

## RETHINKING ON RURAL DEVELOPMENT

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My association with economics began in the mid-fifties in Calcutta, and all through my student career including the period I spent in the early sixties at the London School of Economics, I was mostly taught a particular kind of economics which is generally described as neo-classical economics. The main distinguishing feature of this economics was its assumption about the role of market in bringing about a balance between production and consumption decisions made by the multitude firms and individuals. Left on their own, the market forces were supposed to move the economy towards a state of equilibrium where, subject to various constraints, the production would be maximised. The task of the economist, it was thought, was to study and forecast the market behaviour of individuals and firms, and to identify the 'externalities' which might force a departure from the movement towards equilibrium in order to undertake corrective actions. The economic relationships could be described as a system of equations, and as long as the number of equations equalled the number of unknowns in the system, the solution was known to be feasible. The computer revolution from the early sixties boosted this particular kind of analysis, and programme packages were prepared which would allow such equations to be solved within a few seconds and to produce decisions for researchers, management and planners. Economics was described as a science, a subject which was closer to natural sciences than social sciences. A large number of Ph. D. theses written during this period all over the world consisted of no more work than testing a set of hypotheses about such relationships by assembling data on a set of dependent and explanatory variables, feeding the computer with those, and then attempting an explanation of the coefficients of regression equations which emerged from the other end of the black box. In this kind of analysis there was no room for prose when mathematical symbols would do—any one writing good prose ran the risk of being described as a journalist. Social groups and relationships between these groups were not considered relevant to such analysis—human labour was no more than a 'factor' or 'input' in such equations along with steel, oil, power, and various other raw materials in the production function? Any economist venturing to explore the relationships between social groups and classes or to examine the viability

of a particular economic programme in terms of a given socio-economic context was likely to be described as a sociologist and as Gunnar Myrdal noted, to an economist 'sociologist' is not meant to be a complimentary expression.

This kind of economics also produced a theory of growth. Growth here was measured in terms of an increase in the gross national product or GNP. GNP could be used for comparisons over space and time—to determine whether the rate of growth of a particular country is higher at any given point than the historically given rate, and also the relative growth rates of different countries. GNP figures could be used for saying that Taiwan was growing faster than Pakistan, or that India was growing faster in the fifties than in the sixties. Growth was seen as the main objective of economic policy, to which the resources and manpower of a country were to be directed. It was natural therefore that a high priority was given to the identification of policies and programmes which would favour a high growth rate in case of the less developed countries. It was established, following the Harrod—Domar model, that growth rate was related to two things—first, the capital-output ratio, and secondly to the rate of saving. The first one implied a search for technologies which would produce the maximum of output with the minimum investment of capital—that is, mainly capital-intensive technologies operating on a large scale with massive production capacity which aimed at a large market including the market outside the national frontier. Secondly, the encouragement of a high rate of saving implied that income, and more of increment in income, should accrue to those with a high propensity to save. Workers and others with low income and subject to pressures to meet immediate subsistence needs were not likely to have a high saving rate, whereas businessmen and industrialists and the rich people in general were assumed to save a good part of the incremental income. Inequality, whether explicitly stated or not as a component of state policy, was viewed as an engine of growth, and not as a menace. If not actually encouraged, it was tolerated by the governments as indispensable within the scheme of things. It was not that those viewing inequality as important for growth were unaware of the social implications of such a policy—but the remedies they suggested were special relief programmes directed at those badly hurt by such economic policy. It was also assumed that the benefits of growth, initiated by richer sections, trickle down to the poorer sections. What was important was to increase the size of the cake with modern technology and inputs, the question of distribution was secondary. Capital, not labour, was seen as the main vehicle of development, and for this reason it were those in control of capital, who also happened to be those with a higher saving propensity, in whose hands the decisions regarding growth were rested.

This kind of economics also implied a particular type of approach towards the problems of rural development. Rural was equated with agricultural, and urbanisation was equated with industrialisation. The rural sector was seen as a source of food for the workers in factories and construction and for those engaged in the tertiary sector who did not produce their own food. Generation and mobilisation of surplus food from the countryside was therefore of major concern to the industrialists and governments. Secondly, the agricultural sector also produced raw materials for industries; thirdly, the population living there could be seen as consumers of industrial goods; and lastly, the rural sector supplied the urban sector with a vast reserve of manpower which could be tapped at will according to the needs of the industry. The famous Lewis model of the fifties, and its various ramifications, was based on the assumption of an unlimited supply of labour at a wage level which was somewhat higher than the subsistence wage of family labour in agriculture in order to compensate for costs of migration, higher costs of living in the urban areas, and the psychic costs of adjustment to the urban environment. Such rural-urban transfer of manpower, it was thought, could be undertaken without any loss of production in agriculture because of the existence of underemployment in that sector. On the other hand, the transfer of manpower was expected to improve the conditions of those staying on the countryside, and to create conditions favourable to modernisation and mechanisation of agriculture. Furthermore, with increasing volume of rural workers moving to urban areas, the balance in the total population between the two sectors would change, the terms of trade would swing in favour of the rural sector, and the rural wages would begin to rise—in other words, rural-urban migration would be instrumental in bringing about a balance in the living conditions, wages and working conditions between the two sectors. It is clear that in this account the issues of rural development were seen from the perspective of the needs of industrialisation. In this industry was the leading sector, and the future of the rural population was seen to lie with the industry and the eventual migration of a sizeable proportion of rural work force to the urban areas.

Over the last fifteen years or so, this particular model of growth for the rural sector of those countries, which sees the growth in GNP as the primary objective of economic policy, which accords primacy to capital over labour and the needs for capital formation even at the cost of a high level of inequality, which sees in rapid industrialisation the end of backwardness and the future of the vast mass of rural population trapped in a system with low productivity and underutilisation of manpower, has come under close scrutiny.

With reference to GNP many conceptual, statistical and ethical issues

have been raised. It is being asked, how meaningful is the measure of GNP in cases of subsistence agriculture where work is done by family labour, where economic transactions do not necessarily involve the use of money, where the food eaten by a family labour is not directly proportionate to the amount of work done in the field, and where given the role of family as both unit of production and unit of consumption—it is not easy to establish what is and what is not an economic activity, in the way one could easily do it in an urban-industrial situation where the workplace is different from the home. Would cooking of food for family workers during harvesting be taken as a consumption activity, or as a necessary part of the production process without which the output itself would suffer? More importantly, it could be asked: Is growth desirable? Could the life style and living conditions of the most developed countries of today with very high GNP per capita be set as a goal? And in any case, would the resources of the world permit such a life style for every one under the sun as compared to the present position of that privilege being confined to a small proportion of population? What is the cost of growth in terms of environmental degradation, and exhaustion of scarce resources which are likely to cripple the life of the future generations?

All these questions have shifted the emphasis in research from unidimensional concept of 'growth' in terms of a single figure of per capita GNP to a multi-dimensional concept of 'development', which is not defined in narrow economic terms but encompasses social and political aspects of life as well. Research on 'socio-economic indicators' has been largely prompted by the inadequacy of GNP as a measure of social well-being, and the need to replace it with something which captures the multi-dimensional aspect of development, including environment, nutrition, employment, literacy and several other key indicators. While the problems of determining what is and what is not a key socio-economic indicator, how could such indicators be selected and measured and then aggregated to make them a basis for classification of regions over time and space remain, there is no doubt that a beginning has been made in the right direction through the research sponsored by several United Nations agencies.

The debate on what is and what is not development has also brought into focus the issues of poverty and inequality. Experience in most third world countries has negated the assumption that gains made by the richer, and more advanced sections of the society would eventually 'trickle down' to the poor—they never do. In fact, development, more often than not, accentuates inequality and reinforces the position of the elite in urban and rural areas, as empirical studies for a large number of countries have shown. Experience in these countries also seriously challenges the assumption that the rich save—on the contrary, influenced by the life style and

consumption habits in the richer countries, the elite in the third world countries are seen to indulge in extravagant consumption, and not to save enough to promote even the capitalistic kind of development. On the contrary, a growing volume of evidence, based on data from many countries including the recent study by a group of Latin American scholars known as group, confirms the view that a bigger investment in meeting the 'basic needs' of the people for food, shelter, education, health and work might actually lead to higher growth rate even in the conventional GNP per capita terms. In other words, resources allocated to alleviate poverty, to meet their minimum biological needs, and to reduce inequality through institutional reforms would not only not reduce growth rate but also might actually promote growth. In this approach equality, and not inequality, is seen as the vehicle of development, and even of growth in the conventional sense. A consequence of this debate has been that a greater attention is now being given to poverty-focussed planning, plans to meet the basic needs, and to the institutional changes which might bring about a greater egalitarian distribution of resources.

Coming to rural development and the very elegant Lewis model, the experience of the past three decades has clearly demonstrated the limits to the amount of surplus rural labour which could be absorbed by the way of migration by the urban industries. In vast majority of the third world countries urbanisation is no longer synonymous with industrialisation—the rate of urbanisation has far exceeded the rate of growth of industries, and let alone the issue of absorption of surplus rural labour a serious problem of underutilisation of surplus labour exists in the urban areas. Some of the surplus labour is manifested in direct unemployment and some in the existence and continued growth of the elastic 'informal sector' activities which meet at least a part of the subsistence needs of the unemployed. In some cities of the third world the proportion of such informal sector employees is very large between two-fifths and one-half of the total number of earners. In this situation, it is clear that the rural sector is left with no option but to find some means of livelihood for the underutilised rural labour within the rural sector itself. Such a conclusion has par-reaching implications for a policy towards rural sector. Rural development can be seen no longer as a secondary problem, as a matter of passing interest, but as a field which concerns about four-fifths of the population and much higher proportion of those below poverty line in a country, solution to whose problems would have to be found within the rural sector itself.

Naturally, among the activities in the rural sector agriculture became the preoccupation of many scholars. In some countries, particularly those of Latin America and Africa, where land-man ratio was favourable, attention was given to land reclamation and bringing more and more land under

cultivation. But there were others where land was scarce, whatever cultivable land was there had already been brought under the plough, where any further extension of cultivation to marginal lands might actually denude the top soil and set in a process of soil erosion and desertification, and where the task of land reclamation was in any case a highly expensive business. Given the limited supply of land, and the growing pressure of population on land—which led to fragmentation of holdings and reduced the per capita holdings to between 0.10 and 0.20 hectares in many countries—the ways the agricultural production could be increased were by increasing cropping intensity—that is, cropping more than once, twice or even thrice in a year—and by modernising agriculture.

Both of these two objectives were sought to be met by the adaptation of high yielding wheat and paddy varieties developed in Mexico and Manila in various countries of the third world. Developed and widely distributed from the mid-sixties, these so-called 'miracle seeds' contained many interesting properties such as the capacity to absorb a massive dose of fertiliser without lodging, and a shorter maturing period which helped double cropping. The yield per unit of land cultivated with high yielding varieties was between two and ten times of that for the traditional varieties. No doubt, these seeds opened up the possibility of a very significant expansion of production from the available amount of land, of ending hunger and poverty on the one hand, and of generating enough surplus for the process of industrialisation on the other to proceed unimpeded by the shortage of food or a very high price of food.

Miracle seeds alone could not bring about such change. It was necessary, in order to fully exploit the production potential of these seeds, particularly their responsiveness to fertiliser, that a massive amount of chemical fertiliser would be applied alongside the seeds. Regulated water was another indispensable input which necessitated the development of ground water irrigation, in addition to canal water where it was available. The application of weedicides became necessary in order to check the excessive growth of weed which competed with the plants for fertiliser. The very growth in production attracted the pests and insects—chemicals were, therefore, necessary for pest management. Machineries, particularly tractors, were used on a big scale, alongside the seeds, partly because it helped to break the time bottleneck between the harvesting of one crop and the land preparation for another crop, and partly because the farmers owning tractors and machineries were among the first to adopt the miracle seed. The package of inputs—fertilisers, pesticides, weedicides, seeds, machineries, irrigation pumps—had to be procured from the market or imported, and supplied to the farmers; so a distribution system was set up by the government, and subsidies were offered to encourage the use of

inputs. Institutional credit at a low rate of interest was procured. The era of green revolution was lunched with a great deal of fanfare and publicity, at a great deal of cost in terms of administration, imports, and subsidies.

What was the outcome? There is no doubt that the output increased, but not to the extent expected. In case of India, the rate of growth of agricultural output in the so-called green revolution period was actually lower than that for the fifteen years preceeding the introduction of such seeds. What it succeeded in doing was to offset to a great extent the almost zero growth in the acreage under cultivation during this period but no more. Certainly the increase in output was far from revolutionary. The question is why? I can think of two major answers. First, the very nature of the technology—its capital-energy-import intensity which did not fit in with the shortage of capital and energy, and a low capacity to import which characterised many of the economies where it was applied. It worked as long as it was confined to enclaves with irrigation facilities, and appropriate infrastructure, and farmers with purchasing power, and as long as the amount of inputs needed was well within the capacity of the economy to import or produce. It failed completely when the use of the new seeds and associated inputs became widespread—there was never enough of fertilisers, diesels, power, pesticide and so on to sustain the use of the technology on a large scale.

Secondly, there was the problem of administrative bias in favour of the so-called 'progressive farmers', in effect the rich farmers, who were supposed to be more enterprising in adopting this new technology. In several countries such bias became a cornerstone of agricultural policy justified on the ground that a concentration of resources would be more productive. Rich farmers, having access to administration, credit institutions and extension agencies, and ability to plan over a longer time horizon and to absorb risks of one or two crop failures, were the first to adopt; and a good part of their extra earnings was now converted into investments in machineries, which further increased their productive capacity, credit-worthiness, and risk-bearing ability. Fifteen years since the introduction of high yielding varieties the consequences of such a selective approach are for everyone to see—growing inequality, concentration of land, and landlessness in areas with a successful record with such varieties. A second type of inequality is also growing between the regions with a highly successful application of the new technology, and regions where because of lack of irrigation facilities, or lack of resources, credit, and purchasing power such technology can not be properly and widely adopted.

It is interesting to ask why this particular technology was preferred

by the governments of a large number of third world countries. The answer lies in the timing of the introduction of the new seeds and also in the socio-political system prevailing in those countries. We have already noted that during the mid-sixties the demand-supply conditions in the world food market were turning against the food-deficit countries ; there was not enough surplus around ; and that the possibilities of increasing food production by increasing the area under cultivation were limited. There was of course the alternative of increasing food production through land reform. Many of the empirical studies of the early sixties in various third world countries showed that the relationship between farm size and land productivity was negative, and the small farmers are more efficient than the larger ones in terms of output per hectare. A redistribution of land in favour of the smaller farmers and landless could therefore increase the overall food production through a more intensive application of family labour to available land. This alternative, whose empirical validity was now beyond question, was not preferred because land reform would have eliminated the very people on whom the governments of those countries were dependent for political support. In India the rich farmers are known as 'vote banks' because of their influence over voters and the ability to transfer a large number of votes in favour of one party or another. Over time their own power over the village life has expanded through diversification of economic activities, and through their moneylending and trading activities. Land reform was, therefore, not on, and some other means of increasing land productivity had to be found. The miracle seeds, therefore, came handy to these governments, and its applications actually managed to strengthen and reinforce the economic and political position of the very same people—the rural elite, the rich farmers or kulaks—who would have been most adversely affected by land reform. Whereas land reform could have reduced the dependence of the rural poor on the rural rich, the new technology made them even more dependent on the rich farmers in the village not only for land on lease, for work as labourer, for credit, but also for irrigation water, tractor and high-yielding seeds. In the use of the new inputs one can find a convergence of interest between the rural elite of a country and the multinational agri-business interests which were actively peddling their packages to various governments of the world at that time, and in some countries, for example in case of CIBA in Indonesia, actually obtained a contract from the government concerned to manage rural development by sponsoring a package of inputs and practices.

With growing energy crisis and the accelerating prices of oil and oil products it is inconceivable that the inputs associated with the high-yielding seed varieties can be used on a much wider scale than their present level, leaving aside the issue of their adverse consequences in terms



of widening disparity in the rural areas. The question is, if the new technology is not a solution, what the solution is to problems of poverty, inequality and underutilisation of labour in the countryside in the third world countries? Let this be said that the solution does not lie in newer technologies even technologies designed specifically for the rural poor. Technologies are not neutral, pure products of scientific effort. Technologies, are sponsored and developed at a certain cost by the government or business interests. Technologies are not independent of institutions and social systems which produce those; on the contrary, each technology carries the genetic imprint of these institutions. Furthermore, as long as the power in the rural areas remains in the hands of the rich minority, technologies as well as government schemes and subsidies aimed at the poor are likely to be appropriated by the rural rich. This is as much true of the HYV technology, as of biogas plants, shallow tubewells, and technologies for the improvement of storage structure. The solution is, therefore, not primarily a technological one.

The solution lies primarily in taking power away from the rich minority and in giving it to the rural poor. Only this way can we ensure that the resources spent by the public bodies and the infrastructure created by public fund would benefit the rural majority—who are poor farmers, tenants, landless labourers and artisans. Without a drastic restructuring of the rural society, rural development programmes—even when these are specifically designed to serve the interests of the rural poor, as the experience with the Small Farmer Development Agencies in India shows—would continue to enrich the richer segments, increase land concentration and landlessness. There is no other way.

Land reform is, therefore, very much a precondition of rural development—here I am concerned with rural development of the kind which benefits the rural majority and not the rich minority. Land reform, as we have already noted, would not lead to a decline in agricultural production, but given the size range and the technology used in the agriculture in most third world countries, it might actually significantly augment the total output. It is true that land reform might bring down the 'distress sale' by poor farmers at a low price at the time of harvesting—this by itself should be seen as a good outcome and not a bad one as one accustomed to seeing things from a purely urban perspective would do but, as the experience of countries with successful land reform programme shows, this would not adversely affect the aggregate flow of surplus to the towns, and harm a programme of industrialisation. Furthermore, one might even argue that land reform, by raising the purchasing power and improving the conditions

of living of the rural majority, would vastly expand the market for industrial goods in the rural sector, and thereby actually would facilitate industrialisation process which presently suffers from the limitations of internal market.

The greatest benefit to come from land reform would be in the opportunities it would create to mobilise manpower for creating communal assets in the countryside. For countries of Asia and Africa which are deficient in capital, machineries, and import capacity, and skilled manpower, but which have no dearth of unskilled manpower, this would have important implications for a programme of rural development which is based towards large scale use of local labour for constructing canals, roads, bunds, tubewells and so on. Such communal mobilisation of labour is not possible as long as gross inequality exists in the countryside and the fruits of communal labour are likely to be appropriated by powerful individuals. With land reform, elimination or substantial weakening of the influence of the rich farmers, an egalitarian distribution of land and a decline in landlessness, an institutional structure is created which is favourable to such mass mobilisation of workforce, because now the benefits of mass labour are going to be shared equally by the entire village community. Land reform would thus create the basis for a self-reliant, participatory rural development programme which is based on local needs identified by the majority of the villagers, in place of those imposed from above, which cater for the needs of only one section of the population.

In vast majority of the third world countries there is no alternative to such mass mobilisation of workforce. This is partly because of the work opportunity it would create for otherwise unused manpower, and partly because the governments can not afford any other way of development. Over the last three years I have been working closely with the leftwing government of West Bengal in India, and I find two interesting things—first, the excessive dependence of the rural poor on the government even for things which they can do themselves, that is, building bridges across the canal or building access roads; and secondly, the resources of the government—poor as the taxpayers are—are too limited to permit a massive government-financed programme for rural development. To give an example, if each of the 38,000 villages of West Bengal is awarded one deep tubewell, which would allow for the cultivation of second crop in about 40-50 acres of land, this by itself would exhaust the entire development budget of the state for two years. For this reason I am convinced that there is no alternative to large scale voluntary contribution of labour for creating social assets in the villages and the experience of West Bengal shows that it can be done more effectively when a greater equality is established in the distribution of land, and the political power

is wrested from the hands of the rich minority. Land reform, shift in the locus of political power in the countryside from the rich to the poor, and the participation of the majority in work and development decisions—in my opinion—these are the major components of a relevant strategy for rural development in the third world countries.

In many countries of the third world a tradition of labour mobilisation in communal work exists. One of the best examples of that I saw in Afghanistan where it is customary for people of several villages to join together to construct wells—known as Karez—which tap underground rivers in the hills and divert those to the plains. The wells allow people to go down to work with simple tools in order to build those underground tunnels. The work involves literally thousands of man-months, and it has to be done every year, because in each spring snow in Hindukush melts and the huge volume of water which passes through those underground rivers at the time of 'spring flush' destroys the network of tunnels and the wells. Traditionally the Afghans carry out this extraordinarily hard work every year and a system of village social organisation exists to oversee such work, because this water is so important to their agriculture and also because the benefits of Karez are not appropriated by powerful individuals. Unfortunately, this fine tradition is on its way out, because of increasing commercialisation of agriculture and the growing dependence on the government for such activities. The villagers in many places would now prefer to wait for several years than to contribute their labour voluntarily to a work which would benefit only them and no one else. It is necessary for such traditions to be preserved and to build social and political institutions—like panchayats in West Bengal—which would enable such communal work to be maintained.

Land reform is essentially a matter of political decision. The more dependent a government is on the rural elite for political support the less likely it is that it would venture to undertake radical and meaningful land reform. It is not a question of goodwill or lack of it on the part of the government towards the rural majority, but a matter of survival or death of the political forces and parties which are dependent on the rural rich. For this reason, looking closely at the governments of most third world countries I do not see any particular reason to hope that they would take the task of land reform any more seriously than they did in the past. Whether land reform is carried out in those countries would therefore largely depend on the success or otherwise of new political forces aligned to the poorer sections of the society in capturing state power in those countries.

Let my talk not create the wrong impression that land reform is an end in itself. Land reform is very often no more than a precondition for

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revolutionary social change. Land reform does not simply mean redistribution of land—there may not be enough land to give to every landless in any case. The solution to the problems of rural development—of poverty and joblessness—may not lie in land or agriculture, but in industries and other activities in rural areas. But the significance of land reform does not rest primarily on the material gains it confers on the rural poor, but on the social and psychological change it brings about in the rural poor, in making him feel important, in giving him his sense of self-respect and confidence in his ability, and in making him conscious of his rights, and of being a part of a social entity, which decides for itself and works to attain what is good for the society as a whole.

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# RECENT DEVELOPMENTS IN THEORETICAL MACROECONOMICS

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Initially there is a problem. What do we actually mean by the term 'recent'? Periodisation of economic theory, with its attendant policy package, is always difficult. It is more so when we consider macroeconomics. In fact, macroeconomic theory, with all its technicalities, was born after Keynes published his *General Theory* in 1936, which, in the background of the history of economic thought, is recent enough for our consideration. By 'recent development' therefore we may talk about developments since 1936 up to the present time. This period is characterised by momentous, to be precise revolutionary, developments in macroeconomics.

One special feature of macroeconomic theory, which I consider to be very basic, is that it is always oriented towards policy formulations. Macroeconomic theorizing, as a pure intellectual exercise, is only a very recent phenomenon. It is well-known that Keynes developed his short-run income determination model just because the classical remedies to fight depression proved severely inadequate. A strong dose of fiscalism was needed which required a new and alternative paradigm. The motivation, here, was incontrovertibly how to prescribe some kind of stabilization policies which would be effective. All this is known story. But what is not so well-known, at least not explicitly emphasized, is that this one-to-one correspondence between academic macroeconomics and applied macroeconomics was rather short-lived. It continued till 1970 when the so-called 'consensus model' broke down for both empirical and theoretical reasons. Let me briefly recall this piece of the history of economic thought.

The year 1937 is important for macroeconomic modelling when Hicks interpreted Keynes's *General Theory* in terms of his IS/LM model. The model takes prices as given. To explain the adjustment of prices, a Phillips Curve of some sort was appended. Perhaps the Phillips Curve even had the natural rate property, allowing the economy to be self-correcting in the long run. This model was considered, for the time being, as the 'Consensus Model'. Theorists agreed that some such model described, more or less correctly, the macroeconomic behaviour of the economy. At the more applied level, this consensus was embodied in the large-scale macroeconometric models, such as MPS or the DRI model. Attempts were made to refine these models. Private and public

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decision makers confidently used these models to forecast important economic time series and to evaluate the impact of alternative macroeconomic policies.

The closeness of the links between academic macroeconomists and the applied macroeconomists received a severe jolt in the sixties and seventies. The consensus view faltered for both theoretical and empirical reasons. Empirically the consensus view could not tackle the rising rates of inflation and unemployment experienced during the 1970s. The theoretical reason was that the macroeconomic practice was not based on solid microeconomic principles. The gap between practice and principles was too great to be intellectually satisfying.

Attack came from two sources. First, Friedman (1968, 'The Role of Monetary Policy') and Phelps (1968, 'Money Wage Dynamics and the Labour Market Equilibrium', JPE August) argued from microeconomic principles that the original Phillips Curve empirical relationship between inflation and unemployment would break down if policy makers attempted to exploit it. After all, the equilibrium level of unemployment should depend on labour supply, labour demand, optimal search times, and other macroeconomic considerations, not on the average rate of money growth. Subsequent events proved Friedman and Phelps correct, as inflation rose without any reduction in unemployment.

The other attack came from Robert Lucas (1976, 'Ec. Policy Evaluation: A Critique', Carnegie-Rochester Conference on Public Policy I). His was a comprehensive attack on the whole approach and came to be known as the "Lucas Critique". Lucas pointed out that many of the empirical relationships that make up the large-scale macroeconomic models were no better founded on microeconomic principles than was the original Phillips Curve. In particular the decisions that determine most macroeconomic variables, such as consumption and investment, depend crucially upon expectations of the future state of the economy. Macroeconometric models treated expectations in a very cavalier way, most often making up plausible but arbitrary proxies. Lucas pointed out that an important feature of most policy interventions is that they change the way the individuals form expectations about the future. Proxies for expectation used in the models failed to take account of this feature. The implication of Lucas critique is that such large-scale macroeconomic models should not be used for the purpose of alternative policy evaluations.

'Lucas Critique' destroyed the consensus. Even then the defenders of the consensus school argued that the macroeconomic models are informative enough and, if used carefully, might yield fruitful results.

Their view is that much of the stagflationary 1970s can be attributed to the OPEC Supply Shock. The remainder could always have been attributed to a few large residuals. Heteroscedasticity has never been a reason to throw out an otherwise good model. These defences, however, were not heeded.

Recent researches in the post-Lucas Critique period are mainly directed towards building up the microfoundation of macroeconomics. These exercises are essentially technical and quite unrelated to the contemporary macroeconomic problems. Applied macroeconomists rightly thought of these exercises as quite esoteric, and for all practical purposes they were useless. Applied macroeconomists may be right in their criticism.

Talking about recent theoretical researches in macroeconomics, we may adopt the following taxonomy :

(i) To model *expectations* in a more satisfactory way than what was common in the past. New and surprising implications of many standard models can be deduced from a careful treatment of expectations. The axiom of Rational Expectations and its widespread acceptance may be considered the most significant change in macroeconomics in the past three decades.

(2) Attempts to explain macroeconomic phenomena within the context of *equilibrium* models. By equilibrium is meant that wages and prices adjust instantly to equate supply and demand. In this view Non-market-clearing theory is not needed to explain economic fluctuations. The consensus view is based on some such non-market-clearing presumption. Recent research, however, has shown that intertemporal equilibrium models have much richer implications and are not so easily dismissed.

(3) To rebuild macroeconomics within the context of *disequilibrium* models. This category is the most Keynesian and the most compatible with the textbook IS/LM model. This research can be viewed as attempting to put the textbook Keynesian analysis on firm microeconomic foundations.

The axiom of Rational Expectations has two very serious consequences for policy : First, it makes all policy moves irrelevant. Sargent and Wallace [ Thomas Sargent and Neil Wallace : "Rational Expectations, the Optimal Monetary Instrument and the Optimal Money Supply Rule." J.P.E, April 1975 ] said that if expectations are rational then systematic monetary policy is irrelevant to the path of output and employment. Sargent and Wallace merely applied rational expectations to the natural rate Phillips Curve of Friedman and Phelps. This P. C. posits that expected inflation does not affect unemployment, but that unexpected inflation temporarily lowers unemployment below the natural rate, since the assumption of RE rules out surprising people systematically, S/W concluded

that systematic monetary policy can affect only expected inflation, not unexpected inflation and unemployment.

The meaning of the S/W result has to be correctly stated. Policy irrelevance was sometimes said to be the implication of R. E. per se. We now know that the rational expectation is not the issue at all. Stanley Fischer (1977. 'Long-term Contracts, Rational Expectations and the Optimal Money Supply Rule', JPE) showed that it is entirely possible to construct models with R. E. in which systematic monetary policy can stabilize the economy. Fischer's model, in which sticky wages play a crucial role, produces Keynesian policy prescriptions despite the presence of Rational Expectations. Taylor's staggered wage model also yields identical results.

The second important consequence of framing models with R. E. is that it makes Rules rather than Discretion to be a superior policy stance. Finn Kydland and Edward Prescott ('Rules rather than Discretion: the Inconsistency of optimal Plans', JPE, 1977) have provided a new and persuasive reason to be sceptical about discretion in the conduct of monetary policy. In particular, a monetary authority with discretion is likely to choose too high a rate of inflation. This problem, generally called the time inconsistency of optimal policy, is considered to be rather important.

### **Equilibrium Approach**

The goal of the new classical revolution has been to rebuild macro-economics while maintaining the axioms that individuals always optimise, and more controversially, that markets always clear.

There have been two major strands to this research programme.

(1) The early work of Lucas ('Expectations and Neutrality of Money', J of Ec. Theory, 1972; Some International Evidence on Output-Inflation Trade-offs', AER 1973) emphasized the role of imperfect information regarding prices. The explanation assumes that individuals have imperfect information about the current price level and thus mistake movements in *absolute* prices for relative price change. An unanticipated inflation leads individuals to infer that relative prices of the goods they produce is temporarily high, which induces them to increase the quantity supplied. This story thus generates the natural rate Phillips Curve of Friedman and Phelps, in which output depends on the deviation of inflation from expected inflation.

(2) A more recent tradition has emphasized the inter-temporal substitution of consumption and leisure caused by exogenous technological disturbances. This is the 'Real Business Cycle' approach. (Barro and King: 'Time Separable Preferences and Intertemporal Substitution Models of Business Cycles', JPE, 1983). The 'real business cycle' models



have the virtue of being rigorously founded on microeconomic principles; they are actually simplified intertemporal Walrasian model. Many of the characteristics of economic time series can be surprisingly well mimicked with such models.

### **Disequilibrium Approach**

Disequilibrium macrotheory is directed towards providing justification for the non-Walrasian assumption of textbook Keynesian economics. Do co-ordination failures leading to wage and price rigidity have any micro-economic justification? The disequilibrium theorists, answer is in the affirmative. Stan Fischer and John Taylor in terms of their long-term labour contracts and staggered wage-setting models have tried to provide an explanation of nominal wage stickiness. But this explanation has been criticised. It has been asked if these nominal wage contracts are responsible for large and inefficient fluctuations in output and employment, then why do workers and firms write these contracts? Again, this is a question of the microfoundation of nominal wage stickiness. No doubt, there has been much theoretical work studying optimal risk sharing arrangements between firms and workers. It is clear that optimal contracts cannot produce the nominal wage stickiness on which Fischer and Taylor, as well as textbook models rely.

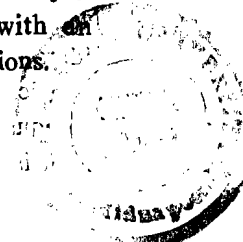
Then again there is an empirical objection. The cyclical behaviour of the real wage does not appear consistent with model incorporating a predetermined nominal wage and movements along a standard downward-sloping labour demand schedule. To the extent that fluctuations are driven by aggregate demand real wages should be countercyclical, once the nominal wages are kept unchanged. Yet, in the data, real wages appear acyclical or a bit procyclical. The prediction of counter-cyclical real wages cannot be easily reconciled with observation.

### **New Keynesian View**

In view of the above problems with sticky nominal wages, the economists in the 1980's have turned away from the labour market and paid attention to the goods market. A 'new Keynesian' view has been emerging. According to the view, the problem in a recession is not that labour costs are high but that sales are low. This emphasis on the goods market can avoid the problem that plagued the textbook story. The New Keynesians combine the Keynesian recognition that the economy does not adjust instantly and smoothly to shocks, including monetary shocks, with an insistence on building their explanations on microeconomic foundations.

New Keynesianism is built on three main microfoundations :

- (1) Efficiency wage theory



(2) The connection between monopolistic competition and traditional macroeconomic propositions and

(3) The role of imperfect information in financial markets.

Efficiency wage models are possibly the most popular in explaining wage rigidities. The argument is that firms do not reduce wages in the face of unemployment because doing so would also reduce productivity. The reason for the reduction in productivity may be that lower paid workers put out less effort, that lowering the wage reduces the average quality of workers, since the best workers quit, etc. In all of these stories, the forces moving the labour market to the equilibrium of supply and demand are absent.

In the goods market, because of the presence of monopolists, prices are not lowered when demand falters. The sellers, it is argued, do not have much incentive to cut their prices to restore equilibrium. The benefit of a price reduction to the firm may be small (second order) even though the benefit to society can be large (first order). If firms face a small 'menu cost' to changing prices or if they are only 'near rational' they might maintain their old prices despite the substantial social loss from this price stickiness. (Mankiw: 'Small Menu Cost and Large Business Cycles: A Macroeconomic Model of Monopoly', QJE, May 1985; Akerlof and Janet Yellen: 'A Near-Rational Model of the Business Cycles with Wage and Price Inflation', QJE (supplement 1985); Blanchard and Kiyotaki: 'Monopolistic Competition and the Effects of Aggregate Demand', AER, Sept, 1987). Unlike the nominal wage rigidity of the old Keynesian view, the price rigidity of the New Keynesian view does not require any apparent substantial departure from rationality.

The role of imperfect information in financial markets is to generate the credit-rationing stories of the Keynesian vintage where financial intermediation in the transmission mechanism of monetary policy produces the expected real effects.

Our story will be incomplete if we do not even briefly mention what is called *Supply-side Economics*. SSE focuses on the incentive effects of taxation. There are two groups - mainstream and radical. The radical group attracted much attention at the time the new Reagan fiscal policy was going into effect in 1981. The group argued that the incentives of taxes were powerful enough to prevent tax cuts from causing a major budget deficit and would have a powerful supply-side effect on inflation. Neither argument was supported by later events. Mainstream supply-siders continue to be influential in policy making and economics. The SSE is basically oriented towards policy-making. But its theoretical basis is inadequately developed and in the opinion of an important macrotheorist it is 'flashy sidelights' in the evolution of economic thought.

It is clear from our above survey of recent theoretical researches in macroeconomics that the academic macroeconomics is not directly motivated by policy challenges for macroeconomic stabilization. In fact, according to more powerful and persuasive Rational Expectations School the policy is irrelevant to stabilization, and if we need any guidance then a Rule rather than any Discretion on the part of authority is strongly recommended. At the policy level, authorities depend more or less on their institution and political compulsions. Macropolicies have differential impact on the different categories of interest groups. Recent theoretical researches, as we have said, are all directed to building up the micro-foundations of macroeconomics. But the question that I would like to ask is : why is this almost paranoid search for microfoundations ? Do we have to accept that macrotheory does not have any autonomous status, outside the traditional microeconomic principles ? Keynes is the founder of modern macroeconomics and he learnt his economics from Alfred Marshall, the doyen of neo-classical microtheory. And there is no reason to suspect that he was not adequately trained by his mentor, Why then is Keynes indifferent to the micro base of the paradigm that he was trying to construct ? I do not know the answer. I may, however, hazard a guess. Keynes did have a clear perception of the fact that the Walrasian general equilibrium system is totally unsuitable for his purpose. Walrasian general equilibrium system, as everybody knows, is a market-clearing full employment system. Hence, where markets do not clear, which is an objective fact, a new non-Walrasian General Equilibrium system is needed where we may have what Keynes said 'an under-employment equilibrium' situation. Equilibrium here is used in Keynes's sense. The type of non-Walrasian G. E. that Keynes thought of, but himself did not develop, is yet to be formulated. The non-Walrasian G. E. that has been developed does not discard Walrasian axioms. This is not what Keynes wanted. His view in the *General Theory* are crystal clear. Let me quote

If the classical theory is only applicable to the case of full employment it is fallacious to apply it to the problems of involuntary unemployment—if there is such a thing ( and who can denyit ? ). The classical theorists resemble Euclidean geometers in a non-Euclidean world who, discovering that in experience straight lines apparently parallel often meet, rebuke the lines for not keeping straight—as the only remedy for the unfortunate collisions which are occurring. Yet, in truth, there is no remedy except to throw over the axiom of parallels and to work out a non-Euclidean geometry. Something similar is required today in economics.

It is not, therefore, an error to say that Keynes wanted to build up

macroeconomics as an autonomous subject. I may also add that if one reads his G. T. a little carefully as well as the correspondence relating to the classic book which has been published in the 29th volume of Keynes's collected writings, then it will be clear that Keynes had a different kind of microrationality in the context of co-ordination failures. This does not have a neoclassical parentage. In my opinion, the views of the New Keynesian school as well as the arguments of some members like Paul Davidson, Eichner, Sydney Weintraub and others of the Post Keynesian school merit much closer attention. In a monetary economy with endemic uncertainty, money can never be neutral. It has always real effects. This is not to deny that their arguments have some loose ends which are yet to be neatly tied together. We have to wait for a truly non-Walrasian General Equilibrium System which would give an autonomy to the modern macroeconomics as a distinct branch of economic theory.

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# URBAN POVERTY

## A STUDY OF KHARAGPUR TOWN

K. MAJUMDAR\* AND S. N. SAU\*\*

### I

Poverty is a great curse on humanity. It is a situational syndrome in which under-consumption, low educational level, bad sanitary conditions, etc. are combined. It is an absolute deprivation of the person's capacity and implies a failure to develop a person's ability to find even the bare necessities of life. The urban poor are more visible and more vocal than their rural counterparts. Urban is a spatial concept which refers to a concentrated settlement. In the precolonial days towns were roughly the trading centres, army camps or places of pilgrimage where the royal court was located. Now-a-days town represents the concentration of non-agricultural activities including trade and industry, and exhibits the modernized traits. Even in the modernized urban society problems of poverty and unemployment are assuming large dimension owing to the large migration flows from the rural hinterland. In fact, urban poverty has turned out to be the product of rural poverty.

Unlike the rural poor the urban poor live in an almost entirely monetised economy. They have for most part to buy their food, fuel and often drinking water, though in the less crowded urban areas some small livestock may be kept. They mainly live in slums, in squatter settlement, pavement, etc. of towns or cities, much closer to one another than do the rural poor.

In reality, urban poverty represents a complex phenomenon. This problem attracted a lot of attention not only on humanitarian grounds and economic considerations but also on account of political importance of the urban poor<sup>1</sup>. In India some steps were taken in pursuance of removal of urban poverty<sup>2</sup>. From last few years particular attention is being paid to improve the conditions of slum dwellers. More and more emphasis is given on sites and service programme, and slum and squatter upgradation. This approach has been increasingly important in development circles and in particular in international agencies such as the World Bank who provide much of the finance for setting up and expanding basic needs

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services. Against the above theoretical background scenario we may study the nature and correlates of urban poverty, Kharagpur Town being our case study.

### Objectives

The objectives of this study are :

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- (1) To discuss the socio-economic conditions of the urban poor of Kharagpur Town.
  - (2) To analyse the factors that are correlated with their poor conditions.

### Hypotheses

The hypotheses which are tested in this study are as follows.

- (1) Majority of the slum dwellers and pavement dwellers are living below the poverty line ;
- (2) The poor slum and pavement dwellers have low access to the organised sector activity ;
- (3) The higher the number of years' stay at this town the higher the income of the family ;
- (4) Intensity of poverty is higher among the migrant slum and pavement dwellers than the rest of the urban population ;
- (5) Consumption expenditure on food occupies the major part of the income of the slum and pavement dwellers ;
- (6) Economic conditions and family size are inter-related ;
- (7) Poverty and literacy conditions are inter-related.

### Plan of the Paper

The plan of the rest of the paper is as follows.

Section 2 provides the data base and methodology. Section 3 describes the town profile. Nature and dimension as well as correlates of poverty are discussed in Section 4. Section 5 discusses urban poverty alleviation programmes. The last section, that is, Section 6 summarises the discussion of earlier sections and makes concluding observations.

## Data Base and Methodology

### 2.1 Data Base

The analysis on data base includes (i) the choice of the type of data used and (ii) selection of the procedure of data collection. These two factors again depend on selection of field, selection of final unit, selection of topic and also on the objectives and hypotheses.

Mainly primary data have been used to develop the work and test the hypotheses. Besides this, there are some secondary data where the town profile and poverty alleviation programmes are analysed.

From the secondary data we observe that there are 277,135 persons at Kharagpore town of which more than 30% are slum dwellers. Though there is no record on the number of pavement dwellers there are a good number of pavement dwellers at Kharagpore town. However, for our study we consider 89 families of 403 persons from 2 slums, 12 families of 45 members from pavement dwellers and 50 other urban households of 200 members. The primary unit of our study is the household. The process of selection of households is random. After the random selection of households required data are collected through questionnaire-cum-personal interview method during July, 1996.

## 2.2 Methodology

Methodology of a study signifies the proper choice and selection of the methods used in the study for the analysis and interpretation of the data set consistent with the objectives and hypotheses of the study.

In case of data analysis we use the percentage, mean and different measures of poverty. In order to identify poverty we have to specify a poverty line in monetary term such that all these families with income less than that are regarded as poor.

Poverty has been defined in the past in terms of what a person or household needs to survive in physiological sense. Thus minimum amount of income required by a family of given size and structure is calculated by a process that involves first an estimate of the minimum goods and services needed and secondly pricing these. The amount so obtained is the poverty line.

Since there are no well-accepted norms for fixing up subsistence level quantities of goods and services and since families differ in terms of age, sex and work activities, the construction of poverty line involves a number of problems both of conceptual and methodological nature. Again, there are the problems relating to (i) whether income or expenditure figures are used, (ii) whether relative or absolute figures are used, (iii) choice of base year, iv) whether household or individual is used as the unit of measurement.

The history of poverty line approach dates back to 1962 when a study group set up by the Planning Commission of India came up with the finding that a per capita consumption worth Rs 20 per month at 1960-61 prices excluding expenditures on health and education which were supposed to be provided by the state free of cost would constitute the "minimum"

for the non-poor. This "minimum" was defined as the poverty line, the minimum income needed to attain desired biological nutrition. Dandekar and Rath proposed poverty lines at the levels of Rs 15 per capita per month and Rs 22.50 per capita per month at 1960-61 prices in rural and urban area respectively. These calculations were based on the presumption that an average Indian would require 2150 calories per day as his minimum nutritional requirement. P. K. Bardhan calculated the poverty line with reference to a minimum diet of 2100 calories and 55 gms of proteins per day which at 1960-61 prices worked out to be a minimum per capita monthly expenditure of Rs 15 in rural areas and Rs 18 in urban areas. The Planning Commission developed the poverty line approach on the basis of 2400 calorie per person in rural area and 2100 calorie in urban areas. In the 7th Plan document poverty lines in rural and urban areas were defined as income worth Rs 107 per capita per month and Rs 122 per capita per month in 1984-85 prices respectively. Again, according to Planning Commission the poverty line for urban India corresponds to approximately Rs 255.2 per capita per month at 1992-93 prices. Now adjusting it by consumer price index we get Rs 357 approximately as poverty line for our study. We also calculate the calorie intake of the households, and the person having calorie intake below 2100 per day is considered poor. For calculating the calorie intake we use the table of nutritive value of Indian food given by National Institute of Nutrition, Indian Council of Medical Research, Hyderabad.

### 3

#### Town Profile

##### 3.1 Location

Kharagpore is the largest urban centre of the district of Midnapore. This town, located on the south bank of Kasai river, is 12 km. away towards south from Midnapore town and 116 km. away towards west from Calcutta. It is situated on the Howrah-Bombay, Howrah-Madras and Kharagpore-Adra-Asansole trifurcation and this location makes it a very important centre for trade and commerce and industrial activity.

##### 3.2 Historical Background

Kharagpur came into existence in the first decade of the present century as a railway settlement. In 1901 only 40 096 persons were living in Kharagpur, a tiny railway settlement. Later on it was selected as the headquarter for low carriage and wagon department of BNR. In 1904,



railway workshop was installed to give further impetus to its growth. Gradually 26 villages around railway junction came under the urban impact and Kharagpur Police Station was constituted with these 26 villages. In 1911, Kharagpur was declared a town with a population of 51,544. In 1951, it was given the status of a city with a population of 129,636. In 1951, Indian Institute of Technology (IIT) was inaugurated at Hijli on the South-Western part of present Kharagpur. In 1954, Kharagpur Municipality was constituted by taking 812.8 acres area with 5 wards.

During 1960 municipal area increased with additional wards. During 1968 Talbagicha was included in the Municipal area and the total area was divided into 20 wards. In the year 1974 IIT was included in the Municipal area. Thus it increased to 30 wards. According to 1991 Census, Kharagpur municipal area accounted for 190,584 members. Adding to this the population of adjoining rural mouzas, the industrial areas, etc., the figures would be more or less 277,135. It accounts for 32.60% of the district urban population.

### 3.3. Industrial Complex

In Kharagpur there is a net-work of modern industries.<sup>8</sup> Two public sector organisations operating here have taken lion's shares of employees. They are Kharagpur Railway Workshop under the Department of Railways, and Telecom Factory under the Department of Telecommunications, Government of India. Under the private sector the most important are Tata Bearing, Tata Constructions and Projects, Flender Macneill Gears Ltd, Century Extension Ltd., etc. The Railway Workshop of Kharagpur, built in 1898, started operation in 1904 and it is the largest integrated set up in Indian railways for repairs and overhaul of all types of Broad Gauge Motor Power and Rolling stock. Telecom Factory produces sockets, saddle sole plates. Raw Materials are brought from outside. The products are used captively for Department of Telecommunication. The production started in 1989.

Flender Macneill Gears Ltd. is a German collaboration company. Its function is the reduction of gear boxes. Production of this company started in July 1982 with employment of 9 workers.

Tata Bearing is a private concern. It produces bearing. This company started its operation in 1988 and employed near about 750 people in 1993-94. The project of M/s. Wellman Incandesent India Ltd. for setting up a coke manufacturing unit of capacity 200 TPD at a project cost of Rs 10 crores at Gokulpur under Kharagpur P. S is going on. In the assisted sector, the unit of manufacture of Pig Iron at Kharagpur

by M/s Tata Metallicks Ltd has already gone into production with approximate investment of Rs 52 crores.

Century Extension Ltd. produces aluminium products, especially aluminium rod and pipes. It started its operation in 1991. During the period 1994-95 it has 366 employees. The raw materials are supplied by NALCO AND HINDALCO. It has its market throughout India.

### 3.4. Population Growth

Now Kharagpore is the first grade town in Midnapore district. Inbetween 1901 and 1911 population increased from 40,096 to 51,544, i.e., by 11,448. Population decreased by 76 inbetween 1911 and 1921. Again in between 1921 and 1931, 1931 and 1941, 1941 and 1951 population increased by 6,666, 29,051 and 4,251 respectively- In 1961 population increased by 17,617 compared to that of 1951 and became 147,253. In between 1961 and 1971 the increase was by 14,004 and the population of 1971 was 161,257. In 1981 the population increased by 71,318 to reach the figure of 233,282. According to the Census of 1991, the population was 277,135 and the increase from the previous census was 43,853.

Such increase in population reflects the difference between fertility and mortality rates, migration and urbanisation. However, the main reason seemed to be imigration This was due to the installation of railways and workshops. Lots of labour were required at that time for clearing the forest and then for setting up the railway backyard, building, junction and offices for workshop. However, the main reasons for high rate of increase of population during 1941-51 were Second World War, famine and epidemic in the district. Establishment of Kalaikunda Air Base during Second World War also contributed to the population growth.

### 3.5 Occupational Structure

Broadly the occupational structure can be classified into seven sectors like Transport and Communication, Industry, Trade and Commerce and other services, Construction, Agriculture, Livestock, Fishing and Mining. As per 1991 Census the Transport and Communication sector accounts for 31.35% of total workers ; Trade and Commerce shares 19.72%. In case of Construction the figure is 2.50%. 4.08% of total workers are engaged in Agriculture. Industrial workers account for 14.35% of the total workers. Only 7.5% of the total workers are engaged in livestock-fishing-mining and the rest 26.73% are engaged in other services.

### **Micro Level Study on the Nature and Dimension of Poverty Among the Households**

The urban poor of Kharagpur town are mainly slum and pavement dwellers. According to Slum Area Act 1956 enacted by Govt. of India, slum has been defined as the area where buildings are, in any respect, unfit for human habitation. Physically, slum consists of clusters of hutments comprising several rooms constructed with temporary building materials where each room is inhabited by a family sharing the common latrine without arrangement for water supply, drains and disposal of solid wastes and garbage within the slum boundaries. Pavement dwellers are in fact the poorest of the urban poor. They are truly shelterless persons who do not have municipal address, live in various open places like pavements, underbridges, railway platform, etc.

#### **A. Socio-Economic Conditions of Slum-dwellers**

We consider 89 households of 403 members from two slums, Madhukar Colony and Kamal Nagar, for our study. We choose randomly 50 households of 230 members from Madhukar Colony and 39 households of 173 members from Kamal Nagar. And to represent the condition of pavement dwellers we consider 12 pavement dwelling families of 45 members. Lastly, to compare the conditions of slum and pavement dwellers with those of other urban dwellers we consider 50 households other than slum and pavement dwellers.

#### **Housing**

Housing is a highly visible dimension of poverty. The housing condition is, in fact, one of the crucial variables towards the approach of rural poverty. As for housing conditions it has been observed that majority (69.66 per cent) of the houses are single-roomed and only 3.37 per cent of the houses have 3 rooms. For single-roomed families the average occupancy per room is 5.2 and in general that is 3.6. While surveying we have seen that the houses are mainly made of mud, straw and bamboo; very few are partially pacca. There are many houses which are not suitable for living during the rainy season.

#### **Occupational Structure**

Most of the slum-dwellers are rickshaw puller, porter, hawker, shop-keeper, daily labour sweeper, water supplier, carpenter, tailer, welder, driver, coal-picker, maid-servant, cook, vegetable seller, beggar, etc. In fact, slum-dwellers are seen to be engaged in more than 25 vocations.

More than 24 per cent of them sell their labour power, 8.77 per cent are engaged in transport and about 42 per cent are engaged in occupations other than service and business which account for 25.44 per cent of the working members. Child labourers are mainly paper-picker, cowdung-maker, coal-picker. The older and disabled persons are mainly beggars.

If we classify occupation in two broad categories—organised and unorganised—we find that majority (90.35 per cent) of the household members are engaged in the unorganised sector. In this category the percentage share of female workers is higher than male.

### Income

The monthly average income of slum-dweller workers engaged in the unorganised sector is low compared to that in the organised sector. That is the lowest in sale of labour power to the organised sector. Slum transport workers earn, on the average, Rs 1,000 per month, while miscellaneous workers (other than service and business workers) earn, on the average, Rs 800 per month. The monthly average income in the service group is found to be the highest with the lowest value of co-efficient of variation. It suggests that the workers under this category not only earn higher income than those in the other groups but also have their employment status much more stable than others. The highest variation is observed in case of the category of sale of labour power (to the unorganised sector) (See Table 1)

Table 1 AVERAGE MONTHLY INCOME OF SLUM DWELLER WORKERS IN DIFFERENT OCCUPATIONS

Occupational Categories	Average Monthly Income (Rs)	Standard Deviation	Co-efficient of variation
Sale of Labour Power	600	152.5	25.41
Service	2,200	264	12.00
Business	2,200	504.6	25.23
Transport	1,000	223.6	22.36
Miscellaneous	800	198.2	24.78

Source : *Field Survey.*

The distribution of households by earning members shows that most (about 80 per cent) of the households have earning members 3 or less. 31.46 per cent of the households have only one earning member and 48.31 per cent of the households have 2 to 3 earning members. On the other hand, more than 66 per cent of the households have 2 to 7 dependent members.

### Family Income

In family income we include the income of all working members of a family, i.e., adult male, adult female and also children. The distribution of households by family income shows that most of the households ( 71.92 per cent ) have family income ranging between Rs 500 and Rs 1500 ( Table2 ).

Table 2 DISTRIBUTION OF HOUSEHOLDS BY MONTHLY INCOME

Monthly Income (Rs)	Number of Households	Percentage
Below 500	5	5.62
500—1000	35	39.33
1000—1500	29	32.59
Above 1500	20	22.46
Total	89	100.00

### Consumption Expenditure

The distribution of households by family expenditure on food shows that more than 50 per cent of the households have monthly family expenditure on food below Rs 1000 and 11 per cent of the households have less than Rs 500 spent on food.

### Present Debt

On account of ill health, marriage, repairing of houses, festivals, maintenance of guests, low income ( due to seasonal variation ), etc. they have to borrow money from different sources like shop-keeper, money-lender and rich neighbour. It is observed that most ( 66.29 per cent ) of the low-income households had to incur debt ranging from less than Rs 50 to Rs 500.

### Sanitation Condition

The sanitation condition in the slum area is deplorable. A large number of the urban poor in Kharagpur town are shelterless and this town is an example of open defecation. More than 73.03 per cent of the slum households do not have any private or public latrines and they are used to open defecation. Only 2.25 per cent of the households have got private sanitary latrines. There is no public sanitary or non-sanitary latrine in the slum area.

### Health Expenditure

More than 50 per cent of the slum households can spend on health less than Rs 50 per month. Another 29 per cent have monthly expenditure on health ranging between Rs 50 and Rs 100.

### B. Socio-economic Conditions of Pavement Dwellers

Pavement dwellers are the poorest of the poor. They are shelterless persons and live in open spaces. Though Kharagpur experienced steep rise in population on account of growth of trade and transport, it remains predominantly a railway transport centre. For this though the pavement dwellers spread all over the town, they tend to concentrate at the railway platform.

Out of our randomly selected 12 pavement dweller families 10 families are seen to be Bengali-speaking and two are Hindi-speaking. Among the respondent families two came from rural places of Kharagpur Police Station and ten families are migrated from other districts.

Among the 45 platform dwellers only 4 members are literate and rest 41 persons are illiterate. They are mainly beggar, head load carrier paper-picker, coal-picker, etc. The monthly family income ranges from Rs 200 to Rs 2000. Out of 12 families 10 have monthly income less than Rs 1000.

### C. Poverty Ratio among Slum Dwellers and Pavement Dwellers

We estimated poverty ratio based on the different measures of poverty. As per head-count ratio 96 per cent of the pavement dwellers and 82 per cent of the slum dwellers are poor. As per other measures poverty ratio is also substantially high ( Table 3 ).

Table 3 POVERTY RATIO AMONG SLUM AND PAVEMENT DWELLERS

Categories	Head-count Ratio	Family-count Ratio	Poverty-gap Ratio	Sen's Index
Slum Dwellers	.82	.71	.40	.45
Pavement dwellers	.96	.92	.41	.52

*Source : Field Survey.*

We may now analyse poverty through hypothesis testing.

(i) Our first hypothesis has been that majority of the slum and pavement dwellers are living below the poverty line. To test this

hypothesis we use the calorie requirement norm and per capita income. The calorie requirement norm provides the better index of poverty. Since experts have suggested minimum calorie intake per capita per day (p.c.p.d.) be 2100 for an individual belonging to poverty line for urban area we may estimate the percentage of households having less than 2100 calories p.c.p.d. Table 4 shows the distribution of slum households by calorie intake p.c.p.d.

Table 4 DISTRIBUTION OF SLUM HOUSEHOLDS AS PER CALORIE INTAKE

Calorie intake p.c.p.d.	No. of households	Average calorie intake	Percentage
600—900	2	800	2.25
901—1200	5	1100	5.62
1201—1400	15	1350	16.85
1401—1800	22	1610	24.72
1801—2099	23	1920	25.84
2100—2400	22	2200	24.72
Total	89	—	100.00

We observe from Table 4 that 75.28% of the households live below poverty line as per calorie intake norm.

The calorie intake data of pavement dwellers are presented in Table 5.

Table 5 DISTRIBUTION OF PAVEMENT DWELLERS AS PER CALORIE INTAKE

Calorie intake p.c.p.d.	No. of households	Average calorie intake
601—900	3	750
901—1200	2	1050
1201—1500	4	1340
1501—1800	0	1780
1801—2099	2	1900
2100—2400	1	2150
Total	12	

The above table shows that only 1 of the 12 sample pavement dwellers households lives above the poverty line as per calorie intake.

In terms of per capita income our calculated poverty line at 1996 prices is Rs 357 per capita per month. On the basis of this poverty line it is found that 70.79% of slum dwellers and 91.7% of pavement dwellers are below poverty line. The distribution of slum and pavement dwellers according to income per capita per month are shown in Table 6 and Table 7 respectively.

Table 6 DISTRIBUTION OF SLUM HOUSEHOLDS BY PER CAPITA MONTHLY INCOME

Per capita income (Rs)	No. of households	Percentage	Average income (Rs)
157—257	11	12.36	190
257—357	54	58.43	280
357—557	12	13.48	495
557—657	3	3.37	555
657—757	4	4.49	675
757—857	2	2.25	800
857—1057	2	2.25	895
1057—1257	2	2.25	1105
1257+	1	1.02	2000
Total	89	100.00	—

Table 7 DISTRIBUTION OF PAVEMENT DWELLING HOUSEHOLDS BY PER CAPITA MONTHLY INCOME

Per capita income (Rs)	No. of households	Percentage	Average income (Rs)
0—157	2	16.67	70
157—257	4	33.33	147.75
257—357	5	41.67	288.6
357—457	1	8.33	450
Total	12	100	—

Thus, our first hypothesis is accepted.



(ii) Our second hypothesis is that the poor slum and pavement dwellers have low or no access to the organised sector. From Table 5 of the previous chapter we find that majority of the slum dwellers are engaged in the unorganised sector. Now here in Table-8 we show the sector-wise distribution of the slum and pavement dwellers.

Table 8 DISTRIBUTION OF HOUSEHOLD WORKERS WORKING IN ORGANISED AND UNORGANISED SECTORS

Sector	SLUM		Average income	PAVEMENT		Average income
	Workers	Percentage		Workers	Percentage	
Organised	22	9.65	2200	0	0	9
Unorganised	206	90.35	1200	38	100	621
Total	228	100	—	38	100	—

From Table 8 it is clear that 90.35% of slum dwellers and 100% of pavement dwellers are engaged in the unorganised sector. So our second hypothesis is accepted. Again, it is observed that the average income of the workers engaged in the organised sector is much higher than that in the unorganised sector. So one of the causes of low income as well as poor economic condition is low access of the households to the organised sector.

(iii) Our third hypothesis is that as the years of stay at the town increase the income of the household also increases. To test this hypothesis we use the following Table 9 and Table 10 respectively for slum and pavement dwellers.

Table 9 DISTRIBUTION OF SLUM HOUSEHOLDS BY YEAR OF MIGRATION AND PERCAPITA AVERAGE MONTHLY INCOME

Year of migration	Frequency	Percentage	Average income
0—5	2	2.25	187.50
5—10	2	2.25	275
10—20	14	15.73	277.53
20—30	65	73.03	333.43
30—50	6	6.74	335.42
Total	89	100.00	—

Table 10 DISTRIBUTION OF PAVEMENT DWELLERS BY YEAR OF MIGRATION

Year	Frequency	Percentage	Averag income (Rs)
0—5	7	58.33	215
5—10	1	8.33	201
10—20	0	0	0
20—30	4	33.34	200
<b>Total</b>	<b>12</b>	<b>100.00</b>	

From the above Tables it is clear that the above hypothesis is true for slum dwellers but not true for pavement dwellers. So our third hypothesis is accepted for slum dwellers only.

(iv) Our fourth hypothesis is that intensity of poverty is higher among the slum and pavement dwellers than the rest of the urban population. To test this hypothesis we consider 50 households other than slum and pavement dwellers in the nearby area. And by comparing the relevant data on percapita income through Table 11 we test our hypothesis.

Table 11 PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY PER-CAPITA INCOME

Per capita income (Rs)	Percentage of pavement dwellers	Percentag of slum dwellers	Percentage of other urban dwellers
0—257	50	12.36	0
257-357	41.67	58.43	0
357-657	8.33	16.85	4
657-857	0	6.74	8
857-1057	0	5.62	10
1057-1357	0	0	32
1357-1657	0	0	24
1657-5057	0	0	22
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

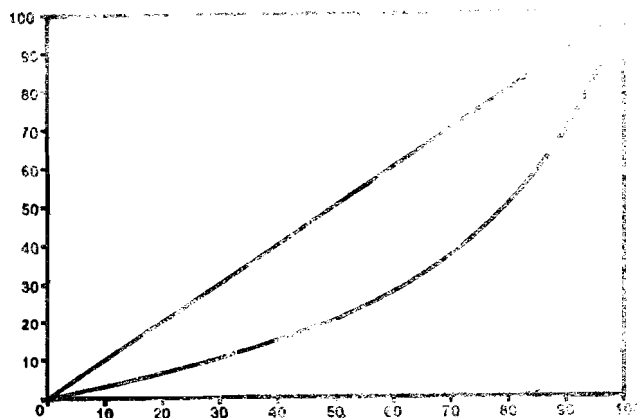
This Table shows that the economic condition in terms of percapita income for the urban households other than slum and pavement dwellers are better than those of the slum and pavement dwellers. It also indicates that the economic inequality is present in this town to a great extent. Our

Table 12 CALCULATION FOR DRAWING THE LORENZ CURVE

Monthly income (Rs)	Mid. point xi	Frequency fi	Cumulative frequency	Total income xi fi	Cumulative total income	Percent cumulative frequency	Percent cumulative total income
—1000	500	50	50	25000	25000	33.11	6.52
1000—2000	1800	41	91	61500	86500	60.26	22.55
2000—3000	2500	13	104	32500	119100	68.87	31.05
3000—4000	3500	15	119	52500	171500	78.81	44.73
4000—5000	4500	9	128	46560	212100	84.77	55.2
5000—6000	5500	9	137	49500	261600	90.73	68.20
6000—7000	6500	2	139	13000	274600	92.05	71.58
7000—8000	7500	2	141	15600	289600	99.38	75.50
8000—9000	8500	1	142	8500	299600	94.04	77.71
9000—	9500	9	151	85500	383600	100	100

survey report on percapita monthly income which is summarised in Table 11 shows that only 8.33% of pavement dwellers and 29.21% of slum dwellers are above the poverty line at Rs 357 while cent percent of the other urban households live above the poverty line.

Thus, our fourth hypothesis is accepted. Now we graphically, through Lorenz curve, represent the extent of inequality among the sample households (Fig. 1).



(v) Through hypotheses 6 and 7 the problem of poverty is investigated through the level of family size and literacy level. The family size is divided into two sections, one section constitutes less than

5 members and the other constitutes greater than or equal to 5 members

Now with the help of Pearsonian chi-square we test whether there is any significant interrelationship between poverty and those attributes. For this purpose we first construct  $2 \times 2$  contingency tables. Table 13 is used to test the inter-relationship between poverty and family size, and Table 14 is used to test the interrelationship between poverty and literacy condition.

Table 13 DISTRIBUTION OF SLUM HOUSEHOLDS ACCORDING TO THEIR ECONOMIC CONDITION AND FAMILY SIZE

Economic condition	Households of family size (<5)	Household of family size ( $\geq 5$ )	Total
Poor	18 (28.57)	45 (71.43)	63 (100)
Non-Poor	20 (76.92)	6 (23.08)	26 (100)
Total	38 (42.70)	51 (77.30)	89 (100)

Note : Figures in the brackets indicate the percentage of households in the respective groups.

From Table 13 it is observed that 57.30% of slum households has large family size ( $\geq 5$  members); for the poor households the figure is 71.43% and for non-poor 23.08%. For households having family size less than 5 the respective percentages are 42.70 (total), 28.57 (for poor families) and 76.9% (for non-poor). We observe a positive association between the poor economic condition and family size. Thus, our fifth hypothesis is accepted.

For Chi-square ( $X^2$ ) testing, the null hypothesis is  $H_0$ .

$H_0$  : Poverty and family size are independent.

$H_1$  : Poverty and family size are not independent.

The calculated value of  $X^2$  is 17.59. After Yate's correction the value is 15.67.

Both at 5% and 10% level of significance calculated value of  $X^2$  is greater than the tabled value. So we reject the null hypothesis.

That means interrelation between number of family members and poor economic condition is statistically significant.

The following Table 14 shows the association between economic condition and literacy level of the individual households.

Table 14 DISTRIBUTION OF HOUSEHOLDS ACCORDING TO THEIR ECONOMIC CONDITION AND LEVEL OF LITERACY

Economic condition	Illiterate	Literate	Total
Poor.	255 (79.93)	64 (20.07)	319 (100)
Non-poor.	19 (22.62)	65 (77.38)	84 (100)
Total	274 (68)	129 (32)	403 (100)

**Note :** Figures in parentheses indicate percentages.

It is observed from the Table that nearly 79.88% of the poor individuals are illiterate, while for non-poor individuals the figure is 22.62. For the sample households as a whole the percentage of illiterate persons is 68 and for literate persons 39. The literacy level is 20.07% for the poor and 77.38% for the non-poor households. Thus, there is a negative relationship between poor households and literacy condition.

So, our sixth hypothesis is accepted. Now to test its significance we form the null hypothesis as

$H_0$  : Poverty and literacy level are independent, and alternative hypothesis is

$H_1$  : Poverty and literacy level are not independent.

The result of Pearsonian  $X^2$  is 100.37. After Yate's correction the result is 97.76.

This value is greater than the tabled value of  $X^2$  both at 5% and 10% level of significance. So, we reject the null hypothesis and accept the alternative hypothesis which indicates presence of significant association between poverty and literacy level.

We observe that year of migration, literacy rate and total family income are positively and significantly correlated (See the correlation matrix in Table 15).

Table 15 CORRELATION MATRIX

	$y$	$x_1$	$x_2$
$y$	1	0.590	0.478
$x_1$	0.590	1	0.442
$x_2$	0.478	0.442	1

Notes :  $y$ =Total family income,  $x_1$ =year of migration and  $x_2$ =literacy rate

## 6

Important poverty alleviation programmes adopted by the Government of West Bengal for Kharagpur town are (i) Nehru Rojgar Yojana (NRY), (ii) Urban Basic Services for the Poor (UBSP) and (iii) Prime Minister's Poverty Eradication Programme. Under (i) there are three components, namely (a) State Urban Micro Enterprises, (b) Shelter Upgradation Programme (launched during 1992) and (c) Wage Employment Programme. UBSP is meant specially for the poor women and its main aim is to create awareness among the poor regarding education, nutrition, drinking water, and health environment. Prime Minister Rojgar Yojana was launched during 1995, and its aim was to provide loan to the educated unemployed of the poor families for their self-employment.

These poverty alleviation programmes could have little impact on urban poverty of Kharagpur town. In Madhukar Colony some of the programmes have been adopted and implemented. UBSP has been exten-

ded to this colony, Besides, twenty households out of our fifty sample households have got loan under the Shelter Upgradation Programme. But none of the beneficiaries is found to have been able to repay the loan. The other programmes are not implemented here. Kamal Nagar in railway area is a neglected slum and here no substantial poverty alleviation programme has been taken. It is also observed that these poverty alleviation programmes are too inadequate and inefficiently managed to remedy the problem of urban poverty.

The pavement dwellers considered in our sample are found to be totally outside the coverage of the poverty alleviation programme.

### Summary and Conclusion

The problem of urban poverty attracts a lot of attention not only on humanitarian grounds and economic considerations but also on account of political importance of the urban poor. Poverty among the large urban mass is manifested in their under-nourished status, poor housing, sanitary and health conditions. Though a lot of literature has developed on the measurement of urban poverty, few focused on its multi-dimensional nature and still less on the roots of urban poverty. The present note is a modest attempt to look into the nature and causes of urban poverty, Kharagpur city of West Bengal being the case study.

Kharagpur with its 277 thousand population as per 1991 Census is a cosmopolitan city. The great majority of the poor of the city are migrants and still larger proportions are slum and pavement dwellers. Poverty among these sections of population is largely the outcome of rural poverty. Many of the urban mass came from the regions where poverty is the common fate of the peasantry, others originated from the lower strata of quite differentiated communities of village India. Most of the urban poor have reported that they have been better off here at Kharagpur than they had been in rural areas.

Whether in respect of nutritional status or in terms of urban infrastructure/amenities, the intensity of poverty is higher among the migrants than among the non-migrants and that is higher among the pavement dwellers and slum inhabitants than the rest of the urban population. Most of the migrants were poor and they moved to Kharagpur for economic reasons.

Of the urban poor the intensity of poverty is the highest among the pavement dwellers. It has been observed that the poor migrants as well as slum dwellers and pavement dwellers have less access to the organised

sector activities than the other sections, resulting in the former's relatively low wage earning and non-wage benefits from their informal sector activities and they also derive less benefits from public infrastructures development programmes/facilities, which leads to their very poor quality of life.

No doubt, recently some special poverty alleviation programmes, namely Nehru Rojgar Yojana, Urban Basic Services for poor, and Prime Minister's Poverty Eradication Programme have been adopted and are being implemented by Kharagpur Municipality, but those appear to be too inadequate and poorly planned and implemented to make any substantial impact on urban poverty.

Certain policy prescriptions emerge from the foregoing discussion. First, employment opportunities, mainly in the organised sector through development of small-and medium-scale industries should be increased so that the over-all income of the labourers is enhanced. Second, literacy rate should be increased since it is positively correlated with the income of the families. Third, minimum housing facilities may be provided through cheap dormitory-type housing to the pavement dwellers. Fourth, the size of the poverty alleviation programmes should be enhanced and decentralised planning and implementation mechanisms should be developed and strengthened so that they would have sizeable impact on urban poverty. Fifthly, suitable health care and family planning programmes have to be revised and implemented so that the physical quality of life of the urban poor is substantially improved. Lastly, urban poverty is mainly the result of rural poverty. Until and unless rural poverty is checked through accelerating rural development it is not possible to substantially alleviate urban poverty.

#### Notes :

1. As per Basic Statistics Relating to the Indian Economy, Vol. 1, 1 Sept, 1991, CMIE, 42.2 million urban population was living below poverty line, which was higher than the total population of Canada, Poland and Spain (See World Development Report 1992).

2. Three important programmes for poverty alleviation are being implemented at the town,

3. See Prospects for Industries in Midnapore published by Industries Promotion Cell, Midnapore District, pp 30-33.



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# **PATTERN AND PACE OF URBANISATION IN SOUTH WEST BENGAL**

**A Study of seventy two Municipal towns**

**ARUN KUMAR NANDI\***

**SUCHANDRA BHATTACHARYYA\*\***

## **I**

### **Introduction :**

Development necessarily entails transfer of workforce from agricultural to non-agricultural activities and also shift of population from rural to urban area<sup>1</sup>. It is quite discernible from the Census data that there is a great variation in growth of population over space and across size classes of urban towns. In developing countries, this urban growth has a marked tendency to concentrate in the primate and metropolitan city.<sup>2</sup> This centralised pattern of urbanisation significantly exists in West Bengal<sup>3</sup> and hence urban literature includes the questions of desirability and inevitability of this pattern of urbanisation. We need to have a fresh look on the following questions relating to the nature of urbanisation in the country : Why is there a great variation in growth of urban population over space and across different size classes of towns ? What is the changing pattern of urbanisation ? Is it approaching towards a decentralised urbanisation ? What factors would account for such variation in urbanisation ? The present study is a modest attempt to throw light on these issues with special reference to the pattern of urbanisation and structural changes of the municipal economies during 1971—1991 in southern part of West Bengal. More particularly, it has attempted to examine whether urban growth remained Calcutta-centric or there is a tendency of dispersed urbanisation over the study area and also the factors which explain the changes, if any.

It is argued here that a process of decentralisation of urbanisation has started in West Bengal in recent years and this is attributed to the structural changes of the urban economy.

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The plan of the rest of the paper is as follows Section 2 describes data base and methodology. A brief profile of the study area is presented in Section 3. Section 4 examines whether the pattern of urbanisation in West Bengal has changed in recent years. Section 5 attempts to explain the pattern in terms of structural changes of the municipal economies. Section 6 summaries discussions and makes concluding observations.

## 2

**Data base and Methodology :** The study is mainly based on Census data covering the period of 1971 Census to 1991 Census. Municipal town, being a standard urban unit, has been considered as our study unit. We have taken 72 municipal towns of south West Bengal that are spread over 9 districts, namely Hooghly, 24-Parganas, Nadia, Midnapore, Bankura, Birbhum, Purulia, Murshidabad and Burdwan. The analysis of these towns is made in two categories. First, distribution

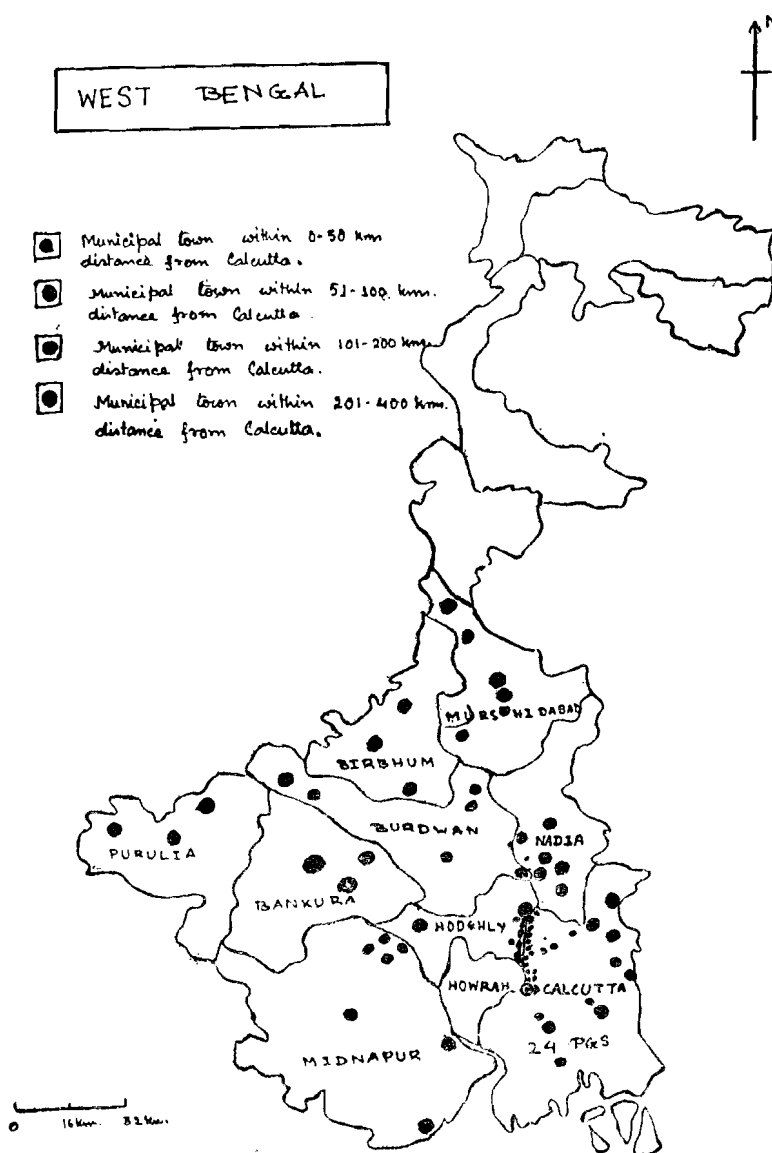
Table 1 DISTRIBUTION OF TOWNS BY SPATIAL CLASSES AS WELL AS SIZE CLASSES IN 1971

Spatial Classes ( Distance in kms. )	Size Classes					Total
	I	II	III	IV	V	
0—50	7	12	10	1	—	30 (42)
51—100	—	4	9	1	—	14 (19)
101—200	1	4	2	3	3	13 (18)
201—400	1	2	9	3	—	15 (21)
Total	9	22	30	8	3	72 (100)

*Sources : Census of India, 1971.*

of towns in terms of spatial class in which there are four classes of towns based on their distances from the State headquarter, i.e., Calcutta ; and these distances are 0—50 kms, 51—100 kms, 101—200 kms and 201—400 kms, secondly, distribution of towns in terms of population size classes. These are Class I, II, III, IV and V towns. The distribution of these towns by spatial classes as well as different size-classes is shown in Table 1. It is observed that first, second and third class towns are concentrated within the distance of 50 kms from Calcutta and 30 out of

72 sample towns of South West Bengal fall within this distance ( See Map 1 ).



Simple statistical techniques have been used for analysis of data and the important operational variables are level of urbanisation defined as percentage of urban population to total population, decadal growth rate of population which is expressed as percentage change of population during the current year to the base year population, population density, literacy rate, share of primary, secondary and tertiary sector workers, distance from State headquarter, index of agricultural production, etc.

## 3

**Brief Profile of the Study Area :** To make the perspective clear, this section briefly explains the demographic and economic characteristics of the concerned districts, namely Hooghly, 24-Parganas, Nadia, Midnapore, Bankura, Birbhum, Purulia, Murshidabad and Burdwan which cover our sample municipal towns ( see Table 2 ). Out of 72 municipal towns, 43 towns belong to the districts adjacent to Calcutta, such as Hooghly, 24-Parganas and Nadia. The number of class I towns of these districts increased from 11 in 1971 to 28 in 1991 and out of these 43 towns, 20 towns are situated at 24-Parganas and Hooghly districts. There is a great variation in level of urbanisation across the districts—7.03 per cent in Birbhum ( lowest ) and 35.15 per cent in 24-Parganas ( highest ) in 1971. In 1991 Census, the level of urbanisation of the districts, Bankura, Birbhum, Purulia, Midnapore and Murshidabad, was far below the State average of 27.98 per cent. In respect of decadal growth of urban population, the three districts, namely Hooghly, 24 Parganas, Nadia have experienced significant decline in growth rates, while Bankura and Purulia districts have shown increasing rate of growth over the two decades of 1971-81 and 1981-91.

Data of 1971 Census regarding classification of workers showed that more than 80 per cent workers in total main workers were engaged in 1971 in primary sector for the districts of Midnapore, Bankura, Purulia and Birbhum, while in 1991 the importance of this sector declined, but not significantly. Percentage share of non-agricultural income to total income varies from 38.46 per cent for Bankura to 82.19 per cent for 24-Parganas and the respective figures for Hooghly and Burdwan were 66.74 and 60.40 per cent in 1988-89. In terms of agricultural production also there was a great variation across the districts. In 1993-94, the index of agricultural production with 1971-72=100 was 268.54 ( highest ) and for district Hooghly for Birbhum it was 143.36 ( lowest ).

Therefore, the overall impression that one gets from the above analysis is that the three districts, namely Hooghly, 24-Parganas and Burdwan are more urbanised and in terms of industrialisation, agricultural production and infrastructural development these districts are in a better position. But in these districts the rate of urbanisation declined impressively compared to other districts of South West Bengal.

## 4

**Pattern of Urbanisation :** The main purpose of this section is to discuss the pattern of urbanisation during the period of 1971-91 in our study area. This section is based on the analysis of the seventy two

Table 2 SOME INDICATORS OF DEVELOPMENT OF THE DISTRICTS

S. L. No.	Items	Hooghly	24-Pgs.	Nadia	Midna- pore	Bankura	Birbhum	Purulia	Murshi- dabad	Burdwan
1.	% of urban area to total area	5.47	4.27	5.72	2.42	1.13	1.33	1.11	2.00	9.57
2.	No. of municipality, 1991	12	29	6	10	3	5	3	7	7
3.	Level of urbanisation : 1971	26.47	35.15	18.74	7.63	7.47	7.03	8.26	8.45	22.78
	1991	31.19	34.55	22.63	9.85	8.29	8.98	9.44	10.43	35.09
4.	Rate of population growth : 1971	38.18	40.37	53.06	36.32	19.45	39.08	25.98	39.28	57.20
	1991	29.29	21.02	36.24	32.76	28.30	33.97	37.65	42.87	51.41
5.	% of non-agril. workers : 1971	44.02	46.94	31.88	18.79	17.67	19.46	18.84	22.24	34.24
	1991	51.18	52.82	40.31	30.64	23.86	25.77	26.82	37.28	39.94
6.	Literacy rate (1991)	56.88	51.39	43.79	57.06	60.68	39.30	35.24	30.26	51.84
7.	% of SC/ST population (1991)	28.17	29.21	31.36	24.62	40.71	31.63	38.58	14.70	33.65
8.	% of share of non agril. income (1988-89)	66.74	82.19	54.49	46.80	38.46	38.71	59.17	45.18	60.40
9.	Index of agril. production, 1993-94 (Base year 1971-72)	269	205	268	227	197	143	158	199	231
10.	No. of registered factory (per lakh population), 1992	9	35	4	2	3	4	3	1	9
11.	% of villages electrified, 1994	99.95	86.23	99.92	49.35	65.08	99.28	60.36	92.42	93.81

Sources : Census of India, 1971, 1981, 1991

Economic Review, Government of W. B, 1995-96.

municipal towns of southern part of West Bengal. For the sake of convenience, our analysis has been made in terms of the following two broad categories.

#### 4.1. Analysis based on Spatial Class

As noted earlier, there are four spatial classes of towns based on consideration of the distances of the towns from Calcutta. Growth rates of urban population across these classes are shown in Table 3. One can get an interesting and important observation from this table by comparing the growth rates of these four classes of towns between the two decades, 1971-81 and 1981-91. Over this time period growth rate of population of the towns nearer to Calcutta decreased while it increased in case of the distant towns. This implies that there is a tendency of dispersed urbanisation, to some extent, in the study area. Annual average growth rates of population in the towns for the spatial class 0-50 kms. and 50-100 kms. decreased from 3.14 per cent and 2.84 per cent during 1971-81 to 2.24 and 2.47 per cent during 1981-91 respectively, while the corresponding figures for the next two classes of towns increased from 1.92 to 3.20 and 2.42 to 3.13 per cent respectively during these decades (see also Figure 1). It is also revealed that the first category of towns,

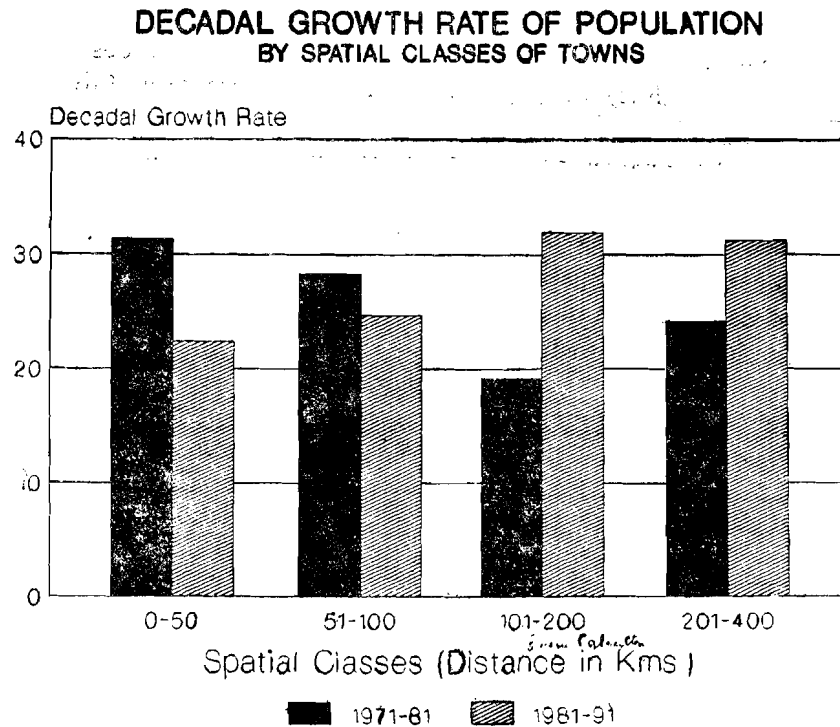


Figure 1

that is, the towns situated around fifty kms. of Calcutta, experienced the

decline in the percentage share from 58.77 to 57.41 while the third and fourth categories of towns recorded some marginal increase in share of urban population ( Table 3 referred back ).

Table 3 GROWTH RATES AND PERCENTAGE DISTRIBUTION OF POPULATION BY SPATIAL CLASSES OF TOWNS

Spatial classes Distance in kms.	Annual average growth rates		Share of urban population (%)	
	'71-81	'81-91	1981	1991
0—50	3.14	2.24	58.77	57.41
51—100	2.84	2.47	12.92	12.86
101—200	1.92	3.20	13.99	14.74
201—400	2.42	3.13	14.32	14.99
Total	2.81	2.53	100	100

Source : *Census of India, 1971, 1981, 1991.*

The density of population across the different spatial classes of towns may also be considered. Table 4 shows the average density of population of the municipal towns in different census periods. It is observed that the average density of population for the first category of towns more than doubled that of any other categories of towns. Data of Table 4 reveals that the percentage change of density of population during the said period was the highest ( 72 per cent ) for the second category of towns and the lowest ( 40 per cent ) for the first category of towns. In other words, density of population has increased less over time in case of towns around Calcutta than in the case of towns whose range of distances from Calcutta has been 51 to 100 kms.

Table 4 DENSITY OF POPULATION OF THE TOWNS BY SPATIAL CLASSES

Spatial classes	Average density of population ( per sq. km. )		
	1971	1981	1991
0—50	8604 (100)	10188 (118)	12117 (140)
51—100	2458 (100)	3400 (138)	4239 (172)
101—200	3812 (100)	4506 (110)	5653 (148)
201—400	3394 (100)	3946 (116)	5041 (148)

Sources : *Census of India, 1971, 1981, 1991.*



## 5

**Explanations for the decentralisation tendency : Structural changes of the Urban Economy :** We now turn to the discussion of explanations for the decentralisation tendency in terms of structural changes of the municipal economy. The occupational structure of an economy is closely interlinked with its economic development. It is evident that in an advanced economy, a very large proportion of working force is engaged in tertiary and secondary sectors and a small proportion of workers are engaged in primary sector of that economy. On the other hand, in a backward economy, the largest percentage of workers is engaged in agriculture and allied activities. It is believed that with the development of an economy, there is a shift of workers from the primary sector to the secondary and tertiary sectors. Table 5 depicts the distribution of workers among primary, secondary and tertiary sectors by spatial classes of towns in 1971 and 1991. It is observed from the Table that the absolute number of people in agricultural and allied activities is increasing due to increasing population. But the rate of increase of workers in this sector is low compared with that in secondary and tertiary sector. In case of primary sector the highest increases was seen in the first spatial class of towns. For the secondary sector the increase was highest for the towns within 51 to 100 kms. distance from Calcutta while in case of tertiary sector percentage change of workers from 1971 to 1991 were more or less same for all.

Table 5 DISTRIBUTION OF MAIN WORKERS AMONG PRIMARY, SECONDARY, TERTIARY SECTOR WORKERS BY SPATIAL CLASSES, 1971 and 1991 ( in thousand )

Spatial classes	Primary Sector		Secondary Sector		Tertiary Sector	
	1971	1991	1971	1991	1971	1991
0—50	16 (100)	26 (162)	353 (100)	465 (132)	283 (100)	524 (150)
51—100	27 (100)	38 (141)	33 (100)	79 (239)	61 (100)	114 (187)
101—200	20 (100)	31 (155)	33 (100)	67 (203)	95 (100)	175 (184)
201—400	22 (100)	27 (123)	38 (100)	70 (184)	88 (100)	165 (187)
Total	85 (100)	122 (144)	457 (100)	681 (149)	527 (100)	978 (186)

Source : Census of India, 1971, 1981, 1991.

**Note :** Figures in parentheses indicate index numbers categories of towns. Table 6 shows the percentage distribution of workers across these three sectors. It is observed that the proportion of primary sector workers to total main workers has declined for all the categories of towns during this period except for the first category of towns where there occurred an increase from 2.42 per cent in 1971 to 2.61 per cent in 1991. On the other hand, for all the categories of the towns excepting the first one which experienced decline in the proportion of secondary sector workers, the proportion of secondary sector workers to the total main workers increased during 1971-91 the change being the highest for the second category of towns. The towns around and closer to Calcutta showed dominant industrial characteristics in 1971 while in 1991 they became tertiary sector activities-based towns. The tertiary sector is dominant particularly in the third and fourth categories of towns. The increasing importance of secondary and tertiary sectors. Then explain their higher growth rate of urban population and population density during 1981-91. All these also reveal the decentralisation process in recent years.

**Table 6 PERCENTAGE DISTRIBUTION OF MAIN WORKERS  
AMONG PRIMARY, SECONDARY, TERTIARY  
SECTOR BY SPATIAL CLASSES, 1971 and 1991**

Spatial classes	Primary Sector		Secondary Sector		Tertiary Sector	
	1971	1991	1971	1991	1971	1991
0—50	2.42	2.61	54.19	45.81	43.38	51.58
51—100	22.17	16.58	27.58	34.14	50.25	49.28
101—200	13.39	11.30	22.40	24.40	64.20	64.29
201—400	14.96	10.19	25.99	26.2	59.05	62.99

*Source : Census of India, 1971, 1981, 1991.*

#### **4.2. Analysis based on size-classes of towns**

For classification of towns here census definition is used and there are five size-classes of towns—Class I (above 100000 population), Class II (50000—100000), Class III (20000—50000), Class IV (10000—20000), Class V (5000—10000). Growth rates as well as density of population of the municipal towns during the period of 1971-91 across these classes are shown in Table 7. The annual average growth rate of population of Class I and Class II towns declined over the decades while it increased in case of Class III and IV towns. In '71-'81 decade, highest growth rate

(3.05 per cent) was recorded in Class I towns, which declined to 2.01 per cent in the next decade. On the other hand, Class III towns experienced the highest growth rate, i.e. annual average growth rate of 3.55 per cent during 1981-91. Regarding the density of population of these classes of towns, it is observed that relatively small-towns (belonging to the classes of III to V recorded higher increase in density (54 to 57 percent) than the relatively big towns (belonging to size-classes of I and II which experienced 44 to 47 percent increase in population density).

This decentralisation tendency across the size-classes of towns may also be explained in terms of their economies' structural changes. The change in the percentage distribution of workers belonging to the three sectors across different size classes of towns during 1971 and 1991 is shown in Table 8.

Table 7 GROWTH AND DENSITY OF POPULATION OF THE MUNICIPAL TOWNS BY DIFFERENT SIZE-CLASSES

Size-classes	Annual average growth rates			Density of population (per sq. Km)		
	77-81	81-91	71-91	1971	1981	1991
I	3.05	2.01	2.84	11247 (100)	13504 (120)	16150 (144)
II	2.55	2.32	2.73	6194 (100)	7540 (122)	9130 (147)
III	3.01	3.55	3.81	3111 (100)	3723 (120)	4805 (154)
IV	1.78	2.92	2.61	1505 (100)	1770 (118)	2290 (152)
V	2.97	2.55	3.14	64 (10)	812 (125)	1091 (157)

Source : *Census of India, 1971, 1981, 1991*

It is observed that the share of workers in agriculture and allied activities to the total main workers has declined over the period for all five classes of towns. In case of Class V towns, the share of the primary sector workers was the highest and it declined sharply from 64.38 per cent in 1971 to 52.63 per cent in 1991 while during this period the percentage share of secondary sector workers increased from 9.02 to 11.80. For other size classes of towns the percentage share of secondary sector workers declined, but this decline in Class III and Class IV towns was marginal while that in Class II towns was higher and in Class I towns still higher.

**Table 8 PERCENTAGE DISTRIBUTION OF MAIN WORKERS  
PRIMARY, SECONDARY, TERTIARY SECTOR BY SIZE-  
CLASSES OF TOWNS, 1971 AND 1991**

Size-classes	Primary Sector		Secondary Sector		Tertiary Sector	
	'71	'91	'71	'91	'71	'91
I	3.04	2.80	47.11	40.06	49.84	57.13
II	5.81	4.50	46.54	42.42	47.65	53.08
III	15.13	11.95	32.74	31.99	52.13	56.06
IV	31.83	30.04	24.57	22.95	43.60	47.01
V	64.39	52.63	9.02	11.80	26.59	35.57

*Source : Census of India. 1971, 1981, 1991*

In recent years West Bengal as a whole recorded spectacular growth in agricultural production and productivity. Districts like Midnapore, Bankura, etc. which are far away from Calcutta have experienced rapid growth in agricultural production and productivity. Consequent of this very rapid agricultural growth towns nearby have recorded substantial rise in trade and commerce activities leading to the significant rise in percentage share of tertiary sector workers. Besides, these distant and relatively small towns have emerged as important industrial growth poles, centres of both traditional and non-traditional industries.

All these explain higher growth rate of urban population and population density in the relatively small towns, i.e., a tendency toward decentralised pattern of urbanisation in recent years. Another interesting observation from the table above is that there is increasing share as well as dominance of tertiary sector workers in all these classes of towns.

## SECTION 5

### Summary and Concluding Observation

The present study attempts to throw light on the pattern of urbanisation —both spatial and size-class-wise during 1971-1991 in 72 municipal towns of southern part of West Bengal. More particularly, it attempted at examining whether urban growth remained Calcutta-centric or there is a tendency of dispersed urbanisation in the study area. Based on Census data, it has been observed that the average decadal growth rate of population of towns near to Calcutta has been decreasing over the decades,

while it has been increasing for the relatively distant towns. This spatial class wise analysis of towns also shows that though the average density of population of towns around Calcutta more than doubled that of others the percentage increase of density during the study period is lower for these towns (around Calcutta) and a significant increase is observed in case of towns situated in the range of 51-100 kms. from Calcutta. Population size-wise analysis of sample towns reveals that the population growth rates of Class I and II towns were declining over the decades, while it was increasing for Class III and IV towns. The density of population also increased at a higher rate in the relatively small towns. All these indicate a tendency of dispersed urbanisation.

The above phenomenon is explained by the relative structural changes in the economies of the sample municipal towns. The towns close to Calcutta or the Class I and Class II towns experienced decline in the percentage share of secondary sector workers and increase in the primary and tertiary sector workers, which the relatively small towns far away from Calcutta, particularly class IV towns in the percentage share of secondary sector and tertiary sector workers. These latter towns including Class III and Class IV towns have become important centres of trade and commerce consequent on rapid agricultural growth in the agricultural hinterland, i.e., in interior districts and they have also emerged as important industrial growth centres.

**Notes :**

1. By Census definition, an area is regarded as urban if it has municipality, corporation, cantonment, board or notified town area committee. Other places are also termed as urban or town if they have (a) a minimum population of 50 0, (b) at least 75 per cent of male working population engaged in non-agricultural pursuits and (c) a density of population of at least 400 persons per square Km.

2. See Brutzkus, E., "Centralized vs. Decentralized Patterns of Urbanisation in Developing Countries : An attempt to elucidate a guideline principle", *Economic Development and Cultural Change*, 23 (4) July, 1975.

3. See Giri, P., "An Analysis of the growth of Small and Medium Towns in West Bengal, 1951-1981" in B. Dasgupta (ed.), *Urbanisation, Migration and Rural Change : A Study of West Bengal*, p 99, 1988.

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# FEMALE LABOUR PARTICIPATION IN THE HANDLOOM INDUSTRY

ABDUL HAI MALLICK\*

I

## Introduction

### A. Importance of the Industry :

Handloom industry is one of India's traditional industries which have escaped unscathed annihilation. It plays a very important role in the national economy of India in generation of employment and income and foreign exchange earning. It occupies an important place in the decentralised sector in rural and semi-urban areas. The share of employment provided by this industry in the decentralised sector is about 5.5 per cent, when in India almost 90 per cent of total jobs are provided by the decentralised sector and the rest by the organised sector.<sup>1</sup> Preserving all ancient traditions in weaving and carrying out improvements to the tools and accessories, Indian weavers are not only producing enough cloth to meet internal demand, but also exporting numerous artistic varieties to the highly industrialised countries of the world.<sup>2</sup>

The industry has an export-oriented component. Products have won acclaim outside India for their unique colour combinations and attractive designs. Industries of this type are necessary for the expansion of international trade, for securing favourable balance of payments and strengthening the socio-economic ties with other countries. In the competitive textile world market of today exports of handloom textiles from India have been able to survive. Not only that, it is noteworthy that exports of handloom goods have increased thirty one times during 1970-71 to 1989-90.<sup>3</sup>

The handloom industry by virtue of its decentralised nature and employment potential has a significant place in its contribution to the Gross National Product (G.N.P.). The G.N.P. (at 1980-81 prices) increased from Rs 89,465 crores in 1970-71 to Rs 2,09,794 crores in 1991-92 showing a 134 per cent increase. The value of production from handloom industry increased from Rs 534 crores in 1970-71 to Rs 829 crores in 1991-92 (at 1970-71 prices) recording an increase of 55 per cent.<sup>4</sup>

The percentage contribution of handloom industry to G.N.P. varied narrowly in between .89 per cent and 1.34 per cent during the period from

1970-71 to 1991-92. This contribution from a decentralised sector with limited capital investment from the Government is of much significance.

**B. Objects of the study :**

The main objects of the present study are ;

- (i) to examine the labour process of the industry ;
- (ii) to examine the role of female labour in the handloom industry ;
- (iii) to discuss the factors that are responsible for the differential participation rates among the male and female workers.

**C. Hypotheses :**

The hypotheses which are tested in this study are as follows :

- (i) Division of labour among the male and female workers operates in the handloom industry.
- (ii) Rate of increase of female labourers is higher than that of male labourers.
- (iii) In the industry rural female workers are larger than the urban counterparts.
- (iv) Labour participation in the industry is higher among the relatively aged workers.
- (v) Hourly earning from the handloom industry is less than that in agriculture.

## II

### **Data Base and Methodology**

In the present study we have used both primary and secondary data. Secondary data relate to employment of male and female labourers. Decennial population census maintains detailed data on industrial workers engaged in the rural and urban areas. But there are certain problems relating to the comparability of census data. Though Census of India gives a time series data on the level and structure of the workforce, frequent changes in the definitions and concepts have made the data non-comparable over time [Unni (1990)]. The 1961 Census used the 1958 Indian Standard Industrial Classification, while the 1971 and the 1981 Census used National Industrial Classification (NIC) 1970. Since these classifications are not directly comparable, 1961 data are not comparable within themselves [Krishnaraj and Deshmukh (1990)]. Census data relate to industry group, not to any particular industry. In 1971 and 1981, the NIC minor group code no. 235 gives information on workers in handloom.

In our analysis, we have also used the data available from Handloom Census 1987-88, where employment of workers is shown for men, women and children. But there are limitations of secondary data. So, to serve our purpose we have also depended on the primary survey for detailed data. Primary data are collected from the randomly selected 20 artisan households through personal interview and questionnaires.

The sampling design for the purpose of collection of primary data consists of a multi-stage random sampling with districts forming the first stage units within the State of West Bengal, while villages form the second stage units and individual industrial units are the basic units of sampling. The main purpose of survey was to enquire about the employment of female labour in the industry. The data collected relate to the year 1995-96.

The collected primary and secondary data have been analysed using various statistical techniques like mean, percentage, ratio, etc.

### III

#### Labour process in the Handloom Industry

Marx analysed the labour process independently of the 'particular form it assumes under given social conditions' [Marx, 1867 : 173]. Here it is a human-nature interaction, the former a conscious being. Because of his/her consciousness, the knowledge of the production process exists in his/her imagination at the commencement of the labour process itself. Marx writes : "At the end of every labour process, we get a result that already existed in the imagination of labour at its commencement" [1867 : 174]. For Marx, the labour process is not a peculiarity of capitalism ; It is a basic inevitable condition for human existence. Marx's concept of the labour process includes human will. Marx identifies three important elements in the abstract nature of the labour process : First, purposive activity, or the labour itself ; secondly, its subject matters ; and thirdly, its instruments". The labour process should here be rightly called the social labour process because the knowledge of the process is part of social tradition [Childe, 1942 : 13-32].

Against this theoretical backdrop we may now examine the labour process in the handloom industry. The creation of use value in the products involves four stages, namely (i) spinning of yarn, (ii) nuree making, (iii) bundle making (rolling) of warp through the sana, and (iv) weaving the cloth. The first stage in the art of weaving is the preparation of cotton. It is generally the womenfolk who undertake the



preparatory process. Also the second stage of production is conducted by the female workers and in the remaining stages they take part as assistants.

At the beginning of the second stage the hank of the yarn is to be unfastened and the knots and breakages properly examined. It is then loosely tied and placed in a reservoir, the water has to be changed every day. The object of wetting the thread is to remove from it foreign matters and make it suitable for the absorption of sizing. The dyed yarn requires to be wetted for only a short while.

Wetting over, the yarn is to be wound on reels. This is done by separating the skins and taking care that during winding the individual strands of thread do not get mixed up. It often happens that the thread breaks off during winding. The ends of the broken threads are sometimes tied by knots. But the other process, known as piecing is to bring the ends together and twist them into a continuous thread.

Sizing is made of starch from rice, parched rice and fried paddy. For finer type of weaving the starch of fried paddy is used. The hanks are put in the starch and thrashed so that the starch penetrates fully into the yarn. Thereafter the sized hank is placed on a swift. The strand of yarn pulled out of the hank is wound on a smaller swift and dried in the sun. During the rainy season the hank is dried by placing it by the side of an oven.

The next stage is the preparation of the warper's bobbin. The sized hank is twisted and untwisted several times to get rid of the adhesive remnants of the starch. Then it is wound on warper's bobbin. The bobbins are placed on a creel and the ends of thread of the bobbins are pulled out and made to pass through a leasing frame. The ends emerging out of the leasing frame are taken together and tied to a post.

Warping now begins. The length of the warp is determined by the requirement and convenience of the individual weaver. Generally, the warp is made long enough for four to twelve pair of dhoties or sharees. The next process is dentine which means drawing the warp ends through the reed. Two persons are required for this purpose. One of them picks up the threads in twos in succession and the other one draws them through the reeds with the help of a hook. The process is repeated until all the warp ends pass through the reeds.<sup>5</sup>

Beaming is the next stage. Warp is now stretched to full length. The

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5. See Census of India 1951.

ends of the threads nearer the reed are fixed to the rod which is placed in the groove within the beam. The beam is then wound. The beam so prepared is then put on a frame and a yard of it is stretched out and held tight by fixing to temporary posts. The next step is looming the warp. Looming the warp being over, preliminaries to actual weaving should be taken in hand. Thus after completing these stages the final stage, i.e., weaving is begun. The labour use and labour type in different stages of production are summarily shown in the table below.

Table 1 STAGES OF PRODUCTION

Stage	Work	Labour use	Labour type
1st stage	Spinning of yarn	Mill made or one labour spines 100 gm. daily (in case of hand spinning silk and tasar yarn)	Unskilled labour (female labour)
2nd stage	Nuree making and Gumming the yarn (sizing and gumming)	Daily 5 to 6 hrs labour power required per loom	Unskilled labour (female labour)
3rd stage	Bundle (rolling) of warp yarn through the sena	One or two days of two labourers per bundle (This varies for different types of cloth)	Skilled labour (female or male labour)
4th stage	Weaving the cloth	One labour is required per loom daily	skilled labour (female or male)

We observe that in different stages of production male and female are involved. Male labourers are mainly engaged in the 3rd and 4th stages. In our study area it has been observed that more than 45% of labourers are female. It is evident from the above analysis of different stages of production and types of labourers employed therein that there is clear division of labour among the male and females and hence the first hypothesis that division of labour among the males and females operates in the handloom industry is accepted.

Handloom Census 1987-88 give data on workers engaged in preparatory and weaving activities. It is observed that female labourers are mainly engaged in preparatory work, while the weaving activities are dominated by the male workers (see Table 2 and Table 3).

Table 2 NUMBER OF WORKERS IN WEAVING ACTIVITY IN WEST BENGAL VIS-A-VIS OTHER STATES OF INDIA, 1987-88

States	Workers (Number)									
	Full Time			Part Time			Men	Women	Children	Grand
	M	W	C	M	W	C	Total	Total	Total	Total
W. B.	251961 (68.74)	49420 (13.48)	3464 (0.95)	12720 (3.47)	41497 (11.32)	7483 (2.04)	264681 (72.21)	90917 (24.80)	10947 (2.99)	366545 (100.00)
Other than W. B.	1158156 (28.89)	729618 (18.20)	50241 (1.25)	132433 (3.37)	1817962 (45.34)	120840 (3.01)	1290589 (32.19)	2547580 (63.54)	171081 (4.27)	4009250 (100.00)
All India	1410117 (32.23)	779038 (17.80)	53705 (1.23)	145153 (3.32)	1859459 (42.49)	128323 (2.93)	1555270 (35.55)	2638497 (60.29)	182028 (4.16)	4375795 (100.00)

Source : Handloom Census, 1987-88.

Notes : Figures in the parentheses represent the percentage shares.

M=Men, W=Women, C=Children

**Table 3 NUMBER OF WOKERS IN PREPARATORY WORK IN WEST BENGAL VIS-A-VIS OTHER STATES OF INDIA, 1987-88**

States	Workers								
	Rural			Urban			Total Rural	Total Urban	Grand Total
	M	W	C	M	W	C			
W. B.	34161 (9.90)	905544 (59.57)	82657 (23.96)	1182 (0.34)	17404 (5.04)	4070 (1.18)	322362 (93.43)	22656 (6.57)	345018 (100.00)
Other than W. B.	143851 (7.94)	889310 (49.07)	392505 (21.66)	34669 (1.91)	253510 (13.99)	98502 (5.44)	1425666 (78.66)	386681 (21.34)	1812347 (100.00)
All India	178012 (8.25)	1094854 (50.75)	475162 (22.01)	35851 (1.66)	270914 (12.56)	102572 (4.75)	1748028 (81.03)	409337 (18.97)	2157365 (100.00)

*Source* : Same as in Table 2

*Notes* : Same as in Table 2.

Table 4 CHANGE IN HANDLOOM INDUSTRY FEMALE WORKERS VIS-A-VIS TOTAL WORKERS IN STATES OF INDIA, 1971-81

States	Female Workers				Total Workers			
	1971	1981	Change	% change	1971	1981	Change	% change
A.P.	49976(2)	46033 2)	- 3943	- 7.89	234279(2)	217153(3)	- 17126	- 7.31
Bihar	3344(10)	6590(9)	3246	97.00	32560(9)	44020(9)	11460	35.20
Karnatak	19056(4)	13222(5)	- 5834	- 30.6	81231(4)	54350(7)	- 26881	- 33.10
Kerala	12542(5)	12460(6)	- 82	- .65	48401(7)	47007 8)	- 1394	- 2.90
M.P.	6099(8)	5922(10)	- 177	- 2.90	24704(10)	20538(10)	- 4166	- 16.86
Maharashtra	12357(6)	12102(7)	- 255	- 2.06	74685(5)	60641(5)	- 14044	- 18.80
Orissa	6859(7)	10907(8)	4048	59.00	45581(8)	59669(6)	14088	30.91
Tamil Nadu	87296(1)	105488 1)	18192	20.84	359898(1)	423942 1)	64044	17.80
U.P.	28649(3)	37419(3)	8770	30.61	164034(3)	244412(3)	80378	49.00
W.B.	4503(9)	33714(4)	17811	396.00	71083 6)	168817(4)	107734	137.00
All-India	270946	321622	50676	18.7	1214155	1446766	232611	16.07

## IV

**Industry at the State Level**

Handloom is spread over almost all States of India. Out of the ten major States West Bengal had in 1971 the 6th rank in respect of total workers but 9th rank in respect of female workers. In 1981, State's rank got elevated to the 4th in respect of both total and female workers.

In India as a whole handloom female workers increased by more than 18% during the period from 1971 to 1981. This percentage was higher than that (16.07%) in respect of total workers. In West Bengal female workers increased during this period by more than 395% while total workers increased at a lower rate by 137%.

The coefficient of variation in female workers across the States declined over this decade from 110 to 106 percent though that for total workers marginally increased from 90 to 91 percent (see Table 4). It is also observed that rate of increase of female workers is higher than that of male workers in all States excepting Uttar Pradesh. Hence, our second hypothesis that rate of increase of female labourers is higher than that of male workers is accepted.

While examining female workers participation in the handloom industry across the rural and urban areas of the State we observe that number of female workers increased very significantly by 439% in the rural area as against 305% in the urban area of West Bengal. In India as a whole rate of increase of female workers has been almost the same [(more than 18%) (See Table 5)]. It is also observed from the table that both in 1971 and 1981 in six out of ten States and India as a whole rural female workers were higher than urban female workers. Hence, our third hypothesis that handloom industry rural female workers are higher than urban counterparts is partially accepted.

Out of 10 selected States of India 7 States including West Bengal experienced the increased relative importance for the female workers (i.e., % share of female workers to total workers increased) in handloom industry. In West Bengal the percentage share of female workers more than doubled during this period. In India as a whole this percentage share remained constant at more than 22 percent (see Table 6)

Handloom Census that was conducted by Govt. of India during 1987-88 throws some light on the composition of handloom workers engaged in weaving activity in the States of India across both rural and urban areas. It is evident that in India as a whole more than 85% of the total handloom workers belong to rural areas and more than 60% were female workers. More than 4% of the total workers engaged in this industry were children. Rural child labour was higher than the urban counterpart. In West Bengal,

Table 5 FEMALE WORKER PARTICIPATION IN THE HANDLOOM INDUSTRY IN RURAL AND URBAN AREAS IN DIFFERENT STATES OF INDIA, 1971-81

States	1971		1981		Changes		%	Changes	
	R	U	R	U	R	U	R	U	
A. P.	35611	14365	30111	15922	- 5500	1557	-15.44	10.83	
Bihar	2697	647	5903	687	3206	40	119.00	6.18	
Karnatak	9714	9342	5349	7873	- 4365	-1469	-44.00	-15.72	
Kerala	10422	2120	10001	2459	-421	339	-4.04	15.99	
M.P.	4416	1683	4707	1215	291	-468	6.58	-27.81	
Maharashtra	3355	9002	2667	9435	-688	433	-20.51	4.81	
Orissa	6043	816	10167	740	4124	-76	68.24	9.35	
Tamilnadu	26416	60880	36750	68738	10334	7858	39.00	12.91	
U.P.	13019	15630	16886	20533	3868	4903	29.71	31.37	
W.B.	3345	1158	18023	4691	14678	3533	439.00	305.00	
All India	146555	124391	173169	148453	26614	24062	18.16	19.34	

Table 6 PERCENTAGE SHARE OF FEMALE WORKERS TO TOTAL WORKERS IN HANDLOOM INDUSTRY IN STATES OF INDIA 1971 & 1981

State	Percentage of Female Workers	
	1971	1981
Andhra Pradesh	21.33	21.20
Bihar	10.94	14.97
Karnataka	23.46	24.33
Kerala	25.91	26.51
M. P.	24.69	16.55
Maharashtra	16.55	14.96
Orissa	15.05	18.28
Tamilnadu	24.26	24.88
U. P.	17.46	15.31
W. B.	6.33	13.45
All-India	22.31	22.23

however, though more than 90% of the handloom workers belong to rural areas, female labourers constituted about 22.5% in rural and 2.3% in urban areas. Thus, our third hypothesis is accepted fully in terms of data released from Handloom Census, 1987-88 (See Table 7).

**Table 7 WORKERS PARTICIPATION IN WEAVING ACTIVITY IN WEST BENGAL VIS-A-VIS OTHER STATES IN RURAL AND URBAN AREAS, 1987-88**

State	Number of Workers								
	RURAL			URBAN			Rural Total	Urban Total	Grand Total
	Men	Women	Child	Men	Women	Children			
W. B.	237806 (64.88)	82544 (22.52)	10653 (2.91)	26875 (7.33)	8373 (2.28)	294 (0.08)	331003 (90.30)	35542 (9.70)	366545 (100.00)
Other then W.B.	956435 (23.86)	2285072 (56.99)	147740 (3.68)	334154 (8.33)	262508 (6.55)	23341 (0.54)	3389247 (84.53)	620003 (15.46)	4009250 (100.00)
All-India	1194241 (27.29)	2367616 (54.11)	158393 (3.62)	361029 (8.25)	270881 (6.19)	23635 (0.54)	3720250 (85.02)	655545 (14.98)	4375795 (100.00)

*Source* : Handloom Census, 1987-88

*Note* : Figure in the parenthesis represents percentage share.



Table 8 INCREASE OF FEMALE WORKERS IN HANDLOOM INDUSTRY IN DISTRICTS, 1971-81

Districts	Female Workers				Total Workers			
	1971	1981	Increase	% Increase	1971	1981	Increase	% Increase
Murshidabad	376(6)	4270(2)	3894	1036	7054(4)	12732(5)	5678	80
Nadia	869(2)	4993(1)	4124	475	21793(1)	48520(1)	26727	123
24-Parganas	332(7)	872(6)	540	163	6201(5)	9613(6)	3412	55
Hooghly	443(4)	1293(5)	850	192	9805(3)	19933(3)	10128	103
Burdwan	496(3)	2975(3)	2479	500	3347(7)	19572(4)	16225	484
Bankura	381(5)	606(7)	225	59	4903(6)	6694(7)	1792	37
Midnapore	2941(1)	4272(4)	1331	141	9830(2)	24056(2)	14226	145
W. B.	4503	22714	17811	396	71083	168817	97734	137

Source : Census 1971, 1981

Note : Figure in the parenthesis represents rank of the district.

## V

**Industry in the district level**

In West Bengal also handloom industry spread across almost all districts. Nadia occupied the first rank among the districts in respect of total handloom workers in both 1971 and 1981. In respect of female workers it had the second rank (after Midnapore District). In 1981 Nadia district elevated to the first position in respect of female workers in 1981 while Midnapore district went down to the fourth position in this respect.

Murshidabad district experienced the highest percentage increase in female workers, followed by Burdwan and Nadia. The highest percentage increase in total workers was experienced by Burdwan, followed by Midnapore and Nadia (See Table 8).

While examining the increase in handloom workers across the rural and urban areas it is observed that the highest percentage increase of rural female workers was experienced by Murshidabad district followed by Burdwan and Nadia, while the highest percentage increase in urban workers was experienced by Bankura, followed by Murshidabad and Nadia (See Table 9)

**Table 9 FEMALE WORKER PARTICIPATION IN THE HANDLOOM INDUSTRY IN RURAL AND URBAN AREAS IN DIFFERENT DISTRICTS OF W. B., 1971-81**

Districts	Number of Female Workers							
	1971		1981		Increase '79-'81		% Increase	
	R	U	R	U	R	U	R	U
Murshidabad	210	166	3321	949	3111	783	1481	472
Nadia	372	497	2259	2734	1887	2237	507	450
2-4Parganas	80	252	112	440	32	188	40	75
Hooghly	338	105	1178	115	840	10	249	9.5
Burdwan	451	45	2906	69	2455	24	544	53
Bankura	370	11	386	120	16	109	4.32	991
Midnapore	941	—	2272	—	1331	—	141	—
All-W. B.	3345	1158	18023	4691	14678	3533	439	305

Source ; Census 1971, 1981.

The percentage share of female workers to total handloom workers increased in all districts excepting Midnapore. The highest increase was experienced by Murshidabad, followed by Burdwan and Nadia (See Table 10)

Table 10 PERCENTAGE SHARE OF FEMALE WORKERS TO TOTAL WORKERS IN HANDLOOM INDUSTRY IN DISTRICTS OF W. B , 1971 & 1981

District/State	Percentage Share of Female Workers	
	1971	1981
Murshidabad	5.33	33.53
Nadia	3.99	10.29
24-Parganas	5.35	9.07
Hooghly	4.52	6.48
Burdwan	14.82	15.20
Bankura	7.77	9.85
Midnapore	9.57	9.44
West Bengal	6.33	12.70

Source : Census 1971, 1981.

## VI

### Micro Level Study

We conducted a survey of 40 rural handloom artisan households where 96 workers are engaged in the industry, out of which 55 (57 percent) are female workers. The quite significant proportion of rural women in this household industry may be explained. The sample villages are the typical weaving villages where agriculture is, in general, a major occupation of workers. But distribution of our sample households by size of land owned shows that they are either landless or sub-marginal farmers owning less than one acre of land (Table 11). Our survey shows that at least 10 per cent of the sample families have moved away from agriculture and specialised in handloom weaving and women have largely been drawn into the workforce. Preparatory works which are of unskilled nature are almost the monopoly of females who work as assistants. They also work in weaving (Table 12). They work long hours even for low returns to supplement the meagre income of the families passing through semi-starvation conditions. Their works perform the function of providing basic security in their rural households.

Table 11 DISTRIBUTION OF HOUSEHOLDS BY SIZE OF LAND OWNED

Land Size (in acre)	Number of Artisan Households
Landless	16(40)
'01—'19	8(20)
'20—'39	6(15)
'40—'59	5(12.5)
'60 & above	5(12.5)
<b>Total</b>	<b>40(100)</b>

*Source : Field Survey.*

*Note :* Figures within parentheses indicate percentage shares to total.

Besides, women's work is utilised preferably in the family enterprises while men undertake outdoor work in agriculture and other economic sector.

Distribution of workers according to their age indicates that more than 55% of the total workers and 43% of female workers were aged more than 40 years. Less than 30% of female workers and 20% of total workers were aged 30 years and below. Thus, our fourth hypothesis that labour participation in the handloom industry is higher among the relatively aged workers is accepted (See Table 13).

Table 12 DISTRIBUTION OF HANDLOOM WORKERS BY SEX AND ACTIVITY

Categories of Workers	Number of Workers		
	Preparatory Works	Weaving	Total
Female	25(86)	30(45)	55(57)
Male	4(14)	37(55)	41(43)
<b>Total</b>	<b>29(100)</b>	<b>67(100)</b>	<b>96(100)</b>

*Source : Field Survey.*

Table 13 DISTRIBUTION OF WORKERS ACCORDING TO AGE

Age	No. of Male	No. of Female	Total	% of Male	% of Female	% of Total
1—14	0	5	5	0	8.8	5.2
15—30	1	12	13	8	21.7	13.6
31—40	10	14	24	24	26.1	25.0
41—50	10	10	20	24	17.4	20.8
51—60	8	12	20	20	21.7	20.8
61—	12	2	14	24	4.3	14.6
Total	41	55	96	100	100.0	100.0

Source : *Field Survey,*

It is to be noted that the workers engaged in this industry earn low income. Distribution of workers as per hourly income from industry reveals that more than 70% of total workers and cent percent of tied workers who have no handloom of their own earn an hourly income Rs 2/- and less, only about 35% of independent artisan workers earn per hour Rs 2.01 to Rs 2.15 and no worker of the industry earns more than Rs 3.00 per hour (see Table 14). All these are to be contrasted with an average hourly wage rate of the agricultural workers, which is more than Rs 3.00 per hour in the district of Midnapore. Thus, our fifth hypothesis that hourly earning in the industry is less than that in agriculture is accepted. It may be noted in this context that this craft which ensures survival but brings low returns is carried on mainly by women.

Table 14 DISTRIBUTION OF WORKERS AS PER ESTIMATED HOURLY INCOME FROM INDUSTRY

Estimated Hourly income Rs.	No. of Workers			% of workers		
	Tied	Independent	Total	Tied	Independent	Total
1.00—1.25	4	0	4	10.52	0	4.17
1.26—1.50	10	2	12	26.32	3.45	12.50
1.51—1.75	18	14	32	47.37	24.14	33.33
1.76—2.00	6	22	28	15.79	37.93	29.17
2.01—2.25	0	12	12	0	20.69	12.50
2.26—2.75	0	8	8	0	13.79	8.33
Total	38	58	96	100.00	100.00	100.00

Source : *Field Survey.*

Despite the low income per hour earned from this industry the artisans, being either landless or sub-marginal farmers, are heavily dependent on this industry in their struggle for earning a minimum subsistence. It has been observed that 60 percent of the tied artisan households, 50 percent of the independent artisan households and 55 percent of the total sample artisan households derive 50 percent or more of the total family income from this industry (Table 15)

**Table 15 DISTRIBUTION OF SAMPLE ARTISAN HOUSEHOLDS  
BY PERCENTAGE OF INCOME FROM HANDLOOMS**

Percentage of Income from Handloom	Number of Artisan Households		
	Tied	Independent	Total
10—29	3(15)	4(20)	7(17.5)
30—49	5(20)	6(30)	11(27.5)
50—79	9(45)	6(30)	15(37.5)
80—99	2(10)	1(5)	3(7.5)
100	1(5)	3(15)	4(10.0)
Total	20(100)	20(100)	40(100.0)

*Source : Field Survey*

However, on account of the low income per hour earned from this industry, most of the sample artisan families live below poverty line. It is estimated that 85 per cent of the tied artisan households, 60 per cent of the independent artisan households and 72.5 per cent of the total sample households live below the (estimated) poverty line of Rs 3993.32 annual per capita income (Table 16).

**Table 16 DISTRIBUTION OF SAMPLE ARTISAN HOUSEHOLDS  
BY PER CAPITA INCOME**

Annual Per capita income (Rs)	Number of Households		
	Tied	Independent	Total
1000.00—1999.99	12(60)	4(20)	16(40.0)
2000.00—2999.99	3(15)	6(30)	9(22.5)
3000.00—3993.32	2(10)	2(10)	4(10.0)
3993.33—4999.99	1(5)	2(10)	3(7.5)
5000.00—6999.99	1(5)	3(15)	4(10.0)
7000 and above	1(5)	3(15)	4(10.0)
Total	20(100)	20(100)	40(100.0)

*Source : Field Survey.*

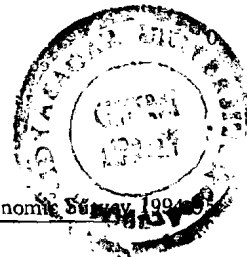
## VII

**Summary and Conclusion**

Handloom industry as a traditional industry in India occupies an important place in the decentralised sector of rural and urban areas. It plays an important role in employment and income generation and foreign exchange earnings. The labour process in this industry indicates that there is division of labour among the male and female workers engaged in this industry—female workers are mainly engaged in the preparatory works while the male workers are dominant in weaving. In India as a whole female labourers have increased significantly during 1971-1981. The rate of increase of female labourers has been higher than that of male labourers in most of the States of India. The rural female workers of this industry are larger than the urban counterparts. The relatively high proportion of female workers in this industry is explained by the extent of proletarianisation of the artisan households, nature of works in the industry and urge to earn somehow basic subsistence for the members of the families. Female labour participation in the industry is higher among the relatively aged workers. In other words, the relatively young persons constitute the relatively low percentage share of total workers. This may be on account of the fact that hourly earning from the industry is less than that in agriculture. Despite this relatively low hourly earning from this industry the landless and sub-marginal farming-cum-artisan households are heavily dependent on this industry in their struggle for earning bare subsistence earning and on account of this low hourly earning from this industry most of the sample artisan households live below the poverty line. There is thus the need for enhancing the earning from this industry through the increase in productivity via improvement of technology and improvement in social welfare and security measures.

**Notes :**

1. State Bank of India (1982 : 267).
2. Amjaneyelu (1990-7)
3. See, Desai (1988), Government of India (1990).
4. R B.I. Bulletins, Eighth Five Year Plan (1992-97) and Economic Survey, 1994-95

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# **PRODUCTIVITY TREND IN THE ORGANISED MANUFACTURING SECTOR IN INDIA : 1970-1988**

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The general perception regarding productivity growth in the manufacturing sector of the Indian economy is that productivity has not much improved over time in spite of significant expansion and growing technological sophistication of the manufacturing sector and also a rising share of manufactures in Gross Domestic Product over the last two decades (Goldar, 1986, Ahluwalia, 1991). However, according to Ahluwalia (1991) there is a 'turnaround' in total factor productivity growth (TFPG) in the early 1980's. In this paper we have reviewed the contribution of total factor productivity growth and the growth of the factors of production (capital and labour) to the growth of output of the Indian manufacturing industries. Nine major industry groups accounting for 80 percent of the total value added in the organised manufacturing sector (in 1981) have been taken up for this study.

Section II of the paper discusses methodology we have adopted for measuring the total factor productivity. Here we have also tried to justify our deviation from the approach taken in other similar studies. In section III we have discussed the measurement of variables. Estimates of production function for the nine industry groups (for alternative estimates of output) along with a discussion of some associated problems of estimation are presented in section IV. The same section presents and analyses our estimates of TFPG. Section V presents the trans-log indices and compares them with the production function measures of TFPG. Section VI computes the TFPG for the overall registered manufacturing sector and takes up growth accounting in terms of contribution of TFPG and growth of inputs to the growth of output.

## **Section II**

### **METHODOLOGY**

In productivity analysis the concept of total factor productivity growth (TFPG) is widely used today. Basically the concept is to treat output (Y) as a function of factors of production, capital (K) and labour (L),

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as well as some unknown influence captured by a proxy variable, time (T).  $Y = F(K, L, T)$ . Then, TFPG,  $G = \frac{1}{Y} \partial Y / \partial T$ . There are several approaches to the measurement of 'G'. These are based on production functions of different levels of generality. 'G' can be expressed in terms of factor elasticities and factor growth rates (discussed below). Direct estimation of production function to obtain factor elasticities is not commonly undertaken. The common approach is to assume competitive equilibrium and equate the factor prices with the respective marginal products so that factor shares in output are the respective elasticities. The factor shares are easily observable. So, the estimation of the production can be avoided.

The above approach is extremely convenient and probably reasonably efficient for economies which approximate to some extent the underlying optimising assumptions of competitive equilibrium economics. Since resources are allocated efficiently each factor is paid just the marginal product. Further, there exists constant returns to scale (CRS) so that payment according to marginal productivity exhausts the product. The assumptions may not be too far out of the way for developed economies which probably operate at a reasonably high level of efficiency in resource allocations. Constancy of returns to scale, though not often true, has sometimes been found a more or less reasonable approximation to reality.

However, for an underdeveloped economy like India it seems too much to pre-assume allocative efficiency in the study of the trend of total factor productivity. A large part of the registered manufacturing sector being under the public sector with administered product prices and the employment (both of capital and labour) policy not often being particularly related to the criterion of profit maximization (Dutt 1987), the presumption of a primary level of allocative efficiency seems invalid. For various reasons (e.g., lack of freedom of entry or exit, the allocative efficiency may not be the hallmark of the private sector also. So, estimates of total factor productivity based on the equality of factor shares to the respective elasticities are likely to be highly biased (probably negatively, because marginal productivities are lower than factor prices ?) for India.<sup>1</sup>

In fact, if the profit maximization criterion is not adhered to one need not be surprised to find the marginal productivity for some factor for some industry to be close to zero or even negative. This may be so, for example, when the employment of a factor can not be trimmed even though demand for the product is low or, even, when the employment policy is determined beyond the plant level based on criteria unrelated to profit maximisation (Joshi and Little, 1994) or productive efficiency. However,

in spite of such 'inefficiency', it may still be found that TFPG is positive. This may be because of the application of advanced scientific techniques, the economy of scale or some other reason like an improvement in management in some respect. Clearly, in view of the inappropriateness of the assumptions mentioned above it may be questioned how far they can contribute to the efficiency of the resulting estimates.

### The Trans-log Measure

The trans-log measure is based on a very flexible form of production function that is particularly suitable for application to observations at discrete points. The second property in particular has made the measure widely popular. We may derive the trans-log measure of total factor productivity as follows. Take the trans-log production function with a slope dummy :

$$\log Y = \alpha_0 + \alpha D + \alpha_1 \log K + \alpha_2 \log L + \alpha_3 T + \frac{1}{2} (\beta_{11} \log^2 K + \beta_{22} \log^2 L + \beta_{33} T^2) + \beta_{12} \log K \log L + \beta_{13} \log K \cdot T + \beta_{23} \log L \cdot T \quad \dots(1)$$

where, Y, K and L are respectively output, capital stock and labour employed and T stands for time. Measurement of the variables have been discussed below. This dummy variable takes into account a shift in TFPG. Elasticities of output with respect to K, L and T are :

$$V_K = \alpha_1 + \beta_{11} \log K + \beta_{12} \log L + \beta_{13} T \quad (2)$$

$$V_L = \alpha_2 + \beta_{22} \log L + \beta_{12} \log K + \beta_{23} T \quad (3)$$

$$V_T = \alpha_3 + \alpha D + \beta_{33} T + \beta_{13} \log K + \beta_{23} \log L \quad (4)$$

For discrete time we proceed to obtain the contribution of TFPG and the growth of inputs to the growth of output as follows :

$$\dot{Y}/Y = \overline{V_K} \dot{K}/K + \overline{V_L} \dot{L}/L + \overline{V_T} \quad (5)$$

where,

$$(\dot{Y}/Y)_t = \log Y_t - \log Y_{t-1}$$

$$(\dot{K}/K)_t = \log K_t - \log K_{t-1}$$

$$(\dot{L}/L)_t = \log L_t - \log L_{t-1} \quad (6)$$

Further,

$$\overline{V_{K,t}} = 1/2 (V_{K,t} + V_{K,t-1})$$

$$\overline{V_{L,t}} = 1/2 (V_{L,t} + V_{L,t-1})$$

$$\overline{V_{T,t}} = 1/2 (V_{T,t} + V_{T,t-1}) \quad \dots(7)$$

(To simplify notations a bit we have excluded time subscripts from elasticities in equation (12).)

$V_K$  is the Divisia quantity index of total factor productivity growth ( or technical change ) applied to the trans-log production function. Whereas the first two terms on the right hand side of (12) are the contributions of capital and labour to output growth, so the sum of the two terms contribution of inputs to output growth.

The use of conditions of producer's equilibrium facilitates the computation of TFPG. The assumptions that factors are paid their marginal products and production shows constant returns to scale mean that the necessary conditions of producer's equilibrium are given by the equality of value shares and the respective elasticities. The value shares are easily observed. Also, the rates of growth of output, capital and labour can be obtained from the respective time series. Substituting observed factor shares ( after centering ) for  $V_T$ ,  $V_L$  in equation (12) one can find a measure of total factor productivity. It is this particular measure, rather than the general form referred to above, that has come to be known as the **transcendental logarithmic ( trans-log ) measure of TFPG.**

Clearly, the trans-log measure uses the assumption of constant returns to scale and is, therefore, deprived of some of the flexibility of the trans-log production function. Further, the measure assumes that the factors are paid their marginal products and is, therefore subject to the limitations referred to above. It should, therefore, be interesting to study how the measure compares with the more general ( with its own limitations ) measure where the parameters are obtained from the production function fitted to the observed data. We have called the latter index the production function index. Thus the production function index does not equate the factor elasticities with the respective observed factor shares. The elasticities are obtained from the fitted production function.

In order to obtain the production function index of TFPG we have undertaken direct estimation of the production function. The problem with our estimation procedure is that direct estimation of trans-log production function involves estimation of a large number of parameters based on basically three time series observations, and that too, of poor quality.<sup>2</sup> This surely affects the efficiency of estimates. But instead of putting artificial restrictions on parameters in the form of assumptions of constant returns to scale or Hicks-neutral technical progress or using the equilibrium equations, we excluded step by step through the process of backward elimination, taking one parameter at a time, generally ( but not always in a straight forward way ) those parameters which were found to be insignificant in regression exercises. We now describe in detail the

procedure by which we obtain our estimates of the production function and the production function measure of TFPG.

In the first stage we first estimate the general trans-log production function using ordinary least squares procedures and all the observations we have. Almost invariably this results in very low values of t-statistics for almost all the coefficients and very high  $R^2$  of estimation. Then we exclude one term of the production function (equivalent to the assumption that the relevant coefficient is not significantly different from zero). Normally, dropping a bottom ranking term (with respect to t-values) gives the best result. The process is repeated in the next step starting normally with the best but sometimes with the second or even the third or next best result (use of personal judgement is inevitable) of the previous step. We proceed in this way until we reach a result where all the coefficients have t-statistics significant at the 5% level. It is important to note here that we have *ignored those forms which do not contain all the variables K, L and T some way or other*. Thus using all the observations we have we often obtained more than one result or in some cases even no result (because we did not consider all the possible combinations of terms) for which all the coefficients have significant t-statistics. Then we repeated the whole process leaving one observation from the beginning, then one observation from the end and then one observation both from the beginning and the end. Sometimes we tried by dropping two observations from the beginning or the end. Ultimately we obtained for each industry a number of results with all the coefficients significant at 5% level. We call such a result a good result.

In the second stage we checked each good result whether it remains good in each of the four cases: (i) when all the observations are considered, (ii) when one observation is excluded from the beginning, (iii) when one observation is excluded from the end and (iv) when one observation is excluded from both the beginning and the end. We call the good results which remain good in all the four above cases 'observationally robust' results.

In the third stage we subject each of the robust results to F-test to check whether all the excluded coefficients are jointly insignificant. We ignore the robust results that fail the F-test at 5% level of significance. The F-test is given by

$$F_{q, n-k} = \frac{R_a^2 - R_c^2}{1 - R_a^2} \cdot \frac{n-k}{q}$$

(Where n, k and q are respectively the number of observations, the number

of coefficients in the general form of the production function and number of independent linear restrictions i.e., the number of coefficients assumed zero in the present case. )

The robust results passing the F-test have then been used, in the fourth stage, to compute the contribution of inputs ( capital and labour taken together ). Our presumption is that inspite of significant sources of inefficiency, as discussed above, the joint contribution of inputs taken together should not normally be negative over the whole of roughly the two decades. We have found that in some of the cases the regression results passing the first three stages show a *negative contribution of capital and labour taken together*. *We have ignored such results* and presented only results that pass all the above criteria. However, in one case we have not found any result showing positive contributions of inputs. In this case we present the result which shows maximum ( though negative ) contribution of inputs. Finally, these results have been used to compute the production function measure of TFPG following equations (11) and (13).

In order to obtain average TFPG over a period of time we have taken the arithmetic mean of annual estimates for both TFPG and contribution of inputs to growth of output. Then these averages have been adjusted to the growth rate of output as the growth of output must be equal to the sum of TFPG and the contribution of inputs ( equation (12) ).

### Section III

#### Data and Variables

We have used two alternative measures of real value added in our study. The first is obtained by the use of a simple value added deflator instead of the wholesale price index. NAS provides estimates of real value added in the manufacturing sector as a whole but not for its subsectors. Some researchers have used the output prices as deflators for current price value added. We have used GDP deflator obtained from NAS as the ratio between current price and constant price GDP. The use of the GDP deflator is apparently too simplistic a solution. But it is not clear that we are more correct when we deflate by the wholesale price index for even the particular industrial product. Because the inputs and outputs are different products. The ideal, of course, is to take seperate and specific price indices to deflate inputs and output But that is too large a task for the present study.<sup>8</sup>

In fact the GDP deflator shows a trend somewhat steeper than that for the wholesale price of manufacturing. So the value added growth rate obtained by us is, in general, lower than what would be obtained by using a wholesale price index. The value added series for different industries obtained by deflation with GDP deflator has been designated as 'Z'. Thus though the Z-measure of value added is admittedly a crude one particularly because it uses a single GDP deflator to deflate value added of all the different industries it seemed to us interesting to work with this deflator.

Our second alternative, which in our view is a better one, is to use a modified value added index. This is represented as :  $Y_t = Y_0 I_t$ , where  $Y_t$  is the real value added index for the year t for any particular industry,  $Y_0$  represents value added in the particular industry for a bench mark year. We have taken 1981-82 as the bench-mark year as it is the base of the wholesale price index used here. Further, 1981-82 is more or less the central point of the time period under study.  $I_t$  represents the index of real output for time 't',  $I_t = I_t^0 / I_0^0$ , where  $I_t^0$  is the value of output in period 't' at prices of '0'.<sup>4</sup> The 'Y' series discussed above avoids the problem relating to the measurement of relative price of inputs. However, the implicit assumption in this case is that real value added is proportional to real output and, hence, real input is proportional to real output. The 'Y' series will be biased to the extent the assumption of proportionality is invalid. In the context of the study of technological change this assumption implies that technological change concerns the efficiency of factors like capital and labour, not material inputs.

In order to obtain the index of labour employed we have made the uncomfortable assumption that efficiency differences in different classes of labour are largely reflected in their remunerations. Although we are convinced that the assumption is not particularly valid for a country like India, the alternative of treating labour as homogeneous also involves series error. Thus, admittedly, our labour index is not satisfactory but, probably, it is better than an unweighted sum of different categories of labour.<sup>5</sup> 'Workers' and 'other employees' (includes supervisors, technicians, managers etc.) are the two groups of labour for which data are consistently available for the period under study. Labour index is formed by a weighted sum of the number of heads in these two groups, weights being (unity for workers) the relative group remunerations.<sup>6</sup>

As for the estimation of capital stock we have taken the real value of capital stock at (1981-82) prices as the measure of capital input. Deflator for fixed capital stock is obtained from data on gross fixed capital formation (GFCF) at current and constant prices, for different years. Data for the



above purpose are obtained from the various issues of Annual Survey of Industries and National Accounts Statistics published by the Central Statistical Organisation. Admittedly, there is scope for refinement of data on capital stock as has been attempted by some researches (Goldar, 1986) and this is a weakness of the present study. However, the focus of the present study is on the plausibility of the production function estimates of TFPG as outlined above and its difference from the trans-log measure for the given set of data.

#### Section IV

##### Production Function and Measure of TFPG

Here we present the estimates of production function for nine major industries of the organised manufacturing sector of the Indian economy for the period 1970-71 to 1987-88 and the estimates of TFPG obtained from these production functions. All the regression results that pass the above mentioned tests have presented in the tables A.1 to A.9. As already discussed, we have two measures of output, Y and Z. Thus for each industry we have two sets of results.

A slope dummy (in the form of 'dummy time') has been included in the regression exercise to account for shift in the TFPG. It should be mentioned here that we have tried with alternative dummy variables (such as D8, D9, D10 etc.) in our regression analysis. D8 takes the value zero upto seventh observation and one from eighth observation onwards. D9 and D10 are defined similarly.

The existence of high degree of multicollinearity may possibly have lent some uncertainty to our analysis. We know that high degree of multicollinearity makes the variance of coefficients high and thus makes the t-statistic an unreliable guide to the significance of the individual parameters. Fortunately, we had very low standard error of estimates. This offsets the effect of high variance to some extent. Further, the three-fold test mentioned above should go some way in giving credibility to our results.

Here we would like to discuss one point in some detail. Since in dropping terms of the trans-log production function we have been guided by the t-test on individual parameters, as an additional check we have undertaken F-test of significance of the joint exclusion of variables from the production function. We may mention that the F-test takes into account the effect of intercorrelations and it often gives conflicting signals vis-a-vis

t-test for individual parameters, when multicollinearity is strong. We have used the F-statistic :

$$F_{q, n-k} = \frac{R_g^2 - R_c^2}{1 - R_g^2} \cdot \frac{n-k}{q}$$

( Where n, k and q are respectively the number of observations, the number of coefficients in the general form of the production function and number of independent linear restrictions, i.e., the number of coefficients assumed zero in the present case ).

Here  $R_g^2$  is the  $R^2$  value for the general case regression,  $R_c^2$  is the  $R^2$  value for a final form regression,  $(n-k)$  and  $(n-k+q)$  are the degrees of freedom for the general case and the final form regression respectively. Tables 1 and 2 show the results of F-test on all the possible forms of production function obtained through backward elimination. The test shows that the dropped terms were not significant jointly. This along with the fact that the t-statistics are highly significant for all the coefficients of the forms presented and that these final forms are observationally robust makes our estimates interesting.

#### TFPG Estimates from Production Functions

In order to facilitate comparison of the performance in respect of TFPG during the 70's with that during the 80's, we have computed average annual TFPG for the entire period as well as for the two sub-periods 1970-71 to 1980-81 and 1981-82 to 1987-88. Table 3 shows the average annual TFPG for these periods for all the possible forms of production function obtained by us for Y variable. Similarly, table 4 shows the same for z variable.

From table 3 we notice that there are altogether four regressions passing all the four stages of screening for Chemical and Chemical Products and five for Non Metallic Mineral Products. For all other industries except Transport Equipment and Parts and Food Products we have two regressions and for these two industries we have one regression for each. Regressions for each industry have been ordered on the basis of the values of  $R^2$ .

In fact, the differences between  $R^2$  values for all the alternative forms are very small in most cases. For Chemical and Chemical Products and Non Metallic Mineral Products, we notice that all the regressions give very close estimates of average annual TFP-G for the whole period. This observation is true of two other industries Basic Metal and Alloys and Non Electrical Machinery. For Transport equipment

**Table 1 : F-TEST OF JOINT RESTRICTIONS ON PARAMETERS  
( Variable Y )**

INDRY	$R^2_o$	$df=n-k+q$	$R^2_a$	$df=n-k$	$SFq; n-k$
1. i*	0.9996	7	0.99966	3	0.20
1. ii	0.9996	7	0.99966	3	0.20
1. iii	0.9996	7	0.99966	3	0.20
1. iv	0.9996	7	0.99966	3	0.20
2. i	0.988	11	0.995	4	0.8
2. ii	0.966	12	0.995	4	2.9
3. i	0.982	11	0.998	4	1.71
3. ii	0.982	11	0.988	4	1.71
4. i	0.9943	12	0.9985	6	2.80
5. i	0.9889	15	0.9907	6	0.129
5. ii	0.9840	14	0.9907	6	0.540
6. i	0.995	12	0.997	6	0.667
6. ii	0.994	13	0.997	6	0.857
7. i	0.994	12	0.997	6	1.00
7. ii	0.993	12	0.997	6	1.33
7. iii	0.993	12	0.997	6	1.33
7. iv	0.993	13	0.997	6	1.143
7. v	0.988	14	0.997	6	2.25
8. i	0.978	9	0.992	4	1.40
8. ii	0.924	12	0.992	4	4.25
9. i	0.928	2	0.978	5	2.84

$$S Fq; n-k = (n-k) * (R^2_a - R^2_o) / q * (1 - R^2_o)$$

**Note :** INDRY=Industry 1. Chemical & Chemical products. 2. Electricity. 3. Basic Metal & Alloys. 4. Transport Equipment & Parts. 5. Electrical Machinery & Parts. 6. Non Electrical Machinery. 7. Non Metallic Mineral Products. 8. Cotton Textiles. 9. Food Products.

\* Roman numerals represent regressions passing all the conditions mentioned above ranked according to the value  $R^2$ .

and Parts and Food Products we have just one regression for each. However, for the three remaining industries, namely, Electricity, Electrical Machinery and Parts and Cotton Textiles, estimates of TFPG vary widely for the alternative estimates of the production function. So, there is some

Table 2 F-TEST OF JOINT RESTRICTIONS ON PARAMETERS  
(Variable Z)

INDRY	$R^2_e$	df=n-k+q	$R^2_o$	df=n-k	SFq, n-k
1.	0.945	10	0.975	3	0.514
2.	0.950	11	0.976	4	0.619
3. i*	0.937	9	0.967	4	0.727
3. ii	0.912	10	0.967	4	1.11
4.	0.991	8	0.992	6	0.375
5.	0.982	11	0.993	6	1.89
6. i	0.985	13	0.994	6	1.29
6. ii	0.983	13	0.994	6	1.57
7.	0.974	12	0.993	6	2.71
8.	0.920	8	0.972	4	1.86
9.	0.879	12	0.981	4	2.68

$$SFq, n-k = (n-k) * (R^2_o - R^2_e) / q * (1 - R^2_e)$$

**Note :** Indry : Industry 1 : Chemical & Chemical Products. 2. Electricity. 3. Basic Metal & Alloys. 4. Transport Equipment & Parts. 5. Electrical Machinery & Parts. 6. Non Electrical Machinery. 7. Non Metallic Mineral Products. 8. Cotton Textiles. 9. Food Products.

\* Roman numerals represent regressions passing all the conditions mentioned above ranked according to the value of  $R^2$ .

ambiguity with respect to the three industries so far as the Y-measure of output is concerned.

As regards regressions for the Z variable from table 4 we observe that for Basic Metal and Alloy and Non Electrical Machinery have two regressions each and they give us reasonably close TFPG estimates for each industry. Rest of the industries show only one regression passing the tests noted above. So, results for the Z variable are unambiguous.

It may be significant that for all the three industries showing divergent TFPG estimates for the Y variable, the estimates for the Z variable are very much closer to those obtained from regression 1 (with highest  $R^2$ ) than to those given by regression 2. This closeness apart from higher  $R^2$ , gives us some basis to emphasize the estimates from regression 1 in our subsequent analysis. In the following discussion unless otherwise mentioned our analysis would be centered around the best regression (Regression 1) for both the variables Y and Z for all the nine industries

Table 3 : AVERAGE ANNUAL TFPG : PRODUCTION FUNCTION APPROACH (Variable Y)

	Reg. 1	Reg. 2	Reg 3	Reg. 4	Reg. 5
Industry : 1 a	3.31	3.26	3.33	3.30	
b	2.70	2.75	3.39	3.35	
c	3.91	3.79	3.27	3.25	
Industry : 2 a	3.53	0.65			
b	3.40	0.63			
c	3.66	0.67			
Industry : 3 a	2.93	2.90			
b	3.04	3.01			
c	2.81	2.77			
Industry : 4 a	2.34				
b	1.81				
c	3.11				
Industry : 5 a	2.08	0.42			
b	2.04	0.27			
c	2.17	0.63			
Industry : 6 a	2.41	2.47			
b	2.35	2.43			
c	2.49	2.52			
Industry : 7 a	1.77	1.74	1.63	1.57	1.26
b	1.78	1.74	1.71	1.62	1.22
c	1.73	1.74	1.52	1.52	1.32
Industry : 8 a	0.03	1.16			
b	1.10	0.89			
c	- 1.17	1.47			
Industry : 9 a	0.64				
b	-1.51				
c	3.47				

Note : Industry numbers explained in table 1

a : 1970-71 to 1987-88. b : 1970-71 to 1980-81.

c : 1981-82 to 1987-88. Reg. = Regression.

For variable Y, TFPG is highest and marginally above 3.5 percent per annum for Electricity (for regression 1, though regression 2 gives a low estimate of TFPG). Industry Electricity is followed by Chemical and

Table 4 AVERAGE ANNUAL TFPG : PRODUCTION FUNCTION  
APPROACH (Variable Z)

	Reg. 1	Reg 2
Industry : 1 a	1.80	
b	1.74	
c	1.87	
Industry : 2 a	3.06	
b	4.31	
c	1.65	
Industry : 3 a	1.72	1.85
b	2.58	2.88
c	0.73	0.66
Industry : 4 a	3.54	
b	2.76	
c	4.66	
Industry : 5 a	1.67	
b	2.66	
c	0.26	
Industry : 6 a	2.56	2.28
b	2.95	3.82
c	2.01	0.11
Industry : 7 a	0.98	
b	1.56	
c	0.18	
Industry : 8 a	-0.28	
b	-0.09	
c	-0.48	
Industry : 9 a	0.34	
b	0.06	
c	0.07	

**Note :** Notations as in table 3.

Chemical Products, with TFPG 3.31 percent per annum. TFPG is between 2 to 3 percent per annum for Basic Metal and Alloy, Non Electrical Machinery, Transport Equipment and Parts and Electrical Machinery (for regression 1). It is marginally above 1.75 percent per annum for Non Metallic Mineral Products. TFPG is low and less than 0.75 percent per annum for Food Products and Cotton Textiles. It is lowest for Cotton Textiles.

For Z variable, highest TFPG (marginally above 35 percent) is reported for Transport Equipment and Parts. It is followed by Electricity, whose TFPG is marginally above 3 percent per annum (It may be noted that this result is very close to that obtained from regression 1, for the Y variable) TFPG is slightly above 2.5 percent per annum for Non Electrical machinery. It is between 1.5 to 2 percent per annum for Chemical and Chemical products, Basic Metal and Alloy and Electrical Machinery. TFPG is less than one per cent per annum for Non Metallic Mineral products, Cotton Textiles and Food products. It turns out to be negative for Cotton Textiles.

#### Industry Ranks According to TFPG

Table 4.4 presents the ranking of various industries in accordance with TFPG for the best regressions in case of both the variables Y and Z. Looking at tables 5 we see that the group of top five industries ranked according to TFPG for variables Y and Z are identical. This group consists of industries Chemical and Chemical Products, Electricity, Basic Metal and Alloy, Transport Equipment and Parts and Non Electrical Machinery. The only industry in this group having widely different ranks is Transport Equipment and Parts; its rank being 5 for Y-measure of output and 1 for Z-measure. Further, what is more striking, industries with ranks from 6 to 9 according to TFPG for both Y and Z estimates of output are identical.

The rank correlation coefficient for the two rankings of industries, according to TFPG for variables Y and Z comes out to be 0.7833. Thus, it may be commented that the ranking of industries based on average annual TFPG obtained from the estimation of production function are broadly similar for Y and Z variables. This is true inspite of the fact that the measures Y and Z vary a great deal. The growth of Y is higher than that of Z and this is reflected in higher TFPG estimates for Y variable compared to the Z variable.

### Section V

#### Comparison of Trans-log Indices and the Production Function Measures of TFPG

We now present the trans-log measures of TFPG (referred to in Section II) for the nine industry groups and compare them with the corresponding production function measures. Table 6 presents the trans-log indices. It is clear that as in the case of production function measures presented in the previous section, the estimates for the Y variable are in

**Table 5 : INDUSTRY RANKING ACCORDING TO TFPG  
(Variable Y and Z)**

Industry	Variable Y	Variable Z
Electricity	1	2
Chemical & Chemical Products	2	4
Basic Metal & Alloys	3	5
Non Electrical Machinery	4	3
Transport Equipment & Parts	5	1
Electrical Machinery & Parts	6	6
Non Metallic Mineral Products	7	7
Food Products	8	4
Cotton Textiles	9	9

Rank Correlation Coefficient = 0.7833

general higher than the corresponding estimates for the Z variable. The reason, as mentioned above, is the higher growth rate of Y compared to that of Z.

We also observe that the ranking of industries produced by TFPG estimates given by trans-log indices for the measures of output (Y and Z) and more divergent than the ranking produced by the production function measures (presented in the previous section).

This becomes clear from table 7. The rank correlation coefficient for rankings according to TFPG for the Y and the Z measures of output is 0.63 for the trans-log indices while the corresponding coefficient for the production function measures of TFPG 0.78, as mentioned above. The rank correlation coefficients for rankings of industries according to the two different measures of TFPG for the same measure of output are also not very encouraging. It is only 0.45 for variable Y and 0.68 for variable z.

#### Section VI

#### TFPG for the Overall Manufacturing Sector and Growth Accounting

We now consider the aggregate of nine industries and refer to it as the overall manufacturing sector.<sup>7</sup> Table 8 shows the weighted arithmetic mean of the average annual TFPG obtained from the best regressions (regression 1 for each industry) for both the variables Y and Z. From the table we notice that the average annual TFPG shows a rise in the second sub period in comparison to the first in case of Y variable, for the overall



Table 6 : AVERAGE ANNUAL TFPG (Percentage)

Industry	Variable Y	Variable Z
(1) 1970/71—87/88	1.91	0.75
1970/71—80/81	1.41	0.23
1981/82—87/88	2.33	1.20
(2) 1970/71—87/88	2.12	1.57
1970/71—80/81	2.07	1.97
1981/82—87/88	2.16	1.17
(3) 1970/71—87/88	1.26	0.38
1970/71—80/81	1.26	0.48
1981/82—87/88	1.26	0.29
(4) 1970/71—87/88	1.36	1.02
1970/71—80/81	0.44	0.91
1981/82—87/88	2.55	1.16
(5) 1970/71—87/88	2.55	1.43
1970/71—80/81	3.41	1.95
1981/82—87/88	1.43	0.47
(6) 1970/71—87/88	1.92	1.43
1970/71—80/81	2.39	2.21
1981/82—87/88	1.24	0.32
(7) 1970/71—87/88	0.19	0.26
1979/71—80/81	0.82	1.12
1981/82—87/88	-0.60	-0.85
(8) 1970/71—87/88	1.42	-0.19
1970/71—80/81	1.19	-0.005
1981/82—87/88	1.65	-0.33
(9) 1970/71—87/88	0.14	0.82
1970/71—80/81	-1.41	-1.65
1981/82—87/88	4.14	3.72

Note : Industry numbers same as in other tables.

Table 7 : RANKING OF INDUSTRIES ACCORDING TO TFPG

Industry	Variable : Y		Variable : Z	
	P. Fn	Tlog	P. Fn	Tlog
Electricity	1	2	2	1
Chemical and Chemical Products	2	4	4	6
Basic metal and alloy	3	7	5	7
Non-electrical machinery	4	3	3	2.5
Transport equipment and parts	5	6	1	4
Electrical machinery and parts	6	1	6	2.5
Non-metallic mineral products	7	8	7	8
Food products	8	9	8	5
Cotton textiles	9	5	9	9

**Note :** P. Fn = Production function measure  
TLOG = Trans-log measure.

manufacturing sector. On the other hand, for variable Z, a fall in average annual TFPG in the second half is observed.

Table 8 : AVERAGE ANNUAL TFPG FOR ALL INDUSTRIES @

Var	1970-71—1987-88	1970-71—1980-81	1981-82—1987-88
Y	2.38	2.12	2.73
Z	1.89	2.30	1.35

**Note :** Var = Variable.

@ : Based on Tables 3 and 4

Estimates based on the trans log production function show that during the seventies TFPG was positive and quite significant. Acceleration in TFPG in the eighties, for Y variable, is only moderate. In fact, Z variable shows a fall in TFPG in the eighties compared to the seventies. We should note that our analysis is silent about the trend of TFPG within the periods. We can only compare the average annual TFPG for the two subperiods. Here our findings are not unambiguous.

Looking at the individual industries (table 3), we notice a sharp increase in TFPG, in the second period compared to the first in case of Y variable for Chemical and Chemical products, Transport equipment and parts and Food products. A moderate increase is observed for Electricity.

Table 9 : GROWTH RATES OF OUTPUT, LABOUR, CAPITAL AND TFP

Industry	Output	Labour	Capital	TFP
1. Y	3.77			3.31
Z	2.40	1.30	1.76	1.80
2. Y	4.16			3.53
Z	4.06	1.90	2.51	3.06
3. Y	2.94			2.93
Z	2.06	1.16	2.57	1.72
4. Y	2.70			2.34
Z	2.56	0.99	2.96	3.54*
5. Y	3.82			2.08
Z	2.66	1.47	1.03	1.67
6. Y	3.00			2.41
Z	2.59	1.15	1.38	2.56
7. Y	2.74			1.77
Z	3.33	1.50	3.46	0.98
8. Y	1.19			0.03
Z	-0.28	-0.05	1.60	-0.28
9. Y	1.92			0.64
Z	2.35	0.70	1.42	0.34

**Note :** Industry numbers as in earlier tables.

TFPG for Y variable remained more or less the same over the sub periods for Electrical machinery and parts, Non electrical machinery and Non-metallic mineral products for the same variable. A sharp fall in TFPG in the second period was noticed for Cotton textiles, while Basic metal and alloy registered a moderate fall for Y variable.

In case of Z variable (table 4), while a sharp increase in TFPG for the second sub period is reported for Transport equipment and parts, Chemical and chemical products show only a small increase. Rest of the industries, in general, show a marked decline in TFPG in the second period, except

Food products, where TFPG remained the same over the two sub periods. Thus important industries (in terms of share in the total manufacturing production) such as Electricity, Basic metal and alloy, Electrical machinery etc showed a sharp decline in TFPG in the second period compared to the first.

Considering eighteen cases, two for each industry corresponding to the two variables Y and Z, we notice that, while a sharp fall in TFPG in the second period compared to the first is observed in seven cases, a sharp rise is shown for four cases. Moderate rise or fall in TFPG in the second period is noticed for two and one case respectively. In four cases, TFPG remained more or less the same over the sub periods.

Table 9 presents TFPG obtained from the first regression and output growth for both the variables Y and Z with respect to nine industries under study. To facilitate comparison the growth of factor inputs, labour and capital, are also shown in the table. Table 10 and 11 show the contribution of the growth in inputs (capital and labour) and that of total factor productivity to the growth of output of the nine industries concerned, for variables Y and Z respectively.

Our finding is that TFPG plays an important role in the growth of output of the organised manufacturing sector in India. From table 10 and 11 we notice that the combined contributions of capital and labour to output growth for a few industries (mainly for the Z variable) to be very low and even zero or negative. It may be mentioned here that a negative or zero contribution of a factor does not mean that it was unimportant in the production process. It only means that on the margin the factors were rather unproductive. Thus, a zero contribution of capital stock in period 't' may be taken to imply that the growth in output in 't' could be, or was in fact, achieved without capital expansion in that period, but that may not imply that the growth in 't' could be achieved without capital's contribution in 't-1' was also zero.

From table 10, for variable Y, we observe that while the highest contribution to output growth in terms of TFPG occurs for Basic Metal and Alloy, Cotton Textiles turns up last. TFPG explains more than eighty percent of output growth for Chemical and Chemical Products, Electricity, Basic Metal and Alloy, Transport Equipment and Parts and Non Electrical Machinery. The contribution of TFPG towards output growth is between fifty and Sixty five percent in case of Electrical Machinery and Parts and Non Metallic Mineral Products. It is low and less than thirty five percent for Cotton Textiles and Food Products.

Table 10 : SHARE OF TFP AND INPUTS IN GROWTH

Industry	Growth in Y	TFPG	Inputs
1.	3.77	3.31	0.46
2.	4.16	3.53	0.63
3.	2.94	2.93	0.01
4.	2.70	2.34	0.36
5.	3.82	2.08	1.74
6.	3.00	2.41	0.59
7.	2.74	1.77	0.97
8.	1.19	0.03	1.16
9.	1.92	0.64	1.28

**Note :** Industry numbers as in earlier tables.

In case of variable Z, though output growth for Cotton textiles turns out to be negative, TFPG also is negative by the same magnitude and hence explains the whole of output growth. TFPG explains more than eighty percent of output growth for Basic metal and alloy, Cotton textiles and Non electrical machinery. It contributes between sixty to eighty percent, towards output growth, for Chemical and Chemical products, Electricity, Transport equipment and parts and Electrical machinery. It is less than

Table 11 : SHARE OF TFP AND OUTPUTS IN GROWTH

Industry	Growth in Z	TFPG	Inputs
1.	2.40	1.80	0.60
2.	4.06	3.06	1.00
3.	2.06	1.72	0.34
4.	2.56	3.54	-0.98
5.	2.66	1.67	-0.99
6.	2.59	2.56	0.03
8.	-0.28	-0.28	0.00
9.	2.35	0.34	2.01

**Note :** Notations as in earlier tables.

thirty percent for Non metallic mineral products and Food products, the latter showing the lowest contribution.

As pointed out earlier, we have considered the aggregate of the nine industries to represent roughly the overall manufacturing sector. Table 12 shows the weighted arithmetic mean of the output growth, TFPG, and the contribution of inputs (capital plus labour) for both the variables Y and Z. We notice that the estimates for variable Y is of higher magnitude than those of variable Z. It is clear from table 12 that in a broad perspective, for the

manufacturing sector as a whole, TFPG explains 76.77 and 75.10 percent of the growth in manufacturing output for Y and Z variables respectively.

Table 12 : CONTRIBUTIONS OF TFPG AND GROWTH IN INPUTS  
TO GROWTH IN MANUFACTURING OUTPUT

Variable	Output growth	TFPG	Inputs
Y	3.10	2.38	0.72
Z	2.53	1.90	0.63

**Note :** Capital and Labour Jointly.

Corresponding estimates of the joint contribution of capital and labour turned out to be 23.23 and 24.90 percent. In other words, our estimates suggest that TFPG explains three-fourths of output growth of the part (80%) of the registered manufacturing sector of India over the period 1970-71 to 1987-88. The similarity of results for the two different measures of output is striking.

**Notes :**

1. While the above criticisms are well established in the literature (Nadiri, 1970 ; Syruin, 1984) their implications for the methodology particularly with respect to an under-developed economy like India is important here.

2. In fact, the data we have used, particularly the capital series, need to be refined a lot as some researchers have tried to do (Goldar, 1986 ; Ahluwalia, 1991 ; Balakrishnan and Pushpangadan, 1994). The focus of the present study, however, is to see the changes in estimates when the production function method is used instead of assuming equality of factor shares and factor elasticities.

3. One point in favour of the value added index is that the Central Statistical Organisation uses the double deflation method to get the constant price value added in agriculture and also, at least partially, in some other sectors. For the manufacturing sector the real value added is arrived at by using the wholesale price index for manufacturing as a whole, not at the two digit or higher levels of disaggregation where the output and the inputs are much more disparate than is the case for the overall manufacturing.

4. Relevant data are obtained from Annual Survey of Industries (CSO), National Accounts Statistics (CSO) and Report on Currency and Finance (RBI).

5. We are particularly vulnerable as we have criticised the assumption of equality of factor shares and factor elasticities. So our use of wage shares of different categories of workers as the weight for the category is an inconsistency which we have indulged in consciously because a better alternative was not immediately clear to us.

6. Relevant data is obtained from Annual Survey of Industries and Indian Labour Statistics.

7. Strictly speaking this is not proper. The nine industries accounted for a little more than three fourths of the value added in 1982-83 in the registered manufacturing sector.

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# STRUCTURE OF EMPLOYMENT IN RURAL INDUSTRIES : A STUDY OF HANDLOOM, KHADI AND POWERLOOM IN TWO DISTRICTS OF WEST BENGAL

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## I

The problem of rural unemployment and poverty in India is old and massive. Despite the implementation of different programmes for overall rural development in the post-independence period and recent structural adjustment programme the problem of rural unemployment as well as poverty has remained acute in India. Of all the States (excepting Kerala) the problem of unemployment has been most severe in West Bengal (W.B) (Puri, 1991). "West Bengal has exceedingly high rate of unemployment, particularly among the educated persons. The trend rate of growth of employment in the state has been lower than rate of growth in the labour force and in population. Besides, employment growth rate of the state has been lower than that in India as a whole."<sup>1</sup> So in this context of chronic unemployment the need for supplementary employment programmes, or the development of new employment opportunities has been felt very urgent in the whole of the country, particularly in West Bengal. Again, it has been observed that there exists a high and rising pressure of population on land and stagnant or falling rate of labour absorption in agriculture or the low capacity for labour absorption of the modern industrial sector or both in the country "... "The average elasticity of employment with respect to the production of 'all crops' for the period 1971-72 to 1983-84 is considerably below the corresponding figure estimated by Tyagi (1981) for the ten-year period ended 1978-79 : an employment elasticity of only 0.5945 latter period compared to 0.769 for the earlier era."<sup>2</sup> "Employment in for the agriculture by usual status measures showed little absorption in the 1980s. By daily status measures there was an improvement in absorption in agriculture but even this showed a lag between the rate of growth of labour force and the rate of growth of absorption in agriculture."<sup>3</sup>

Under these circumstances, the expansion of non-farm economic activities can be considered as a solution to the problem of unemployment and poverty or as a pressure valve or even as a potential source of growth within the rural sector (Jayasuriya and Shand, 1983 ; Islam, 1983 ; Anderson and Leiserson, 1980). 'The evidences available indicate that rural non-farm economic activities provide an important source of employment and a living wage for the under-privileged sections of society. The importance of this sector may be gauged from the fact that they account roughly for about one-fourth of the national income and about one-fifth of

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the country's labour force."4 As non-farm economic activities, rural industries are of great importance for solving the unemployment problem in a country like India (Mukhopadhyaya and Lim, 1985). It has been revealed largely in the existing literature that the employment intensity and employment potential of the Handloom(HL), Khadi (KH) and Powerloom (PL) industries is high (See Mullick, 1994 ; Cook, 1984 ; Bottomley, 1965 ; Ho and Huddle, 1976 ; Krishnaraj, 1992 ; Mukhopadhyay and Lim, 1985 ; Government of India, 1974, 1978, 1981.

The questions that arise in this context are : (i) What is the structure of employment of HL, KH, and PL industries ? (ii) What sections/classes of people are benefitted in such industries ? The present study is a modest attempt to seek answers to these and other related questions.

The need for such a study arises out of two considerations : (i) The importance of HL, KH and PL Industries in Indian economy, (particularly in the rural economy) ; (ii) the gap in the existing literature.

**Importance of HL, KH, and PL Industries :** The selected industries are important in the national economy of India in generation of employment and foreign exchange earnings. It is observed that more than Rs 16,168 crores worth of textiles exports which constituted more than 20% of total exports were made during 1992-93, of which more than 54% was accounted for by readymade garments, followed by cotton textiles (mill-made/powerloom) including yarn (23.7%), man-made textiles (8.2%) and handlooms (6.4%). The value of exports of these selected industries has shown an increasing trend over years during 1981-82 to 1992-93 Exports of man-made fibre textiles recorded the fastest growth among textiles, followed by cotton textiles (mill-made/powerloom) including yarn, ready-made garments, silk textiles, handloom cotton textiles and woollen textiles (See Table 1).

While the rate of growth calculated by comparing two arbitrary end points is found unreliable, an attempt is made to calculate growth on the basis of trend lines. We use here only straight line trend ( $y = a + bt$ ). The results obtained are shown in Table 2.

We observe that excepting woollen textiles exports, all other textiles recorded more than 19 per cent growth per annum during 1981-82 to 1992-93. Man-made fibre textile experienced the highest growth rate (30%), followed cotton textiles ( mill-made / powerloom ) including yarn and by ready-made garments (23.43%), silk textiles (20.31%), cotton textiles ( handlooms ) (19.88%).

While increase in exports has been substantial in most of the textiles, growth in employment generation, however, has been relatively low ( 2 to 4 per cent ) ( see Table 3 ).

In absolute terms, employment in khadi industry in India as a whole increased from 9.41 lakh in 1970-71 to 14.45 in 1992-93 and that in handlooms in factory sector increased from 11,918 in 1975 to 15633 in 1986 and in powerloom from 31369 to 48402 during this later period<sup>5</sup>.

In West Bengal also total employment during 1980-81 to 1991-92 increased slowly from 6.36 lakh to 7.11 lakh in handlooms, from 0.23 lakh to 0.26 lakh in powerloom and 0.36 lakh to 0.52 lakh in khadi.

Table 1 : INDIA'S EXPORTS OF TEXTILES DURING 1981-82 TO 1992-93 ( Value Rs Crore )

Year	Cotton Textiles (Mill-made/powerloom) including yarn	Cotton Textiles (Handloom)	Man-made Fibre) Textiles	Wollen Textiles	Silk Textiles	Ready-made garments	Total
1981-82	284.1(100)	123.2(100)	37.4(100)	151.5(100)	69.7(100)	669.8(100)	1335.7(100)
1982-83	314.5(111)	129.4(105)	55.2(148)	172.6(114)	82.9(119)	629.3(94)	1383.9(104)
1983-84	319.4(112)	125.9(102)	51.5(138)	123.3(81)	94.5(136)	734.6(110)	1449.2(108)
1984-85	471.6(166)	168.4(137)	54.0(144)	152.6(101)	122.9(176)	948.3(142)	1917.8(144)
1985-86	469.6(165)	161.3(131)	49.9(133)	152.5(101)	156.2(224)	1096.1(164)	2085.6(156)
1986-87	560.6(197)	165.7(134)	68.3(183)	173.2(114)	194.9(280)	1503.0(224)	2665.7(200)
1987-88	1035.6(364)	239.3(194)	159.0(425)	162.9(108)	199.9(287)	1999.5(299)	3796.2(284)
1988-89	1057.3(372)	284.1(231)	269.0(719)	271.9(179)	273.9(393)	2278.1(340)	4434.3(332)
1989-90	1483.2(522)	341.8(277)	589.2(1575)	434.6(287)	314.9(452)	3472.2(518)	6635.9(497)
1990-91	2051.1(722)	407.2(331)	624.8(1671)	92.3(61)	435.9(625)	4639.6(693)	8250.9(618)
1991-92	3142.7(1106)	689.2(559)	1089.1(2912)	166.7*(110)	671.0**(963)	6282.4(938)	12041.1(901)
1992-93	3830.0(1348) [23.7]	1034.0(839) [6.4]	1431.1(3826) [8.9]	312.5(206) [1.8]	720.0(1033) [4.5]	8841.2(1320) [54.7]	16168.8(1211) [100]

\* Woollen Textiles excluding Hand-knitted, woollen carpet, etc.

\*\* Silk Textiles including Ready-made garments.

Source : *Compendium of Textile Statistics, Govt. of India.*

Table 2 STRAIGHT LINE TREND OF EXPORTS OF TEXTILES  
1981 82 to 1992-93

Textiles	Fit	R <sup>2</sup>	Growth Rate (%)
Cotton Textiles (mill-made/ powerloom) including yarn)	$y_1 = -655 + 293.3t$ (6.3)	0.80	23.43
Cotton Textiles (Handloom)	$y_2 = -94 + 64.1t$ (4.8)	0.69	19.88
Man-made fibre textile	$y_3 = -356 + 112.1t$ (5.4)	0.74	30.00
Woolen Textiles	$y_4 = 123 + 11.4t$ (1.5)	0.18	5.78
Silk Textiles	$y_5 = -89 + 56.5t$ (7.2)	0.84	20.31
Ready-made Garments	$y_6 = -1441 + 646.0t$ (6.3)	0.80	23.43
Total	$y_7 = -2512 + 1183.4t$ (6.3)	0.80	22.80

Note : Figures in the parentheses indicate respective *t*-ratios

Review of Existing Literature : There exists a number of studies which cover different aspects of HL, KH and PL industries ( e.g. Anjuneyula (1990),

Table 3 : STRAIGHT LINE TREND OF EMPLOYMENT IN TEXTILES

Textiles	Period Considered	Fit	R <sup>2</sup>	Growth Rate (%)
Khadi	1970-71 to 1992-93	$N_1 = 8 + 0.31t$ (11.01)	0.85	2.63
Handloom (Factory)	1975 to 1986	$N_2 = 13260 + 247.55t$ (2.15)	0.32	1.66
Powerloom (Factory)	1975 to 1986	$N_3 = 32497 + 1574.67t$ (7.02)	0.83	3.62

Note : Figures in parentheses indicate respective *t*-ratios.

Angadi (1976), National Institute of Rural Development (1977), Jain (1985), Eapen (1977), Nasir (1989), Pathak (1980). We concentrate here only the employment aspect of those industries. Mullick (1994) in his study showed that the growth rate of workers in HL industry during the period of 1971 and 1981 has been higher in W. B. than in many other States of India and this industry has also absorbed higher percentage of female workers in W. B. Rao (1985) studied the growth of employment over years in KH and village industries. HL and PL industries. Mukhopadhyay and Lim (1985) examined the employment potential and employment intensity of such industries as a non-farm sector. There also exists a lot of studies relating to employment in those industries [ see HO and Huddle (1976), Krishnaraj (1976) ].

Thus, the brief review of the existing literature on the selected industries would indicate its inadequacy to give sufficient answers to our research questions. The present study is a modest attempt to remedy the gap which exists in the existing literature.

Objectives of the study : In the perspective of the aforesaid consi-

derations, the major objectives of the study are set as follows : (i) to examine the mode of production in the selected industries ; (ii) to discuss the nature of employment in the selected industries.

## II

### Data Base and Methodology

**Data Base :** Both Primary and Secondary data have been used. For field level study, the process of multi-stage random sampling has been applied. For each category of industry an equal number of workers, i.e., 66 workers have been interviewed in relation to their sex, age, etc. This study has been carried out by taking 66 households (HHS) having 382 family members in case of HL industry, 66 (HHS) having 392 family members in case of PL industry and 66 HHS consisting of 342 family members for KH industry.

The secondary data have been collected from different official sources. The study has been in the nature of survey and mainly based on primary data collected on the basis of a questionnaire and personal interview method. It is the workers in the selected industrial units who have been interviewed, but the data related to both his own and other members of the family.

The broad items on which the primary data have been collected for study are as follows : (i) age, (ii) sex, (iii) modes of operations, i.e., wage labour and labour in putting-out system, (iv) nature of employment, i.e., temporary labour and permanent labour.

**Study Area :** Our study covered industrial units located at Birati and Madhyamgram of North 24-Parganas and at Tamluk sub-division of Midnapore district.

**Statistical Techniques used :** The collected primary and secondary data have been subjected to various statistical techniques for analysis. We used the test of hypothesis applying "t" test for analysis of data.

## III

### Labour Process in the Industry

Before entering into the study of structure of employment in HL, PL and KH industries, it is essential to examine the labour process for understanding different stages of their operations. The technology used in our selected KH and HL industrial units is mainly traditional. Mechanical devices are used in most cases, but the use of electric power is generally absent in KH and HL industries. In case of PL industry the mechanical processes are very hazardous and risky and such industry is mainly run by the use of electric power. In case of KH industry the different stages of production consist of (i) the hand spinning (HSP), (ii) tailoring (TL), (iii) bleaching-dyeing printing (BPD) operations etc. In case of our HL industrial units the stages of product development involve (i) winding (WI), (ii) warping (WR), (iii) weaving and checking (WVC) and BPD. Again For PL industry the stages of product development involve : (i) winding (WI), (ii) weaving, (iii) drawer & Reacher (DA), (iv) Jobber / Mechanical, (v) Cleaner-Cum-General job, (vi) Checking etc.

Both male and female workers are engaged in different stages of these industries. These industries are unorganised on both independent and putting-out basis.

Table 4 NUMBER OF MAIN WORKERS BY SEX IN THE KHADI, HANDLOOM AND POWERLOOM INDUSTRIES IN INDIA AND WEST BENGAL, 1971—1981

	Khadi			Handloom			Powerloom		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
India 1971	49202 (87.31)	7154 (12.69)	56256 (100.00)	943209 (77.69)	270946 (22.31)	1214155 (100.00)	165249 (94.32)	9945 (5.68)	175194 (100.00)
1981	34872 (78.32)	9654 (21.68)	44526 (100.00)	1125144 (77.77)	321622 (22.23)	1446766 (100.00)	265094 (93.31)	19006 (6.69)	384100 (100.07)
W.B. 1971	930 (88.99)	115 (11.90)	1045 (100.00)	66580 (93.67)	4503 (6.33)	71083 (100.00)	4188 (96.77)	140 (3.23)	4328 (100.00)
1981	655 (90.72)	67 (9.20)	722 (100.00)	146103 (86.55)	22714 (13.45)	168817 (100.00)	4065 (93.60)	278 (6.40)	4328 (100.00)

**Note :** Figures in parenthesis indicate the percentages.

**Source :** *Census of India* 1971, 1981.

Shares of Khadi, Handloom & Powerloom Industries in Total Workers.

## IV

**Structure of Employment in Handloom (HL), Khadi (KH) and Powerloom (PL) Industries : A field level study**

In order to discuss the structure of employment an attempt has been made to observe the participation of workers belonging to various groups of sex at HL/KH/PL industry.

The comparison of workers by sex in 1971 and 1981 reveals that in India as a whole proportion of female workers increased in khadi and powerlooms, while it remained static in handlooms during this period. In West Bengal, this proportion declined in khadi, while significantly increased in handlooms and powerlooms ( Table 4 ).

The field level study, reveals that there exists 61%, 83%, 20% male workers and 39%, 17%, 80% female workers in HL, PL and KH industries respectively.

Let us now look at the issues relating modes of operation and nature of employment. Different stages of production of the selected industries have two types of modes of operation, viz. wage labour (WL) system and putting-out (P-O) system. It is observed that there are 71.21% WL and 28.79% labour under P-O system in KH industry as a whole. The wage labourers are more prevalent than the labourers under P-O system in the HSP operation compared to others (BPD and TL). Across the different HL related operations, it is found that the labourers in P-O system have more participation in WVC activity as compared to others (BPD+WI+WR). The WL is more prevalent in BPD activity as compared to others (WI+WR) in HL industry. Similarly, WL has more participation on WI activity as compared to WR.

To highlight the nature of employment in the selected industries all workers have been classified as permanent labour and temporary labour. It is observed that 75.78% of persons employed in HL industry are permanent labour, while 30% and 45.45% workers are permanent in PL and KH industries respectively.

## V

**Summary and Conclusions**

The HL-related operations as a whole consist of more male workers than female workers. Concentrating on the modes of operation it is found that the HL activities as a whole have more WL as compared to labour in P-O system. Among different HL-related operation, it is observed that there are more labour in the form of P-O system in WVC activity as compared to others (BPD+WI+WR), more WL in BPD activity as compared to others (WI+WR), more WL in WI activity. The risk bearing ability of persons and the mechanism of different mechanical operations in such industrial activities are the causes behind such phenomenon.

The HL-related operations employ more permanent labour. Regarding age specific concentration of workers it is observed that the adult workers in the working age group participate more on HL-related activities. The reasons behind this phenomenon are similar to those of KH industry.

The KH-related operations employ greater proportion of female workers as compared to others ( i.e. HL & PL industries ). Again, among HL-and PL-related operations, the women get more scope of employment in HL industry. The traditional production process of KH and HL industries has made it possible to employ more proportions of women workers having lower literacy status in general.

Among the selected industries, HL industry employs greater proportion of permanent labour while PL and KH industries provide more scope for temporary employment to the labourers.

The percentage of WL is lower as compared to labour in P-O system in case of BPD operation of KH industry, while all the workers engaged in BPD activity of HL industry are in the form of WL. In PL industry, all persons work in the form of WL. As a whole, the KH industry consists of lower proportion of WL (than the labour in P-O system) as compared to that of HL industry.

Some policy prescriptions can be made from the discussion so far.

The KH and HL activities may be promoted particularly for the upliftment of less privileged class of the society i.e. women class. There should be organisational reforms in these industries so that benefits from this industry are really enjoyed by the proprietor artisans and workers. Institutional credit and marketing facilities should be extended so that the poor artisans are rescued from the clutches of mahazans and middlemen.

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