to mainstreaming a gender perspective in development. If the focus of development planning is to reduce poverty and inequality, and information and communication technologies are tools to this end, then it is logical that data which will reveal the scope and intensity of the digital divide between women and men will enable to better plan and respond to development challenges. That is why United Nations Education, Scientific and Cultural Organisation (UNESCO) recognises the gender divide as "the most significant inequality to be amplified by the digital revolution" (Primo, 2003)[1].

The prelude of this discussion accepts the fact that digital divide (DD) has become a world wide phenomenon and it is more evident in developing nations. The perception of poverty now incorporates the notion of information inequality and deprivation of the benefit of ICTs. The scope of this paper is limited to an extension of the above mentioned thought and it tries to see gender inequality as an aggravating factor of DD and various factors that may lead to gender digital divide (GDD) and tries to draw attention towards inadequacy of data and statistics that may lead to a wrong policy direction. The discussion begins with introducing the concept of GDD and factors that may lead to such gender orientation of DD. Then we move towards various available statistics in the area of DD and we try to establish the fact that the GDD is even neglected or yet to appear in the conceptual plane of the policy research.

While discussing the paper a note or caution need to be mentioned regarding the term "women". All women in the developing world do not belong to one homogeneous group. There are highly variable political, socio-economic, and cultural differences that affect the lives of both men and women across different regions of the world. Not all women are disadvantaged. At the same time, however, it should be noted that gender inequality is more pervasive across societies than other forms of inequality. It is a feature of social relations in most societies, albeit in different forms.

Barriers to women's access to and use of ICT: the gender issues in ICT for developing countries with special reference to India

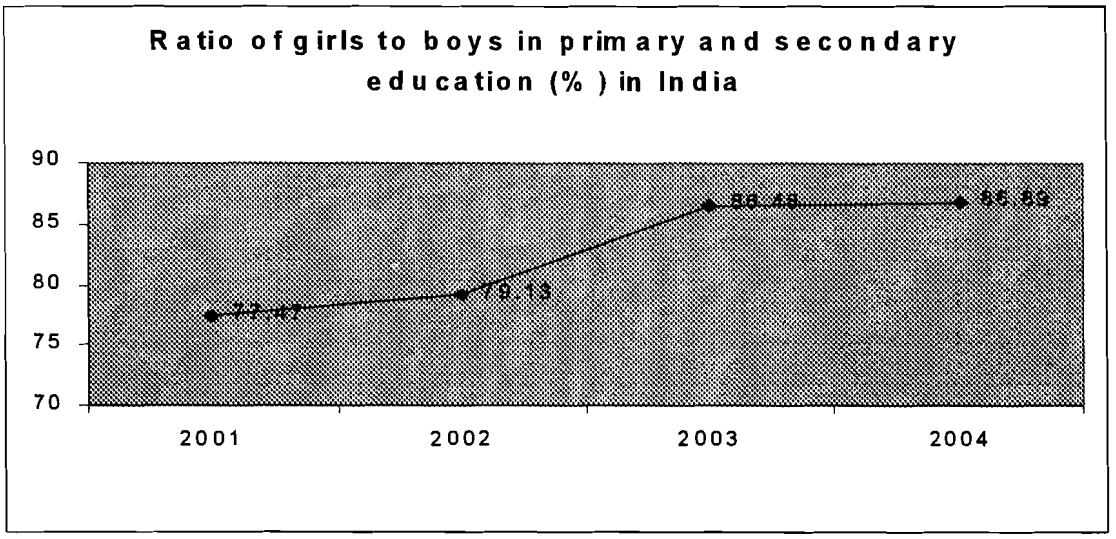
A gender approach to understanding the DD critiques technology-related inequities (the condition of being unequal disparities) in the context of larger societal and cultural inequities. Those groups most affected by the DD are the same groups historically affected by gender roles that are socially constructed through institutions such as family, religion, education, and are pervasive in daily routines. Women with in the developing countries are in the deepest part of this divide. Gender roles frame actions and shape behaviours. Many of the realities of life are different for women than they are for men. According to UNDP, "in no society do women enjoy the same opportunities as men" (UNDP, 1995)[2].The world over, most women are poorer than men, not as well educated and with lower levels of literacy. They tend to earn less and hold fewer positions of power and decision making in the family, in businesses, and in political and public life. These inequalities impact women's ability to benefit equally from the opportunities offered by information technology and to contribute fully to shaping the developing global knowledge economy and society.

Women in developing regions remain marginalised or excluded from basic education and life skills training. Many more are completely illiterate. The few that do enjoy access to basic education are increasingly

finding themselves on the wrong side of a gender-based digital divide. This understanding also broadens the significance of "access" beyond that of physical access to computers and the Internet to include access to support and encouragement to pursue and value technology-related fields, educationally and professionally (at home, in school etc.). It also includes access to non-hostile, inclusive software and Internet content.

Education

Women in developing countries are less likely than men to have the requisite education and knowledge to use ICT effectively. Women's lower levels of literacy and education relative to men, as well as negative attitudes towards girls' achievement in science and mathematics, contribute to the gender dimension of the DD. Though the ratio of girls to boys in primary and secondary education in India is increasing but rural women are lagging behind.



Graph 1

Source: World Development Indicators Database, World Bank

Social and Cultural Issues

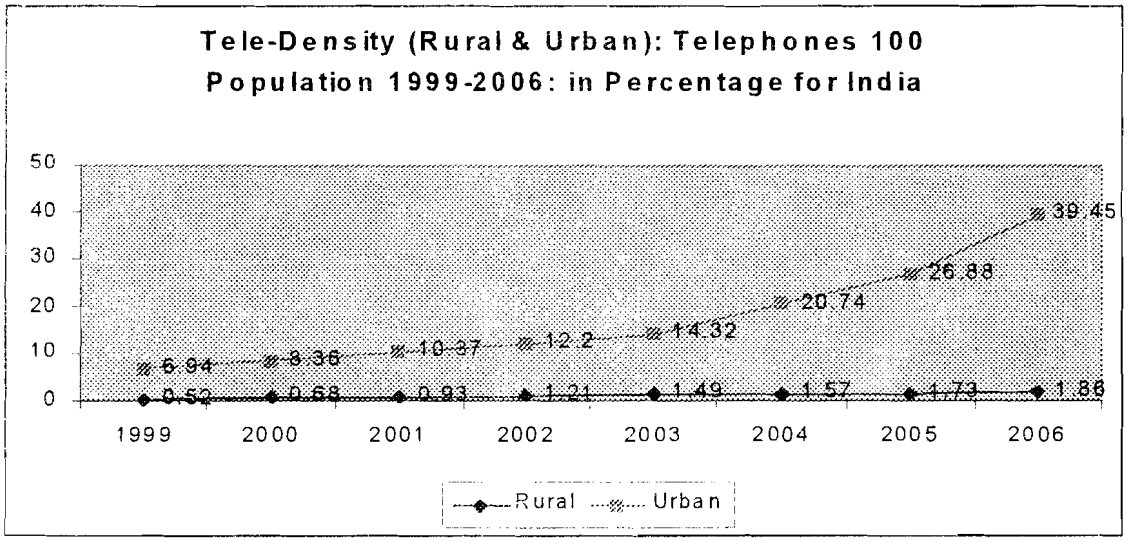
Women tend to have priorities in life different from their counterparts. For example due to the lack of easy access to water, fuel and transport, rural women in developing countries spend six to eight hours a day fetching firewood and water. Given gender-defined multiple roles and heavy domestic responsibilities, their leisure hours are few.

Frequently, information centre or cyber cafes are located in places that women may not be comfortable frequenting or that are culturally inappropriate for them to visit. Since most communications facilities in developing countries are in offices or shared public access, women also have problems of time. The public centre may not be open when women can visit them or they may be open during the evening time, when it is problematic for women to visit them and then return safely to their homes in the dark. Their mobility (both in the sense of access to transport and ability to leave the home) is also more limited than that of men.

Sometimes gender-based cultural attitudes, and not the immediate gender identification of technology use, prevent young girls and women from accessing and using ICT. In Uganda, girls did not get equal access to the limited number of computers installed in school (under a World Links Program) because of the socio-cultural norm that "girls do not run." Boys ran and got to the computers first and refused to give them up to girls. In India, in the well-known 'hole in the wall' experiment, the aggressiveness of boys pushing away girls prevented the girls from using the computers (Hafkin, 2003)[3].

Geographical Locations

Most women in developing countries live in non urban areas, without electricity or telecommunications infrastructure, while ICT processes are concentrated in urban areas. More than identifying ICT disparities, many DD scholars warn that ICT exclusion results in increased social exclusion, with Indian women 'getting further behind' (in income, education, rights etc.) as compared to men. Tele density in India is steadily increasing from 5.11% as on 31.3.03 to 12.74% as on 31.3.06 and currently stand at 15.12% as on 30-0[illegible]6. The rural telephony has not kept pace with the impressive growth in urban connectivity.



Graph 2

Source: Report of the Working Report on the Telecom Sector for the 11th Plan (2007-2012)

As seen above, the rural telephony has not kept pace with the impressive growth in urban connectivity. This in turn is leading to the widening of the 'digital divide'. The existing Rural lines are 14.77 million (Landline + FWT) and this translates into rural teledensity* of 1.86 (*without taking into consideration mobile phones provided in the rural areas).

Although the percentage of population in India living in urban India has increased form 28%in 2000 to 29% in 2005 (World Development Indicators database, 2007) but still the majority of the people live in non urban areas. The increase in the teledensity shows biasness towards the urban areas.

Financial Rresources

Women tend to have less access than men to those ICT facilities that do exist. This is because they are particularly marginalized since the great majority has no buying power and thus no access to modern means of communication.

Almost all communication facilities cost money. Women are less likely than men to own radios and televisions, or to access them when they want to, in the case of household possession of the technology. When it involves paying for information access, such as at a rural information centre or a cyber cafe, women are less likely to have the disposable income to do so (or hesitate to use family food, education, and clothing resources for information). (Hafkin, 2003)[4]

Women's limited access to resources and their insufficient purchasing power are products of a series of interrelated social, economic and cultural factors. Although woman in urban areas may have more money to access ICT facilities but rural women tend to suffer far more than urban women. Their low income along with low social status in most societies is a major contributor for not being able to use ICT facilities.

Industry and Labour

The pattern of work in the IT industry is highly gendered. Women are found in disproportionately high numbers in lowest paid and least secure jobs. The research by Asian Institute of Technology of Indian women in IT industry based in the two major cities brought out with the following observations. Women have a lower share of resources such as education, information, mobility, good health, nutritious food, leisure and rest as compared to men. As a result, they cannot fully develop their capabilities and remain lower than men in the job market. There are few women in the top management sectors in the industry. The bottom most positions employ the maximum number of women (software engineers, call centres, medical transcriptionists).

This restricts women's choices in terms of better job opportunities. (work location, work load, time commitments, travel, networking, career growth...) Women employed in the IT industry are relatively free from domestic drudgery, this is a class-specific phenomenon restricted to a few in high level jobs whose domestic responsibilities have been transferred to women of a lower economic class. The opportunities offered by IT have only benefited a privileged few. (Kelkar, 2001)[5].

Legal Restrictions in India

The Constitution of India ensures gender equality in its preamble as one of the fundamental rights. However, there still exist a wide gap between the goals enunciated in the constitution, legislation, policies, programs, and the reality of the status. In this discussion we would like to mention one Act – The Factories Act, 1948 or The Factories (Amendment) Act – 2005 amongst a few others. The section 66 of that act prohibits employment of women in factories between 1:00 p.m. and 6:00 a.m. This section was incorporated in the Act, after India's ratification of the International Labour Organization (ILO) Convention no. 89. The State Government, however, have the power to vary the limits laid down under clause (b) of sub-section (I) of the said section so as to permit employment of women in any factory or class of factories, but no such authorisation can permit employment of women between 10:00 p.m. and 5:00 a.m. The ICT companies like BPO firms, Call centres come under the factories classification. Though a few State Governments like Tamilnadu have given exemption to these industries a long path is yet to be covered to give women employees a non-discriminatory working time.

Privacy and Security

The large and growing presence of pornography on the Internet is a method of using the technology for women's sexual exploitation and harassment. The technology being used not only to create illicit content but also as a platform for pernicious acts/elements include trafficking of women through the Internet, pornography, sexual harassment and use of Internet to perpetuate violence against women.

Importance of Gender Statistics

Gender pervades how people use the Internet. But there is paucity of sex-disaggregated information on the Information Society. This reflects the more general dearth of information on women's activities across all sectors that has led to a lack of understanding of the 'different world's men and women live in'- in terms of access to education and work, health, personal security and leisure time (United Nations, 1995)". The collection and analysis of information on the differential impact of ICT on men and women is a necessary prerequisite to the achievement of a globally equitable Information Society

Without special attention to gender, men and women will not have equal opportunities to enter the information age. Without explicit gender analysis and incorporation of the results into policy, programs, and projects, it is unlikely that the results will have a positive impact on women. The benefits of ICTs may bypass women even if their countries develop an adequate infrastructure for information and service delivery. Success in integrating gender perspectives will require commitment of financial and human resources, capacity building, top leadership support and a change of agendas, practices, and attitudes at all functional levels. It will also be necessary to collect data periodically on gender and ICT trends, the impact of ICTs on gender equality, and women's participation in the ICT sector, including at the decision-making level. Trends must also be monitored closely.

At the international level, the Geneva WSIS Declaration and Plan of Action (2003) contain several references to women and gender equality, including the commitment to ensure that the information "enables women's empowerment and their full participation on the basis of equality in all spheres of society and in all decision-making processes" and to "mainstream a gender equality perspective and use ICT as a tool to that end" (para. 12 of the Declaration). The Plan of Action contains references to women and gender concerns in its paragraphs on ICTs for education and training, fostering entrepreneurship, promoting health, employment and telework, media, and ICT indicators. Frameworks and strategic plans on national ICT policies are generally devoid of women-focussed issues or pay lip-service to women's concerns. The strategic framework for ICT development in India, Malaysia, and the Philippines is silent on gender issues and considerations (although India has some programs to encourage women to use ICT in different sectors). Analysis of the current projects and policies on ICTs and digital inclusion in Brazil shows that in none of them is gender equality addressed as a main issue. The ICT Policy for China addresses women and ICT as part of the overall development of women. The ICT policy in Tanzania mentions gender, women and equitable five times in total, mostly in relation to discussions on the notion of human capital for a well-educated and learning society, but every ministry is required to have a women's desk. Among ICT policies in African countries available for review, those of Botswana, Malawi and Madagascar contain no references to women or gender equality.

There is some positive movement, though. A plan adopted in 2002 by the Ministers of Communications of the Pacific Island Forum states that "Everyone will have equal opportunity access to ICT without barriers and with special regard to women, the disadvantaged, the disabled, under represented

minorities, and those in rural and remote communities" (cited in Green and Trevor-Deutsch 2002). Indonesia has mainstreamed ICTs in its overall development plan for women, but only the Republic of Korea has a plan and a budget for this, and has pursued it vigorously (George Sciadas, 2005)[7].

Some observations on currently available official statistics and indicators to capture this divide

Statistics on women's access and usage of ICT relative to that of men are useful in understanding the gender divide. Unfortunately, there are serious information gaps and problems of reliability, as the data sources are of different quality for Asian countries. There are also anomalies and inconsistencies with regard to data collection procedures adopted by different countries, particularly for temporal comparison.

Standard presentations of ICT statistics pay no attention to gender differentials. To cite one example of this, the World Bank Development Data Group publishes "ICT at a glance", with breakdowns by country. They have breakdown the data in economic and social context, ICT sector structure, ICT sector performance. The economic and social context of 'ICT at a glance' for India does not have any data indication towards the gender gap in ICT (Table 1). No breakdowns by sex are shown for any of the indicators, despite the fact that more than half of the indicators are based on demographic data that could be disaggregated by sex. As far as most official statistics are concerned, the gender DD is invisible and unmeasured.

Table 1 : World Bank ICT at a Glance

India		
Economic and social context	2000	2005
Population, total (millions)	1,016	1,095
Urban population (% of total population)	28	29
Poverty (% of population below US$1 per day)	..	34.3
GNI per capita, Atlas method (current US$)	450	730
GDP growth, 1995–2000 and 2000–5	5.8	7.0
Adult literacy rate (% ages 15 and over).	..	61
Primary, secondary, tertiary school enrolment (% gross)	55	62

Source: World Bank Development Data Group.

Notes: Figures in italics are for years other than those specified. .. indicates data are not available.

Even in the UNESCO site the fact file on India for activities in the area of communication and information does not capture the gender differentials.

Table 2 : ICT and Population Data of India

Variable	Value	Assessing Year
Population:	1,055606,890,880	2003
GPD per capita (US$):	560	2003
Phone subscribers per 100 inhabitants:	6.45	2003
Computers:	Not available	2003
Internet hosts:	86,871	2003
Internet users:	18,481,044	2003
Internet subscribers:	4,140,000	2003
International bandwidth (Mbs):	3,000	2003
Radio households:	68,157,600	2002
TV households:	62,316,000	2002

An observation in the current Indian government documents also shows the insufficiency in data for inclusion of the gender in the DD concept and thus measuring the gender gap of digital divide. The report of the standing committee on Information technology (2004-2005), fourteenth Lok Sabha under Ministry of Communications and Information Technology (Department of Information Technology), Government of India, evolve a strategy on telecom sector for the 11th Plan with the basic objective of development of world class infrastructure for supporting accelerated growth of IT and other sectors of the economy with special focus on technological changes in access parameters, convergence of services and markets, international scenario. But it does not conceptualize the gender aspect of ICT. Report of the working group on the telecom sector for the eleventh five year plan (2007-2012) under government of India Department of Telecommunications Ministry of Communications & Information Technology (October, 2006) provides various plan of action in areas like ICT education, employment and many others with supporting telecommunication data but does not show any gender sensitivity.

Some good initiatives

There are however some notable developments. In the case of the Republic of Korea, for example, there is a conscious and deliberate process to integrate gender equality agenda into the national IT policy framework. In the area of policy planning and management, the Australian government is implementing gender-aware statistical and data gathering methods in relation to its IT and e-commerce policy.

Some good initiatives of generating statistical data for inclusion of gender factor in DD concept are taking place. Some data are available for selected developing countries along with US. Table 3 represents data on Indian women for ICT.

Table 3 : Women's internet use in India

Women as % of Internet users, 2000	23.0
Total women Internet users in '000s	115.0
Total no. Internet users in '000s	500.0
Internet users as % of total population	0.2
Female prof. & tech. workers % of total	20.5
Female literacy rate	39.4
Female GDP per capita (US$)	902

Source: Academy for Educational Development (AED) for the Office of Women in Development, Bureau for Global Programs, Field Support and Research, US Agency for International Development (USAID)

Even their statistics comes with a caveat that "It should be noted that most women Internet users in developing countries are not representative of women in these countries as a whole but, rather, are part of a small, urban, educated elite. Statistics by country are particularly puzzling because there does not appear to be any correlation between women's Internet usage and expected indicators such as female literacy rate, female GDP per capita, female representation in professional and technical jobs or gender empowerment. Developing countries with high female Internet use have low overall Internet use. In countries where the Internet is used primarily by urban elite, women are well represented."

Challenges in collecting gender statistics

According to Michael Minges the reason behind little data on gender and ICT is -First many government organizations do not collect national ICT statistics in a consistent and regular manner. Of those government agencies that compile [ICT] statistics, most do not provide a breakdown by gender. Second, traditional, ICT statistics are either obtained from telecommunication organizations (e.g. telephones) or estimated based on shipment data (e.g. personal computers). These organizations have their own operational or analytical reasons for maintaining the data, and gender is not one of them. . . . until primary ICT data collectors see market value in obtaining gender-disaggregated statistics, the data will not be widely available (Minges, 2003)[8].

George Sciadas commented while measuring the infostat for development that while some progress has been made in recent years - at least in raising the issue - much remains to be done in order to understand better why gender gaps exist and why they matter, as well as to initiate actions as to how best to close the gender digital gaps and how this links to more general disadvantages facing women. To this end, proper quantification and analysis become critical. Such efforts, however, continue to be hindered by a dearth of adequate and reliable statistical information; much like the digital divide, a statistical divide exists where the need is greatest – in developing nations. While efforts are underway to address the situation, it may be years before satisfactory progress is achieved. In the meantime, the best alternative is to compile all that exists, despite its incompleteness and heterogeneity, and combine it with contextual knowledge as a means to deepen our understanding, support much-needed policies, and monitor progress. This is where this project aspires to contribute.

Getting Rid of the Rigidity in Occupation Structure in North East India: Some Policy Implications with Reference to the Rural Economy of Arunachal Pradesh

*Debasish Neogi**

Abstract : *The typical geographical feature of some of the districts in Arunachal Pradesh is that the rural sector has to survive all by itself without depending much on the urban sector. The occupational options in the rural area include two -- agriculture and the non-farm cottage industry. However, the majority of the people still depend on agriculture for their livelihood. With the rise in population, the agricultural sector has become virtually exhausted. Lack of any effective policy to promote the non- farm sector in the state has led to a rigid occupation structure here over the past few decades. A number of Government schemes, providing incentives & finances to purchase raw materials and training the rural youths, have not been able to break the deadlock. As a result, economic growth, in this part of the world, has virtually become stagnant. This paper makes an effort to find solution to this problem and search the alternatives available to bring prosperity in the non-farm sector, which will be able to make a dent on the structural rigidity in the rural part of Arunachal Pradesh.*

1. Introduction:

Structural rigidity happens to be a notable feature of Indian economy especially during the post–reform period. Statistics show that as the share of agriculture in the G.D.P. of the country has been decreasing consistently and moving in favour of secondary and tertiary sectors, the occupation structure of the country has undergone any significant change. In 1991, 64.8% of the total work force in India depended on agriculture for their livelihood and in 2001, it dropped to 58.4%. When compared to the condition prevailing at the time of Independence, the performance is certainly promising, but the pace at which it was intended to take place has not been achieved. The reasons are many and the reasons vary from one region to the other. One can not compare the economics of Punjab, Haryana, Uttar Pradesh with that of North–East Indian states. The region has tremendous strategic importance since as a whole it has only about 2% of its boundaries attached to the 'mainland India' and around 98% border with Bhutan (650 km), China (1000 km), Nepal, Myanmar(1450 km) and Bangladesh (1640 km). Despite that, even after 60 years of Independence of the nation, the region, Arunachal Pradesh being one of the states belonging to this region, is still missing the strong links with the "mainland" of the country. The main reason for "seclusion" of the state is the geographical barrier in the forms of steep mountains, rivers and dense forests. Though efforts on part of the authority are there for the improvements in the infrastructure, transport and communication facilities, still there are some remote areas which are not connected with any motorable tracks. One has to walk a long distance to reach there. At this point it must be mentioned that Arunachal Pradesh has only 30.98% of the total road having surface as compared to 57.82% at the national level. The same in the entire

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North Eastern region is, however, further lower at 25.55%. There are also some places in the region, for example, Vekuliang in Lohit district, which remains cut-off by the flowing hilly streams during nine months of the year and it is only during the winter, when the water in the river recedes, the people in these areas come in touch with outside world.

According to the 2001 Census of Government of India, over 70% of the total population of Arunachal Pradesh live in rural areas. An estimate of the National Sample Survey Organization (NSSO) reveals that still over 56% of its population earns their livelihood from the primary sector. The state has 64.22% of the total population in the form of tribals. Though there exist more than 125 tribes, as per 1991 Census, only 15 out of those tribes has above 5000 population. The land ownership patterns as also the crops produced in the state vary from one place to the other and from one tribe to another. Rice, maize, millet, vegetables, pulses, wheat, oilseeds, spices and sugarcane etc. are recognized as the main crops of the state. However, the underdeveloped infrastructure has become the main hurdles in the way of development of agriculture here. The remote parts of the state, which incidentally produce a significant share of the agricultural produces, are normally deprived of the supply of necessary inputs like fertilizers, chemicals, pesticides etc. In the same way, the produced crops also face the problem of transportation to the markets. Though, initially, the traditional agricultural produce of the tribal people were primarily meant for self consumption, there is evidence to claim that attitudinal change among the tribal cultivators has started to come to the fore with the gradual increase in the production of marketable surplus. The surplus is brought to the nearby local markets by the farmers themselves. Commercialization of agriculture, though lately, has been introduced in the state. It has resulted in changes in the cropping pattern in the recent time. The cash crops like ginger, mustard, cardamom and green chilly and the horticultural produces like orange, apple, pineapples along with the traditional crops like paddy, buckwheat, vegetables, etc. have started to figure in the list of marketable crops. There are only 17 towns in the state and district Upper Siang does not have any urban part. The towns, though have organized markets, are normally located at far away places from the villages. Under such circumstances, it often becomes difficult to link up the economy of the villages with that of the towns. The Agriculture Produce Marketing Committee (APMC) operating in the state since 1998 is the only state owned organization looking after the marketing aspect of these produces. But it is not sufficient to absorb the entire produces. The rural economy of the state is, thus, trapped in a vicious circle where agriculture has become the only available option of occupation, which has made the occupation structure rigid, and such rigidity, in the face of decreasing returns to agriculture, has affected the socio-economic development of the people in the state. The present paper makes an attempt to find ways to break the deadlock of this structural rigidity.

2. Socio-Economic Features of Tribal People in the District:

In order to have a proper understanding of the problem, it is imperative to have knowledge of the socio-economic profile of the tribesmen of the state. The socio–economic feature of the inhabitants of the state differs widely from rural to urban areas. In the towns, apart from government establishments, there are markets having a number of petty traders and vendors. The markets meet the requirements of the people of the towns. The supply of food grains, egg, fish, meat normally occur from the sources outside the state; while the vegetables, pulses and milk etc. come both from the rural part and from outside the state. Apart from the food items, for other requirements like clothes, toiletries, luxury items, the people in the town

depend entirely on the outside sources. All it means is that the people in the towns do not have to depend much on the rural sector for their requirements. Some agricultural activities are also found within these towns. The towns are surrounded by a vast rural area.

The condition in the rural areas, on the other hand, is entirely different. A small portion of the rural areas is plain while the major part is located in the hilly terrain – covered with dense forests, steep mountains, rivers and fountains. People, here, remain scattered. Only some of the villages are connected to the nearby towns through pucca roads, while the rest of the villages are having approach roads, which are invariably kachcha. Only 38.53% of the villages in the state have any road connectivity. People in the villages have physical as well as sentimental "attachment" with land. However, not all of them are employed in agriculture. At the same time, there is a wide–spread income disparity in the rural areas. The rich families had procured land in the plain areas in the rural part and also in the towns. In the plain area within the rural sector, they started large scale harvesting. The plots in the towns have been, mostly, leased out for commercial ventures. It has led to the diversification of their sources of earnings. This has further intensified the rich-poor gap. It has a negative impact on the economic growth in the vast rural sector of the state. Annual exponential growth rate of population during 1991-2001 in the urban part of Arunachal Pradesh was 7.23% as against only 1.43% in its rural counterpart, which makes the rural-urban growth differential significantly large at 5.79%.

Table 1 provides some of the socio-economic parameters of the districts in Arunachal Pradesh. These parameters include demographic ones like population share, sex ratio, literacy rate; infrastructural status in terms of proportion of villages connected by road; economic factors given by growth rate of Net District Domestic Product (NDDP) from 1993-94 to 2000-01 and the incidence of poverty, proxied by percentage of families living below poverty line. The population share indicates the relative importance of the districts, based upon which the development strategy has to be prioritized. The sex ratio determines the extent of social imbalance existing in the state, which, in turn, reveals the progressiveness of the society. The literacy rate can be treated as a pre-requisite of any attempt to diversify the occupational structure of the region. The data on road connectivity will help to understand the core problem of the present study. The growth rate in NDDP and the extent of poverty indicates the relative performances of the districts on economic front.

Table 1 Some Socio-Economic Parameters of Arunachal Pradesh

	Demographic Factors as on 31-03-2004			Infrastructure	Economic Factor	
Districts	Population Share	Sex Ratio	Literacy Rate	% of Villages Having Road Connectivity	Growth Rate (%) of NDDP from 1993-94 to 2000-01	Percentage of BPL families during 9th plan
Tawang	3.58	963	41.14	25.66	3.46	66
West kameng	6.80	749	61.67	46.97	1.69	49
East kameng	5.20	985	40.89	26.52	0.61	69
Papum pare	11.10	899	70.89	43.02	4.30	46
Lower subansiri	8.91	985	45.01	33.17	2.60	67
Upper subansiri	5.05	973	50.89	28.18	4.90	84
West siang	9.46	913	60.31	45.72	2.73	48
East siang	7.96	937	61.22	73.68	3.00	44
Upper Siang	3.04	858	49.8	56.00	2.85	45
Dibang valley	5.25	840	59.45	66.96	2.59	38
Lohit	13.08	857	56.05	40.70	2.49	53
Changlang	11.43	905	51.98	59.57	1.42	25
Tirap	9.14	911	42.01	57.23	1.11	74
Arunachal Pradesh	100.00	901	54.74	38.53	2.78	54

Source: Directorate of Rural Development, Govt. of Arunachal Pradesh and Directorate of Economics & Statistics, Govt. of Arunachal Pradesh, *Statistical Abstract of Arunachal Pradesh 2004* and Govt. of Arunachal Pradesh, *Arunachal Pradesh Human Development Report, 2005.*

The largest share of population of the state is found in Lohit district, which has a higher incidence of literacy rate at 56.05%. The district also has large incidence of poverty with more than half of the families living below poverty line. The highest literacy rate, is, however, found in the capital district Papum pare. The sex ratio in the state is better than many other states of the country, though it varies from a low of 749 in West Kameng to 985 in East Kameng and in Lower Subansiri. As far as the extent of poverty is concerned, the highest incidence of poverty is found in Upper Subansiri, where 84% of the families live below poverty line. The irony is that it is the same Upper Subansiri district, which has recorded the highest growth rate in Net District Domestic Product in between 1993-94 and 2000-01. However, the extent of poverty existing in Arunachal Pradesh starts from a low of 25% BPL families in Changlang, which incidentally has 1.42% recorded growth in NDDP. It signifies the extent of income inequality existing even in the districts. On an average, the NSDP of the state grew by 2.78%, while 54% of household families of the state live in below poverty line status. The tribal people belonging to the lower strata of income in the society are unable to survive with their traditional cultivation in the face of improved methods adopted by the rich farmers. In addition to that, the rich land lords also spend money for increasing the sizes of land, channeling water

from different fountains and rivers to their farms. This has further improved the productivity of their land. Besides, the rich peasants often opt for horticultural activities on the slopes of the mountains. The state is famous for production of apples, oranges and pineapples, which have a reasonably good market across the country and also in abroad. On the other hand, the small and marginal farmers, out competed by the rich class, are left with no other option but to work as wage labourers. Some are compelled to look for alternative occupation. The best, among the alternatives available, is, of course, the forest-based and agro-based cottage industries. Arunachal Pradesh has 81.22% of the surface covered with forest. The bamboo and the canes, collected from the forests, are used to produce sophisticated articles for different purposes including interior decorations of the house holds. The tribal women weave traditional coats, hats, and garments made of furse. They also weave items containing excellent embroidery work. Hunting wild animals is very much a part of the tribal life. The tribal people prepare costly articles using the skins of the animals. The artisans produce sculptures with stones. They also have expertise in wood curving. In this sense, the tribal villages of the state happen to be a good source of handicraft products. Apart from the artisans, there are groups of people engaged in producing honey, ghee, country made bear etc. People are highly efficient in this part of the world. Their skills are nature gifted and the skills are normally developed without any formal training. However, as major occupational alternatives, these options have mostly remained underutilized in this state.

3. Focusing the Problem

In a remote place like Arunachal Pradesh, it often becomes difficult to have a perfect substitute of agriculture. Given the barriers in the way of inflow of knowledge regarding technological innovation, upcoming of advanced equipments and market related information, it becomes difficult even to upgrade the widespread agricultural activities. As per the Report of the Task Force on Shifting Cultivation, 1983, under Ministry of Agriculture, Govt. of India, in the entire Northeast region, as many as 4,43,336 families actively engaged in age old shifting cultivation. In Arunachal Pradesh, 54,000 families practice this cultivation. In the absence of any other effective employment alternative in the countryside, inspite of knowing the damages done by shifting cultivation on the environment and ecology, it has become difficult for the authority to persuade the people to leave these practices. There are enough evidences within India itself where prosperity in agriculture has led the economies to boom. The examples are Punjab, Haryana, Uttar Pradesh etc. These are the states, where such agricultural prosperity has opened up the option of diversification of the occupation structure – key to enhancement of the income base of the economy. It must also be mentioned at this point that the Green Revolution in the mid-sixties came to these places and had never been able to spread its reach in the remote corners of the North Eastern part of the country. As a result, inspite of having a significantly large literate mass, the entire region has not been able to come out of the traditional mode of production in agriculture and diversify much of its employment providing alternatives.

Table : 2 Occupation Structure (as % of Total Workers) in Arunachal Pradesh, 1991 and 2001

Districts	Cultivators		Agricultural Labourers		Household Industry Workers		Other Workers	
	1991	2001	1991	2001	1991	2001	1991	2001
Tawang	51.39	43.00	5.79	2.11	0.31	0.45	42.50	54.44
West Kameng	42.68	35.42	3.79	3.99	0.72	1.03	52.81	59.56
East Kameng	75.18	70.95	1.50	2.74	0.13	0.33	23.19	25.98
Papum Pare	36.59	24.36	4.25	3.35	0.13	1.41	59.02	70.88
Lower Subansiri	79.19	72.24	1.19	3.36	0.14	0.62	19.48	23.78
Upper Subansiri	65.13	68.68	0.95	2.05	0.37	0.50	33.56	28.77
West Siang	64.61	63.24	2.17	2.01	0.14	1.37	33.08	33.38
East Siang	57.05	52.23	9.79	5.78	0.11	1.92	33.06	40.07
Upper Siang	———	65.05	———	2.39	———	0.17	——	32.36
Dibang Valley	37.43	53.99	19.06	7.19	0.11	0.60	43.40	38.22
Lohit	48.97	57.64	5.80	6.53	0.18	0.69	45.05	35.14
Changlang	59.66	69.94	8.83	5.40	0.18	0.98	31.34	23.68
Tirap	71.26	78.35	0.62	0.72	0.02	0.32	28.09	23.61
Total	59.03	58.44	5.02	3.85	0.19	0.86	35.77	36.85

Source: Directorate of Economics & Statistics, Govt. of Arunachal Pradesh, *Economic Review of Arunachal Pradesh, 1994*, Itanagar and Directorate of Economics & Statistics, Govt. of Arunachal Pradesh, *Statistical Abstract of Arunachal Pradesh 2005*, Itanagar.

The literacy rate in the Northeast India is 68.64% according to 2001 census and it is pretty higher than the corresponding national average of 65.38%. In Arunachal Pradesh, the rate is 54.74% - a sharp increment to what it was in 1991 census (41.59%).

Table 2 gives a district wise profile of occupation structure in Arunachal Pradesh in 2001 and it is compared with the respective figures in 1991. It points to the rigidity in the occupation structure in the state. The proportion of cultivators has remained almost stagnant at 59%, though the percentage of agricultural labourers has decreased marginally from 5% to just below 4%. The people engaged in household industry sector are highly insignificant 0.19% in 1991 that remained still below 1% (at 0.86%) in 2001. However proportion of workers engaged in other category of work have experienced upward shift. This is the category dominated by the service sector. Out of that the lion's share of this population are in Government sector jobs and some are in trade and allied activities.

Table 3 Sectoral Contribution (in%) to NSDP

Industry	1970-71	1980-81	1990-91	1999-2000	2000-01	2001-02
Agriculture	38.33	36.91	35.09	32.84	31.16	28.89
Forestry & Logging	20.72	10.23	9.58	4.94	3.64	4.09
Fishing	0.04	0.08	0.72	1.16	1.06	1.10
Minning & Quarring	0.11	0.06	0.79	0.75	1.04	0.58
Primary Sector	59.19	47.28	46.19	39.69	36.89	34.67
Manufacturing	0.85	6.51	6.04	4.74	4.43	4.51
Construction	19.58	18.69	17.98	9.69	15.58	16.85
Electricity	-0.10	-2.99	-2.47	2.37	2.14	2.29
Secondary Sector	20.33	22.21	21.56	16.81	22.16	23.65
Transport, Storagr	1.55	0.36	0.65	6.22	5.89	6.03
Trade, Hotel	1.96	4.42	4.95	5.30	4.79	4.85
Banking & Insurance	0.11	0.60	1.49	2.08	1.78	2.06
Real Estate	0.79	7.79	5.29	2.61	2.46	2.62
Public Administration	9.98	10.36	8.17	15.09	13.80	14.09
Other Services	6.09	6.98	11.72	12.21	12.23	12.04
Tertiary Sector	20.48	30.51	32.25	43.50	40.96	41.68
Total	100	100	100	100	100	100

Source: Govt. of Arunachal Pradesh, *Arunachal Pradesh Human Development Report, 2005*.

Table 3 makes it clear that even though the proportion of people engaged in agriculture has not changed in any significant manner, the contribution of agriculture in the NSDP has decreased continuously from 38.33% in 1970-71 to 28.89% in 2001-02, a change by 9.44%. Infact, the share of the entire primary sector faced a sharp decline by almost 25% from 59.19% in 1970-71 to 34.67% in 2001-02. The secondary sector's contribution has increased marginally by 3.32% during the last three decades. However, the contribution of the tertiary sector recorded increase by 21.21% in the same span of time. The bulk of the share in this category owes to Public Administration. As its is well known that Arunachal as a state is only twenty years old (it got statehood in 1987), the process of creation of districts and administrative set ups is still continuing. In consequence, the public administration, as an economic activity, is enlarging at rapid rate in this border state of India. Added to that is the geo-political location of the state that makes it a compulsion to have an elaborate system of governance here. However, the public administration can not be considered as a permanent solution to the growing problem of unemployment and underemployment. The sector, like in the other parts of the country, has reached a near-saturation point. Given the present trend of state withdrawal and increased privatization in the economy, state governance as employment generating sector will soon cease to exist. At the same time, the most crucial issue, at present, is question of the very sustainability of the occupation in the non-farm sector. In the absence of easy access to any

organized market, the survival of people engaged in this sector depends entirely on the demand generated for their products in the agricultural sector.

The focal point of this study is this labour surplus rural economy of Arunachal Pradesh. Data on worker and non-worker in the state reveals that the proportion of non-worker in the total population of the state has increased from 53.76% in 1991 to 56.08% in 2001. Such a vast section of the society needs to be accommodated properly with adequate employment opportunities in order to have an inclusive economic development in the state. The agriculture sector is fully exhausted in the plain area and no addition to the cultivable land is now possible without destroying forests. Given this state of the economy, the total production in agriculture has ceased to show any significant upward trend. Data compiled from the *Basic Statistics of North Eastern Region, 2006*, published by North East Council of Govt. of India, shows that in Arunachal Pradesh, food grain production was 173 thousand Metric Ton (MT) in 1984-85, which increased to 176.6 thousand MT in 1996-97 and further to 184 thousand MT in 2000-01. The yield increased marginally from 1071 MT to 1165 Mt and then dropped to 1103.2 MT during the same years. At the national level, however, the yield remained higher through out. It was 1149 MT in 1984-85, increased to 1614 MT in 1996-97 and further to 1635.6 MT in 2000-01. In the short run, when the rate of growth of population is also insignificant, marketable surplus, generated in agriculture remains fixed. Moreover, the existence of inadequate local market coupled with a high transportation cost makes it impossible for the poor and marginal farmers and also the poor village artisans to find any outlet for their products. Since the people are scattered in the region, in the absence of any proper coordination among them, it becomes difficult to formulate joint marketing strategy. Contrary to that the rich farmers produce crops in large scale, which reduce the unit cost of production and transportation. As a result, the marketable surplus can reach the global market easily.

Concentrating on the non-farm sector, at present, leads to the conclusion that the markets for the non farm products converge to the demand from the people engaged in agriculture, which, in turn, depends on the amount of agricultural surplus generated. The rich landlords, after meeting self and the tenants' requirements and also after fulfilling the inventory needs send a part of the produce to the markets in town. The residual can be used to purchase the non farm products. However, given the nature of the products produced in the non farm sector, no single set of customers can be treated to form permanent market as the market gets saturated quickly. All these have resulted in the non farm sector becoming virtually stagnant and it has failed to emerge as a viable source of livelihood. The rural economy of the state is, thus, stuck to a point of structural rigidity. The Governments, both State and the Central, have announced a number of schemes for training the rural youth and financing the raw materials required for self employment. But all have failed to make any dent on the problem.

Remedy

The very nature of the problem advocates that the only way to break the rigidity lies in increasing the aggregate demand for the product in the non-farm sector. For this, two alternative policies can be suggested.

The first solution lies in the collective effort of the society. This policy consists of two steps. The first one is building up a proper coordination among these workers. The role of cooperative society in this connection will be important. In Arunachal Pradesh, the cooperative societies already exist in different

fields like running departmental stores, ration shops, poultry and dairy farms etc. But such formal societies for marketing of non-farm produces are missing in the state.

The second option is based on the policy of solving the problems of the villages by the villagers. All the rich landlords can be taxed to contribute a certain proportion of their marketable surplus to the cooperative society. The money can be collected through the chieftains of the villages, i.e. the "Gaon Burah", as he has control over the villagers. A small fraction of the money collected can be spent as the establishment expenditure of the cooperative society. The remaining part of the fund will be used to procure the finished non-farm goods from the village artisans. The goods, especially the handicrafts, clothes etc. have extensive demand in the cities in different parts of the country. The goods can also be exported. So the task of the cooperative marketing society will be to collect the goods from the remotest corners and take it to the outside market. Every year with rise in the returns from the products, a portion of the returns will be contributed towards the marketing society. This will, in turn, lead to a gradual decline in the share of the agricultural surplus invested for marketing of the non-farm products and within a short time, the requirement of taxing agriculture for the survival of the non-farm sector will fall to zero and the expenditure of the marketing will be borne by the non-farm sector itself. Unlike agriculture, this sector is not subject to decreasing return or climatic variations.

The high return in this sector will attract more youths to opt for this occupation. This will break the structural rigidity and make them move in favour of the non farm- sector.

MODEL USED FOR ANALYSIS :

It is a two sector model comprising agriculture and non-farm rural sector and it is based on the formulation of Rakshit (1982). The economy of the urban sector does not come into the purview of the model since with only tertiary sector prevailing in the urban area, the issue of any restructuring of the economy becomes irrational.

Assumptions :

(1) The society comprises three classes of people – the landlords/rich farmers, the tenants/agricultural labourers and the non-farm workers.

(2) In the short run, the total volume of production in both agriculture and the non farm sectors remain unchanged.

(3) In the primitive society of Arunachal Pradesh, where banking facilities are rarely available in the rural area, the possibility of saving on part of the poor cultivators, agriculture labourers, people engaged in non-farm work is ruled out. Thus the whole of the earnings of these economic agents are spent.

(4) The rich tribal landlords spend income on food and non farm products. Part of their savings is spent for accumulation of inventories; for extending the size of the land and for improvement of land fertility. The tenants spend income on food and on non farm products. The non farm workers spend income on food and on the non farm articles produced by other workers.

(5) With the availability of surplus labour, the wage rates in both the sectors are fixed.

(6) The output in agriculture is not demand determined. This is simply because of the essentiality of the food grains for the very survival of human being. The presence of relatively more population

in the rural area makes this assumption more realistic. But the output in the non farm sector is demand determined.

(7) For the sake of simplicity, let there be barter trade among the people.

(8) Selling the non farm goods outside the rural area are not taken into consideration.

(9) The only source of demand for the non farm sector is the surplus generated in agriculture.

(10) For different classes of the society, the marginal propensity to consume are different, but remain constant during the period under consideration. The share of the income spent by the land lords on inventories and land augmentation also remain constant during this period.

(11) In the short run, the absolute number of labourers in both the sectors remains constant.

Let the volume of output in agriculture = X

The volume of output in the non farm sector = Y

The wage rate of the labour in agriculture = w_1

The wage of the labour in the non farm sector = w_2

The wage rates are equal to the respective marginal productivities.

Let the number of labour in the agriculture = N_1

The number of labour in the non farm sector = N_2

The marginal propensity to consume food by the tenant = α

So, the MPC of the tenants for the non farm products = $(1 - \alpha)$

The MPC of the non farm workers for food = β

Accordingly, the MPC of the non farm workers for non farm goods = $(1 - \beta)$.

The MPC of the land lords for food = γ_1

The proportion of the earnings the landlords save (including inventory accumulation and land augmentation) $= \gamma_2$ and $\gamma_1 + \gamma_2 = \gamma$

So, for the landlords, the MPC for the non-farm products = $(1 - \gamma)$.

$0 < \alpha < 1$; $0 < \beta < 1$; $0 < \gamma < 1$; $\gamma < \alpha$; $\gamma < \beta$.

Thus, the income accruing to the tenant = $w_1 N_1$

The income accruing to the land lord = $(X - w_1 N_1)$

The income accruing to the worker = $w_2 N_2$

After meeting the food requirements of the landlord and the tenant, the marketable surplus in agriculture becomes :

$$X^s = (1 - \alpha) w_1 N_1 + (1 - \gamma)(X - w_1 N_1)$$

$$= w_1 N_1 [(1 - \alpha) + (1 - \gamma)(X / w_1 N_1 - 1)]$$

$$= w_1 N_1 [(1 - \alpha) + (1 - \gamma)(1/e - 1)] \quad \ldots\ldots\ldots\ldots\ldots (1)$$

where X^s = Marketable surplus;

$e = w_1 N_1 / X$ = employment elasticity of the agricultural output.

Since $w_1 N_1 < X$, and $w_1 > 0$,

$N_1 > 0$; $0 < e < 1$.

The demand for the non farm products generated from the agricultural sector is the marketable surplus, that is, X^s and that generated within the non farm sector is $(1 - \beta) Y$.

In equilibrium, in the non farm sector, demand = supply,

that is, $X^s + (1-\beta)Y = Y$

i.e $Y[1-1+\beta) = X^s$

so, $Y = X^s / \beta$ ..... (2)

Again in this sector, the total output is the total return to the workers.

So, $w_2 N_2 = Y$ ..... (3)

Putting the value of Y from equation (3) into equation (2), we get:

$w_2 N_2 = X^s / \beta$

So, $N_2 = X^s / w_2 \beta$ .....(4)

Putting the value of equation (1) into (4) , we find :

$$N_2 = [w_1 N_1 \{(1-\alpha) + (1-\gamma)(1/e-1)\}] / w_2\beta$$

$$N_2 / N_1 = [w_1\{(1-\alpha) + (1-\gamma)(1/e-1)\}] / w_2\beta$$

Given the assumption that w_1, w_2, α, β, and γ are constant, the occupation structure, represented by N_2 / N_1 will depend upon 'e'. If e falls, the value of N_2 / N_1 will rise and vice-versa.

Now, the main issue, we are concerned with, is about the behaviour of e. In fact, it depends upon the nature of production. If we assume a homogenous production function with constant return to scale, e is most likely to remain constant, so long as the investments made by the land lords is of land augmenting type [since mechanization is almost impossible in the hilly terrain, its possibility is ruled out]. Given that w_1 remains constant, the ratio of employment in agriculture and the supply of land, measured in efficiency units, will remain unchanged. This, in turn, leads to a constant e, thereby making the occupation structure to remain rigid and unchanged.

In order to break this deadlock, let us assume that a fraction 't' of the land lords surplus is taxed and contributed towards a cooperative society for procurement of non farm products and sending it to the market. Then the fund collected by the cooperative society is $= t(X - w_1 N_1)$.

Let us assume that a portion of this fund δ is spent as the establishment expenditure of the cooperative society. δ is assumed to be small. In this situation, the demand made by the cooperative society for the non farm product is

$= t(1-\delta)(X - w_1 N_1)$.

Now, the demand for the same from the land lord will be

$= (1-t)(1-\gamma)(X - w_1 N_1)$.

The total demand for the non farm goods will be the surplus generated in agriculture and surplus of the cooperative society net of the expenditure incurred on establishment account of the society and it will be :

$$X^s = (1-\alpha) w_1 N_1 + (1-t)(1-\gamma)(X - w_1 N_1) + t(1-\delta)(X - w_1 N_1)$$

$$= w_1 N_1 [(1-\alpha) + (1-t)(1-\gamma)(1/e-1) + t(1-\delta)(1/e-1)]$$

$$= w_1 N_1 [(1-\alpha) + (1/e-1)\{(1-t)(1-\gamma) + t(1-\delta)\}]$$

$$= w_1 N_1 [(1-\alpha) + (1/e-1)(1-t-\gamma + t\gamma + t - t\delta)]$$

$$= w_1 N_1 [(1-\alpha) + (1/e-1)\{(1-\gamma) + t(\gamma-\delta)\}] \quad \ldots\ldots (5)$$

Like the derivation in equation (4), it can also be derived in this case as

$N_2 = X^s / w_2 \beta$.

Putting the value of X^s from equation (5), we find,

$N_2 / N_1 = [w_1 \{(1-\alpha) + (1/e-1)\{(1-\gamma) + t(\gamma-\delta)\}\}] / w_2\beta$

For each unit of income transferred from the landlords to the cooperative society, the demand for non–farm goods, in the form of surplus, increases by $(\gamma - \delta)$. So, the multiplier in this process becomes $(\gamma - \delta)/\beta$.

Since δ is small, it can be considered that $\gamma > \delta$. We also know that $\gamma < \beta$.

As a result, the value of the multiplier $(\gamma - \delta)/\beta < 1$.

The reason for the value of the multiplier being less than 1 is the leakage of δ portion of the fund collected by the cooperative society in the form of establishment expenditure.

Thus, in this case, even if the value of 'e' remains constant, the multiplier will raise the value of N_2 / N_1, thereby, changing the occupation structure in favour of the non farm sector.

The second alternative to raise the demand for the non farm products is through State intervention. The case demands the affordability of the Government to procure the non farm products from the workers and sell it in the market. In this connection, it can well be said that the failure of the Government schemes in the past calls for a change in the policies of the Government. The Government can make the things better off if the Government investments (also) come for marketing of the products of the non farm sector. Only then, the demand for the products can be shifted in the upward direction.

Let the Government spends a lump sum amount T for procurement and marketing of the products. Then the total demand for the non farm products will be:

$X^s + T)$, where $X^s = (1-\alpha) w_1 N_1 + (1-\gamma)(X - w_1 N_1)$.

In the non farm sector, the equilibrium is given by :

$$X^s + (1-\beta)Y + T = Y$$

$$\text{i,e } Y = (X^s + T)/\beta \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(6)$$

Putting the value of X^s in equation (6), we get,

$$N_2 = (X^s + T)/w_2\beta \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(7)$$

Or, $(X^s + T) = (1-\alpha) w_1 N_1 + (1-\gamma)(X - w_1 N_1) + T$

$= w_1 N_1 [(1-\alpha) + (1-\gamma)(X/w_1 N_1 - 1) + T/w_1 N_1] \ldots\ldots(8)$

Putting the value of equation (8) into (7), we find,

$N_2 = [w_1 N_1 \{(1-\alpha) + (1-\gamma)(X/w_1 N_1 - 1) + T/w_1 N_1\}] / w_2\beta$

Or, $N_2 / N_1 = [w_1 \{(1-\alpha) + (1-\gamma)(1/e-1) + 1/e_g\}] / w_2\beta$

Where, $e_g = w_1 N_1 / T$ = elasticity of employment in agriculture with respect to the Government subsidy in the form of 'T' in the non farm sector.

If 'T' rises, e_g will fall, causing N_2 / N_1 to rise.

Thus, if the Government provides subsidy or spends on procurement and marketing of the non farm products, besides spending money on other purposes like training the people and financing the purchase of raw material, the rigidity in the occupation structure in the rural economy can be broken and the relative share of the employment will become inclined towards the non farm sector. This is the sufficient condition to solve the problem. The financing of the training and purchase of the raw materials is necessary condition. For solving any problem, satisfaction of both the criteria is a pre–requisite.

Conclusion:

The findings of the study regarding the root cause of the structural rigidity in the form of deficiency

in demand in the non farm rural sector is an indication that the market for these products have to be ensured in order to get rid off the chronic unemployment and under-employment problem in the rural sector and, thus, have a viable alternative source for employment generation. The study has also pointed out that synergetic efforts are necessary, at least, initially for the first few years to help the non farm sector to find its place in the world market. However, the success of the project will depend on the attitude of the people involved or the way the rich land lords can be 'persuaded' to contribute. The efficiency of the cooperative marketing society also plays an important role for successful completion of the project.

However, the role of the Government in healing the problem is crucial. Given the objective of the Government to increase welfare of the society, it is expected that the Government will consider the importance of the matter seriously and allocate enough resources to give the required "big push" to the non farm sector of the rural economy in Arunachal Pradesh. As a matter of fact, the existing policy of the Government in this regard has to be modified towards a need-based one.

The socio-economic and socio-cultural features of the tribal people indicate that they can work with ease, comfort and delight remaining close to the nature – among the hills, rivers and forests. Any policy, thus, prescribed for the well-being of the tribal folk should have provision of generating enough employment opportunities in the rural belt, thereby, allowing these people to stay in their native places, collect the required raw materials from the nature itself, and produce goods. With the financial support to market these products, the cottage industries, besides the traditional agriculture will, then, usher in a new era of industrialization in this remotest part of the nation. The occupation structure will cease to be rigid and a time will come, when the relative proportion of employment in the non farm sector will out number that in the agricultural sector and it will ensure a faster economic growth in the state.

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