

# Economic Reforms & The Exit Policy

NPC Research Division

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*A comprehensive scheme of economic reforms is on. The need for a responsive exit policy has been highlighted in more than one forum. Such a policy is under formulation by the Government. The present discussion is organised by NPC Research Division through the responses to five major issues on the subject by experts and representatives of industry/trade unions.*

*Arun Ghosh, former Member, Planning Commission; M.S. Krishnan, President, AITUC; J.J. Irani, President, Confederation of Indian Industry (CII), and N.M. Dhuldhoya, President ASSOCHAM answer the issues posed.*

In the ongoing debate, two views emerge on the current economic situation:

- (i) The economy is faced with only a resource crisis (fiscal and foreign exchange) which can be successfully managed with economic prudence.
- (ii) The current crisis is a culmination of decades of inefficiency rooted in the economic policies and therefore, the policy framework needs a thorough overhauling (marketisation).

## Your views?

Arun Ghosh

The view, that the current crisis is a culmination of decades of in-efficiency rooted in the economic policies, and that "market oriented" production and investment policies can remedy the situation, is palpably wrong because such a policy would lead to a production pattern based on the overwhelmingly unequal distribution of income and wealth in favour of some ten to fifteen per cent of the population. The Indian economy is faced with two types of crises: one, that of inadequate resources, and the other a neglect of human development by way of education, primary health services, care of the mother and the child (a combination of which can bring down the rate of population growth, as demonstrated by Kerala). We need to focus on certain hitherto neglected aspects of development. These call for greater investment in both social and economic infrastructure, and in the interest of economy and efficiency of public expenditure – greater decentrali-

**These call for greater investment in both social and economic infrastructure.**

zation. A shift in policy is also required for the development of rural areas, and development effort has to be anchored to demand from the vast masses of the Indian



population whose incomes need to be raised through systematic rural development.

*M.S. Krishnan*

The AITUC believes that it is a crisis due to the wrong policies pursued over the past ten to twelve years. The balance of payments position would not have deteriorated to this extent if the Government had not allowed indiscriminate imports, mostly of consumer goods which eated to the ten to fifteen percent upper middle class elite and the richer sections of society. This was not matched by exports of our goods and led to increased deficit and the resource crunch. This crisis could have been managed by a proper policy of economic management. Instead, the devaluation of the Rupee and more loans from the IMF and World Bank coupled with further measures of increased liberalisation, deregulation of all industries, free entry of multinationals, removal of FERA restrictions as well as MRTP, privatisation of Public Sector etc. have all contributed to complicating the problems further. The only way to get out of the crisis is to change the present policies completely and adopt policies wherein the exports are more and imports less, where the reserves are used strictly for meeting the financial crunch, where internal resources are generated faster, where the public sector performance improves increasing the revenues to the exchequer, where employment generation takes place and development strategy is adopted in the interests of the millions of poor.

**It is a crisis due to the wrong policies pursued over the past ten to twelve years.**

*J.J. Irani*

The current economic decline and recession is a global phenomenon. In developing countries, particularly, in India, the effect has been more noticeable. But the economic gloom cannot be attributed to any one cause. The political priorities in developing countries have overshadowed the economic priorities. Economic prudence is required as a prerequisite for prosperity but without comprehensive measures to free ourselves from the shackles of myriad administrative and legal controls, we cannot face the transition. In order to cope with the structural changes and new technologies, the economy must relationalise the skill structure of its labour force. We need to mould our development strategies and policies to suit the effect of the structural changes. The industrial

policy announced by the Government of India and pursued in the last one year is a step in the right direction but a strict sense of discipline is a vital prerequisite. Marketisation just for the sake of it is not the solution. We must develop the right infrastructure and forge ahead in the open market by hard work, discipline and skill upgradation with total commitment to quality.

**The current economic decline and recession is a global phenomenon.**

*N.M. Dhuldhoya*

The current crisis is indeed a continuation of decades of inefficiency rooted in economic policies and, therefore, the policy framework needed a thorough overhauling. It has been obvious for quite some time that the economy could not have made any headway with the older policies. A highly overvalued rupee in July 1991, ever-rising budget deficit, ever expanding net credit from the Reserve Bank, outdated labour laws, over regulation and excessive controls, over subsidisation and numerous brakes on the economic system; all these cumulatively drove the economy to a virtual dead-end from which it could not be rescued without the policy reforms which the government initiated in 1991. The new economic policy enabled industry, the manufacturing sector in particular, to enlarge capacities, diversify and achieve growth. The severe economic crisis forced the government to reduce Govt. expenditure and impose restrictions on imports; and introduce radical changes in policies with regard to industry, trade and finance to accelerate growth through quality and productivity improvement and thus facilitate globalisation of Indian industry. For India to meet its debt servicing obligations, and achieve a viable balance of trade position, exports will have to record atleast 20% growth annually in dollar terms. Given the tardy growth in exports in recent years, the trade deficit will have to be neutralised through foreign capital flows. More importantly, we need an optimal mix of flows with greater reliance on foreign investment rather than borrowed capital.

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Some experts maintain that the lack of an appropriate exit framework has been a major factor leading to accumulated sickness in Indian organisations. This also has been responsible for the absence of technological and managerial dynamism among Indian organisations affecting their competitiveness unfavourably, according to them. Do you agree?

Arun Ghosh

**The primary cause of sickness in industry is poor management, and quite frequently, rapacious management.**

The primary cause of sickness in industry is poor management, and quite frequently, rapacious management. For example, the jute industry has been sick for quite some time, and yet, owners of jute mills live in great luxury; the money has been made in the purchase of raw jute and in the sale of jute products, but the profits have not gone to the companies but to the owners (and their agents). In effect, Indian entrepreneurs have always managed an exit policy of sorts without formal sanction. As per the Report on Currency and Finance 1990-91 employment in organised private industry declined from 4.64 million in December 1981 to 4.37 million in December, 1988. We do need a *humane* policy of both retraining and redeployment of labour in "sunset industries"—and where redeployment is not possible, a "golden" handshake, for which a tripartite funding programme needs to be instituted. But then, the absence of technological and managerial dynamism cannot be ascribed to the absence of a coherent "exit policy". The blame should go to our managerial class.

M.S. Krishnan

It is not the non existence of an exit framework that is leading to accumulated sickness. Mismanagement and siphoning off of funds, irregularities in the private sector and bureaucratic management of the public sector, wrong policies of the government like withdrawal of budgetary support etc. led to this present position.

**Mismanagement and siphoning off of funds, irregularities in the private sector and bureaucratic management, led to the present position.**

J.J. Irani

Largely yes. It is more humane to allow the sick units to die out. There is a lack of discipline among labour and companies are unable to deal firmly under present labour laws. There is a need for recasting such a labour oriented policy. But the fate of the comprehensive industrial relations law contemplated since 1983 when the first IR Bill was tabled in Parliament, only prompts us to comment that our political will does not match the economic compulsions. In a liberalised economy, the Indian industry has to accept the new environment and face the challenges of competition from abroad. To enable the industry to be globally competitive, there is a need to implement the policy changes apart from strengthening the infrastructure. Adoption of a proper exit framework is needed to allow the managements to operate their units, and if not viable, to shut them.

**It is more humane to allow the sick units to die out.**

N.M. Dhuldhoya

The exit policy, in simple terms, means freedom for a company to shutdown a factory or office if it is not viable, or to reduce the number of employees in an operation if it can manage better with fewer people. If the barriers to exit are not removed it effectively amounts to protecting the inefficient. As a result, the impulse towards cost reduction and competitiveness are bound to get thwarted. At this stage of the liberalisation experiment, the flexibility in entry and the lack of freedom to exit would result in the economy incurring the cost of modernisation without being able to benefit from its efficiency gains. In India, the legislative framework does provide for closure, transfer, and sale of industrial and commercial establishment. The genesis of the problems, however, lies in the administration of the law. The requirement of seeking prior permission of the state governments for effecting closures has

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drawn flak from all quarters. This is because governments generally refuse permission for legal closure on the pretext of protection of public interest even after having



been satisfied about the genuineness and adequacy of the reasons stated. Also the process of rehabilitation of sick units is painfully slow due to the lethargic functioning of the BIFR. Presently, there is no policy to effectively deal with the problem of sick SSI units, since such units cannot be referred to BIFR. Exit policy, coupled with a mechanism for quick rehabilitation of viable sick units is essential for growth and the sooner we have a policy announcement in this regard, the easier it would be to check the rising industrial sickness.

**Some experts hold that the lack of an exit policy constitutes a major disincentive to the free flow of direct foreign investments in to India. Your comments?**

*Arun Ghosh*

The free flow of direct foreign investment depends on what may be described as an "ambient" atmosphere. The absence of an exit policy has nothing to do with it. The foreign investor gets frightened by the social turmoils, by the physical insecurity of their key personnel, by the sudden disruptions in the availability of infrastructure facilities. Our airlines, communications and power systems fail from time to time, without warning. The modern manager from, say, Japan, does not understand these phenomena, does not see them as temporary ripples, is unable to cope with them. Instead of tackling the wrong issues, we should deal with the problem of infrastructure. The foreign investor is also worried about lack of stability (in the balance of payments). In case of devaluation, the exchange value of his direct investment goes down. Stability, proper law and order, peace and harmony are essential prerequisites for a foreign investor venturing into a new country.

**The absence of an exit policy has nothing to do with it.**

*M.S. Krishnan*

It is not true to say that the lack of an exit policy constitutes a major disincentive to the free flow of direct investments into India. The major issues dissuading the foreign investors are bureaucratic procedures and delays in approving projects, the undesirable conditions regarding investment of capital and repatriation of returns etc. Some have spoken of 'Climate of Labour' and 'Labour laws' in our country. With the recent removal of most of these restrictions, modifications in the FERA and other

measures, there should not be any impediment to direct foreign investment. However, if acceptance of an exit policy is made a condition for foreign investment, there will be stiff resistance from the Trade Unions and the working classes.

**The major issues dissuading the foreign investors are bureaucratic procedures and delays.**

*J.J. Irani*

Foreign investors cannot overlook the productivity standards of Indian industry, as compared to Western norms. If we want to attract foreign capital to our industry, we must also ensure attractive return on such investments. The infrastructural facilities in the areas of communication, transport, as well as discipline at work and high productivity are inevitable assurances that we must be able to provide to any one who comes forward to invest in our industries. The government has to take a decision on the exit policy to attract investments from Indian and foreign companies. Without a step in this direction, the package of liberal policy measures will be incomplete.

**Without a step in this direction, the package of liberal policy measures will be incomplete.**

*N.M. Dhuldhoya*

The crux of the new policies as well as the structural reforms is the emphasis on investment decisions being taken based purely on the consideration of commercial values and economic viability. Without the freedom of exit, businessmen may prefer not to invest in an industry because they would rather not be faced with the possibility that, if things do not work out, they will be permanently burdened with the liability of keeping a loss making unit running. This applies to both Indian and foreign businessmen. In the absence of industrial restructuring policy, foreign investors are still skeptical about their being able to run their undertakings as a business proposition. So long as the industrial units have to obtain prior permission of the state government for bringing



structural adjustments in their operations, which they know from the past experience, has ever been forthcoming, they will never be enthused to bring sizeable investments in the country. For they know that though it has become easier to enter the business, it is still extremely difficult, if not impossible, to get rid of surplus labour, and make the undertaking leaner if the changed circumstances so demand.

**Without the freedom of exit, businessmen may prefer not to invest in an industry.**

**Do you think the freedom to exit is a pre-requisite for productivity improvement in India?**

*Arun Ghosh*

No. we are obsessed by the slogan of "exit policy". As stated earlier we do need a coherent and "humane" exit policy, but we need lots of other things first. Productivity of labour depends primarily on "morale" and irresponsible talk of "exit policy", of retrenchment and lay-offs, can do more to damage morale than help boost productivity. We also need better education and skill formation, on-the-job training, to improve productivity. Finally, the productivity of our capital is abysmal. We set up technologically efficient plants of enormous size, cannot manage them, have low capacity utilisation, and low productivity. The fertiliser industry is a case in point. Or take our steel plants which are overmanned; and yet labour costs (as a percentage of total costs) is the fourth lowest in India, world wide. But our blast furnace productivity is poor, our steel melting shops productivity is poor, in fact, our "management" of the available facilities is generally poor. These are the reasons for the high cost of Indian steel. So freedom to exit is not likely to improve productivity; we need better management.

**We are obsessed by the slogan of "exit policy".**

*M.S. Krishnan*

Productivity does not depend only on the worker. It depends on many managerial factors such as procurement of raw materials on time, proper planning regarding production and targets, marketability of the goods

produced etc. Even if it is found on the basis of study that there is surplus labour, and that impedes productivity, it is to be corrected by retraining or redeploying such labour and not by taking recourse to retrenchment.

**Productivity does not depend only on the worker.**

*J.J. Irani*

Going by the past experience of Indian industry, freedom to exit is an important factor for productivity improvement. But pruning has to be confined to 'dead wood'. A disciplined and quality conscious workforce is an equally important attribute to high productivity. If freedom to exit is misused, the industry will pay a much higher price than what they will save.

**Freedom to exit is an important factor for productivity improvement.**

*N.M. Dhuldhoya*

Indian economy, caught in the vortex of "diminishing returns", needs the pull of a strong productivity improvement drive which would focus on the following issues:

- Removing all impediments in the way of full utilisation of men, material and machinery
- Reduction in costs, elimination of all types of wastes and maximum economy in all operations.

**Indian economy, caught in the vortex of "diminishing returns" needs the pull of a strong productivity improvement drive.**

The absence of a formal exit policy did affect realisation of the aforesaid objectives since it meant keeping the sick units alive thereby holding up precious resources—both material and human. An easy exit mechanism enabling speedy closure of units can help in opening up more vistas for productive utilisation of resources. However, formulating an exit policy is by no means a guarantee that productivity and competitiveness will increase. "In large and medium scale organisations labour costs amount to



only 10 per cent of the cost of production. Deducting this further by retrenchment and other means is not going to help much," opine labour leaders. They feel that industry should look for other means of reviving sick units and improving productivity, rather than take the easy way out and retrench people. But simply, the problem of increasing productivity is the problem of making more efficient use of all types of resources in employment at the least possible cost. This would in turn require speedy closure of sick and unviable units and transfer of resources to profitable ventures. This is exactly what the exit policy stands for and seeks to accomplish.

### **What according to you can be the ideal framework of an Exit Policy for India?**

*Arun Ghosh*

Before formulating an 'Exit Policy' for labour we should legislate for the following. Every 'sick' unit may be allowed to be taken over by the workers *without any outstanding liabilities*, that is, with *all debts cancelled* (and 'secured' creditors reimbursed from the National Renewal Fund). The workers may then be asked to prepare a rehabilitation scheme; and if the scheme is deemed viable, should be assisted by a fresh equity base which should also be publicly funded (again, out of the National Renewal Fund). Then, with the backing of the new equity and a viable rehabilitation programme, the worker can get the short term credit required for current operations. In the process— in preparing a viable scheme — the workers will themselves come up with part retrenchment, part wage freeze offers. This has happened in the case of Kamani Engineering. Only when workers are not able to prepare such a rehabilitation scheme need we think of a "golden handshake" and an 'exit' for the industrial unit concerned.

**The workers may be asked to prepare a rehabilitation scheme; and if the scheme is deemed viable, should be assisted by a fresh equity base.**

*M.S. Krishnan*

There cannot be anything like an 'ideal framework of an exit policy' at all as it has never worked either in the interests of the industry, the workers or the economy. This is the international experience also.

**There cannot be anything like an 'ideal framework of an exit policy'.**

*J.J. Irani*

Revival of investment and growth of industry must be the guiding spirit of our exit policy. The framework of exit policy must aim at exit of inefficiency—a comprehensive plan to retrain and redeploy the redundant skills, and surplusage. Severance, where necessary, must be accompanied by an attractive package to enable the worker to meet his basic needs and provide seed money for him till he finds an alternative source of livelihood where state must extend a helping hand. The exit framework therefore, must work on a plan for comprehensive data bank on manpower to facilitate mobility of workforce within industry, and rehabilitation in the event of severance.

**Exit policy must aim at exit of inefficiency — a comprehensive plan to retrain and redeploy the redundant skills, and surplusage.**

*N.M. Dhuldhoya*

The underlying objective of the exit policy should be to make the exit process free from administrative and legal hassles. Sick industrial companies, most of which are clinically dead, are being unduly subjected to vigorous and time consuming quasi-judicial process at BIFR. Time has come to reorient legal and other control framework so as to aim at the welfare of the society rather than rendering of social justice.

**The exit policy should make the exit process free from administrative and legal hassles.**

Free exit *per se*, if allowed might lead to problems of unemployment and displacement of the workers. In case of potentially viable but currently sick units, an effective alternative mechanism to exit providing for ameliorative measures including rationalisation of surplus manpower needs to be provided for. An exit policy based on well-for-



mulated mechanisms for compensation as well as redeployment should go a long way in telescoping the revival or exit process to a compressed time horizon. The policy, therefore, needs to consider opportunities and strategies for retraining and redeployment of persons rendered jobless. Exit policy itself would lead to more employment opportunities in the long run by productive deployment of resources currently blocked in sick undertakings. Establishment of suitable institutional set-up providing retraining, identification of training needs and mechanism for deployment of displaced workers after retraining to alternate jobs are the issues needing serious consideration. Exit would probably meet with readier ac-

ceptance if the concerned agencies play a pro-active part in package preparation and other revival related tasks. Workers' interests are best protected by providing them productive wage employment and not by ensuring continuance of jobs in a closed/sick unit. The National Renewal Fund has been constituted with a view to providing retraining, redeployment and financial assistance to the workers during the period of transformation and joblessness. It is unfortunate that the guidelines finalised for the administration of the Fund do not say anything about retraining of workers. The need is to crystalize the proposals with a concern for labour and pronounce the same in the form of the much awaited exit policy. □

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# Labour Adjustment Policies: An Alternative View

Yoginder K. Alagh

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*In accelerating industrial growth, the macro policy for restructuring sick units assumes great importance. The author presents his views on what impact this can have on the labour scenario.*

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Last summer there was an intense debate in South Korea, since the Government and the policy makers had declared the intention, for the first time, to choke priority credit for the modernization programme of a large enterprise which had fallen sick. The Korean Heavy Industry Corporation for example was running losses to the tune of \$150 million in the late eighties and yet engaging in a massive modernization programme. With much less technological capabilities than the BHEL, (they were not in a position to fabricate state of the art boilers for a nuclear power plant, which BHEL was, they were exporting turbines to India. Now it can be argued that South Korean policies cannot be repeated in India or alternately that that country's experience is not important. The first argument is incorrect since there are examples of successful restructuring of enterprises in India, in both the public and the private sectors. They are not as many as desired, but they are not low enough to be called "exceptions" and wisdom in any case lies in replicating successes. A few instances may be instructive.

## Restructuring in Tyre Industry

Vikrant Tyres, a Karnataka Government enterprise was sick. In 1985, the then Member in-charge of Economic Policy in the Planning Commission declared in the annual meeting of the forum of financial writers that loss making public enterprises like Vikrant Tyres should be closed down. But in 1984-85 the company had declared a dividend and continued to do so. There were scale economies and cost reduction possibilities in the production of tyres in the initial phases of production and not in the finishing processes. A capacity of around 2500 to 3500 nos./day was considered optimal (a million tonne unit had a capital investment of around Rs. 100 crores in the eighties). Vikrant expanded gradually to that level, incorporating the latest technological changes in product design.



Restructuring plans within the tyre industry in India were possible in a particular macro policy framework. The Government of India had decided since 1983 to place pressure on the tyre companies on the price front, since there were fears of cartelization. However the appropriate price to be aimed at was the long range marginal cost of a tyre worked out on the basis of capital requirements of either modernisation or installation of a state of the art unit. This provided that an economic rate of return was computed on a life time of twenty years for the capital – rather than using capital figures derived from “depreciation” for corporate tax figures. Prices were related to such long range marginal costs. In these methods therefore while capital costs per unit would rise on account of technological progress, working costs would generally fall. In fact at one period the Government threatened the industry with imports with a tariff calibrated to approximate the LRMC price for the consumer:

**At one period the Government threatened the industry with imports with a tariff calibrated to approximate the LRMC price for the consumer.**

Vikrant operated like a commercial company. If it could, it charged higher prices – but the important issue is that the macro regime permitted them to modernize.

### **Macro Policy for Restructuring**

The case of cement was more impressive. From 1982 to 1987, around two thirds of the capacity was switched over from the wet process to the dry process. Energy consumption was 1.6 giga cal./tonne in the former and around 1.0 giga cal./tonne in the latter. Again the macro regime was one where the realization to the plant from the dual pricing scheme approximated the LRMC price. The realisation was sometimes ensured through raising the levy price and at other times by reducing the levy share. Finally after a substantial degree of modernisation, the industry was decontrolled. The same was true of aluminium.

In a number of cases, restructuring took place in a manner such that the macro policy and pricing regime gave the correct signals. The NIPFP has estimated that around two thirds of large Indian industry was put under such rules in the eighties. However, these reforms which relied on a large measure of domestic competition and the threat of external competition at the margin were not

implemented in many critical sectors like steel, thermoplastics, textile fibres, drugs, sugar and fertilizers, even though fully designed proposals were available. The successive Governments could not take on the interests involved. Senior industrialists who argue for a free

**In a number of cases, restructuring took place in a manner such that the macro policy and pricing regime gave the correct signals.**

economy in principle, are petrified of decontrol of their own firm. The administrative and political elite, needless to say, does not like to shed the power. Since this note was first written for a trade union argument the Government has announced the decision to decontrol steel prices, which is a very encouraging step. A large sum of money has been spent on modernising the steel plants and they should be raring to go. Leaving aside one special case, the industry should now compete globally.

It is not that the Korean model cannot be applied. It was applied much too hesitantly and selectively and it is this process which should be accelerated. My recommendation (Economic Times, 1992) for the budget is:

“A compensatory increase in excise rates, some rationalisation of direct taxes, and reduction in custom duties on intermediates and final products in plastics and final products.”

If the Finance Ministry is very ambitious in internationalising, my fears are that:

“the budget package could comprise a 30 per cent reduction in overall customs rates, drastic lowering of tariff in engineering, chemical, electronics and capital goods... and reduced borrowing for rural development, social service, public investment and outlay programmes.”

The argument of course can be that this kind of strategic planning through markets is wrong anyway. The economist Lance Taylor has characterized this as multi-faceted pricing strategy (MPS) and labels my description of an “ideal” Indian transitional regime thus. But the difficulty with this critical view of strategic planning would be that it is the only policy framework which has succeeded – for Mohsin Khan’s review of experience of structural adjustment documents the output losses persisting in the system. Recently UNCLA Secretary General



Gert Rosenthal's review of Latin American and Caribbean experience shows that the output loss of the last decade, continues, through the last two years. The line being currently advocated in India for the next year and agreed to, in the GOI's Memorandum is not a knowledge based attempt at reform.

**Having not succeeded in pushing through quick domestic reform, the policy makers are succumbing to simple rule based international pressure like "reduce the level and dispersion of tariffs". No serious restructuring is possible this way.**

Having not succeeded in pushing through quick domestic reform, the policy makers are succumbing to simple rule based international pressure like "reduce the level and dispersion of tariffs". No serious restructuring is possible this way. Industry will only go to the wall. The World Bank's predictions of 15 per cent annual output loss in major employment generating industries like engineering, almost through a decade is an underestimate — but even that will cripple this country, and lead to an insufferable strain on its multireligious federal polity. It would be a serious folly to underestimate such dangers. The employment loss both direct and indirect in such a context will be between 3 million to 8 million as currently estimated by different agencies.

Different agencies in the GOI are giving conflicting signals on this issue. The Finance Ministry's Memorandum to the IMF more or less endorses the IMF/World Bank views on tariff changes but the Planning Commission's Plan approved by NDC only asks for "gradual" tariff reform. If there is a 'policy', it is not public.

If a sensible macro policy reform is worked out, the credit requirements of "viable" restructuring enterprises need to be met. These should be commercially met rather than made a drain on the budget. Thus while the budgetary deficit reduction will be met, the fiscal deficit

reduction target given to the IMF will not be met, for as D.T. Lakadawala, I.S. Gulati and R.J. Mody point out, there is no cogent argument that government or public sector should not borrow for productive purposes.

Having said all this it needs to be noted that workers would still be unemployed as they are now — for there are enterprises both in the public and private sectors which are not viable at any feasible set of prices. One is not quite sure what the safety net is all about. The original authors of the safety net scheme were international civil servants disturbed by developments in Latin America and the concept seems to have been passed on. Our own experience is considerable. We know that when people lose jobs in a big way, life can be made easier by a good retrenchment package, some planning, retraining and specific rehabilitation policies (Textile labour in Ahmedabad). The growth context of the regional economy matters (Ahmedabad vs. Kanpur; both extensively studied). In fact, Gujarat had offered in the NDC meeting on the Eighth Plan to help in working out modalities based on our experience.

If all policies are determined why should this kind of note be written? To begin with it needs to be reiterated that a number of basic premises of restructuring of the economy are supported by the mainstream of Indian economists namely budgetary restraints, delicensing, removal of quotas, the Exim bank scheme with priorities given for engineering, diamond exporters, etc. and so on. When economists like Prof. Dandekar and Prof. Lakadawala argue for a more modulated tariff reform, it is in the hope of building a public opinion on an important issue. Beginning with the freedom fighter who heads the nation, as also with the leadership of different political parties, and the wider political processes they represent, there is the audience for which economic policy alternatives need to be spelt out for debate before adoption. It is only the fringe which haunts the cocktail circuits who believe that the only policy package available is that which follows from simple globalization rules.

### Reference

**Economic Times**, "Alagh foresees a Balancing Act", 24 Feb. 1992. □



# Demographic Transition & Labour Supply in India

S. Irudaya Rajan, U.S. Mishra & P.S. Sarma

*The present stage of India's demographic transition poses typical problems of increasing number in the working ages as well as old ages as a consequence of high fertility in the past and greater survival in recent times. The economic agenda for the future, therefore, clearly calls for generation of more employment. The paper examines the detailed implications of this demographic transition on the size of the labour force in India.*

India's population has grown nearly two and half times since independence and there exists great pessimism regarding her ability to restrict the growing numbers in the near future. The growing numbers have always been perceived as the cause and consequence of poverty and underdevelopment. This growth is a consequence of the demographic transition that has taken place over time. Most often, planners and policy makers in the country have not taken cognisance of the demographic transition and this has resulted in wastage on the economic front. For instance, Kerala failed to take advantage of one of the first consequences of demographic transition. As a result of past declines in fertility, there was no growth in the population in school-going age during 1970s and 1980s, yet more and more money was pumped into the educational sector. As enrolment rates were already high in 1970s, the increased outlays on education during the last 20 years have had only marginal benefits. Between 1961 and 1987, the population in the age interval 5-14 increased by 30 per cent whereas the real expenditure in education during the same period increased by more than 300 per cent. Since there will be no growth in the population of age interval 5-14, large sums of money for education of this group should be curtailed. (Mari Bhat and Irudaya Rajan, 1990). The State Planning Board of Kerala had advised the government to close down 485 such schools but only 112 schools were actually closed (The Hindu, 1992). The lessons learnt in Kerala have to be propagated to the other parts of the country. The present stage of India's demographic transition poses typical problems of increasing numbers in the working ages as well as old ages as a consequence of high fertility in the past and higher survival in recent times. On the economic front, the agenda should be to generate more employment in order to accommodate the increased supply of labour force. The specific objectives of the paper are:

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- To examine the trends in size and composition of the working age population.
- To assess the unemployment situation based on the growth rate of workers and population in working ages.
- To predict the excess supply of labour in working population aged 15-59 in comparison with the demand for workers in the same age group.

### Sources of Data

This preliminary investigation is based on the data on population and workers by age available from the census for the period 1961-1981 and the future demand for workers is based on projections made by the authors specifically for the purpose of this paper. The supply of

workers is taken from projections made earlier for the Social Development Section, United Nations, Bangkok (Irudaya Rajan, Mishra and Sarma, 1993)

### Age Structure

Table 1 presents the proportion of population in the working ages (15-59) in different states of India over a period of time and table 2 shows the changing age structure within the working ages. Detailed age pyramids for India and Kerala can be seen from figures 1a and 1b. In the wake of the demographic transition, the age structure has undergone a dramatic change. During the last three decades India's age structure maintained a broad base with more than one third of its population consisting of children less than 14 years of age. With the recent reduc-

**Table 1:** Trends in the proportion of working Ages (15-59) for Major States in India, 1961 to 2021.

States	1961	1971	1981	1991	2001	2011	2021
Andhra Pradesh	54.2	53.2	55.3	59.2	60.8	62.8	64.2
Bihar	52.1	51.5	52.0	55.8	55.3	57.6	61.5
Gujarat	52.2	51.7	55.2	58.2	60.4	62.8	64.2
Karnataka	52.1	51.5	54.2	59.2	60.2	61.9	63.8
Kerala	51.5	53.5	57.2	62.6	66.1	66.8	63.9
Madhya Pradesh	54.0	50.5	53.2	55.9	55.6	57.4	59.4
Maharashtra	54.0	52.9	55.9	59.4	59.5	61.2	62.2
Orissa	55.2	51.6	54.0	58.3	59.4	61.8	64.4
Rajasthan	52.2	50.3	51.9	57.2	58.1	59.5	61.9
Tamil Nadu	56.8	56.5	58.7	62.2	63.8	64.0	64.5
Uttar Pradesh	53.2	51.4	51.3	54.7	55.0	56.4	60.1
West Bengal	54.1	51.7	55.8	59.1	61.8	64.4	64.4
India	53.3	52.0	54.2	56.9	59.3	61.6	63.8

Notes: Calculated from the Census for the periods 1961 to 1981 and from the projections for the periods 1991 to 2021. Details of the projections can be seen from, Irudaya Rajan et. al, (1993).

**Table 2:** Percentage of Working Population by Three Age Categories, (15-29), (30-44) and (45-59) for major states of India.

States	1961			1971			1981			1991			2001		
	15-29	30-44	45-59	15-29	30-44	45-59	15-29	30-44	45-59	15-29	30-44	45-59	15-29	30-44	45-59
Andhra Pradesh	46.1	34.3	19.6	45.1	34.2	19.7	45.9	33.5	20.6	48.9	30.9	20.2	45.9	33.2	20.9
Bihar	46.0	34.2	19.8	44.6	35.6	19.8	45.7	34.4	19.8	52.2	29.1	18.7	49.5	32.2	18.3
Gujarat	48.5	33.2	18.3	48.2	32.8	19.0	50.7	31.0	18.3	49.6	31.9	18.5	45.6	34.6	19.8
Karnataka	47.1	34.1	18.8	47.5	33.3	19.2	49.5	31.5	19.0	49.9	31.1	20.0	45.3	34.3	20.4
Kerala	47.7	32.6	19.7	50.0	30.5	19.5	52.7	28.1	19.2	47.1	33.9	19.0	40.4	37.1	22.5
Madhya Pradesh	46.9	34.1	19.0	44.8	35.4	19.8	47.3	32.7	20.0	50.9	30.2	18.9	48.5	32.5	19.0
Maharashtra	47.6	33.8	18.6	46.0	34.5	19.5	47.1	32.7	20.2	48.1	31.3	20.6	44.3	34.2	21.6
Orissa	45.7	34.1	20.2	43.9	35.7	20.4	47.0	32.8	20.2	50.5	29.8	19.7	47.0	33.5	19.5
Rajasthan	48.0	33.7	18.3	46.6	34.1	19.3	48.9	31.6	19.5	52.4	29.6	18.0	49.5	32.6	17.9
Tamil Nadu	45.7	33.8	20.5	45.0	33.8	21.2	46.5	32.2	21.3	45.6	32.2	22.2	41.7	35.2	23.1
Uttar Pradesh	45.7	34.1	20.2	44.5	34.8	20.7	46.1	33.0	20.9	51.8	28.7	19.5	50.8	31.1	18.1
West Bengal	48.0	34.1	18.0	47.3	34.1	18.6	50.7	31.0	18.3	49.7	31.6	18.7	45.0	35.0	20.0
India	46.9	33.9	19.2	46.1	34.2	19.7	48.0	32.2	19.8	49.7	30.6	19.7	47.3	32.9	19.7

Note: Same as Table 1.



tion in fertility levels, the age structure has got revised with a more narrow base and broader width in the mid ages due to high fertility in the preceding period.

The percentage of population in working ages (15-59) has increased slightly from 53 to 54 during 1961-81 and is expected to increase sharply to 59 and 64 for the periods

appropriate steps are not taken to generate additional employment to accommodate higher supply of labour in the future, then a similar situation to that in Kerala is bound to repeat in other states as well. Most of them are likely to show moderate increases in the proportion of working population after 1991. The projections clearly indicate the

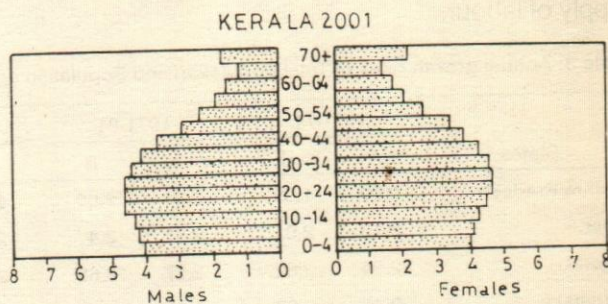
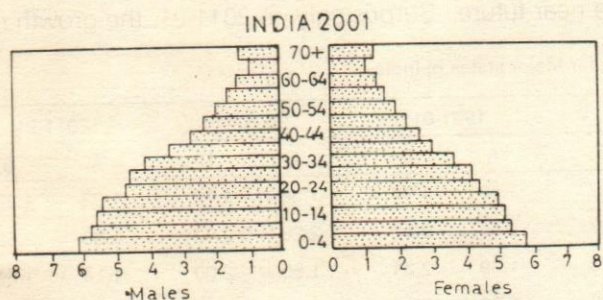
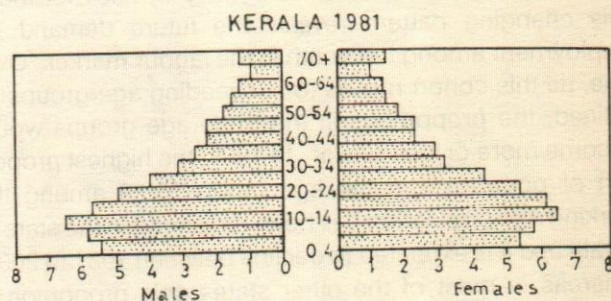
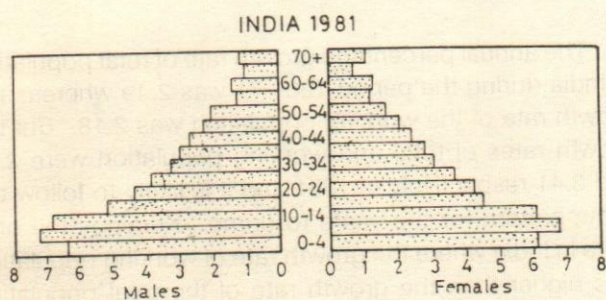
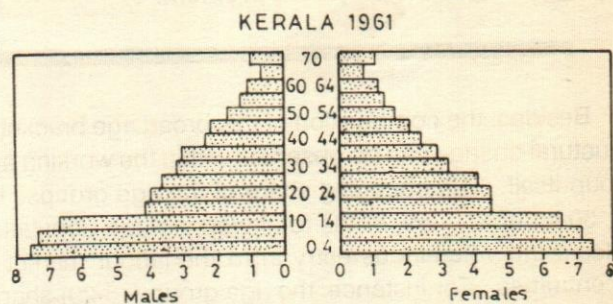
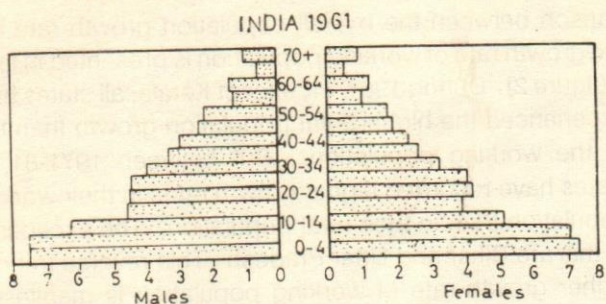


Fig. 1a. Age Pyramids of India, 1961-2001

Fig. 1b. Age Pyramids of Kerala, 1961-2001

2001 and 2021 respectively for India. The increase was 1 per cent in the initial 20 years (1961-81) and in the next forty years, it is expected to increase by 10 per cent. This proportion varies among states and for different census periods. The proportion of persons in the working ages has shown a sharp increase between 1981 and 1991. During 1981-91, the lowest increase (3 points) was found in Gujarat, Tamil Nadu and West Bengal and the highest increase (6 points) was observed in Kerala. One of the reasons for high unemployment in Kerala is due to the unusually high supply of labour in the age group 15-59. If

continuous increase in the working age proportion upto 2021 in most of the states. The only exception is Kerala where increases in the proportion of working age population is to continue upto 2011 and thereafter decline. The proportion of working population in Kerala has increased from 52 in 1961 to 57 in 1981 and is expected to increase upto 66 in 2001, 67 in 2011 and then may decrease to 64 in 2021. Upto 2011, the working population in ages 15-59 is expected to grow sharply in Kerala where as states like Uttar Pradesh will experience the similar growth only after 2011. It is time that planners and policy makers in India



took note of the present growth of working population to plan for tackling the growing unemployment problem.

**It is time that planners and policy makers in India took note of the present growth of working population to plan for tackling the growing unemployment problem.**

Besides, the composition of this broad age bracket, a structural change can be observed within the working age group itself. The changing share of the age groups 15-29, 30-44 and 45-59, in the total working age population reflects the voluminous entry in to the labour market in recent times. For instance, the age group (15-29) shares almost half of the working population. It was 49.7 in 1991 and is expected to decline moderately by 2001 for India. This changing pattern reveals the future demand for employment among the youth in the labour market. Over time, as this cohort moves to succeeding age groups as defined, the proportions in the three age groups would become more or less similar. In 1981, the highest proportion of population in the age group 15-29 among the working age population has been registered in the state of Kerala and it is expected to decline between 1981 to 2001. Whereas in most of the other states, this proportion is expected to increase thus indicating future increase in supply of labour.

## Growth Rates

The total dependency ratio is measured as the proportion of children (0-14) and old (60+) to the persons in working ages. The working population needs to be economically productive to support the dependent population and ought to be provided with work. A comparison between the overall population growth rate and the growth rate of working population is presented in table 3 (figure 2). During 1961-71, except Kerala, all states have experienced the higher total population growth than that of the working population. But between 1971-81, all states have recorded higher growth rates in their working population than in their total population. The exceptions to this are Bihar and Uttar Pradesh. This reverse trend of higher growth rate of working population is manifested and aggravated during 1981-91 and is expected to continue in the future until 2021.

The annual percentage growth rate of total population in India during the period 1961-71 was 2.49 whereas the growth rate of the working population was 2.18. But the growth rates of total and working population were 2.36 and 3.41 respectively in 1981 and it is likely to follow the same pattern for the years to come. Kerala is the only state in India where the growth rate of working population was higher than the growth rate of the total population even during 1961-71. This trend was at its peak between 1981-91 and the difference is projected to narrow down in the near future. Surprisingly, in 2011-21, the growth rate

**Table 3:** Annual growth rates of Total Population and Population aged (15-59), for Major states of India.

States	1961-71		1971-81		1981-91		1991-01		2001-11		2011-21	
	A	B	A	B	A	B	A	B	A	B	A	B
Andhra Pradesh	2.09	1.85	2.31	2.69	2.39	3.27	1.63	1.96	1.36	1.72	1.02	1.28
Bihar	2.13	2.01	2.41	2.4	2.35	3.27	2.65	2.52	2.26	2.77	1.83	2.62
Gujarat	2.94	2.82	2.77	3.65	2.08	2.73	1.89	2.34	1.55	2.00	1.14	1.39
Karnataka	2.42	2.27	2.62	3.24	2.07	3.18	1.96	2.16	1.54	0.77	1.19	2.72
Kerala	2.63	3.12	1.92	2.82	1.41	2.48	1.16	1.79	0.85	0.96	0.67	0.21
Madhya Pradesh	2.87	2.04	2.53	2.97	2.67	3.32	2.52	2.46	2.32	2.71	2.06	2.48
Maharashtra	2.75	2.48	2.44	2.98	2.54	3.31	1.92	1.94	1.57	1.90	1.32	1.52
Orissa	2.50	1.69	2.02	2.56	1.95	2.90	1.82	2.05	1.48	1.94	1.16	1.62
Rajasthan	2.78	2.33	3.29	3.60	2.81	4.12	2.64	2.84	2.48	2.77	2.18	2.67
Tamil Nadu	2.23	2.16	1.74	2.19	1.49	2.18	1.17	1.44	0.93	0.97	0.59	0.68
Uttar Pradesh	1.98	1.57	2.55	2.57	2.54	3.37	2.62	2.70	2.44	2.74	2.04	2.83
West Bengal	2.69	2.13	2.32	3.25	2.46	3.20	1.69	2.22	1.36	1.84	1.05	1.04
India	2.49	2.18	2.47	2.58	2.36	3.40	1.93	2.44	1.65	2.09	1.27	1.68

Note: Same as Table 1.

Note: A refers to the growth rate of the total population and B refers to the growth rate of population in ages (15-59).



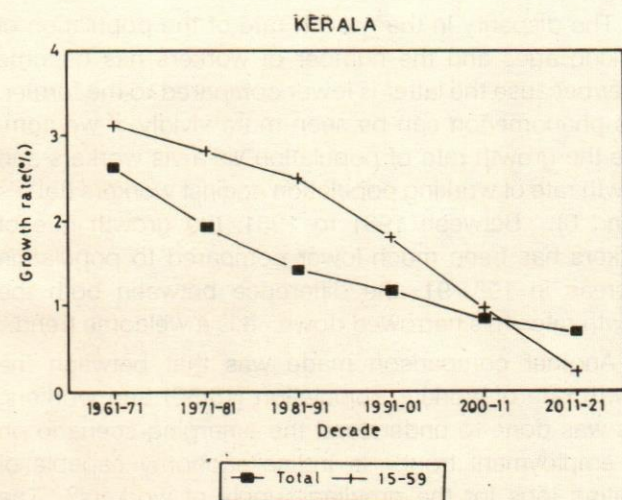
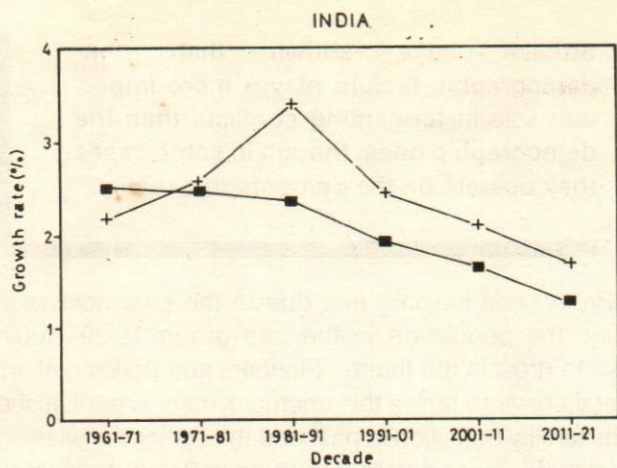


Fig. 2. Annual Growth Rates of Total Population and Population aged (15-59)

of population is expected to be three times higher than the growth rate of workers.

**States like Kerala and Tamil Nadu which are in the final stage of demographic transition have registered the lowest growth rate for the ages 15-29.**

The growth rates among three different age groups within working population are presented in table 4. The prime age for search of employment in India is around 15-29 years. The annual growth rate for 15-29 age group was 1.97 per cent during 1961-71, increased to 3.11 between 1971 and 1981 and is high during 1981-91 and then, is projected to decline to the same level as that of 1961-71.

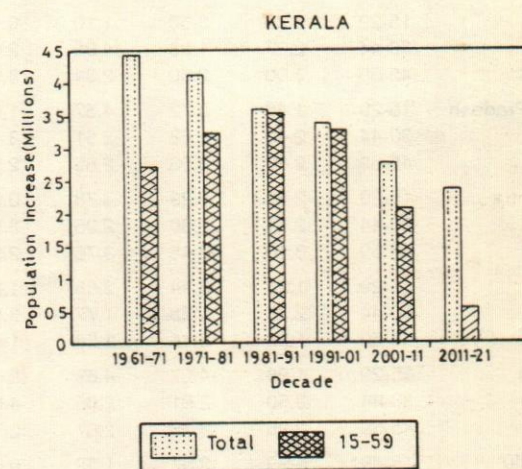
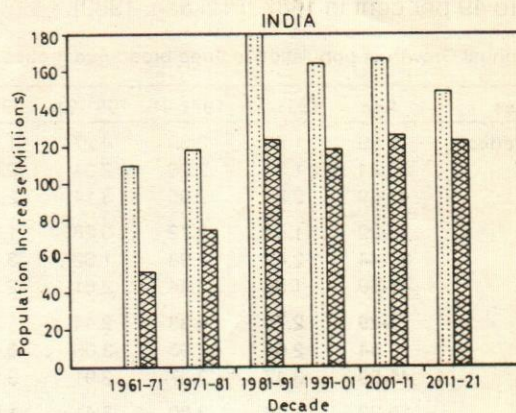


Fig. 3. Decadal Increase of Total Population and Population aged (15-59)

In other words, the growth among 15-29 population stands high in all the major states during 1971-81 and 1981-91. States like Kerala and Tamil Nadu which are in the final stage of demographic transition have registered the lowest growth rate for the ages 15-29.

Kerala needs more exposure on this aspect. The relevance of past reductions in mortality to the employment situation is better understood by examining the growth rate of population in ages 15-29 where most of the unemployed are usually found. The annual growth rate for this population was 0.8 per cent in 1961-71, 3.7 per cent in 1971-81 and 3.5 per cent in 1981-91 (Mari Bhat and Irudaya Rajan, 1990). Such a huge increase in the size of the population entering the labour force during the 1960s and 1970s seems to be the prime factor behind the growth of unemployment in Kerala. The two surveys by the Department of Economics and Statistics of Kerala have



revealed that number of unemployed women as a percentage of the labour force has soared from 14 per cent in 1965-66 to 49 per cent in 1987 (Prakash, 1989).

**Table 4:** Annual Growth of population in three broad age groups.

States	Age	1961-71	1971-81	1981-91	1991-01
Andhra Pradesh	15-29	1.60	2.90	4.27	1.22
	30-44	1.99	2.26	2.34	2.83
	45-59	2.22	2.95	3.14	2.39
Bihar	15-29	1.65	2.72	5.28	1.88
	30-44	2.49	1.98	1.32	3.83
	45-59	1.98	2.44	2.61	2.28
Gujarat	15-29	2.74	4.38	2.44	1.33
	30-44	2.64	2.93	3.06	3.40
	45-59	3.37	3.07	2.91	3.22
Karnataka	15-29	2.36	3.80	3.41	1.04
	30-44	2.00	2.51	3.12	3.40
	45-59	2.52	3.12	3.24	3.08
Kerala	15-29	3.75	3.50	1.10	0.12
	30-44	2.27	1.83	4.95	2.91
	45-59	3.00	2.60	2.34	3.94
Madhya Pradesh	15-29	1.48	3.72	4.57	1.87
	30-44	2.49	1.98	2.51	3.43
	45-59	2.59	3.03	2.85	2.52
Maharashtra	15-29	2.08	3.29	3.78	0.99
	30-44	2.71	2.30	2.95	3.02
	45-59	3.10	3.45	3.76	2.51
Orissa	15-29	1.23	3.44	3.88	1.21
	30-44	2.25	1.53	1.77	3.52
	45-59	1.80	2.46	2.54	1.99
Rajasthan	15-29	1.98	4.27	4.69	2.13
	30-44	2.50	2.61	2.85	4.09
	45-59	2.95	3.76	2.67	2.77
Tamil Nadu	15-29	1.99	2.57	1.99	0.45
	30-44	2.15	1.62	2.19	2.52
	45-59	2.56	2.25	2.72	1.93
Uttar Pradesh	15-29	1.26	3.02	4.96	2.45
	30-44	1.83	1.89	1.59	3.78
	45-59	1.83	2.74	2.42	1.78
West Bengal	15-29	1.97	4.18	2.99	1.06
	30-44	2.14	2.04	3.51	3.54
	45-59	2.53	3.09	3.52	3.09
India	15-29	1.97	3.11	3.87	1.85
	30-44	2.30	1.85	2.75	3.39
	45-59	2.50	2.63	3.36	2.42

Note: Same as Table 1.

In a lecture during the Golden Jubilee Celebrations of Bombay University Library, late Professor V.K.R.V. Rao strongly pleaded for investments in Assam lest serious unrest erupts there. The subsequent events proved him right and the same is also more or less true for Punjab. Studies have shown that non-demographic factors play a more important role in fermenting conflicts than the demographic ones, though in some cases they operate on the demographic reality (Mukerji and Irudaya Rajan, 1990).

**Studies have shown that non-demographic factors play a more important role in fermenting conflicts than the demographic ones, though in some cases they operate on the demographic reality.**

Projections indicate that due to the past decline in fertility, the population in the age group 15-29 would cease to grow in the future. Planners and policy makers in Kerala have to tackle this unemployment crisis caused by the fertility transition in past and the earlier transition in mortality (for more details, see Irudaya Rajan, 1989; Mari Bhat and Irudaya Rajan, 1990).

The disparity in the growth rate of the population of working ages and the number of workers has become wider because the latter is lower compared to the former. This phenomenon can be seen more vividly, if we compare the growth rate of population vis-a-vis workers and growth rate of working population against workers (tables 5 and 6). Between 1961 to 1981, the growth rate of workers has been much lower compared to population whereas in 1981-91, the difference between both the growth rates has narrowed down. It is a welcome trend.

Another comparison made was that between the growth rate of working population (15-59) and workers. This was done to understand the emerging scenario on the employment front. Is Indian economy capable of creating jobs for the growing supply of workers? The results provided in table 6 are not impressive.

**Table 5:** Annual growth rate of total Population and total workers in India.

States	1961-81		1981-91	
	TP	TW	TP	TW
Andhra Pradesh	2.44	1.57	2.39	2.26
Bihar	2.52	0.88	2.35	2.43
Gujarat	3.26	2.49	2.08	3.34
Karnataka	2.87	1.97	2.07	2.54
Kerala	2.53	1.90	1.41	1.97
Madhya Pradesh	3.06	1.62	2.67	2.61
Maharashtra	2.94	2.05	2.54	2.63
Orissa	2.51	1.54	1.95	1.80
Rajasthan	3.50	1.54	2.81	3.48
Tamil Nadu	2.18	1.58	1.49	2.16
Uttar Pradesh	2.52	0.90	2.54	3.18
West Bengal	2.81	2.12	2.46	3.37
India	2.78	1.48	2.36	2.54

Note: Same as Table 1

TP refers to the growth rate of total population and TW refers to the growth rate of total workers.



**Table 6:** Annual growth rate of working population and workers.

States	1961-81		1981-91	
	TWP	TW	TWP	TW
Andhra Pradesh	2.52	1.57	3.27	2.26
Bihar	2.44	0.88	3.27	2.43
Gujarat	3.75	2.49	2.73	3.34
Karnataka	3.12	1.97	3.18	2.54
Kerala	3.41	1.90	2.48	1.97
Madhya Pradesh	2.80	1.62	3.32	2.61
Maharashtra	3.10	2.05	3.31	2.63
Orissa	2.34	1.54	2.90	1.80
Rajasthan	3.39	1.54	4.12	3.48
Tamil Nadu	2.41	1.58	2.18	2.16
Uttar Pradesh	2.27	0.90	3.37	3.18
West Bengal	3.03	2.12	3.20	3.37
India	2.67	1.48	3.40	2.54

Note: Same as Table 1

TWP refers to the growth rate of total working population (15-59) and TW refers to the growth rate of total workers.

Table 7 furnishes data on the growth rate of working population (15-59) and workers in age 15-59. No state in India has shown much progress on the employment front during the period 1961-81. Comparison with 1981-91 was not possible as data on workers by age were not made available by the Registrar General and Census Commissioner of India.

**Table 7:** Annual growth rate of working population (15-59) and workers (15-59).

States	1961-81	
	TWP	WWP
Andhra Pradesh	2.52	1.73
Bihar	2.44	0.97
Gujarat	3.75	
Karnataka	3.12	2.12
Kerala	3.41	2.01
Madhya Pradesh	2.80	1.59
Maharashtra	3.10	2.12
Orissa	2.34	1.61
Rajasthan	3.39	1.90
Tamil Nadu	2.41	1.70
Uttar Pradesh	2.27	0.98
West Bengal	3.03	2.12
India	2.67	1.59

Note: Same as Table 1.

TWP refers to the growth rate of total working population (15-59) and WWP refers to the growth rate of workers in working population (15-59).

### Estimates of Working Population and Workers

The definitional problem of workers in Indian censuses and National Sample Surveys have been briefly

outlined in table 8. The census provides data on workers for each census year and the National Sample Survey (NSS), an alternative source on employment, supplied data for the periods 1972-73, 1977-78, 1983-84, and 1987-88. Neither census nor NSS data on work participation rates are consistent. Both census and NSS, at least, have shown a trend of declining female participation. Moreover, the estimation of supply of and demand for workers can be derived from the census due to its being a decadal event. [Interesting discussions on this aspect can be seen from Krishnamurthy (1984) Visaria and Minhas (1991) and Simon (1992)].

**Table 8:** Reported Female Participation Rates for Rural India and Kerala from four censuses and four NSS surveys

	CENSUS			
	1961	1971	1981	1991
Rural India	31.4	15.9	23.1	27.2
Rural Kerala	20.9	14.1	13.5	17.9
	NSS			
	1972-73	1977-78	1983-84	1987-88
Rural India	37.5	28.8	28.4	28.7
Rural Kerala	39.3	21.1	19.3	19.3

Source: Various Census and NSS reports and also Simon (1992).

As the number of workers are available from the 1991 census, the number of workers for 2001 can be estimated. Two set of estimates of the same are provided in table 9.

**Table 9:** Estimated number of total workers for the period 2001.

States	I			II		
	T	M	F	T	M	F
Andhra Pradesh	36819	22210	14609	36977	21514	15463
Bihar	34941	25880	9061	37838		
Gujarat	22620	14219	8401	23578	13585	9993
Karnataka	23512	14603	8909	24218	14196	10022
Kerala	11142	8228	2914	11184	8223	2961
Madhya Pradesh	35603	21731	13872	37473	21684	15689
Maharashtra	42600	25663	16936	43926	25219	18707
Orissa	13956	9907	4049	14157	9675	4482
Rajasthan	22802	13698	9104	24978		
Tamil Nadu	29852	18596	11256	30817	18287	12530
Uttar Pradesh	29102	42974	16128	63703	20392	43311
West Bengal	29421	22679	6742	31253	11180	20073
India	384796	260392	124404	406503	260384	146119

Note: Estimate I is based on assuming the 1981-91 growth rate of total workers as constant and the Estimate II is obtained through assuming the trend in the growth rate of total workers between 1961-81 and 1981-91. The workers by sex are not projected for Bihar and Rajasthan due to some data problems.

Estimated by the authors.



Estimate I is based on the growth rate of total workers during 1981-91 assumed to be constant and estimate II is obtained through the assumption of the trend in the growth rate of the workers between 1961-81 and 1981-91. The estimated number of workers for India is expected to be around 385 millions by estimate I and 407 millions according to estimate II. These estimates have been computed for the major states by sex in India. Krishnan (1992) has estimated workers to be around 393 millions by 2001 for India alone.

**The estimated number of workers for India is expected to be around 385 millions by estimate I and 407 millions according to estimate II.**

Table 10 furnishes the number of workers in ages 15-59 for 1991 and 2001 estimated through assuming the growth rate of 15-59 workers as constant. Under this assumption, the number of workers in ages 15-59 is expected to be around 287 millions in 2001 for India. Tables 11 and 12 provide the estimates of supply, demand and excess workers for 1991 and 2001. The working population (15-59) is taken from our earlier projections (Irudaya Rajan, Mishra and Sarma, 1993). In fact the estimates of working population made by us for India are almost closer

**Table 10:** Estimates of workers in ages 15-59.

States	1991			2001		
	T	M	F	T	M	F
Andhra Pradesh	24512	16220	8292	28749	19637	9112
Bihar	21448	18092	3356	23527	20750	2777
Karnataka	15601	11183	4418	18908	13952	4956
Kerala	8567	6269	2299	10285	7646	2639
Madhya Pradesh	22151	15361	6790	25673	18654	7022
Maharashtra	28537	19354	9183	34598	24187	10411
Orissa	10060	7746	2314	11683	9272	2411
Rajasthan	13093	10092	3001	15578	12577	3000
Tamil Nadu	20988	14785	6203	24549	17683	6866
Uttar Pradesh	32082	29137	2945	35240	32865	2375
West Bengal	18063	15837	2226	21888	19259	2629
India	247605	190900	56705	287075	228864	58211

Note: The estimate is based on assuming the growth rate of workers in age (15-59) during 1961-81 as constant for 1991 and 2001. Gujarat had experienced a negative growth rate during 1961-81, hence the projections are not made available.

Estimated by the authors.

to the estimates made by United Nations. (United Nations, 1992). Estimates of workers for ages 15-59 have been made using two assumptions. One estimate is by using the proportion of workers in ages 15-59 to the population of ages 15-59 corresponding to the period 1981 and the other is by assuming the changing trends in this proportion during the period 1961-81.

In the same table, the excess of working population (unemployed or seeking work) in the age group 15-59 for major states by sex for 1991 and 2001 is also given. As the projections are more relevant for future, the estimates for the year 2001 can be discussed. If the employment situation in the country is not improved in the near future, the excess supply of labour is going to aggravate the unemployment problem. The best estimates can be the assumption of the proportion of workers in 15-59 to total population in ages 15-59 of 1981 to remain same in the future (Table 12). According to this estimate, the non-worker population is expected to increase from 194 million in 1991 to 242 million in 2001 for the country as a whole. The alternative estimate depicts a more grave situation in this regard. The inter-state analysis of the situation reveals worse scenes in Kerala, Bihar and Punjab where about fifty percent of working age population will be without work. In some states, more than one third of the working age population would be in need of work. This is more pronounced in the case of females. It is high

**The inter-state analysis of the situation reveals worse scenes in Kerala, Bihar and Punjab where about fifty percent of working age population will be without work.**

time, the government creates an atmosphere in which both private and public sectors can generate more employment opportunities for men and women both in rural as well as urban areas to reduce the excess supply of labour which has been partly created by the demographic transition. The emerging demographic scenario calls for immediate attention of the policy makers so that the country can be saved from conflicts and violence created mostly by the educated unemployed and misguided youth.

### Concluding Remarks

The assessment of trend, size and age composition has clearly indicated that the age structure is changing rapidly due to the earlier decline in mortality and the



**Table 11:** Demand, Supply and Excess of workers in 15-59 Age in 1991.

Assumption: Proportion of workers in 15-59 age to total working population in 15-59 age in 1981 as constant

States	Male			Female			Total		
	Population	Workers	Excess	Population	Workers	Excess	Population	Workers	Excess
Andhra Pradesh	19835	17820	2015	19437	10165	9272	39272	27985	11287
Bihar	25207	21052	4155	22993	5126	17867	48200	26177	22023
Gujarat	12439	10701	1738	11523	3818	7705	23962	14519	9443
Karnataka	13520	11794	1726	12996	5306	7690	26516	17100	9416
Kerala	8857	6379	2478	9322	2481	6841	18179	8861	9318
Madhya Pradesh	19340	17120	2220	17627	8779	8848	36967	25899	11068
Maharashtra	24340	20825	3515	22427	10972	11455	46767	31797	14970
Orissa	9278	8291	987	9092	2898	6194	18370	11189	7181
Rajasthan	12751	11033	1718	11433	4060	7373	24184	15093	9091
Tamil Nadu	17439	15076	2363	17182	6836	10346	34622	21912	12710
Uttar Pradesh	40692	34234	6458	35310	4671	30639	76003	38906	37097
West Bengal	21219	17187	4032	18966	2564	16402	40185	19751	20434
India	250149	212876	37273	230375	73228	157147	480524	286104	194420

Assumption: Rate of decline in the proportion of workers in 15-59 age to total working population in 15-59 age during 1961-1981 to continue

Andhra Pradesh	19834	17376	2458	19437	8971	10466	39272	26347	12925
Bihar	25207	20285	4922	22993	2663	20330	48200	22948	25252
Gujarat	12439	10428	2011	11523	3058	8465	23962	13486	10476
Karnataka	13520	11378	2142	12996	4516	8480	26516	15894	10622
Kerala	8857	5844	3013	9322	2114	7208	18179	7959	10220
Madhya Pradesh	19340	16516	2824	17627	7002	10625	36967	23518	13449
Maharashtra	24340	20124	4216	22427	9503	12924	46767	29627	17140
Orissa	9278	8113	1165	9092	2460	6632	18370	10574	7796
Rajasthan	12751	10612	2139	11433	2851	8582	24184	13463	10721
Tamil Nadu	17439	14605	2834	17182	6140	11042	34622	20745	13877
Uttar Pradesh	40693	32697	7996	35310	2029	33281	76003	34726	41277
West Bengal	21219	16234	4985	18966	2247	16719	40185	18481	21704
India	250149	204981	45168	230375	57914	172461	480524	262895	217629

Note: Estimated by the authors.

continuous decline in fertility. The growth rate of workers in the ages 15-59 is lower compared to the growth rate of population of ages 15-59 and the total population as well.

**According to one estimate, the country is expected to have 356 million people unemployed in 2001.**

Over time, unemployment has been aggravated in many states of India, and is particularly pronounced in states like Kerala. The projections of estimated unemployed (or seeking work) in the future (supply minus demand for labour) indicates a disturbing trend all over the country.

According to one estimate, the country is expected to have 356 million people unemployed in 2001.

### References

- Irudaya Rajan, S., U.S. Mishra & P.S. Sarma**, (1993). 'Aging in India: A Demographic Assessment of Past and Future'. Background chapter prepared for the India case study on aging. Centre for Development Studies, Trivandrum and Social Development Section, United Nations, Bangkok.
- Irudaya Rajan, S.** (1989). Aging in Kerala: One more Population Problem? *Asia Pacific Population Journal*, Volume 4, No. 2.
- Krishnan**, (1992). Population, Poverty and Employment in India. *Economic and Political Weekly*, Volume XXVII, No. 46.
- Krishnamurthy, J.** (1984). Changes in the Indian Work Force. *Economic and Political Weekly*, Volume, XIX, No. 50, December 15.



**Table 12: Demand, Supply and Excess of workers in 15-59 Age in 2001.**

Assumption: Proportion of workers in 15-59 age to total working population in 15-59 age in 1981 as constant

('000)

States	Male			Female			Total		
	Population	Workers	Excess	Population	Workers	Excess	Population	Workers	Excess
Andhra Pradesh	23795	21358	2437	23156	12099	11057	46951	33457	13494
Bihar	31809	26446	5363	28554	6337	22217	60363	32783	27580
Gujarat	15322	13193	2129	14249	4725	9524	29571	17917	11654
Karnataka	16398	14319	2079	15850	6478	9372	32249	20797	11452
Kerala	10524	7553	2971	10906	2893	8013	21431	10445	10986
Madhya Pradesh	24025	21287	2738	22048	10991	11057	46073	32279	13794
Maharashtra	28896	24764	4132	26948	13205	13743	55844	37968	17876
Orissa	11222	10011	1211	10914	3472	7442	22136	13483	8653
Rajasthan	16284	14117	2167	14742	5246	9496	31026	19363	11663
Tamil Nadu	20036	17296	2740	19587	7781	11806	39623	25077	14546
Uttar Pradesh	51616	43466	8150	44915	5948	38967	96531	49414	47117
West Bengal	25464	20900	4564	23651	3240	20411	49114	24140	24974
India	310354	264480	45874	287615	91551	196064	597969	356031	241938

Assumption: Rate of decline in the proportion of workers in 15-59 age to total working population in 15-59 age during 1961-1981 to continue

Andhra Pradesh	23795	20291	3504	23156	9250	13906	46951	29542	17409
Bihar	31809	24469	7340	28554	220	28334	60363	24688	35675
Gujarat	15322	12520	2802	14249	2845	11404	29571	15365	14206
Karnataka	16398	13312	3086	15850	4550	11300	32249	17863	14386
Kerala	10524	6311	4213	10906	2045	8861	21431	8356	13075
Madhya Pradesh	24025	19799	4226	22048	6545	15503	46073	26344	19729
Maharashtra	28896	11848	17048	26948	8138	18810	55844	19986	35857
Orissa	11222	9579	1643	10914	2419	8495	22136	11998	10138
Rajasthan	16284	13057	3227	14742	2124	12618	31026	15181	15845
Tamil Nadu	20036	16213	3823	19587	6193	13394	39623	22407	17216
Uttar Pradesh	51616	38786	12830	44915	0	44915	96531	38786	57745
West Bengal	25464	18589	6875	23651	2446	21205	49114	21036	28079
India	310354	244981	65373	287615	53286	234329	597969	298267	299702

Note: Estimated by the authors.

**Mari Bhat, P.N. & S.Irudaya Rajan, (1990).** Demographic Transition in Kerala Revisited. Economic and Political Weekly, Volume, XXV, Nos. 35 and 36.

**Mukerji, S. & S. Irudaya Rajan, (1990).** Demography of Conflict. Chapter 4, pp. 95-122 in K.N. Sharma (eds). 1990. Peace, Technology and Development Studies in the Sociology of Peace. Rawat Publications, Jaipur.

**Prakash, B.A., (1989).** Unemployment in Kerala: An Analysis of Economic Causes. Working Paper No. 231, Centre for Development Studies, Trivandrum.

**Simon, R.M., (1992).** Women, Work and Development: Issues in Female Labour Force Participation in Kerala. M. Phil Dissertation. Jawaharlal Nehru University, New Delhi.

**The Hindu, (1992).** September 2.

**United Nations, (1991).** The Sex and Age Distribution of Population — The 1990 Revision. Department of International Economic and Social Affairs, Population Studies No. 122, United Nations, New York.

**Visaria, P. & B.S. Minhas, (1991).** Evolving an Employment Policy for the 1990s: What do the Data tell us? Economic and Political Weekly, April 13. □



# Population Growth, Work Participation & Occupational Changes in Rural India

M.J. Bhende & H.G. Hanumappa

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*This paper studies the growth of population and work force changes in the occupational pattern during the last three decades using census and NSS data. It discusses the growth in employment and magnitude of unemployment. A few suggestions to tackle the employment related issues are also presented.*

India opted for a strategy of planned economic development since 1951 and it assumed that the mechanism of planning as adopted would raise the level of employment with rising productivity accompanied by rising real wages. In other words, it was assumed that the growth of the national economy will lead to the expansion of employment opportunities in the country. Thus, the focus of employment strategy during the first twenty years of planning was on agricultural as well as industrial growth, which was expected to generate employment on a sustained basis in the long run. But in reality, the nature of growth in the modern/organised sector became more capital intensive and resulted in declining labour absorption (Hirway, 1991). Similarly, growth in agriculture facilitated by irrigation was labour intensive in the initial stages, but became capital intensive later and was accompanied by reduced labour employment (Mehra, 1976; Vaidyanathan, 1986). The variation in the magnitude and direction of economic growth from the one visualized by the planners on the one hand and the high growth rate of population/workforce on the other created surplus labour which became a massive army of unemployed and underemployed. This has been the root cause of mass poverty in rural India.

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## Liberalisation & Employment

The new economic policy focussing more on growth through liberalisation does not lay much emphasis on employment generation. The new policy will induce producers to use capital intensive technology to compete in the product market and thus the growth in employment in modern sector will be modest in the near future. The scope for increasing employment in the traditional sector is also limited. However, development of traditional sector by creating infrastructural facilities will help to generate employment (Hanumappa, 1992). Moreover, the development of human resources through skill formation and



encouragement for self employment will have high pay offs in the long run in providing employment to the masses and alleviating rural poverty.

**The new policy will induce producers to use capital intensive technology to compete in the product market.**

### The Population Growth

The population of the country has almost doubled during last three decades (1961 to 1991). The compound growth rate per annum was higher for urban population as compared to rural population (table 1). Despite the high level of literacy and awareness about family planning, the higher rate of population growth in urban population indicates the tendency of migration among rural population to urban areas for obvious reasons. If we assume the overall growth rate as common to both rural and urban areas, the population migration from rural to urban areas is so conspicuous that rural migrants represented about 16 and 18

per cent of the urban population during 1981 and 1991 census respectively.

### Labour Force

The definition of 'worker' changed from census to census and therefore data on workforce collected during various censuses may not be strictly comparable. However, the total workforce is made up of main and marginal workers, which has increased from 188.7 million in 1961 to 315 million in 1991. The growth of labour force is on the lines of population growth. The rate of growth of female workers was higher than that of males during the last two decades (table 2).

### Work Participation

The work participation rates indicate the percentage of population that joined the workforce. Increase in participation rate may not necessarily indicate increased availability of work nor is the converse true. The overall work participation rate has declined between 1961 and 1991 – the reduction in the work participation rate was more in rural areas than in urban areas. Decline in the

**Table 1: Trends in Growth of Population**

Year	Total Population (millions)	Compound Growth Rate (%)	Rural Population (million)	Compound Growth Rate (%)	Urban Population (million)	Compound Growth Rate (%)
1961	439.23	1.97	360.30 (82.02)*	1.89	78.93 (17.98)	2.37
1971	548.15	2.24	439.04 (80.09)	2.00	109.11 (19.91)	3.29
1981**	685.19	2.25	525.46 (76.69)	1.61	159.73 (23.31)	3.88
1991**	846.30	2.13	626.69 (74.26)	1.61	217.61 (25.74)	3.14

\* Figures in parenthesis indicate percentage share in total population.

\*\* Includes projected population (by Expert Committee on Population) for Assam and Jammu and Kashmir where population census could not be held during 1961 and 1991 respectively.

**Table 2: Growth of Labour Force from 1961 through 1991 (Millions)**

Year	ALL			RURAL			URBAN		
	Total Workforce	Male	Female	Total Workforce	Male	Female	Total Workforce	Male	Female
1961	188.68	129.17	59.51	162.25	106.75	55.50	26.43	22.42	4.01
1971	197.87 (0.48%)	149.88 (1.50%)	47.99 (-1.79%)	165.54 (0.20%)	121.17 (1.27%)	44.37 (-1.84%)	32.33 (2.03%)	28.71 (2.50%)	3.62 (-0.93%)
1981*	244.61 (2.14%)	181.08 (1.91%)	63.53 (2.84%)	197.31 (1.77%)	139.92 (1.45%)	57.39 (2.61%)	47.30 (3.88%)	41.16 (3.67%)	6.14 (5.43%)
1991*	314.88 (2.56%)	223.49 (2.13%)	91.39 (3.70%)	249.31 (2.37%)	167.81 (1.83%)	81.50 (3.57%)	65.57 (3.32%)	55.68 (3.07%)	9.89 (4.88%)

\* Excludes Assam and Jammu and Kashmir for 1981 and 1991 censuses respectively.



work participation rate was more conspicuous in the case of females in both rural as well as urban areas (table 3).

**Table 3:** Work Participation Rates from 1961 Through 1991

Year	Particulars	Persons	Males	Females
1961	Total	42.98	57.12	27.96
	Rural	45.07	58.22	31.42
	Urban	33.48	52.40	11.09
1971	Total	36.10	52.76	18.17
	Rural	37.70	53.76	20.76
	Urban	29.63	48.88	7.18
1981	Total	36.77	52.65	19.77
	Rural	38.87	53.80	23.18
	Urban	30.00	49.07	8.32
1991	Total	37.64	51.52	22.69
	Rural	40.13	52.43	27.06
	Urban	30.45	48.96	9.73

Note: 1) Excludes Assam where the 1981 census could not be held and Jammu & Kashmir where the 1991 census has not been held.

2) The 1971 census figures include workers and non-workers with secondary work. The 1981 and 1991 census figures include main workers and marginal workers.

**Decline in the work participation rate was more conspicuous in the case of females in both rural as well as urban areas**

The overall work participation rate declined in 1981 as compared to 1961 for both males and females in all age groups. However, the rate for adult males in the age group 35-59 remained more or less unchanged for both rural as well as urban areas between 1961 and 1981. The work participation rates for females were much lower than

**Table 4:** Work Participation Rates by Age and Sex During 1961 and 1981

Age Group	ALL			RURAL			URBAN		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
YEAR 1961:									
Below 14	8.03	9.39	6.60	9.15	10.61	7.63	2.59	3.55	1.57
15 - 34	66.17	88.06	43.65	70.29	91.12	49.78	49.50	76.92	15.79
35 - 59	73.80	96.67	47.59	75.98	97.47	52.28	63.65	93.31	22.88
60 +	49.49	76.61	22.38	52.04	79.89	24.30	35.20	58.43	11.42
TOTAL	42.98	57.12	27.96	45.07	58.22	31.42	33.48	52.40	11.09
YEAR 1981:									
Below 14	5.18	5.97	4.34	6.11	6.92	5.26	1.86	2.60	1.08
15 - 34	54.61	77.67	30.18	59.59	82.06	36.61	41.07	66.45	11.55
35 - 59	66.88	96.35	34.36	69.10	97.18	39.33	59.65	93.85	16.59
60 +	40.07	65.07	14.03	43.12	69.09	15.90	27.52	48.27	6.48
TOTAL	36.77	52.65	19.77	38.87	53.80	23.18	30.00	49.07	8.32

that of males and most of it came from the age group 15-59. Interestingly, the rate for males in the age group 60 and above was higher than that of females in all the age groups. Further the work participation rates were higher for rural population than their urban counterparts in all the age groups (table 4). Hence, it is prudent to assume that the reduction in work participation rate is the result of economic development rather than arguing that it is due to the differences in defining workers during various censuses. Moreover, the reduction in rates from 1961 to 1981 may be due to the withdrawal of certain sections of population from the workforce unmatched by additions in a proportionate way (Vivekananda, 1992).

The reduction in the rate of work participation of rural males in the age group below 14 years was considerably higher than their counterparts in urban areas. This can be attributed to the spread of education and increased enrolment of children in the schools during past two decades. The overall decline in the work participation rate of rural females can be attributed to socio-economic factors. The empirical studies have indicated that as the income of household increases, the participation of female members in the labour force decreases (Walker & Ryan, 1990; Bhende et al, 1992).

### Occupational Structure

Diversification of the occupational structure in an economy is usually considered to be a positive development as it is an important component of the growth process. Over the years, proportion of workers engaged in cultivation has been on the decline and that engaged as agricultural labourers is on the increase. Similarly, the share of workers engaged in household industries in the



**Table 5: Percentage Distribution of Workers by Industrial Category**

	Year	RURAL			URBAN			TOTAL		
		Male	Female	Persons	Male	Female	Persons	Male	Female	Persons
Cultivation	1961	61.09	58.87	60.33	5.56	12.09	6.55	51.45	55.72	52.80
	1971	56.00	32.72	51.61	5.21	4.17	5.10	46.24	29.69	43.36
	1981	55.16	37.07	51.10	5.20	4.66	5.13	43.70	33.70	42.06
	1991	51.79	39.98	48.47	4.90	5.54	4.99	40.01	34.55	38.75
Agricultural Labourers	1961	15.76	24.82	18.86	2.21	10.57	3.48	13.41	23.86	16.71
	1971	25.20	54.32	30.69	4.66	17.51	6.00	21.25	50.40	26.31
	1981	24.00	50.20	29.88	4.66	16.57	6.05	19.56	46.18	24.94
	1991	26.11	47.94	31.77	5.35	14.89	6.66	20.90	43.56	26.15
Household Industry	1961	5.69	6.97	6.13	5.77	19.80	7.90	5.70	7.84	6.37
	1971	3.12	3.57	3.21	4.38	9.96	4.96	3.37	4.24	3.52
	1981	2.87	3.79	3.08	4.21	10.48	4.94	3.18	4.59	3.47
	1991	2.84	3.76	3.08	4.82	10.30	5.57	3.33	4.63	3.63
Other Workers	1961	17.45	9.33	14.67	86.45	57.53	82.07	29.43	12.58	24.12
	1971	15.67	9.39	14.48	85.75	68.35	83.94	29.14	15.65	26.80
	1981	17.97	8.94	15.94	85.93	68.29	83.88	33.56	16.03	30.01
	1991	19.26	9.32	16.68	84.93	69.27	82.78	35.76	17.26	31.47

total workers has declined and other sectors of the economy registered an increase (table 5).

There was a steep decline in the share of female workers engaged in cultivation as compared to the share of male workers. The distribution of male labourers from urban areas among different sectors remained more or less constant from 1961 through 1991. However, significant changes were observed in the proportion of urban female workers engaged in different sectors of the economy. A sharp decline in the proportion of women workers engaged in cultivation and in household industries was observed during 1961 through 1991. In case of rural areas also shifts from the category of cultivators to agricultural labourers and from household industries to other sectors were more prominent in the case of female workers.

**There was a steep decline in the share of female workers engaged in cultivation as compared to the share of male workers.**

According to NSSO survey (32nd, 38th and 39th Rounds) agriculture is still the predominant activity employing about two-thirds of the workforce. However, there are also sectoral shifts away from agriculture in the last fifteen years. In rural areas agricultural employment accounted for 85.5 per cent in 1972-73 and it declined to 77.8 per cent in 1987-88 with a corresponding increase in non-agricultural activities. The proportion of casual labour increased from 25 per cent to 33 per cent between

1972-73 and 1987-88 with a corresponding decline in self employment from 65 per cent to 61 per cent (Planning Commission, 1990). The reduction in the proportion of female workers as cultivators was more conspicuous in urban areas and may be due to the introduction and implementation of different land reforms and tenancy laws like land to the tiller. Moreover, the progressive decline in the average size of landholding and increased fragmentation of land might have resulted in withdrawal of workforce from cultivation as it became more and more unremunerative over the years. Though the diversification of the economy is a welcome feature, the empirical evidence shows that structural changes in the occupational pattern are not always favourable, as a sizeable part of the workers moved away from agriculture as it could not accommodate any more labour (Vaiciyanathan, 1987; Bhalla, 1990). However, in some cases diversification may be positive where labour has shifted away from agriculture for better prospects (Bhalla, 1991).

### Growth of Employment

The urban employment grew at much faster rate per annum than rural employment. The rate of growth of employment of female labour which was higher than that of male labour between 1972-73 and 1977-78 has declined at a faster rate in the subsequent period and was lower than the growth rate of employment for males during 1983 to 1988 (Planning Commission, 1990).

The rate of growth of employment varied across the sectors of economy during 1972-73 to 1987-88. The employment in construction as well as in electric, gas and water sectors grew at more than 7 per cent per annum during the last one and half decade. The rate of growth of



employment in the remaining sectors (except agriculture) was more than 3 per cent per annum. Moreover, agriculture which provided employment to more than 60 per cent of the workforce in the economy, registered an average growth rate of only 1.37 per cent per annum (table 6).

**Table 6:** Growth of Employment\* by Major Sectors, 1973-88

Sector	1972-73 to 1977-78	1977-78 to 1983	1983 to 1987-88	1972-73 to 1987-88
Agriculture	2.32	1.20	0.65	1.37
Mining	4.68	5.85	6.16	5.47
Manufacturing	5.10	3.75	2.10	3.61
Construction	1.59	7.45	13.69	7.23
Elect. Gas & Water Supply	12.23	5.07	4.64	7.06
Transport, Storage and Communication	4.85	6.35	2.67	4.65
Services	3.67	4.67	2.50	3.05
Total	2.82	2.22	1.55	2.17

\* Usual principal and subsidiary status.

Source: Hirway, (1991).

## Rates of Unemployment

Growth rate of population and resultant increase in the workforce exceeded the growth rate of employment and led to backlog of unemployed workforce and it is growing year after year. The unemployment rates were much higher for urban than for the rural areas and for women than men (table 7). However, the rate of unemployment increased at a faster rate in rural areas during 1983 to 1987-89. The rate of unemployment by UPS and WS criteria has shown increasing trend whereas there is decrease in the unemployment rate by Daily Status (DS) criteria. These trends imply that while the total unemployed labour (according to DS) has shown a decline

as a percentage of labour force, the percentage of unemployed workers has increased. The above trends suggest that the structure of unemployment is changing and shifting from predominance of underemployment towards rise in open unemployment. This is particularly strong in the case of rural areas and more robust in the case of females. The usual status unemployment for females has increased and daily status unemployment has declined.

**The structure of unemployment is changing and shifting from predominance of underemployment towards rise in open unemployment.**

By using the rates of unemployment derived from NSS data for 1987-88 to the projected population, the estimated backlog of unemployment would be 13 million by UPS criteria at the beginning of 1990-91 financial year. The magnitude of backlog rises to 16 million if weekly status criterion is considered and further to about 20 million by daily status criteria, (table 8). The estimates based on the earlier rounds of NSS indicated that about 12 million persons were severally underemployed in the beginning of 1990. Thus the backlog for planning purpose could be assessed to be around 20 million in the beginning of the Eighth Plan. The labour force is projected to increase by 37 million during 1990-95 and another 11 million during 1995-2000. Thus, the total number of persons requiring employment would be 65 million during 1990-95 and 106 million during 1990-2000 (Planning Commission, 1990).

**Table 7:** Rates of Unemployment (% Unemployment to Labour Force) During 1983 and 1987-88 by Sex and Residence Status

Worker	Year	RURAL			URBAN			TOTAL (R + U)
		Male	Female	Total	Male	Female	Total	
UPS	1983	2.12	1.41	1.91	5.86	6.90	6.04	2.77
	1987-88	2.87	3.52	3.07	6.07	8.77	6.56	3.77
WS	1983	3.72	4.26	3.88	6.69	7.46	6.81	4.51
	1987-88	4.16	4.27	4.19	6.71	8.93	7.12	4.80
DS	1983	7.52	8.98	7.94	9.23	10.99	9.52	8.25
	1987-88	4.58	6.91	5.25	8.79	12.00	9.26	6.09

UPS Usual Principal Status. A person is considered unemployed according to this concept if he/she was available for but without work for a major part of the year.

WS Weekly Status. A person is considered unemployed according to this concept if he/she though being available for work did not have work even for one hour during the reference week.

DS Daily Status. It is a measure of unemployment in terms of person days of unemployment of all the persons in the labour force during the reference week.



**Table 8:** Estimates of Unemployment as on April, 1990 (million)

	Male	Female	Total
<b>By Usual Status (UPS)</b>			
Rural	4.97	2.66	7.63
Urban	4.16	1.30	5.46
Total	9.13	3.96	13.09
<b>By Current Weekly Status (CWS)</b>			
Rural	7.06	2.92	9.98
Urban	4.59	1.31	5.90
Total	11.65	4.23	15.88
<b>By Current Status (CDS)/Equivalent million person years</b>			
Rural	7.75	4.59	12.34
Urban	5.91	1.66	7.57
Total	13.66	6.25	19.90

Note: These figures relate to the population in age group 5+.

Source: Planning Commission, (1990).

### Future Strategy

The early assumptions when we considered employment as a function of economic growth proved to be inadequate. The special employment programmes introduced in early seventies to combat open unemployment and underemployment could not make much headway in reducing unemployment. It was observed that one per cent growth in GDP was accompanied by 0.6 per cent growth in employment during 1972-73/1977-78. This has declined to 0.38 per cent during 1983/1987-88. Thus to accomplish the goal of full employment by 2000 A.D., GDP will have to grow at the rate of 8 per cent per annum (Planning Commission, 1990).

- Priority should be accorded to check population growth. Otherwise, the well thought attempts directed towards employment promotion and capable of reducing unemployment will bear no fruits.
- With the introduction of new economic policy of liberalisation, the modern/industrial sector of the economy will be more capital intensive rather than labour intensive and hence, expansion of employment will be limited. However, demand for skilled labour will increase during the modernization process and hence it will be prudent to invest in human resource development programmes.
- In the past, most of the concessions (tariffs and subsidies etc.) were based on investment criteria and not on employment potential. Hence, concessions should be extended to the traditional industries which are labour intensive in nature.

- The economic and fiscal policies should be tailored to induce private investment in sectors which have high employment potential.

**Concessions should be extended to the traditional industries which are labour intensive in nature.**

- The special employment programmes need to be properly integrated with development activities and efficiently implemented. Substantial employment can be generated in the economy by undertaking the development of infrastructure facilities which will also help in enhancing the development and growth of the economy.
- Employment in agriculture is closely related to the spread of irrigation. Irrigation influences labour absorption in many ways. For example, it increases the cropping intensity, effects shifts in cropping pattern from low value to high value crops, which are incidentally labour intensive also. So, public and private investment in irrigation should be encouraged. The price policy should encourage the shift in cropping pattern which has high labour component in the production and also general second round of employment during processing as in the case of sugarcane, cotton and oilseeds. The setting up of agro-business consortium at district level will also go a long way in generating employment as it will integrate production processing and marketing aspects.
- Diversification of traditional agriculture and encouragement to dairy, inland fisheries, sericulture, and dryland horticulture etc., has tremendous potential to generate employment in traditional sector. The spread of watershed based farming wherein land reclamation, farm forestry/agro-forestry, soil conservation, land levelling, and management of non-arable land etc., are the important activities. This not only will increase the employment potential of agriculture but will also help in sustainable development in the long run.
- A sizeable portion (22 per cent) of the rural workers are engaged in non-agricultural activities and majority of them are in the manufacturing sector. Hence, there is need to pay more attention to the expansion and development of small and cottage industries in the rural areas. Also encouragement



should be given to set up agro-based industries in rural areas, so as to bridge the gap between rural and urban employment and to check rural to urban migration.

### References

- Bhalla, Sheila**, (1990). An Approach to the Question of Employment Generation for Agricultural Labour, Ministry of Labour, New Delhi.
- Bhalla, Sheila**, (1991). "Jobs for Rural People", Paper presented at the all India Seminar on Agro-climatic Zonal Planning Project, Ahmedabad.
- Bhende, M.J. Walker, T.S., Lieberman, S.S. & Venkataram, J.V.**, (1992). "EGS and the Poor; Evidence from Longitudinal Village Studies", *Economic and Political Weekly*, Vol. 27(13).
- Hanumappa, H.G.**, (1992). 'Macro-Economic Reforms and the Agricultural Sector', *Productivity*, Vol. 33(2).
- Hirway, Indira**, (1991). "Labour Absorption in the Indian Economy: Some Issues", *The Indian Journal of Labour Economics*, Vol. 34(4).
- Mehra, S.**, (1976). "Some Aspects of Labour Use in Indian Agriculture", *Indian Journal of Agricultural Economics*, Vol. 31(4).
- Planning Commission**, (1990). "Employment: Past Trends and Prospects for 1990s". Working Paper, Planning Commission, New Delhi.
- Vaidyanathan, A.** (1986). "Labour Use in Rural India: A Study of Spatial and Temporal Variations", *Economic and Political Weekly*, Vol. 21(52).
- Vivekananda, M.**, (1992). Agricultural Development and Distribution of Gains: An Intra and Inter Regional Analysis of Karnataka, Institute for Social and Economic Change (mimeo).
- Walker, T.S. Ryan, J.G.** (1990). Village and Household Economics in India's Semi-Arid Tropics, The Johns Hopkins University Press, Baltimore, USA. □

### WEIGHTS

Put a large family car on this 2.5 tonne mass comparator, and it will be able to tell you how much loose change the driver has in his pocket. The National Physical Laboratory [NPL] (Teddington, Middlesex, England) designed and built the comparator to have an accuracy of three parts per million.

This level of accuracy was needed to ensure that the NPL could construct a new 1.2 meganewton (MN) deadweight force standard machine – vital in calibrating force in areas such as aerospace. The deadweight force machine is one of the largest in Western Europe and incorporates 55 weights, all of which have to be adjusted to the closest tolerances.

In the picture given here an engineer at the NPL is shown with the comparator which uses three load cells to compare an unknown mass with a previously weighed, composite standard mass – rather like a traditional set of scales.

But at this point the similarity ends. The NPL's comparator has "top pan" configuration which allows the weighing of components of any shape or size; and it is designed to compensate for changes in temperature and barometric pressure. It also incorporates features which prevent the load cells being affected by small side forces and bending moments.

The NPL has a range of mass comparators and force deadweight machines to ensure that industries ranging from shipbuilding to car manufacture are provided with the latest calibration facilities.

The NPL plays a role in providing technical support to many national and international bodies concerned with specification standards. These written standards are very different from the physical measurement standards with which the laboratory is primarily involved, but their preparation frequently requires a sound knowledge of measurement techniques. For further details contact:

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*Source: British Commercial News, May/June 1993.*



# Economic Structure & The Growth of Population & Labour

N. Krishnaji

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*The extreme concentration of control over land and its use virtually remained intact despite the successful implementation of the first phase of land reforms. The poor constitute a proportion in excess of a third in the population. The second part of Mahalanobis strategy viz. a regionally widespread development of employment intensive small industry is yet to take root in the planning process. The prospects for labour in agriculture are dim. The silver lining is the increase in work availability in non-farm non-agricultural activities, argues the author.*

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During the 1950s, India had to adopt a strategy for economic growth and development that gave the State a major and leading role. The choice was made out of an admiration for the Soviet model of planned economic development that converted, in a couple of decades a backward country into an industrial giant of sorts.

## Infrastructure

Behind the decision was perhaps the realisation that the private sector, working under conditions of a free market economy, could not be relied upon to develop on its own, the infrastructure needed for generating a satisfactory rate of economic growth and for improving the conditions of life for the masses in the country. The development of roads and railway networks, expansion of electric utilities and the provision of social services in the fields of education, public health, and so on, demanded heavy investments. In countries such as India with large-scale poverty the returns to such investments (with long gestation lags) were bound to be unattractive to the private investors, who in any case could not possibly have succeeded in raising resources to the required extent, even with foreign collaboration. A weak industrial bourgeoisie was a common colonial heritage of the poor nations. This was one compelling reason why most poor countries in the post-colonial era (in Latin America, Africa and Asia) had been according priority to public investment in infrastructure in the pursuit of economic growth.

**The private sector, working under conditions of a free market economy, could not be relied upon to develop on its own, the infrastructure needed for generating a satisfactory rate of economic growth.**



This required planning in varying degrees at a centralised level. (This kind of planning has failed in some important respects as we now realise in retrospect, but that is a different story.) It must be added that this was a choice imposed more by binding internal and external constraints on growth than by the intensity of love for the Soviet model or socialism, however understood.

We now have a very large pool — frequently cited as the third largest in the world — of scientific and technical manpower and an industrial base capable of producing a wide range of goods. We make matches to kindle small fires and we also make rockets and missiles that can devastate; and consumer products of a large variety catering to the demand of the middle and the rich classes. We have built up an adequately modern transport and communication system covering the whole country.

It is extremely doubtful whether such progress would have been possible without planning and massive state intervention in all spheres of the economy. (Of course, the kind of things we are producing through our industrial system has a certain socially-based character clearly unrelated to the needs of the majority of people. People need food, clothing and shelter, not necessarily, ice-cream, designer dresses and holiday homes.)

## Rural Reforms

Another pressing need for the adoption of a strategy of planned growth arose from the precarious food situation in the country. Levels of food availability per head were generally low and remained stagnant over decades during the pre-Independence period. Later, the periodic droughts created severe food scarcities, and occasionally led to local famines. The zamindari and other highly exploitative systems of land relations constituted a formidable barrier to productive investment in agriculture because these systems left the direct producers at the margin of bare subsistence. Land reform had therefore to be placed at the top of the agenda for planning. And, land reforms, it was thought, could only be implemented by the State through the legislative process.

It is, of course, possible to argue that with Independence, the political power passed into the hands of a section of the educated middle class, a part of which constituted the bureaucratic steel frame inherited from the British; also that this class was eminently suited to design and implement an economic plan for progress because the bourgeoisie was too weak and the landed aristocracy too backward-looking to accomplish the tasks of modernising the economy; also, perhaps that the three classes

constituted a ruling coalition under which the educated middle class served the interests of the properties classes to secure and further its own interests through its control over the educational and administrative systems.

The initial phase of land reform involving the abolition of zamindari and other similar types of land relations was implemented fairly successfully. But not wholly so: the extreme concentration of control over land and its use virtually remained intact despite some quantitative and qualitative changes. The places vacated by zamindari who controlled land revenue collection rights over large domains and shared rents (in terms of cash, product and labour services) with others — through sub-infeudation — are now occupied by large landowners who, unlike in the past, have among their ranks many belonging to the middle class groups. The rural rich have now clear ownership rights and decisive command not only over economic resources but also over village life in general. And, their influence extends far beyond village and local boundaries: to the state and national levels. To a large extent this has come about through the political process in which votes gathered in the rural areas dictate the prospects of political parties, irrespective of ideology.

It is no wonder then that the second phase of land reform has failed. Practically every state has on the statute book legislations, on land ceilings, repeatedly amended to 'plug loopholes'. Still, loopholes, ever — present in the law enable big landowners to escape from the ceiling net. The land appropriated and actually distributed to the landless is negligible. Very few big landowners have lost land through the operation of the ceiling laws anywhere in the country. The large farmers have steadily moved up on the political ladder. Using their position through electoral games involving much play with caste, class and regional loyalties. The big farmers have now the ability to mobilise state support in their cause — however unjust. In some regions of the country, they have organised private armies to preserve their wealth and privilege. There are many examples of arson and brutal torture (most notoriously the blinding of people) and killing on a large scale organised by the rural rich, almost always with the support of the state machinery — before or after the event, depending upon the circumstances.

An immediate result of this type of rural politics is that close to a half of rural families have gained very little from the process of planned development despite all the rhetoric about the commitment of the state and polity to the cause of the poor. Another quarter of families survive on the border of subsistence.



## Rural Poor

Poverty limits the prospects for economic growth. It restricts the size of the market for manufactured goods and limits its composition to the bare necessities for survival. The barrier can be broken only through a steady improvement in the living standards of the rural (and the urban) poor. The poor constitute still, four and a half decades after Independence, a proportion in excess of a third in the population as a whole.

**Poverty restricts the size of the market for manufactured goods and limits its composition to the bare necessities for survival. The barrier can be broken only through a steady improvement in the living standards of the poor.**

The constraints on the growth of the domestic market, imposed by poverty at home can, in theory, be relieved through the expansion of exports. However, the development experience of Japan, South Korea and Taiwan — encompassing the great national successes of recent times — clearly shows that the pursuit of export earnings can be successful only after a radical and effectively implemented land reform programme that widens the home market. (State regulation of economic affairs has played a vital role in all these countries for the promotion of not only national interests but also for the eradication of extreme poverty, all too visible as the economies were getting reorganised from low levels of prosperity.)

Apart from land reform, other strategies for improvement in agricultural productivity in the small farm sector — both per worker and per unit of land — were needed to promote a broad-based growth in agriculture. Such improvements would have led to a partial eradication of rural poverty.

The actual policies followed and their consequences are too well-known to be detailed. We have promoted the green revolution concentrating public funds on a few crops in a few regions to achieve the necessary growth in food production after the disasters following the droughts of the mid-sixties. The impact of these policies — which continue to prevail today — has to be understood not only in terms of subsidies and benefits but also by the manner in which they have strengthened the economic and political power of the rural rich.

So, the planners solved a basic problem that of achieving a satisfactory level of food (grain) production in aggregate terms. The country now produces enough food to feed all. However, productivity expansion has taken place largely in already well-endowed regions which have further benefitted from public investment policies and state intervention. This has left practically untouched the large-scale poverty endemic to the rain-fed and dry tracts of the country, which for the most part were earlier under the zamindari type of land systems.

**Productivity expansion has taken place largely in already well-endowed regions.**

## Industrial Development

Let us now consider some aspects of industrial development. The priority given during the early phases of planning — thanks to the vision of P.C. Mahalanobis — to the development of infrastructure and the capital goods sector has paid rich dividends in terms of the strong foundations we now have for building a diversified industrial structure. However, we have neglected the other aspect of the Mahalanobis strategy — viz. a regionally widespread development of employment-intensive small industry for the manufacture of articles of mass consumption. The expansion of large-scale industry in the public sector has served more the interests of the private sector (paradoxically) and the bureaucracy (by design?) than of wage workers, especially unskilled labour. The much talked-about inefficiency of the public sector is rooted in the manner public funds have been used to promote sectional interests. As the public sector expanded, helping the growth of private profits and strengthening the position of the educated middle classes, the working class got divided into two clearly distinct categories; the

**The expansion of large-scale industry in the public sector has served more the interests of the private sector and the bureaucracy than of wage workers, especially unskilled labours.**

organised and the unorganised. This has led to the emergence of a large mass of people — the assetless rural poor and those in the informal urban sector — who have



gained little despite national achievements, (impressive by some yardsticks but not by others).

## Population Trends

Populations in the poor countries have been growing at historically unprecedented rates during the last four decades. These countries are passing through the first phase of the so-called demographic transition, following the steady but mostly slow improvements in living standards in the post-colonial period. Historical evidence suggests that during the early stages of development, mortality rates decrease at varying rates over space – even as the fertility rates remain at high pre-transitional levels. This leads to an accelerating rate of population growth during this phase. How long this lasts depends on when the fertility rates also begin to decline, heralding the second phase of the transition, the phase of a decelerating population growth. The process of transition runs out only when both mortality and fertility levels settle at low rates resulting in a stationary, non-growing population or one that grows at a negligibly low rate.

Despite sharp variations among the poor countries and among subregions within them, what is generally true, and quite remarkable, is the rapidity with which the mortality rates have been declining. During the early nineteenth century, the countries in Western Europe, whose economies were then growing rapidly, experienced decreasing death rates and accelerating population growth rates. But the declines in mortality in the third world are far more impressive, and hence the population growth rates far higher, than they were in the European past. It is difficult to assess the role of rates of improvement in living standards in bringing about the differences between these two historical conjunctures. A reason cited for the wide differences in the declines in the death rates is that medicine and medical 'technology' embracing its preventive and curative aspects are features of this century. The wonder drugs, most notably antibiotics, were available to the poor nations at just the right time; malaria deaths could be reduced, if not eliminated altogether; small pox could be banished; other big-killers like tuberculosis, could be controlled.

Thus, fertility transition is the key to decelerate population growth. We have much knowledge now on the nature of this transition, based on the historical experience of Europe in the late nineteenth century as well as on the experience of the third world poor countries during the last few decades. Broadly speaking, fertility decline comes about through both an increase in age at marriage and a decline in the number of children among

married couples, practising contraception. Among the concomitant factors identified with these processes are: (1) improvements in public health and sanitation that promote a decline in the infant mortality rate and ensure survival of children (which, in turn, may result from either a rapid and general improvement in living conditions or from public policies and expenditures to promote health); (2) advances in literacy, education and employment opportunities for women, and the *empowerment* of women in general; (3) conditions promoting the withdrawal of children from domestic and productive work; and above all (4) the perception of the economic advantage of small families, by all, but more particularly by rural families, especially those engaged in family-based agricultural and other activities.

There also seems to be an almost universal pattern in the variation in the processes among social and economic classes, and among regions. Generally, the well-to-do classes, better educated and enjoying higher living standards, lead the transition. The poorer classes follow suit. But how fast it will happen will depend on how conditions are changing for the poor.

While the movement of people away from rural and primary activities was associated with industrialisation in Europe and later in the U.S.A., Canada etc., and later still in Japan etc., there is no clear-cut correlation between industrialisation (and urbanisation) and fertility decline. In many third world countries, fertility rates have begun to decline from about the nineteen seventies.

**There is no clear-cut correlation between industrialisation (and urbanisation) and fertility decline.**

In India, fertility has begun to show signs of decline during the seventies. But there is much spatial variation in the phenomenon. For example, in Kerala, fertility had begun to decline from the sixties, and the decline there is the steepest in the country. There are other predictable patterns. The decline is more prominent in the urban areas than in the rural areas, among the educated and middle classes than among the poor, and so on. While there is no doubt that ultimately the fertility transition will be universal, there are vast regions within India where the fertility levels continue to be high: eg. in U.P., Bihar and Orissa. Coincidentally – or predictably – the mortality rates, especially infant mortality rates also continue to be high in such regions.



Mortality rates can be – and will be – brought down drastically in the poorer parts of the country and among the poorer sections of the population. The improvements in public health (including immunisation of children) and sanitation and in the provision of clean and safe drinking water, which are expected to take place in the coming decades will play the most important role in the expected mortality transition. As for fertility, it is difficult to make predictions. Much will depend on the rate of expansion in the literacy among, and employment opportunities for, women and, more generally, on the prospects for improved living standards for the poor.

An important consequence of the expected pattern of transition is that the poorer regions and the poor people in general would go through the first phase of the demographic transition in the next couple of decades. This means that for them the population growth rates may actually increase, with death rates falling rapidly and birth rates remaining steady or declining only slowly.

Agricultural labourers and small peasants – clinging to tiny bits of land and working for wages to supplement their income – are among the poorest of the poor in the

country. The demographic transition is likely to produce ever-increasing numbers among their ranks. Thus, people seeking wage work in the rural areas would constitute a growing proportion in the population.

**There is, little scope for expansion of employment in agriculture.**

There is, on the other hand, little scope for expansion of employment in agriculture as a number of studies demonstrate conclusively: even as productivity and output growth can be maintained, the prospects for labour in agriculture are dim. The silver lining is the increase in work availability in non-farm, non-agricultural activities. But we still do not know how this has come about, much less on how it can be used for promoting employment.

For this decade, and probably the next one as well, policy makers have to concentrate on the dry and rain-fed poor agrarian regions, and find ways to raise living standards among the poor in these regions. □

#### **GENDER DIFFERENCES IN MANAGING A SMALL BUSINESS**

Many Belgian SME's are going out of business in the first four years of existence. Could any indications of differences between male and female novice entrepreneurs be found in the way they manage their businesses?

136 entrepreneurs were questioned about the problems they have perceived, the way they have looked for solutions, the additional help or advice they could use and their needs for additional management training. Most of these entrepreneurs were working in the retail sector, or hotel and catering and employ 2 or 3 workers. Alongside this survey, some supplementary in-depth interviews were held with entrepreneurs who have experienced bankruptcy. The answers showed no big differences between men and women in the way they organise and manage their businesses. Both men and women pay little attention to professional feasibility studies before setting up their business. They are not very interested in short or long term planning, do not invest in professional marketing or concentrate on the calculation of financial results. However, many of the entrepreneurs in the sample experience problems in executing these activities and feel the need for additional management training. The main argument for not following existing management schooling programmes is lack of time. A predictable, but striking fact is that women spend more time on housekeeping, while men spend more time on their enterprise. This cultural pattern seems to be important to the way that men and women are managing their businesses. The researchers also noticed that for female entrepreneurs, the financial income from the SME's as a percentage of the family income is of less importance than for male entrepreneurs.

*Source: ECWS News, Feb. 1992*



# Employment Strategy in India: Some Key Issues

N.J. Kurian

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*The ongoing economic reforms have added a new dimension to the debate on the unemployment problem in the country. There is a strong presumption and some evidence to believe that the policies of macro-economic stabilisation and associated structural changes are likely to impose undue burden on the labour class, especially on the unorganised segment of it. This paper examines the issue in the current Indian context.*

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Creation of employment opportunities has been an important objective of development strategy in India. An alarming aspect of the economic growth during the last decade, however, has been the deceleration in the growth of employment. The employment elasticity of output has been steadily declining in Indian agriculture and industry over the years. As a result, the highest decadal growth of national income (GDP) was accompanied by the lowest decadal growth of employment in the eighties. The compound annual growth of employment for the decade was only about 1.5 per cent per annum as against the corresponding GDP growth of about 5.5 per cent. During the Seventh Plan, the employment creation fell far short of the target. As a result, though it was planned to absorb the net addition to the labour force of about 39 million and make a marginal dent into the backlog of unemployment, in effect the Eighth Plan has started with an unemployment backlog which was significantly more than that at the beginning of the Seventh Plan.

A significant share of the labour force, though employed, suffers from an acute problem of low productivity and low earnings. This is especially true in the case of traditional household and village industries and unirrigated agriculture. As a result, even when all the members of a family including children are fully occupied in self-employment or wage employment, the family continues to be below the poverty line. Underemployment and seasonal employment in agriculture are other serious problems faced by the rural poor. The various sophistications and refinements brought about in the concepts and measurements of employment, unemployment and underemployment in India have not fully succeeded in properly quantifying the above problems.

The problems of unemployment and poverty create social and political tensions besides misery for the victims. Indeed, most of the political unrests, social tensions



and even terrorism in different parts of the country have a direct bearing on unemployment, especially those of the literate youths. While unemployment may not be a visible volatile problem in an agrarian economy, it becomes a serious and visible problem in a modernising economy. Unemployment of the educated becomes an explosive social and economic issue. As education spreads to the traditionally agricultural communities, the newly educated get alienated from manually-oriented agricultural work. But getting non-manual work is difficult. Firstly, there are very few opportunities. Secondly, the educated from rural areas often do not succeed in successfully competing with the urban educated in chasing the few jobs available. A large segment of the labour force remaining unemployed also implies that society is wasting valuable human resources. Besides, the welfare loss resulting from not allowing a significant segment of the society to either contribute to nation-building or receive any benefit from the development process could, indeed, be of serious magnitude.

**While unemployment may not be a visible volatile problem in an agrarian economy, it becomes a serious and visible problem in a modernising economy.**

The on-going economic reforms have added a new dimension to the debate on the unemployment problem in the country. There is a strong presumption and some evidence based on the experience of other countries, to believe that the policies of macro-economic stabilisation and associated structural changes are likely to impose undue burden on the labour class, especially on the unorganised segment of it. This paper examines the foregoing issues in the current Indian context.

### **Conceptual Deficiencies**

According to the comprehensive surveys of employment and unemployment conducted by the National Sample Survey Organisation (NSSO) at five year intervals since 1972-73, there has been a steady deceleration in the overall rate of growth of employment over the years. It was 2.8 per cent during 1972-77 and 1.5 per cent during 1983-88. Employment growth registered a secular decline in almost all sectors of the economy. In agriculture, it was particularly alarming as it fell from 2.3 per cent to 1.2 per cent and further to 0.6 per cent during the period. As compared to an increase in employment of 2.2

per cent per annum during the last two decades, the growth in labour force has been about 2.5 per cent per annum. As a result the backlog of unemployment has been steadily increasing in our country.

On the recommendation of an Expert Committee, three alternate concepts of unemployment namely Usual Primary Status (UPS), Current Weekly Status (CWS) and Current Daily Status (CDS) have been in use since early seventies. A person is considered unemployed on UPS basis if he/she was not working, but was either seeking or was available for work for a relatively longer period during the reference year. A person is considered unemployed on CWS basis if he/she had not worked even for one hour during the week, but was seeking or available for work. The CDS is a comprehensive measure of unemployment which estimates the total person-days of unemployment of all persons in the labour force. The UPS unemployment rate could be regarded as a measure of chronic unemployment for a larger period whereas CWS unemployment rate measures chronic unemployment for a shorter period. On the other hand, CDS is a comprehensive measure of unemployment including chronic unemployment of long term and short term as well as underemployment.

As per the latest NSSO estimates available for 1987-88, rate of unemployment worked out to be 3.8, 4.8 and 6.1 according to the UPS, CWS and CDS respectively. The incidence of unemployment is significantly higher in urban than in rural areas. Unemployment rates for women are higher than those for men. A larger difference between UPS and CDS in the case of women than in the case of men is an indication that underemployment is a more serious problem for women than for men. The incidence of unemployment among the educated is much higher than that in the total labour force; indeed, unemployment rates rise with every successive higher level of education.

The NSSO estimates of unemployment rates according to the three alternative concepts over the period 1972-73 to 1987-88 do not indicate any consistent trends. For the period 1983 to 1987-88, however, certain changes in the structure of unemployment are observed. Chronic unemployment as measured by UPS has increased from 2.8 to 3.8 per cent whereas the unemployment as measured by CDS declined from 8.3 to 6.1 per cent during the period 1983 to 1987-88. These trends suggest that in the eighties there had been a shift from widespread underemployment towards greater chronic unemployment. This trend is stronger in rural areas than in urban areas. Further, the chronic unemployment increased much faster in the case of women than in the case of men.



In our country low productivity and low incomes of a large proportion of employed persons constitute a more serious problem than open unemployment measured conventionally in terms of involuntary idleness. Incidence of poverty is much higher than that of unemployment. Majority of the poor are apparently employed, though at very low levels of productivity and incomes. Since they can not afford to remain unemployed they engage themselves in some activity or other even if it yields a very low income. This is why the rate of unemployment in India remains comparatively low. The problem of underemployment, that is, a situation of work with very low levels of productivity and income, is a more acute problem.

**Low productivity and low incomes of a large proportion of employed persons constitute a more serious problem than open unemployment.**

An inter-state comparison of the incidence of poverty and unemployment brings this out clearly. There are wide variations in the level of poverty as well as the rate of unemployment among the major states. The latest NSSO estimates of poverty and unemployment are available for 1987-88. Share of population below poverty line varies from 7 per cent in Punjab to 41 per cent in Bihar. Incidence of unemployment on the basis of UPS varies from 1.5 per cent in Madhya Pradesh to 17.1 per cent in Kerala. On the basis of CDS, unemployment estimates vary from 2.9 per cent in Madhya Pradesh to 21.2 per cent in Kerala. There is, however, no evidence of any strong positive association between level of poverty and incidence of unemployment as could be seen from Table 1. Poorer states like Bihar, Madhya Pradesh and Uttar Pradesh have relatively lower rates of unemployment on the basis of UPS as well as CDS. On the other hand, states with low levels of poverty like Haryana, Kerala and West Bengal have higher rates of unemployment on the basis of both UPS and CDS. Punjab, with the lowest level of poverty has high rate of chronic unemployment as measured by UPS.

The foregoing analysis clearly establishes that the present concepts of employment and unemployment based purely on time disposition fail to gauge the true status of the labour force. To capture the true employment status of an individual, his/her time disposition has to be linked to productivity and income levels also. Im-

provement in the productivity of work force assumes particular significance in the poorer regions of our country where large sections of employed persons live in abject poverty.

**Table 1:** Distribution of major states according to the intensity of Poverty and Unemployment — 1987-88

	Poverty	UPS Unemployment	CDS Unemployment
Above All-India Average	Andhra Pradesh	Andhra Pradesh	Andhra Pradesh
	Bihar	Assam	Haryana
	Karnataka	Haryana	Kerala
	Madhya Pradesh	Kerala	Orissa
	Orissa	Orissa Punjab	Tamil Nadu
	Uttar Pradesh	Tamil Nadu West Bengal	West Bengal
Below All-India Average	Assam	Bihar	Assam
	Gujarat	Gujarat	Bihar
	Haryana	Karnataka	Gujarat
	Kerala	Madhya Pradesh	Karnataka
	Maharashtra	Maharashtra	Madhya Pradesh
	Punjab	Rajasthan	Maharashtra
	Rajasthan	Uttar Pradesh	Punjab
	West Bengal		Rajasthan
			Uttar Pradesh

**Improvement in the productivity of work force assumes particular significance in the poorer regions of our country where large sections of employed persons live in abject poverty.**

### Past Experience

The pressure of rapidly increasing population had been borne by agriculture in the past; the average size of the operational holdings has come down drastically. According to the latest data from agriculture census for 1985-86, more than 75 per cent of the operational holdings are below two hectares. As a result the capacity of agricultural sector to absorb additional labour force has been shrinking. The growth rate of employment in agriculture which was 2.3 per cent per annum during 1972-73 to 1977-78 declined to 1.2 per cent during 1983 to 1987-88.

We have followed a development strategy based on iniquitous distribution of land holdings and elitist industrial



policies. As a result of lopsided public policies, distortions have emerged in the relative prices of capital vis-à-vis labour. Subsidised credit for mechanisation in agriculture led to increased displacement of labour which in turn led to a declining elasticity of employment with respect to output. As a result the labour absorption capacity of agriculture has been declining. Employment generation in the large scale manufacturing has been less impressive than its growth in value-added terms in the Eighties. Deceleration of employment growth has been particularly sharp in the organised sector. Employment in the organised manufacturing sector has virtually stagnated during the Eighties. Growth in employment in the organised sector has primarily been in the public sector.

**Subsidised credit for mechanisation in agriculture led to increased displacement of labour which in turn led to a declining elasticity of employment with respect to output.**

Increasing casualisation has been another feature of the structural change of Indian work force in the recent years. The share of casual wage labour in the country increased from 23.3 per cent in 1972-73 to about 30 per cent in 1987-88. This has been mainly at the expense of self-employment which has declined from 61.4 per cent to 56.3 per cent during the same period. Within these overall trends, there are some differences between the rural and urban areas. While in the rural areas increase in the proportion of casual labour was accompanied by a decline in the proportion of the self-employed, in urban areas such increases in the proportion of casual labour has caused a decline in the share of salaried regular employment. The pace of casualisation is found to be faster in the case of male than of female workers, though the proportion of casual wage labour has uniformly been higher among female than among male workers.

**Just as green revolution bypassed the agricultural labour, the state-sponsored industrialisation has also bypassed the rural non-agricultural labour.**

Just as green revolution bypassed the agricultural labour, the state-sponsored industrialisation has also

bypassed the rural non-agricultural labour. It has generated unfair competition between the traditional labour-intensive village industries and modern labour-saving industries and as a result the former has been losing ground. Unable to sustain themselves and their families, the once self-employed and self-reliant rural artisans either turned servicing/part-time workers or moved to cities in search of employment and landed up as coolies, rickshaw pullers and domestic servants. The rural artisan, in general, finds himself against odds at each level of his operation, be it the purchase of raw materials, marketing of products or the arrangement of institutional credit. His weak sustaining and bargaining power is exploited by the intermediaries to his utter disadvantage.

We pursued trickle-down economics as the centrepiece of our development strategy. As a result, a significant proportion of our population, especially in rural areas, continued to live in abject poverty. By early 1970s the need for direct intervention policies in favour of the poor was recognised. A number of special employment programmes were introduced on experimental basis during the Seventies. On the basis of these experiments, a set of anti-poverty programmes were started as regular plan schemes in the early Eighties. Two main components of the anti-poverty programmes being implemented are self-employment programmes and wage-employment programmes. The principal self-employment programme is the Integrated Rural Development Programme (IRDP) and the major wage-employment programme, the National Rural Employment Programme (NREP) and its successor Jawahar Rozgar Yojana (JRY).

Several evaluation studies including the nationwide Concurrent Evaluations have indicated that IRDP and NREP suffer from one or the other of the following problems: faulty planning and ineffective delivery system, absence of decentralised decision making and people's participation, ad-hoc and piecemeal approach, absence of commitment on the part of political leadership and bureaucracy, inefficiency, corruption and lack of motivation of administration, lack of coordination amongst planning and implementation agencies at the local level and inadequate attention to forward and backward linkages.

An influential section of social scientists, however, believes that the present day anti-poverty programmes including IRDP and JRY are intrinsically incapable of eradicating poverty and unemployment, not only because they are poorly conceived and badly managed, but also for a more fundamental reason. It is argued that these programmes are attempts at correcting the structural



**The inequitous social order and economic structure do not allow the weaker sections to receive benefits out of development programmes even when those are targeted towards them.**

consequences without altering the structural characteristics. The inequitous social order and economic structure do not allow the weaker sections to receive benefits out of development programmes even when those are targeted towards them. Land, though important, is not the only resource over which ownership and control is inequitable in rural areas. Ground water resources, grazing lands, fishery resources and village commons are examples of other important assets which are being shared in a highly inequitable manner. Though there is broad consensus that this inequitous arrangement should change, if there is any lesson from past experience, it is that these institutions and structures are hard to reform. The best example is the case of land ceiling legislations. While direct attempt to change the structure has not been yielding results, alternative approach of erecting countervailing non-exploitative institutions for credit, marketing, input supply and so on has been providing some bargaining power to the poor.

Though there is much to be desired in the way special employment programmes are planned and implemented, even the staunchest critics agree that they are worth pursuing. There is a forceful argument that the combination of self-employment (IRDP) and wage employment (JRY) need argumentation by adding a third component viz., an assured social security payment to the unemployable destitutes who can not be assisted through self or wage employment programmes. A time has come

**Instead of subsidising unviable investment in IRDP, the same funds could be used for the provision of universal primary education and assured health services to the poor.**

to reconsider the universal need/applicability/relevance of IRDP/JRY throughout the country. A measure of substitution between anti-poverty investment and social sector investment has been taking place. As a result, vital

sectors like primary education and primary health have been starved of investment. Instead of subsidising unviable investment in IRDP, the same funds could be used for the provision of universal primary education and assured health services to the poor. Further, expansion of these services in the rural areas will generate significant non-farm employment for the educated rural youth. Besides, there is significant scope for labour-absorbing economic growth in the context of our agrarian economy.

### **Employment Potential**

The main thrust of agricultural policy in the recent past was on various input subsidies and incentive prices. Major benefits of such policies have accrued to farmers in regions which have been already agriculturally developed. And since such regions have been already experiencing shortage of agricultural labour, often output growth was associated with labour saving technologies including farm mechanisation. On the other hand there is enormous potential for employment in agriculturally lagging regions through irrigation development and better water management and measures like land reforms, particularly consolidation of fragmented holdings, ensuring security of tenure to tenant cultivators, development of wasteland, land reclamation, contour bunding, etc. which are all highly labour intensive activities. This will not only increase agricultural production but also augment employment and incomes where they are most needed. Agricultural development in early stages is more labour intensive than in later stages. It implies that investment in backward regions will generate more employment than investment in developed regions.

**Investment in backward regions will generate more employment than investment in developed regions.**

The link between agricultural development and poverty alleviation weakened over the years. The employment elasticity of agricultural growth for the country as a whole has declined significantly during the eighties. It even turned negative in the traditional green revolution belt. Poverty Alleviation Programmes (PAPs) on the other hand tended to treat agricultural development programmes as different from those of poverty alleviation. As a result, Poverty Alleviation Programmes like IRDP and JRY have given very little importance to activities like soil conservation, water harvesting, drainage and construction of field



channels. The integration of these programmes with agricultural development can be made effective by strengthening the land-base for the poor, particularly women among them, through the effective implementation of the existing legislation on land reforms.

The capacity of agriculture to absorb additional labour force, however, is limited. Indeed, it is desirable to siphon off the excess labour from agriculture in view of deteriorating land-man ratios and overriding need for raising labour productivity. But to where? Obviously the decaying traditional village industries and crafts cannot act as a repository of surplus labour from agriculture. Also the overcrowded urban areas do not generate enough employment opportunities to absorb even the natural increase in urban labour force. Hence, the additional employment opportunities will have to be found within the rural areas in such activities which offer scope for additional labour absorption. Even though rural non-agricultural sector had belied the expectations in the past, recent sectoral shifts indicate that the prospects are not all that bleak. The total number of non-factory enterprises in rural India is more than three times as compared to urban India. With the value of fixed assets around only 5 per cent of the total, it has been able to generate more than 50 per cent of total employment in rural non-factory sector. This clearly indicates the enormous employment potential in non-agricultural rural activities.

Agriculture and allied activities continue to absorb about 80 per cent of the rural labour force. The trend in the size-classwise land holdings distribution in the country indicated a steady process of miniaturisation. The consequent adverse land man ratio has been resulting in serious problems of underemployment and unemployment of a seasonal nature. The traditional concepts of viable farm size, economies of scale, returns to factor, etc. have very little relevance in the context of a vast majority of Indian farms. The twin objectives of agricultural development should be maximisation of employment and output per unit of land. For this purpose land-augmenting and labour absorbing technologies have to be employed.

**The twin objectives of agricultural development should be maximisation of employment and output per unit of land.**

This may call for significant re-ordering of priorities in agricultural investments. The patterns of investment has

to undergo substantial shifts from capital-intensive to labour-intensive technologies. The importance of investment in assured irrigation needs special mention. Employment implications of irrigation, through its various effects like the increase in cropping intensity, yield levels and cropping pattern are found to be quite significant. A redeeming fact is that the unexploited irrigation potential in the country is concentrated in the very same regions where chronic poverty and low productivity employment are the highest.

Animal husbandry is second only to crop production in terms of employment and income generation in rural India. After land, livestock is the next major productive asset of the rural household. About 20 per cent of the value added in the agricultural sector is accounted for by animal husbandry. States like Punjab, Haryana, Gujarat, Kerala and Uttar Pradesh which have done well in milk production are also those which have done well in crop production. Similarly the regions lagging behind in milk production are the very same ones which are lagging behind in crop production. There appears to be a strong positive relationship between the dynamics of green revolution and white revolution and the labour-absorbing potential of livestock sector can not be underestimated.

**The labour-absorbing potential of livestock sector can not be underestimated.**

The importance of fisheries as a source of employment and incomes as well as a valuable source of nutritious food has to be fully appreciated. While marine fisheries is associated with littoral states, the scope of inland fisheries is universal. Inland fisheries should be highlighted as a supplementary source of employment and income, especially in the eastern region where poverty is acute and sources of surface water are abundant. The employment and income generation potential per unit area is much higher in the case of inland fisheries as compared to crop farming. The economics of converting water-logged land into fish-ponds is likely to be much favourable compared to converting the same into crop land.

The substantive issue, however, is that in the context of marginalisation of agricultural holdings, crop farming alone will not be able to sustain vast majority of farm households. The chances of wage employment are also not very bright. Under these circumstances it is important to explore the possibilities of an integrated farming sys-



tems approach whereby the farm household diversifies its activities to fully utilise its surplus labour. This can be achieved by taking up an appropriate combination of activities including crop culture, animal husbandary, pig-gery, poultry, duckery and fish farming. Apart from increasing the employment potential significantly, this approach will lead to significant savings in terms of input use as it involves biological waste recycling as well as optimisation of input use and output production. While encouraging the traditional village industries and crafts to overcome their competitive disadvantages vis-a-vis modern industries, every effort has to be made to promote modern industries, especially the foot-loose and labour-intensive ones in rural areas. This may involve building up of appropriate infrastructural facilities, forward and backward marketing linkages and training and information dissemination. This process, when pursued to its logical ends, can convert the surplus labour into valuable human capital. And the experience of a number of south-east Asian countries demonstrate that this is quite possible.

**Crop farming alone will not be able to sustain vast majority of farm households.**

There is substantial employment potential in agro-processing industries. They cover a wide range of activities utilizing farm, animal and forestry based products as raw materials. At one end, there are certain traditional agro-based industries such as cotton textiles, rice and flour mills, sugar, khandsari and gur manufacture, edible oil extraction, and the processing of plantation crops such as tea, coffee and cashewnuts. At the other end, there are certain relatively modern industries which have come to be called the "processed food" industries. In addition, there is also a limited extent of processing of agro-wastes and byproducts of main agro-based industries and processing of herbs, medicinal and aromatic plants and flowers. While organized sector, private or cooperative, will have to play an important role in the processing of perishable products, the small scale sector can play an important role in producing other types of processed foods. Agro-processing industries can provide a boost to agricultural production and farm incomes in the country.

### **Economic Reforms & Employment**

An important aspect of economic reforms is that government's intervention in the productive sectors of the economy will be minimised and market forces of demand

and supply will be allowed a free-play. The critics of the reforms fear that in the short-run, stabilisation policies will lead to stagnation or deceleration of the economy which will create mass-unemployment in the unorganised sector. Restructuring of the economy, in the medium-term, will lead to large scale retrenchment of employees in the organised sector, especially in the public sector, critics fear.

In the short run, agricultural production is largely determined by supply side conditions, especially the weather, so long as price support is provided by the Government for major agricultural products. As such employment in the agricultural sector is not likely to be much affected by the stabilisation programme. In the non-agricultural sector, again, a slow down in production will not be easily translated into reduced employment in the organised sector, partly because jobs are legally protected and partly because workers in the organised sector are themselves quite well-organised. In any case employment in this sector has been more or less static at around 30 million persons which is less than 10 per cent of the labour force. The implication is that the adverse impact of stabilisation, either in the form of reduced employment growth or reduced real wages, is likely to be concentrated in informal, non-agricultural activities, leading to intensified distress among sections of society which are already marginalised.

**Employment in the agricultural sector is not likely to be much affected by the stabilisation programme. Adverse impact of stabilisation, either in the form of reduced employment growth or reduced real wages, is likely to be concentrated in informal, non-agricultural activities, leading to intensified distress among sections of society which are already marginalised.**

The first year of reforms also happened to be a below-normal year in terms of weather conditions. This has resulted in below normal farm employment, lower crop output and higher farm prices. An import compression initiated before the reforms to tackle the grim balance of payments situation and steep reduction in public spending to reduce fiscal deficit set in a period of industrial stagnation/recession. As a result, the growth of GDP in real terms during 1991-92 was only a little over one per cent and the per capita income showed a decline of about



one per cent as compared to the previous year. The steep increase in foodgrains prices and the likely reduction in organised sector non-farm employment might have added to the distress of poor during 1991-92.

The condition of the economy improved substantially by the second year of reforms. There has been significant success in bringing inflation under control. Fiscal deficit has been reduced as planned. Balance of Payment situation, though difficult, shows signs of improvement with a pick-up of exports to the hard currency areas. Monsoon of 1992, though below normal, turned out to be quite good in the rain-fed areas due to better temporal and spatial spread. This has resulted in a good kharif harvest and an expected excellent rabi harvest. The climate of inflationary expectations has disappeared and prices of foodgrains and other essential items have either come down or stabilised. Industrial recovery, though sluggish, is on its way. Industrial growth and export performance might have been much better during the current year, but for the social unrest and riots in different parts of the country during December 1992 and January 1993. Despite these setbacks, the GDP growth in real terms is projected to be over 4 per cent during the second year of reform. The GDP growth is expected to further pick-up in the third year onwards of the reforms. The sacrifice in terms of employment and growth in the wake of stabilisation programme appears to be minimal as compared to other countries which have gone through the same process.

The more serious issue, however, is the possible effects of structural reforms on employment in the country. Our traditional approach to labour problems has been to provide workers with the maximum security in terms of both employment and wages. This security, however, was available to only a small percentage of privileged workers; and even this has proved increasingly illusory with spreading sickness in several industries. There is also considerable evidence that our institutional structure of industrial relations discourages increased use of labour in production processes and therefore militates against

**This will require more flexible work practices than those provided under our labour laws.**

the growth of employment itself. Intensification of competition in the market is bound to link the fortunes of the firms with that of workers. If we want our firms to be

globally competitive, they should be enabled to adopt themselves to fast-changing international conditions. This will require more flexible work practices than those provided under our labour laws. We must devise ways of insuring labour against changes in employment which are not firm-specific or industry-specific. We must turn our thoughts to employment insurance and income stabilisation arrangements which would protect workers income without reducing the flexibility of employment practices. We must evolve a system for regulating industrial relations which protects the legitimate interests of workers without hurting the economy's ability to cope with rapid technological and economic changes.

**Redeployment of workforce may, however, take place in order to meet the requirements of modernisation and restructuring. What is to be eliminated is high wages unrelated to productivity.**

The Government has repeatedly made it clear that liberalisation of the economy would not result in any significant rise in unemployment as no retrenchment of existing employees would be permitted as a result of new economic policy. Redeployment of the workforce may, however, take place in order to meet the requirements of modernisation and restructuring. The Government has already operationalised the National Renewal Fund to provide assistance for retraining and redeployment of workers as also to provide a social security net to the labour force. An important aspect of the restructuring of the Indian economy has to be necessarily to remove the redundant employment in the public sector either by raising the productivity of labour or by redeploying the employees to more productive activities. The sad experience of the command economies of the communist world in terms of assured employment and incomes is fresh in our memory. Even in China the famous "iron rice bowl" of guaranteed lifetime employment has become a thing of the past. Chinese experiments with market economy over the past one decade has generated an unprecedented boom in the Eastern and Southern provinces. These provinces are attracting vast resources, both domestic and foreign, and are creating millions of new employment opportunities. This process is, indeed, a repetition of what has been taking place in a number of east-Asian countries which have been growing at 8-10 per cent per annum for several years. A time has come for releasing the productive energies and enterprises of our



people to generate employment and incomes in the process of creation of new wealth and private fortunes. Liberalisation aims at creating more jobs at higher productivity and higher wages. What is to be eliminated is high wages unrelated to productivity. Such high wages are borne by the society at large and is a burden on the poor. The real choice is between subsidy for loss-making enterprises and subsidy on wage employment for the poor.

In the context of the macro-economic adjustment programme currently underway in the country, wage employment programmes have a special significance. They can provide the needed safety net to the poor. But the massive funds required for providing wage employment to all will, again, starve vital sectors of investment. There is need for targetting, rather self-targetting. An important issue to be sorted out in this connection is the wages to be paid—official minimum wages or market wages or subsistence wages. The Employment Guarantee Scheme of Maharashtra is universally acclaimed for many of its virtues. Maharashtra's special circumstances, especially a thriving urban sector, allows it to mobilise a substantial share of the needed funds which most of the other states are not in a position to generate. A centrally financed Scheme throughout the country can be extremely burdensome. However, if it can be integrated with all the labour-intensive plan programmes like rural housing, rural roads, primary schools, minor irrigation works, soil conservation, land development and tree planting, the resource additionality may not be unbearable. And it has to be conceived, planned and implemented with in a highly decentralised framework.

### Concluding Comments

The most valuable of the assets of India is its labour force. This, however, is the one asset of the country which remains most underutilised. Not only that this has arrested the growth of the economy significantly, but it has also resulted in abject poverty and deprivation to the millions of Indians. For, vast majority of them have few assets other than their labour.

The various labour laws enacted to protect the interests of the workers in the country have in effect of slackened employment growth in the country. The experience of agriculturally forward regions is that agricultural surplus

provides inputs and resources for various agro-based and ancillary industries and also assured markets for goods and services. The downstream employment opportunities of such development are considerable. Government, instead of attempting to create employment on its own, should be creating opportunities for self employment. Developing infrastructure, institutions for credit and other services, training and skill development, and ensuring that the various players in the market follow the rules and contract obligations should be the major concerns of the Government.

If the experiences of fast developing countries in East-Asia including China have any lesson for us it is the labour-absorbing nature of economic growth in those countries. Other things being equal, foreign capital gets attracted to those countries which have either cheap labour or huge market potential. And we have both. Our exports are far more labour-intensive than our general industrial production. With liberalisation and globalisation, our labour-force is bound to gain in terms of more employment opportunities and higher real wages. Without any social security arrangements, relief-employment is really a substitute for unemployment benefits. The payment of relief is being linked to physical labour primarily to ensure that only the genuinely needy get the relief. This, however, has to be only an interim arrangement till all those who want to work are able to find productive work on their own. It is highlighted that poverty is concentrated in the regions where agricultural productivity is very low. The very same regions, however, have enormous scope for raising productivity. But this will require considerable investments in land and water resources development. Most of these activities are highly labour-intensive. Considerable public investment along with appropriate institutional reforms including land consolidation and securing tenancy are essential pre-conditions for achieving green revolution in these regions. Employment generation, equity, growth and efficiency are all complementary to each other in this context.

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# A Model for Rural Employment Growth in India

N.K. Nair, Jagpal Singh & Rajendra Prasad

*Given the fact of a rapid industrialization strategy as the core of economic development, India's Five Year Plans could extend to the poor dominated rural sector only a secondary role; a role that shortcircuited the policy makers' mind to limit the scope of rural development to levels warranted by the 'Cheap Food Paradigm'. Even the Eighth Five Year Plan which advocated primacy to growth and diversification of agriculture allocated only 18.65 percent of the investments to the agricultural sector which employed over two thirds of the total labour force. This paper attempts to arrive at a resource allocation model which strives to retain the labour with in the rural sector itself rather than driving them away to the urban sector to eventually form the 'urban informal sector'.*

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## The Plan Strategy

The strategy of planned economic development in India for more than four decades has been on the premise that low or static standards of living, underemployment and unemployment are the manifestations of basic underdevelopment which characterises an economy depending mainly on agriculture. Thus rapid industrialisation is considered as the core of economic development. (Second Five Year Plan; a Draft Outline:7). The Theoretical framework necessary to support such a strategy was derived from the Mahalanobis<sup>1</sup> two sector model which was based on the developmental philosophy: "If one wants a high rate of growth of consumption in the long run, then the best policy is to give priority to the development of investment goods industries even though the latter has a higher capital output ratio and even though one cannot eat machines. (Rudra, 1975). Thus, despite being predominantly a rural economy and that the resource endowment of the economy favoured a rapid growth of the labour intensive agricultural sector, India's achievements have been paradoxically industry oriented and capital intensive. Since this strategy neglected the developmental requirements of the labour intensive agricultural sector, it debilitated the economy in dealing effectively with the twin maladies of large scale unemployment and underemployment and widespread poverty and deprivation, especially in rural areas. "..... one final irony

1. Mahalanobis (1953) model was initially developed by Fieldman in the erstwhile Soviet Union during late twenties which was later revived by Domar (1957). The logic of the two sector model was later extended by Raj & Sen (1961) to a four sector model. "While the implicit assumption underlying the Harrod-Domar Model is that the saving rate is a reflection of the behavioural characteristics of the decision making units such as the households, the corporate sector and the government, Mahalanobis made it a rigid function of certain structural features such as the capacity of the domestic capital goods industry and the capital output ratios of the capital goods sector and consumer goods sector". (Bhagwati & Desai, 1970 : 234-36).



of the disappointing growth rate has been that it has handicapped seriously the alleviation of poverty in India. The principal problem in India is manifestly her poverty. With 14 percent of world's population; India has the fortune of having twice as large a share of world's poor" (Bhagwati, 1992 : 27). Estimated head count ratio reached as high a percentage as 48.7 in 1987-88, the number involved ranging between 261 million and 284 million (Minhas et.al, 1991)<sup>2</sup>. Similarly the underutilization of manpower resource (underemployment and unemployment) is estimated at around one fourth of the total available labour time (Satyapaul, 1988; Visaria & Minhas, 1991).

**It is especially noteworthy that the Eighth Five Year Plan which extended primacy to "growth and diversification of agriculture to achieve self sufficiency in food grains and generate surpluses for exports" also allocated only 18.65 percent of the investment to the agricultural sector which employed over two thirds of the total labour force.**

Given the fact of rapid industrialization as the core of economic development, India's Five Year Plans could extend to the poor dominated rural sector only a second

dary role; a role that shortcircuited the policy makers' mind to limit the scope of agricultural development to levels warranted by the 'Cheap Food Paradigm'. Agricultural programmes have been conceived and implemented only as an aid to the process of industrialization rather than as an integral part of it. (Bagchi, 1990). The investment discrimination underwent by the rural sector has been clearly evident from table 1 which presents the pattern of resource allocation in India's eight Five Year Plans. It is especially noteworthy that the Eighth Five Year Plan which extended primacy to "growth and diversification of agriculture to achieve self sufficiency in food grains and generate surpluses for exports" (Planning Commission, 1992, Vol. 1) also allocated only 18.65 percent of the investment to the agricultural sector which employed over two thirds of the total labour force.

### Ignored Limitations

In the context of a developing country like India, the rapid industrialization strategy has a few significant limitations. First, it ignored the proven pivotal role that the agricultural sector could have played through boosting the demand for non-agricultural goods and services. A number of scholars notably Chakravarty (1974), Raj (1976) and Vaidyanathan (1977) sought to explain the sluggish growth of industrial output in India since the mid sixties in terms of the meagre increase in agricultural production.<sup>3</sup> Second, this strategy ignored the likely

**Table 1 : Pattern of Resource Allocation in Indian Five Year Plans (Percentage)**

	I Plan (1951-56)	II Plan (1956-61)	III Plan (1961-66)	Annual Plans (1966-69)	IV Plan (1969-74)	V Plan (1974-79)	VI Plan (1980-85)	VII Plan (1985-90)	VIII Plan (1992-97)
Agricultural & Allied Sectors, Irrigation & Floor Control	37.0	20.9	20.5	23.8	23.3	22.1	15.24	11.23	18.65
Power	7.6	9.7	14.6	18.3	18.6	18.8	12.07	13.65	12.80
Industry & Construction	4.9	24.1	22.9	24.7	19.7	24.3	32.39	34.56	31.14
Transport & Communication	26.4	27.0	24.6	18.5	19.5	17.4	10.92	11.96	14.28
Social Services	24.1	18.3	17.4	14.7	18.9	17.4	29.38	28.60	23.13
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: I — V Plan, Dingra (1990)

VI — VIII Plan, Planning Commission (1992) Vol. I.

2. Alagh (1992) arrives at head count ratios which are much lower. Estimates of Poverty Gap Index, Sen's Poverty Index and Foter-Greer-Thorback Index are arrived at by Mahendra Dev et.al. (1992).

3. Ahluwalia (1985) found no evidence to support the proposition that agriculture constituted a drag on industrial growth during the period 1959-60 to 1979-80, although she acknowledged that the slow growth of agricultural incomes did act as a constraint on demand for industrial goods. Sen (1981) was however, firm that the agricultural constraint was fully in operation as early as 1960. Sen (1990) also subscribed to the thesis of agricultural constraint.



favourable impact of a rural led approach to economic development on poverty through the less skewed distribution of incomes that would have emerged as a result of rapid expansion of the rural sector. Third, it ignored the likely unfavourable impact of the well-known wage goods constraint factor on the growth of the industrial sector itself. Bhagwati & Desai (1970 : 117) observed that "the relative neglect of agriculture and hence of the wage goods constraint with its attendant, some what exaggerated, concern with the building up of the investment goods to break eventually the capital goods constraint were to be shown by the subsequent events to have been unfortunate and harmful to the progress of economic development in the country." Fourth, this strategy ignored the weak linkages that existed between the progressive modern sector and the unorganized traditional sector, at least in the beginning stages, against which such a strategy could have only led to further reinforcing the 'structural dualism' which the strategy aimed to eliminate in the long run. "A striking experience of India at independence was a tardy growth of modern sector which remained a small island with very weak links in terms of labour and material resources with the industrial sector. The industrial sector itself remained lopsidedly developed with a shortage of capital goods" (Bhardwaj, 1990 : PE 24).

### Declining Employment Elasticity

An OECD study calculated that "on an average in the developing countries the manufacturing sector employs 20 percent of the labour force and the unemployment and underemployment account for an average of 25 percent. The increase in labour productivity is assumed to be 2.5 percent per year. In order to absorb the increase in labour force growing at 3 percent a year, industrial production would have to increase by 18 percent a year, a rate beyond the achievement of any developing country". (quoted in Stewart, 1978 : 213). There exists now considerable empirical evidence to the failure of modern industrial sector in substantially contributing to the employment objectives in the developing nations. Morawetz (1974), for instance, showed that while the manufacturing output growth ranged between 6 and 13 percent in the developing nations of Asia, Africa and Latin America during 1963-69, manufacturing employment grew only at a much slower rate, ranging between 2 and 6 percent during the same period. In fact against a 10.7 percent growth rate in manufacturing output, employment actually declined at the rate of 12.6 percent in Thailand. An unfortunate but natural fall out of the failure of the modern sector to contribute significantly to the employment objectives in developing countries including India is

the emergence of the so called 'urban informal sector', a substratum which has been growing at the fastest rate in recent years and which "combines the features of a precapitalist mode of production with that of the capitalist — co exist with primitive accumulation" (Johri, 1992 : 70-71).

Recent studies in India also lend evidence to the failure of industrial sector in providing increasing employment opportunities to the growing labour force. Papola (1988) found that the employment elasticities of Indian manufacturing sector decreased from 0.508 in 1968-75 to 0.465 in 1975-84.<sup>4</sup> Most importantly, the employment elasticity of manufacturing turned out to be negative during 1980-84. In a system of efficiency determination governed by international standards, such declines in employment elasticities of the organised sector should not be unexpected either. Whether or not there exist many technological options to produce a commodity, (as has been believed in accordance with the traditions of neoclassical economics) the decision will usually be to select the most recent which are, invariably of high and increasing capital intensity (Griffin & Enos, 1970). Research and development on the other hand, typically responds to the needs (and resources) of the developed countries, so that new products and processes are not geared to the demand patterns and factor endowments of the developing nations. Transplanted into the developing countries, these products and processes often serve only to support the expansion of the so called modern sector and the consumption patterns of the very rich (Ahluwalia, 1974).

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### 'Bimodal' Growth of the Farm Sector

The growth of the farm sector itself was unbalanced in the kind of development process which the Indian economy experienced during these years because the secondary role assigned to it prompted the adoption of a

4. Chakravarty (1989) & Planning Commission (1990) also corroborated to the declining employment elasticity of Indian manufacturing sector in recent years.



relatively capital intensive 'bimodal' development path as against the 'unimodal' path which seeks to encourage a more progressive adoption and wider diffusion of technical innovations, adapted to the factor proportions of the sector as a whole. The essential distinction between the two approaches is that while the 'unimodal' strategy emphasizes the sequence of innovations, that are highly divisible and largely scale neutral, a 'bimodal' strategy entails a much more rapid adoption of a wide range of modern technologies but would be confined to a smaller fraction of the farm units because of the structure of consumers with commercial demand is small in relation to labour force (Johnston, 1972). The thrust of a 'unimodal' strategy is to encourage general diffusion of yield increasing and such mechanical innovations as are complementary with the new seed fertilizer technology. The 'bimodal' strategy emphasizes simultaneous adoption of innovations that increase substantially the amount of land which individual cultivators can efficiently work in addition to yield increasing innovations emphasized in the 'unimodal' approach. "In reinforcing with in a sub-sector of large and capital intensive farms, a 'bimodal' strategy will have an advantage in maximizing the rate of increase in the short run because it bypasses the problems and costs associated with involving a large fraction of the farm population in the modernisation process. In a longer view, however, a 'unimodal' strategy appears to be more efficient, especially in minimising the requirements for the scarce resources of foreign exchange and loanable funds" (Johnston, 1972 : 457-68).

The cornerstone of agricultural strategy in India since mid sixties was its selective approach; selection of areas endowed with favourable infrastructure and with in these areas selection of progressive farms for the distribution of inputs. The rationale behind the strategy was given by the limitations of the supply modern inputs. These should reach the areas and people who are likely to make their most optimum use. It has been argued that the bias against the small farmers is built in to the new technology by the very costly nature of the inputs, while the new technology has been 'scale neutral', 'access to resources' which enables implementation of the new technology has not been so. (Dasgupta, 1983; Hanumantha Rao, 1990). In the long run with the wider application of tractors and harvesters, there has been the serious risk of a sudden decline in the number of labour days needed per unit of land. There are evidences to the effect that the richer farm households are now dispensing with hired labour. The selective approach of the new agricultural strategy, "presents a technical solution to the country's food problem and bypasses the institutional issues" (Dasgupta,

1990 : 131-32). "The new strategy stemmed from the belief that the major constraint on Indian agricultural growth has been technical rather than institutional" (Sen, 1974). Hanumantha Rao (1990 : 33) found that the higher output per hectare of net sown area among large farms was achieved not through higher cropping intensities involving greater use of labour but by stepping up significantly the yield per hectare of individual crops by the intensification of certain inputs like fertilizers. Such farmers were also found resorting to highly labour displacing mechanization like harvest combines. In so far as cropping intensity among large farms continued to be lower than among small farms, the inefficiency of resource use persisted in a land scarce and labour abundant economy. In effect therefore to a considerable extent there was substitution of capital (embodied in mechanical as well as bio-chemical inputs) for labour. This had the adverse effect on employment and incomes of hired labour whose number has been increasingly casualized on account of the ability of the large farmers to do away with permanent labour.

### Anti Poverty Programmes

The declining labour intensity in both the farm and nonfarm sectors of the economy has emerged not as sequel to the changing factor endowment as it happened in developed economies, but as a consequence of a deliberate strategy to force the growth of the economy along the path of rapid industrialization towards self reliance which was misconceived to be the ultimate goal of economic independence. The resultant underutilization of labour in both urban and rural areas (underemployment and unemployment) is the core of poverty problem in India. In accordance with the neoclassical tradition, (welfarism) the policy regime in India tried to overcome the poverty problem through a series of antipoverty programmes targetted at various economically disadvantaged groups especially from the rural areas (Community Development Scheme, MFAL, DPAP, CADP, TRYSEM, DADP, IRDP, Jawahar Rozgar Yojana and the like, popularly known as the rural development programmes).<sup>5</sup> The inadequacies in the scope, content, coverage and targeting of these programmes were unfavourably commented by a large number of evaluation studies undertaken by various scholars and institutions. It was pointed out that, by their very nature and magnitude, the problem of unemployment and underemployment and mass poverty in rural areas cannot be solved through

5. A sum of Rs. 30,000 crores has been allocated to these programmes during the Eighth Five Year Plan.



ad hoc interventions (i.e. through the 'add on' or 'relief type' antipoverty schemes). Besides, now it is almost certain that such schemes cannot be sustained for a long time because of fiscal constraints.<sup>6</sup> The genesis and growth of these economic maladies would have to be linked to the very development strategy which shaped the framework of resource mobilization and allocation in the country for over four decades. Simultaneously along with redefining the developmental priorities, issues relating to the choice of technique not only in the rural areas but also in the rest of the economy deserve serious reconsideration. In addition to the perpetuation of a mass poverty base and severe underutilization of manpower resource, India's development strategy has reinforced the forces of 'structural dualism' that is typical of undeveloped countries, a phenomenon that horizontally divides the economy in two blocks; a technologically modern sector with high productivity and equally high wages and another one with primitive technology, low productivity and equally low wages, generally in rural areas. The necessary and sufficient conditions for success in rural development efforts are:

1. That the average labour productivity in the rural sector is substantially raised so that there is no incentive for the rural labour to migrate to urban areas in search of opportunities with higher incomes.
2. That the number of job opportunities available in the rural areas are sufficiently large enough to absorb all the underemployed and unemployed labour in economically gainful occupations.

**The resultant underutilization of labour in both urban and rural areas (underemployment and unemployment) is the core of poverty problem in India.**

Attempted in the following is a model of resource allocation in the line of Stewart (1978) which in essence strives to retain the labour within the rural sector itself rather than driving them away towards the urban sector, the employment elasticity of which has been demonstrab-

6. Bhardwaj (1990) notes "The fiscal crunch and the crisis in raising resources from the advanced sectors (the ones that have taxable surplus) without endangering, the saving and investment climate, seen as imperative for stimulating growth even while the resource need for poverty and welfare management escalate with mounting social and political pressures on the state".

ly low or in some cases even negative to eventually form the rapidly growing 'urban informal sector'.

### A Model for Rural Employment Generation

It is necessary to make a few strategic assumptions towards building the model. First, the economy is assumed to be open where there are no restrictions on trade, entry and exit of firms etc. Second, the investments are assumed to be divisible so that attempts at allocating the available resources (labour, capital) among the sectors to the desired extent are not constrained by any indivisibilities which often are the hall-marks of modern technologies. The third assumption is that it is possible on the part of the planning authority to ensure a predetermined level of aggregate savings for investments during any period. In other words, the saving ratio is exogenous to the model and also a constant.<sup>7</sup> Fourth, the model also requires the 'no technical change' condition in all the sectors of the economy except in the case of the priority sector viz. the rural sector. This in fact is not an assumption but an implication of the central issue that is being addressed by the model that substantial improvements in productivity of the rural sector is necessary to achieve sustainable success in rural development and that this is attainable only if the level of technology in the rural areas is improved significantly.

Two additional working assumptions are also necessary in order to facilitate easier computations: one, that the aggregate and sectoral production functions are of degree of homogeneity one (constant returns – to-scale) and two, zero or negligible lags between the investments and the flow of outputs. Relaxation of these two assumptions, while may lead to complex computations, is unlikely to affect the directions of the model results. In fact, the unrealistic implications of the latter assumption (zero or negligible lags between investments and flow of outputs) have been offset, to a large extent, by the first strategic assumption of an open economy that, if and when required due to higher investment output lags, goods and services could be imported in order to fulfil the requirements of material inputs and final consumption.<sup>8</sup>

Each element in an intersectoral flow matrix (table 2) represents the flow of output from the  $i$ th sector to the  $j$ th sector in order to produce  $y_j$  quantity of output. The input coefficient of employment  $\lambda_{ij}$  is defined as the quantity of

7. It is, however, possible to endogenise the saving variable in an extended formulation of the present model which is not attempted here.

8. The scope of the model has not been extended to issues relating to trade or foreign exchange, however.



**Table 2 : Intersectoral Flow Matrix**

Sectors	1	2	3	...	n	Total Intermediate Consumption	Final Consumption	Total Output	Total Employment
1	$x_{11}$	$x_{12}$	$x_{13}$	...	$x_{1n}$	$x_1$	$c_1$	$y_1$	$e_1$
2	$x_{21}$	$x_{22}$	$x_{23}$	...	$x_{2n}$	$x_2$	$c_2$	$y_2$	$e_2$
3	$x_{31}$	$x_{32}$	$x_{33}$	...	$x_{3n}$	$x_3$	$c_3$	$y_3$	$e_3$
⋮									
n	$x_{n1}$	$x_{n2}$	$x_{n3}$	...	$x_{nn}$	$x_n$	$c_n$	$y_n$	$e_n$
Total						X	C	Y	E

ith output ( $x_{ij}$ ) necessary to employ one man year in the jth sector

$$\lambda_i = \frac{x_{ij}}{e_j} \quad (1)$$

for the jth sector

$e_j$  = employment in the jth sector

The employment coefficient of output  $\theta_i$  stands for the man years necessary to produce one unit of output in the ith sector.

$$\theta_i = \frac{e_i}{y_i} \quad (2)$$

$e_i$  = employment in the ith sector

$y_i$  = output of the ith sector

The technical coefficient of employment ( $\rho_i$ ) is defined as the change in employment in the ith sector as a result of a unit change in employment in the jth sector, the level of technology in the ith sector being held constant. The technical coefficient of employment will be able to give us the required additional employment in the ith sector when we employ a given number of additional man years in the jth sector.

$$\rho_i = \lambda_i * \theta_i \quad (3)$$

If, suppose,  $\Delta e_j$  additional number of man years are to be employed in the jth sector, the ith sector extra employment will be given by

$$\Delta e_i = \frac{\rho_i}{\rho_j} * \Delta e_j \quad (4)$$

When  $J = 1$ , the total additional employment ( $\Delta E$ ) that will be generated in the economy will be:

$$\Delta E = \Delta e_1 + \sum_i \left( \frac{\rho_i}{\rho_1} \right) * \Delta e_1 \quad (5)$$

We aim at allocating the additional investment ( $\Delta K$ ) among various sectors in such a manner that the additional employment thus generated in the rural sector is maximised subject to the condition that the average output per employed additional man year in that sector is at least  $\bar{Y}$ . Suppose if given the assumptions of constant returns-to-scale and fixed coefficient of production, the required capital per man year to produce  $\bar{Y}$  level of average output in the rural sector is  $\bar{K}$ . Suppose further that

$$\bar{Y} = \bar{Y} \quad (6)$$

$$\bar{K} = \bar{K} \quad (7)$$

where  $\bar{Y} = \frac{Y}{E} \quad (8)$

$$\bar{K} = \frac{K}{E} \quad (9)$$

$Y$  = Total output of the economy

$E$  = Total employed man years

$K$  = Total stock of capital

The sectoral allocation of capital will be given by the expression

$$\Delta k_i = \Delta e_i * \bar{k}_i \quad (10)$$

$$\bar{k}_i = \frac{k_i}{e_i} \quad (11)$$

where  $k_i$  stands for the capital stock in the ith sector.

In the case of the rural sector the capital requirements will be given by the expression

$$\Delta k_J = \Delta e_J * \bar{K} \quad (12)$$

where  $J$  stands for the rural sector

$$\Delta K = \Delta \sum_i k_i + \Delta k_J \quad (13)$$

$i = 2, 3, \dots, n$  sectors

$j = 1$ , rural sector.



The only unknown quantity in this model is the additional employment in the rural sector ( $\Delta e_j$ ) which can be determined by the expression.

$$\Delta e_j = \frac{\rho_j * \Delta K}{(\rho_j * K) + \sum_{i=2} \rho_i * K_i} \quad (14)$$

In this model the total additional investments ( $\Delta K$ ) during any year will be a fixed proportion ( $\delta$ ) of the total output of the economy during the previous years ( $Y_{t-1}$ )

$$\Delta K_t = S_t = \delta Y_{t-1} \quad (15)$$

For purposes of calculations presented here, it is assumed that 20 percent of GDP will be invested during any year (i.e.  $\delta_1 = 0.20$ ). The model calculations are repeated with an assumed alternative rate of investment of 25 percent. (i.e.  $\delta_2 = 0.25$ )

### The Model Calculations

We have attempted to arrive at the model results based on the following procedure:

(1) The model was first computed for the Sixth Plan period (1980-85) with the data available from the Technical Note on Sixth Five Year Plan (1980-85).<sup>9</sup> The model results were then compared with those available from the Sixth Plan document. These computations were, then terminated at 1984-85 because it can and need to be recomputed for the Seventh Plan period based on the data relevant for Seventh Plan calculations.

(2) The model was then recomputed for the Seventh Plan period based on the data available from the Technical Note on Seventh Plan (1985-90)<sup>10</sup>. The performance of the model was compared with those arrived at by the Seventh Plan document.

(3) The model computations were then continued for the Eighth Plan period (1992-97) based on the data from the Technical Note on Seventh Plan (1985-90). The data base for model calculations could not be updated to the

9. By assumption, saving rate is equal to investment rate. The anticipated investment rates in India were 21.6 percent, 22.7 percent and 23.2 percent respectively in Sixth, Seventh and Eighth Five Year Plans. The actual domestic saving rate of the economy were 19.65 percent, and 20.37% respectively in Sixth and Seventh Plans. The projected saving rate in 1991-92 is 21.6 percent which is also considered as the saving rate during the Eighth Plan Period. (Planning Commission 1992, Vol. I).

10. Due to nonavailability of adequate details from the Technical Note on Seventh Plan, the interindustry flow anticipated by the Technical Note on Sixth Five Year Plan for 1984-85 was used for the Seventh Five Year Plan period.

Eighth Plan period because of the nonavailability of the technical details of the Eighth Plan from any published source.<sup>11</sup> The model outcomes were then compared with those arrived at by the Eighth Plan (1992-97). Model computations were continued up to 2001-02, i.e. the terminal year of the Ninth Plan. The data used for the computation of the model are given in tables 3-5.

### Model Results

The summary results of the model computations along with those from the Five Year Plans are presented in tables 6-8. Some selected parameters of the model are compared with those from the Five Year Plans in tables 9-12.

#### (i) Employment

While the Sixth Plan proposed to generate employment of 34.28 million man years at an investment rate<sup>12</sup> of over 26 percent, the model yielded significantly higher employment generation figures i.e. 34.64 million man years at an investment rate of 20 percent and 44.61 million man years at an investment rate of 25 percent. Similarly while the Seventh Plan had an employment generation target of 40.36 million man years at an investment rate of over 28 percent the employment generation according to the model worked out to be as high as 46.24 million at an investment rate of 25 percent. In the case of the Eighth Plan the employment generation was of the order of 36.16 million at an investment rate of over 26 percent. The model's employment generation implications came to be significantly higher; 46.22 million at an investment rate of 20 percent and 62.93 million at an investment rate of 25 percent. The model proposes to generate employment of about 55 million man years during the Ninth Plan period at an investment rate of 20 percent. The employment

11. Because of this reason, the level values of the model variables during any year are not comparable with the corresponding values from the Eighth Five Year Plan. Therefore, only the incremental values of the model variables during the periods were compared with the corresponding values from the Eighth Plan. An additional limitation arises from the fact that a Leontief type production function with fixed coefficients of production has been used for computations for an extended period.

12. The investment rates in tables 9-12 are computed as a simple product of capital output ratio and the growth rate. Since, there is an upward bias in the procedure of calculating capital output ratio in this manner, the investment rates are also overestimated. The actual investment rates in the Five Year Plans were lower than those shown in tables 9-12. Since the procedure of computing capital output ratio is the same for both the Five Year Plans and the model series, there cannot be any distortion in the comparative assessment.



**Table 3 : Intersectoral Flows in 1979-80 and 1984-85 (Rs. 000 million at 1980-81 Prices)**

Year	Agriculture		Industry		Construction		Trade & Commerce		Transport & Communication		Services		Total	
	79-80	84-85	79-80	84-85	79-80	84-85	79-80	84-85	79-80	84-85	79-80	84-85	79-80	84-85
Agriculture*	60.0	79.6	85.0	112.8	3.4	4.8	0.0	0.0	1.6	2.2	7.2	9.5	157.2	208.7
Industry†	39.3	71.5	262.2	403.9	58.6	85.9	8.1	11.4	30.3	42.4	51.3	68.4	449.8	683.5
Construction	5.4	7.4	18.4	27.8	0.0	0.0	0.0	0.0	2.5	3.6	13.2	17.1	39.5	55.9
Trade & Commerce	11.8	14.9	76.6	105.0	42.3	65.0	5.3	7.3	6.7	10.6	12.0	20.0	154.7	222.9
Transport & Communication	2.3	2.8	21.3	31.8	8.4	8.8	14.8	20.3	2.2	3.0	8.3	14.4	57.3	81.1
Services	8.0	10.6	26.2	39.7	1.4	1.9	24.9	34.2	6.6	9.1	16.3	21.9	83.4	117.5
Total	126.9	186.9	489.6	721.0	114.1	166.5	53.2	73.3	49.9	70.9	108.3	151.2	942.0	1369.9

\* Include agriculture, livestock, forestry and fisheries sectors.

† Include mining, manufacturing and electricity sectors.

Source : Reduced and price adjusted from the 14 x 14 table arrived at by the Technical Note of Sixth Five Year Plan (Planning Commission, 1981: 99-04).

**Table 4 : Employment\* and Value Added Estimates in 1979-80 and 1984-85**

	Employment (Million)		Value Added (Rs. 000 Million)		Implicit Price Index** (1980-81 = 100)		Value Added (Rs. 000 Million at 1980-81 Prices)		Value Added per person (Rs. 000 at 1980-81 Prices)	
	1979-80 <sup>§</sup>	1984-85 <sup>§§</sup>	1979-80 (at 1979-80 Prices) <sup>†</sup>	1984-85 (at 1984-85 Prices) <sup>††</sup>	1979-80	1984-85	1979-80	1984-85	1979-80	1984-85
Agriculture	80.33	96.11	340.9	713.0	89.75	133.01	379.8	536.0	4.7	5.6
Industry	23.46	28.97	206.7	389.5	89.75	136.20	230.3	285.9	9.8	9.8
Construction	9.29	10.43	49.2	120.1	86.73	162.49	56.7	73.9	6.1	7.0
Trade & Commerce	13.28	18.32***	150.8	286.0 <sup>†††</sup>	85.33	142.57	176.7	200.6	13.3	10.9
Transport & Communication	9.57	11.94	55.5	108.3	105.10	155.33	52.8	69.7	5.5	5.8
Services	15.19	20.95***	167.3	317.4 <sup>†††</sup>	91.32	136.70	183.2	232.2	12.0	11.0
Total	151.11	186.75	970.5	1934.3	89.88	138.02	1079.6	1398.3	7.1	7.5

\* In terms of standard man years of 8 hrs per day, 273 days.

† Technical Note on Sixth Five Year Plan.

†† Seventh Five Year Plan (1985-90).

\*\* Derived from CSO's National Accounts Statistics for respective years.

§ Technical Note on Sixth Five Year Plan; excludes employment generation under IRDP, NREP schemes.

§§ Technical Note on Seventh Five Year Plan; excludes employment generation under IRDP NREP Schemes.

\*\*\* Technical Note on Seventh Five Year Plan gave a total employment of 39.26 million together for these sectors. This was allocated between the two based on their shares in 1979-80.

††† Seventh Five Year Plan (1985-90) gave a total of Rs. 603490 million together for these sectors. This was allocated between the two based on their shares in 1979-80.



**Table 5 : Investment Estimates for 1979-80 and 1984-85 (at 1980-81 Prices)**

Year	Net Fixed Capital† (Rs. 000 million)		Ratio of Inventories and Replacements to Net Fixed Capital†† (%)		Estimated Investments (Rs 000 Million)		Estimated Investments Per Person (Rs. 000)	
	1979-80	1984-85	1979-80	1984-85	1979-80	1984-85	1979-80	1984-85
Agriculture	620.4	710.8	32.2	68.1	819.9	1195.0	10.2	12.4
Mining & Quarrying	52.3	110.9	20.8	20.0	63.2	131.9		
Manufacturing	449.1	597.8	78.5	73.7	801.7	1038.4	49.5	53.7
Electricity, Gas etc.	226.9	336.4	31.6	14.6	298.5	385.4		
Construction	19.9	32.6	299.7*	299.7*	79.6	110.9	8.6	10.6
Trade & Commerce	71.5	94.3	159.1**	159.1**	185.1	244.2	13.9	13.3
Transport & Communication	267.9	323.4	112.2	31.3	565.9	424.8	59.1	35.6
Services	1131.5	1327.3	27.2	164.9	1438.9	2873.5	95.0	137.2
<b>Total</b>	<b>2838.9</b>	<b>3534.0</b>	<b>49.8</b>	<b>51.2</b>	<b>4252.8</b>	<b>6404.1</b>	<b>28.2</b>	<b>34.2</b>

† CSO's National Accounts Series quoted in NPC Research Section (1990).

†† Technical Note on Sixth Five Year Plan.

\* Due to exceptionally high ratio for 1984-85, ratio for 1979-80 repeated.

\*\* Due to exceptionally high ratio for 1979-80, ratio for 1984-85 repeated.

**Table 6 : Employment Generation During the Plan Periods (million man years)**

	Sixth Plan Period (1980-85)			Seventh Plan Period (1985-90)			Eighth Plan Period (1992-97)			Ninth Plan Period (1997-02)	
	Sixth Five Year Plan	Present Model		Seventh Five Year Plan	Present Model		Eighth Five Year Plan†	Present Model		Present Model	
		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		
Agriculture	18.92* (55.2)	23.01 (66.4)	29.74 (66.7)	17.98 (44.6)	20.24 (56.0)	25.85 (55.9)	9.05 (25.0)	24.96 (54.0)	33.59 (53.4)	28.78 (52.4)	40.06 (51.2)
Industry	6.12 (17.9)	7.17 (20.7)	9.24 (20.7)	7.47 (18.5)	10.73 (29.7)	13.84 (29.9)	7.82 (21.6)	15.67 (33.9)	22.15 (35.2)	20.32 (37.0)	30.50 (39.0)
Construction	2.04 (5.9)	1.51 (4.4)	1.92 (4.3)	2.20 (5.4)	1.44 (4.0)	1.82 (3.9)	3.53 (9.8)	1.63 (3.5)	2.13 (3.4)	1.77 (3.2)	2.37 (3.0)
Trade & Commerce	3.36 (9.8)	1.49 (4.3)	1.89 (4.2)	—	1.83 (5.1)	2.33 (5.0)	—	1.99 (4.3)	2.56 (4.1)	2.10 (3.8)	2.74 (3.5)
Transport & Communication	1.73 (5.0)	0.56 (1.6)	0.71 (1.6)	2.80 (6.9)	0.64 (1.7)	0.80 (1.7)	3.39 (9.3)	0.66 (1.4)	0.83 (1.3)	0.67 (1.2)	0.85 (1.1)
Services	2.12 (6.2)	0.90** (2.6)	1.11 (2.5)	9.90 (24.5)	1.28 (3.5)	1.60 (3.5)	12.36 (34.2)	1.31 (2.8)	1.67 (2.7)	1.34 (2.4)	1.71 (2.2)
<b>Total</b>	<b>34.28</b>	<b>34.64</b>	<b>44.61</b>	<b>40.36</b>	<b>36.16</b>	<b>46.24</b>	<b>36.15</b>	<b>46.22</b>	<b>62.93</b>	<b>54.98</b>	<b>78.23</b>

\* Includes 4 million man years under IRDP and NREP Scheme.

\*\* Includes Trade & Commerce also.

† These are estimated by the present study. 1989-90 employment was assumed as given in Seventh Five Year Plan (1985-90). These were projected to 1991-92 based on the rates of growth during the plan period. The sectoral employment figures are projected to 1996-97 using the compound growth rate of employment during the Eighth Plan Period given in the Plan.

Note: Figures in brackets are the percentages to total.



**Table 7 : Employment Generation During the Plan Periods (Rs. 000 millions at 1980-81 Prices)**

	Sixth Plan Period (1980-85)			Seventh Plan Period (1985-90)			Eighth Plan Period (1992-97)			Ninth Plan Period (1997-02)	
	Sixth Five Year Plan*	Present Model		Seventh Five Year Plan*	Present Model		Eighth Five Year Plan*	Present Model		Present Model	
		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		
Agriculture	80.6 (25.8)	166.2 (58.9)	215.3 (59.0)	71.0 (18.6)	153.0 (49.5)	195.9 (49.5)	89.8 (13.3)	194.6 (48.2)	264.2 (47.8)	228.8 (47.0)	322.9 (46.2)
Industry	80.1 (25.6)	70.5 (25.0)	90.7 (25.0)	114.8 (30.0)	106.3 (34.4)	136.6 (34.5)	269.7 (40.0)	154.6 (38.3)	218.6 (39.6)	200.6 (41.2)	301.0 (43.1)
Construction	16.2 (5.2)	10.9 <sup>††</sup> (3.6)	14.0 <sup>††</sup> (3.9)	20.3 (5.3)	10.9 <sup>††</sup> (3.5)	13.8 <sup>††</sup> (3.5)	21.9 (3.3)	12.7 <sup>††</sup> (3.1)	16.8 <sup>††</sup> (3.0)	14.2 <sup>††</sup> (2.9)	19.1 <sup>††</sup> (2.7)
Trade & Commerce	50.4 (16.1)	19.8 (7.0)	25.1 (6.9)	69.4 <sup>**</sup> (18.1)	20.1 (6.5)	25.4 (6.4)	—	21.8 (5.4)	28.0 (5.1)	22.9 (4.7)	30.0 (4.3)
Transport & Communication	13.4 (4.3)	4.0 <sup>††</sup> (1.4)	5.1 <sup>††</sup> (1.4)	28.8 (7.5)	4.9 <sup>††</sup> (1.6)	6.1 <sup>††</sup> (1.6)	37.4 (5.6)	5.1 <sup>††</sup> (1.3)	6.6 <sup>††</sup> (1.2)	5.6 <sup>††</sup> (1.1)	6.8 <sup>††</sup> (1.0)
Services	72.1 (23.0)	10.6 (3.7)	13.4 (3.7)	78.5 <sup>**</sup> (20.5)	14.2 (4.6)	17.8 (4.5)	254.1 <sup>†</sup> (37.8)	14.6 (3.6)	18.5 (3.4)	14.9 (3.6)	18.9 (2.7)
<b>Total</b>	<b>312.8</b>	<b>281.1</b>	<b>363.6</b>	<b>382.8</b>	<b>309.4</b>	<b>395.6</b>	<b>672.9</b>	<b>403.4</b>	<b>552.6</b>	<b>487.0</b>	<b>698.7</b>

\* Income levels in the Plans were at 1979-80, 1984-85 and 1991-92 prices. These were inflated or deflated to 1980-81 prices by applying price indexes derived from ESO's National Accounts Statistics, GDP series.

\*\* Five Year Plan calculations were for both the sectors together. Income levels for the sectors were first allocated based on their shares in 1979-80. These were then deflated to 1980-81 prices by applying the respective price indices.

† Includes trade and commerce also.

†† The actual income per man year has been lower than the national average. Calculations were based on national average income per man year.

Note: Figures in brackets are percentages to total.

**Table 8 : Investments During Plan Periods (Rs. 000 million at 1980-81 Prices)**

	Sixth Plan Period (1980-85)			Seventh Plan Period (1985-90)			Eighth Plan Period (1992-97)			Ninth Plan Period (1997-02)	
	Sixth Five Year Plan*	Present Model		Seventh Five Year Plan*	Present Model		Eighth Five Year Plan*	Present Model		Present Model	
		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		20% Invest- ment	25% Invest- ment		
Agriculture <sup>†</sup>	364.2 (21.1)	633.0 (53.3)	812.3 (53.4)	412.4 (18.3)	642.6 (42.3)	816.9 (42.1)	538.8 (17.3)	837.2 (41.8)	1133.3 (41.4)	1004.5 (41.2)	1416.1 (40.5)
Industry <sup>††</sup>	848.2 (49.2)	355.9 (29.9)	458.3 (30.1)	978.4 (43.5)	576.0 (37.9)	743.4 (38.3)	1357.9 (43.5)	841.5 (42.0)	1189.6 (43.4)	1090.6 (44.7)	1637.6 (46.8)
Construction	19.7 (1.2)	41.7 (3.5)	52.6 <sup>**</sup> (3.5)	—	45.6 <sup>**</sup> (3.0)	57.5 <sup>**</sup> (3.0)	93.1 (3.0)	54.6 <sup>**</sup> (2.7)	71.8 <sup>**</sup> (2.6)	61.8 <sup>**</sup> (2.5)	83.8 <sup>**</sup> (2.4)
Trade & Commerce	84.2 (4.9)	40.9 (3.4)	51.5 <sup>**</sup> (3.4)	—	56.3 <sup>**</sup> (3.8)	73.2 <sup>**</sup> (3.8)	—	66.5 <sup>**</sup> (3.3)	86.3 <sup>**</sup> (3.2)	73.2 <sup>**</sup> (3.0)	96.7 <sup>**</sup> (2.8)
Transport & Communication	205.5 (11.9)	33.4 (2.8)	41.7 (2.7)	339.9 (15.1)	22.9 (1.5)	28.8 (1.5)	476.5 (15.3)	23.4 (1.2)	29.6 (1.1)	23.7 (1.0)	30.2 (0.9)
Services	200.8 (11.7)	88.7 (7.0)	105.1 (6.9)	519.7 <sup>§</sup> (23.1)	175.2 (11.5)	220.2 (11.4)	652.4 <sup>§§</sup> (20.9)	180.4 (9.0)	228.9 (8.4)	184.0 (7.6)	235.0 (6.6)
<b>Total</b>	<b>1722.5</b>	<b>1188.3</b>	<b>1521.5</b>	<b>2250.4</b>	<b>1520.5</b>	<b>1940.0</b>	<b>3118.7</b>	<b>2003.6</b>	<b>2739.5</b>	<b>2438.3</b>	<b>3499.4</b>

\* Plan Allocations were at 1979-80, 1984-85 and 1991-92 prices. These are inflated or deflated to 1980-81 prices by applying price indices derived from CSO's National Accounts Statistics, capital formation tables.

\*\* Due to lower existing investments per man year in these sectors (Table : 5) allocations were increased to equal the National average investment per man year.

§ Includes constructions and trade & commerce also.

§§ Include trade & commerce also.

† Includes agriculture, Livestocks, Forestry and fishing sectors.

†† Includes manufacturing, mining and electricity sectors.

Note: Figures in brackets are the percentages to total.



**Table 9 : Performance Indicators during the Sixth Plan Period (1980-85). (Rs. 000 at 1980-81 Prices)**

	Sixth Plan				Model							
	Investment Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)	20% Investment Scenario				25% Investment Scenario			
					Investment Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)	Investments Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)
Agriculture	19.2	4.3	4.5	3.93	27.5	7.2	3.8	7.53	27.3	7.2	3.8	9.39
Industry	138.6	13.1	10.6	6.15	49.6	9.8	5.1	5.48	49.5	9.8	5.1	6.86
Construction	9.7	7.9	1.2	5.16	27.6	7.2	3.8	3.58	27.3	7.2	3.8	4.51
Trade & Commerce	25.0	15.0	1.7	5.15	27.5	13.3	2.1	2.14	27.2	13.3	2.1	2.69
Transport & Communication	118.8	7.8	15.2	4.64	59.6	7.1	8.4	1.51	58.7	7.2	8.2	1.86
Services	94.7	34.0	2.8	6.86	99.7	11.8	8.4	1.13	94.7	12.0	7.9	1.41
Total	50.2	9.1	5.5	5.20	34.3	8.1	4.2	4.75	34.1	8.2	4.2	5.98

<sup>†</sup> For explanations see text.

**Table 10 : Performance Indicators during the Seventh Plan Period (1985-90). (Rs. 000 at 1980-81 Prices)**

	Seventh Plan				Model							
	Investment Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)	20% Investment Scenario				25% Investment Scenario			
					Investment Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)	Investments Per man Year	Income Generation Per man Year	Capital Output Ratio <sup>†</sup>	Growth Rate (% per Year)
Agriculture	22.9	3.9	5.9	2.52	31.7	7.6	4.2	5.15	31.6	7.6	4.16	6.43
Industry	130.9	15.3	8.6	6.99	53.7	9.9	5.4	6.51	53.7	9.9	5.42	8.11
Construction	—	—	—	4.97	31.6	7.5	4.2	2.78	31.6	7.6	4.16	3.48
Trade & Commerce	—	—	—	6.12	31.8	11.0	2.9	1.93	31.4	10.9	2.88	2.41
Transport & Communication	121.4	10.3	11.8	7.16	35.8	7.6	4.7	1.36	36.0	7.7	4.68	1.70
Services	4.29 <sup>††</sup>	13.9 <sup>††</sup>	3.1 <sup>††</sup>	6.00	136.7	11.1	12.3	1.19	137.6	11.1	12.40	1.49
Total	55.8	9.5	5.9	4.96	42.1	8.6	4.91	4.08	42.0	8.6	4.88	5.11

<sup>†</sup> For explanation, see text.

<sup>††</sup> Includes Trade and Commerce, Construction also.

generation during the period increases to as high as 78 million man years at an investment rate of 25 percent.<sup>13</sup> An overwhelmingly large part of the employment, thus,

13. It needs to be cautioned that the model outcomes might have been exaggerated as a result of the use of an input output table relevant for mid eighties.

generated by the model has been in the rural sector. The shares of rural sector in total employment has been found significantly higher according to the model, when compared to those from the corresponding Five Year Plans. This is particularly so in the case of the ongoing Eighth Plan which allocated only about 25 percent of total employment generation to the rural sector, where as the



**Table 11 : Performance Indicators during Eighth Plan Period 1992-97. (Rs. 000 Million at 1980-81 Prices)**

	Eighth Plan				Model							
	Investment Per man Year	Income Generation Per man Year	Capital Output Ratio†	Growth Rate (% per Year)	20% Investment Scenario				25% Investment Scenario			
					Investment Per man Year	Income Generation Per man Year	Capital Output Ratio†	Growth Rate (% per Year)	Investments Per man Year	Income Generation Per man Year	Capital Output Ratio†	Growth Rate (% per Year)
Agriculture	59.5	9.9	6.01	3.12	33.5	7.8	4.29	4.67	33.7	7.7	4.38	5.73
Industry	173.6	34.5	5.03	7.49	53.7	9.8	5.48	6.17	53.7	9.9	5.42	7.65
Construction	26.4	6.2	4.26	4.76	38.5	7.8	4.94	2.69	33.7	7.9	4.27	3.50
Trade & Commerce	—	—	—	—	33.4	10.9	3.06	1.83	33.7	11.0	3.06	2.18
Transport & Communication	140.6	11.0	12.78	6.48	35.5	7.8	4.55	1.30	35.7	7.9	4.52	1.42
Services	52.7*	20.5*	2.57*	6.02*	137.7	11.1	12.40	1.13	137.2	11.1	12.36	1.38
Total	86.2	18.6	4.63	5.7	43.3	8.7	4.98	4.03	43.5	8.8	4.94	5.04

\* Includes Trade and Commerce also.

† For explanations see text.

**Table 12 : Performance Indicators of the Model during 1997-02 (Values Rs. 000 at 1980-81 Prices)**

	20 Per cent Investment Scenario				25 Per cent Investment Scenario			
	Investment Per man Year	Income Generation Per man Year	Capital Output Ratio†	Growth Rate (% of per Year)	Investment Per man Year	Income Generation Per man Year	Capital Output Ratio†	Growth Rate (% of per Year)
Agriculture	34.9	7.9	4.42	4.4	35.3	8.1	4.36	5.34
Industry	53.7	9.9	5.42	5.96	53.7	9.9	5.42	7.32
Construction	34.9	8.0	4.35	2.64	35.3	8.1	4.36	3.24
Trade & Commerce	34.9	10.9	4.01	1.76	35.3	11.0	3.21	2.17
Transport & Communication	35.5	7.9	4.49	1.33	35.6	8.1	4.40	1.55
Services	137.2	11.1	12.36	1.09	137.3	11.1	12.37	1.33
Total	44.3	8.9	4.97	3.99	44.7	8.9	5.02	4.99

† For explanations see text.

model allocated as high as 53-54 percent of the employment to the rural sector.

**An overwhelmingly large part of the employment, thus, generated by the model has been in the rural sector.**

### (ii) Growth of the Economy

The higher employment generation targets achieved by the model have not been found to constrain the growth performance of the economy. Of course, the rate of growth of the economy turned out to be lower at 20 percent investment rate in the case of the model when compared to those from the Five Year Plans. However, at comparable investment rates, the growth rates of the economy happened to be either equal or higher accord-



ing to the model when compared to those from the Five Year Plans.

**The higher employment generation targets achieved by the model have not been found to constrain the growth performance of the economy.**

### **(iii) Sectoral Shares in investments**

The rapid industrialization based growth strategy of the Five Year Plans allocated a disproportionately higher share of investments to the modern sectors like industry, transport and communications and services. This has the consequence of rendering the investments per man year higher in these sectors by multiples of that in the rural sector; about 7 times in Sixth Plan, 5 times in Seventh Plan and 3 times in Eighth Plan, all in the case of the industrial sector. The model, however, narrowed down this gap to less than 100 percent levels. This is a significant outcome of the model because of the unfavourable impact of such an allocation on the age old 'structural dualism' that prevails between the rural and the urban sectors. However, the same degree of reduction in investment per man year could not be achieved in the case of transport and communication and services sectors, probably because of the inherent nature of the technologies in the case of these sectors. But this has not affected the overall outcome of the model because of the comparatively lower share of investments and employment allocated to these sectors.

### **(iv) Distribution of Income**

The most conspicuous outcome of the model is the rise in the average incomes of those additional man years of employment generated in the rural sector during each plan period. The increase was from Rs. 4300 to Rs. 7200, in the Sixth Plan; from Rs. 3900 to Rs. 7600 in the Seventh Plan all at 1980-81 prices. During the Eighth Plan period however the average income generation in the rural sector has been decreased according to the model, when compared to the Five Year Plan estimates, from Rs. 9,900 to Rs. 7,800 both at 1980-81 prices. This is because of the reduced capital intensity of the rural sector according to the model in comparison to the Eighth Five Year Plan propositions; from Rs. 59500 per man year to Rs. 33500. However, it is important to note that the average income per man year has been drastically reduced in the case of the industrial sector also. The employment generation

targets were substantially higher in the model when compared to those according to the Eighth Five Year Plan. It is also significant that the sectoral differences in income generation per man year were considerably narrowed down according to the model during the Ninth Plan period.

### **(v) Sectoral Shares in Income**

The combined impact of allocations both of higher investments per man year and employment targets to the rural sector has resulted in the arrest of the downward trends in the share of rural sector in the additional income generated during each plan period. According to the model computations, this share has been rising during subsequent plan periods, unlike in the case of Five Year Plans. According to the Sixth Plan, the share of rural sector in the GDP would have declined from 35.2 percent in 1979-80 to 33.1 percent in 1984-85. According to the model, the share of the rural sector increased to 40-41 percent in 1984-85, depending upon the investment rate. Similarly, the rural sector's share should have declined from 38.3 percent in 1984-85 to 34.1 percent in 1989-90 according to the Seventh Plan. According to the model, this share increased to about 40-41 percent in 1989-90. The decline was from 25.8 percent in 1991-92 to 22.8 percent in 1996-97 according to the Eighth Plan which was reversed to increase to 43 percent during the same period. The share of the rural sector will continue to rise slightly during the Ninth Plan Period also.

**The most conspicuous outcome of the model is the rise in the average incomes of those additional man years of employment generated in the rural sector during each plan period.**

### **Unemployment : The Final Scene**

The implications of the growth of the economy according to the Five Year Plans and according to the model, on the unemployment scene are summarised in Table 13. Given the uniform unemployment figures as at the beginning of each plan period the model yields higher employment targets. Most strikingly, while according to the Eighth Five Year Plan, the unemployment is likely to be about 13.24 percent at the end of the plan period, it is likely to be about 9.7 percent, according to the model at an investment rate of 20 percent. This is likely to decline to 4.9 percent if the investment rate could be considered



**Table 13 : Labour Force and Unemployment Scene**

	Labour Force (Million)	Man Years Employed (Millions)			Man Years Unemployed (As percent of labour force)		
		Five Year Plan	Model		Five Year Plan	Model	
			Investment Scenario			Investment Scenario	
			20%	25%		20%	25%
1979-80	237.68 <sup>†</sup>	151.11 <sup>**</sup>	151.11 <sup>**</sup>	151.1 <sup>**</sup>	36.42	36.42	36.42
1984-85	289.81 <sup>†</sup>	185.39 (186.70) <sup>†</sup>	185.75 (186.70) <sup>†</sup>	195.72 (186.70) <sup>†</sup>	36.03 (36.57)	35.90 (35.57)	32.43 (35.57)
1989-90	306.81 <sup>†</sup>	227.06	222.86	232.94	25.99	27.36	24.07
1991-92	294.60 <sup>*</sup>	246.75 <sup>††</sup>	246.75 <sup>††</sup>	246.75 <sup>††</sup>	16.24	16.24	16.24
1996-97	325.87 <sup>*</sup>	282.70	293.97	309.73	13.24	9.79	4.95
2001-02	367.82 <sup>*</sup>	NA	337.68	361.13	NA	8.19	1.81

\*\* Sixth Five Year Plan estimates.

† Seventh Five Year Plan estimates.

\* Eighth Five Year Plan estimates.

†† Estimated by the present study:

The employment levels in each year are arrived at after adding the estimated employment generation according to each scenario during the plan period to the respective uniform employment levels at the beginning of the plan excepting the case of Ninth Plan for which there is not yet any employment estimate.

**If the investment rate could be treated as 25%, unemployment could be brought down to 1.8 percent by the end of the Ninth Plan period, according to the model.**

as 25 percent. Again, if the investment rate is treated as 20%, there will still be an unemployment rate of 8.19 percent at the end of the Ninth Plan period (2001-02). If the investment rate could be treated as 25%, unemployment could be brought down to 1.8 percent by the end of the Ninth Plan period, according to the model.

## Conclusion

Given the rapid industrialization based growth strategy, India's Five Year Plans extended only a secondary role to the rural sector, a role that shortcircuited the minds of the policy makers to limit the scope of the rural sector within the confines of the 'Cheap Food Paradigm'. Since this strategy, in general, neglected the developmental requirements of the labour intensive agricultural sector it debilitated the economy in dealing effectively with the twin maladies of large scale underemployment and unemployment on the one hand and abject poverty on the other. Governed by a system of efficiency based on international standards, Indian organised sector resorted to

techniques of high and increasing capital intensity. The growth of the farm sector itself became unbalanced in this development process because the production target oriented secondary role assigned to it prompted the adoption of a relatively capital intensive 'bimodal' development path as against the popular 'unimodal' growth which encourage techniques based on the local resource endowments and their wider diffusion. Thus, the declining labour intensities in the farm and nonfarm sectors of the economy has emerged not as a sequel to the changing factor endowment but as a consequence of a deliberate attempt at forcing the growth of the economy along the path of capital intensive industrialization. The success in rural development requires that the rural sector's productivity is substantially raised so that there is no incentive on the part of the rural labour to migrate to urban areas in search of higher sources of incomes and also that the opportunities in the rural areas are sufficiently large enough to absorb a majority of the unemployed and underemployed man years in to gainful economic activities. This, however, requires extension of primacy to

**The model evolved, here is a proof to the effect that it is possible to totally eliminate rural unemployment by the turn of century without any loss of growth momentum.**



rural sector in the allocation of planned investments. The model evolved, here is a proof to the effect that it is possible to totally eliminate rural unemployment by the turn of century without any loss of growth momentum, even after allowing for the imperfections in the data caused by the use of an input-output table relevant for mid eighties.

## References

- Ahluwalia, Isher Judge (1985)**, *Industrial Growth in India, Stagnation since Mid Sixties*, Oxford University Press, Delhi.
- Ahluwalia, M.S. (1974)**, "The Scope for Policy Intervention" in Hollis. B. Chenery et.al (ed), *Redistribution with Growth*, Oxford University Press, New York.
- Alagh, Y.K., (1972)**, "Growth Performance of the Indian Economy, 1950-89; Problems of Employment and Poverty." *The Development Economics*, June 1992.
- Bagchi, Amiya Kumar (1990)**, "Planning for Employment", *Economic & Political Weekly*, (April 21).
- Bhagwati, J.N. & Padma Desai (1970)**, *India: Planning for Industrialisation*, Oxford University Press, London.
- Bhagwati, Jagdish (1992)**, *India's Economy: The Shackled Giant, The 1992 Radhakrishnan Lecture*, CII, New Delhi. (Mimeo)
- Bharadwaj, Krishna (1990)**, "Paradigms in Development Theory: Plea for Labourist Approach". *Economic & Political Weekly* (Jan. 27).
- Chakravarty, Sukmoy (1974)**, *Reflections on the Growth Process in Indian Economy*, Administrative Staff College of India, Hyderabad.
- Chakravarty, Sukmoy (1989)**, "Nehru and Indian Economic Development" in P.V. Indiresan et.al (ed) *Development Through Technology*, Indian Institute of Technology, New Delhi.
- Dasgupta, Biplab (1983)**, "India's Green Revolution", V.S. Mahajan (ed), *Studies in Indian Economy*, Deep & Deep Publications, Delhi.
- Dhingra I.C. (1990)**, *Indian Economy*, Sultan Chand & Sons, New Delhi.
- Domar E.D. (1957)**, "A Soviet Model of Growth", *Essays in The Theory of Growth*, Oxford University Press, New York.
- Griffin K.B. & J.L. Enos**, *Planning Development*, Addison-Wesley Publishing Co., London.
- Hanumantha Rao, E.H. (1990)**, "Changes in Agricultural Structure: The Indian Experience" in Asian Productivity Organisation, *Improving Agricultural Structure in Asia & The Pacific*, Tokyo.
- Johnston, Brice F. (1972)**, "Criteria for the Design of Agricultural Development Strategies", *Food Research Institute Studies, in Agricultural Economics, Trade and Development*, Vol. II, No. 1, excerpted in Gerald M. Meier, *Leading Issues in Economic Development*, Oxford University Press (1984) under the title "The Case for the Unimodal Strategy".
- Johri, C.K. (1992)**, *Industrialism & Employment Systems in India*, Oxford University Press, Delhi.
- Mahalanobis, P.C. (1953)**, "Some Observations on the Process of Growth of National Income", *Sankhya*, (16).
- Minhas B.S., L.R. Jain & S.D. Tendulkar (1991)**, "Declining Incidence of Poverty in the 1980s: Evidence US Artifacts". *Economic & Political Weekly* (July 6).
- Morawetz, David (1974)**, "Employment Implications of Industrialization in Developing Countries" *Economic Journal*, (Sept).
- Papola T.S. (1988)**, "Restructuring in Indian industry: Implications for Employment and Industrial Relations", ILO-ARTEP, New Delhi.
- Planning Commission (1956a)**, *Second Five Year Plan: A Draft Outline*.
- Planning Commission (1956b)**, *Second Five Year Plan*.
- Planning Commission (1981)**, *Technical Note on Sixth Five Year Plan 1980-85*.
- Planning Commission (1985)**, *Seventh Five Year Plan 1985-90, Vol. 1*.
- Planning Commission (1986)**, *Technical Note on Seventh Five Year Plan 1985-90*.
- Planning Commission (1990)**, *Employment: Past Trends & Prospects for 1990s.*, Working Paper.
- Planning Commission (1992)**, *Draft Five Year Plan, 1992-97, Vols. I & II*.
- Raj, K.N. (1976)**, "Growth and Stagnation in Industrial Development", *Economic & Political Weekly*, (Nov. 26).
- Raj, K.N. & A.K. Sen (1961)**, "Alternative Patterns of Growth Under Conditions of Stagnant Export Earnings", *Oxford Economic Papers*, 19(1).
- Rudra, Ashok (1975)**, *Indian Plan Models*, Allied Publishers; New Delhi.
- Satyapaul (1988)**, "Unemployment in Rural India", *Economic & Political Weekly* (July 16).
- Sen A. (1981)**, *The Agrarian Constraint to Economic Development: The Case of India*, Unpublished PhD Thesis, Cantridge quoted in Sen (1990).
- Sen, Pranab (1990)**, "Growth Theories and Development Strategies, Lessons from Indian Experience" *Economic & Political Weekly* (July, 27).
- Sen, Bandhu Das (1974)**, "The Green Revolution in India", quoted in Dasgupta (1983).
- Stewart, Frances (1978)**, *Technology & Underdevelopment*, 2nd Edition, MacMillan, London, excerpted in Gerald M. Meier, *Leading Issues in Economic Development*, Oxford University Press (1984) under the title "Technology & Employment".
- Vaidyanathan A. (1977)**, "Constraints on Growth & Policy Options", *Economic & Political Weekly*, (Sept. 17 & Dec. 17).
- Visaria, Pravin & B.S. Mirhas (1991)**, "Evolving an Employment Policy for the 1990s, What do the Data Tells us"? *Economic & Political Weekly* (April 13). □



# Impending Events: A Global Industrial Relations Perspective

C. S. Venkata Ratnam

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*In the wake of the tidal wave of transition sweeping through the whole globe, the author elaborates on the changes likely to occur in the area of industrial relations. The impact of decentralisation will usher in financial participation of employees, opines the author.*

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We are living in a world where rapid changes have become a constant feature. Unabating turbulence and never-ending transition compound the complexity of our diverse societies even as they seem to become "borderless." The past few years have been both eventful and traumatic with significant changes in the world order which have profound implications for the future of the mankind.

## Democratisation

The wave of democratisation—political transformation in Eastern Europe and the former USSR, the German unification, the retreat of Latin America's military rulers and the progress of multi-party democracy in Africa—continues to sweep the world today and radically affect the lives of working people and their employers. This has led to the breakdown of certain orthodox ideologies, transition and transformation of economies, and changes in industrialisation strategies which influence human resource policies and industrial relations. Developments in one part of the world create ripples all over. The changes in the former USSR and the Gulf War have affected the Indian economy with consequential implications for employment and industrial relations.

## Globalisation

National policies are being influenced significantly by extra-national forces on a variety of economic, social and labour matters. Problems and decisions in one part of the world affect prospects and shape the events and institutions elsewhere too. International debt and cross-national inequities are limiting the sovereignty of independent nations to act decisively even on internal matters. This is a new interpretation of global interdependence which unfortunately is not based on balance of power and opportunities.



Globalisation impinges on industrial relations because it contributes to structural changes resulting from new forms of organisation of work and production within and between firms and also because it subjects national labour markets to increased pressures from foreign economic influence (Campbell, 1991). Far reaching technological changes have altered earlier notions about comparative costs and competitive advantage. Japanese auto firms located in North America bargained for 4 job classifications in the place of 100, for instance. The employment dislocation due to job reclassification and new competitive forces resulted in a decline of 500,000 for the auto workers union in Japan in 1980s (Reich, 1991). In the context of new employer initiatives for flexibility and competitiveness in a global firm, trade unions are considering a variety of options (Hecker & Halleck, 1991) such as the following which need not be mutually exclusive but can be used in combination:

- Restricting the mobility of capital so that it cannot shop for cheaper labour in developing countries or lower-wage industrial nations
- Raising the cost of doing business in other nations through international organising, international labour standards, and multinational bargaining campaigns and
- Accepting the mobility of capital, choosing to compete in the world economy on some basis other than wages—for example, a “high-wage/high performance” industrial policy—and dealing with the adjustment side through domestic labour market policies.

**Globalisation impinges on industrial relations because it contributes to structural changes resulting from new forms of organisation of work and production within and between firms and also because it subjects national labour markets to increased pressures from foreign economic influence.**

### **Structural Adjustment & Unemployment**

International debt, recession in most parts of the world, growing unemployment and inflation have been major problems. Social security systems in industrialised countries are becoming vulnerable. Sweden had to scale down employers' contributions to social security, Italy

had to consider stopping indexation of wages. Large scale redundancies and workforce reductions in many parts of the world cast additional responsibility to seek or sustain social security arrangements.

**International debt, recession growing unemployment and inflation have been major problems.**

The employment scene will continue to be a cause of concern accentuating deprivation and social tensions. In the wake of German unification, East Germany lost one out of every three jobs. Most European countries have about 6 per cent unemployment rate and 12 per cent poor. Rise in unemployment and shift to part-time or informal sector employment will together make more and more jobs less paying. As has happened in the last decade, during 1990s also, employment stability can be maintained in several parts of the world at the cost of a steep decline in real wages. In sub-Saharan Africa, on average, real wages fell by 30 per cent during 1980 and 1986 and urban unemployment is expected rise from the current 18 per cent to about 31 per cent by the end of this decade. Asia outperformed all regions in the world but South Asia continues to languish.

International organisations have begun to express concern about decline in the creation of productive employment and the deterioration in human capital due to the contraction of social expenditures such as on education, health and housing. Notwithstanding education and training policies to enhance workers' productivity and flexibility to adjust to rapidly changing job markets, unemployment problem persists even in industrialised countries (ILO, 1992b). The social and labour policies which hitherto did not receive much attention from the Brettonwood twins (IMF and the World Bank) are likely to gain due consideration in the current and future structural adjustment reforms.

### **Competitiveness**

Accelerated rate of growth, productivity improvement and accent on total quality will, no doubt, be the corner stones of competitiveness in a global economy. But these alone would not suffice. Innovation and strategic alliances will make a vital difference to the fortunes of enterprises and economies. Improvement, if not innovation, has been the main strength of many economies in Asia (AIMA, 1992).



**Accelerated rate of growth, productivity improvement and accent on total quality will be the corner stones of competitiveness in a global economy.**

Unbridled competition has its negative side too. Market forces, if left alone altogether, care less for social issues. It is only very recently that World Bank and IMF have begun to focus attention on social and labour issues also in the wake of efforts of organisations like the UNESCO and the ILO.

The Confederation of Japan Automobile Workers' Unions (JAWA) recently addressed itself to this problem through a research survey and listed the "triple suffering" due to excessive competition for the sake of competition: the employees are exhausted, the profits are declining and the industry is bashed from abroad (JAWA, 1992).

### **Privatisation**

The transition of Central and East European countries to free market economy was based mainly on a negative vote due to mounting dissatisfaction with communism and command economy. The structural adjustment pressures also resulted in a massive thrust towards privatisation in most developing countries. Privatisation is one of the major elements of structural adjustment process going on in most parts of the world. It involves complex social and labour issues. Fears about privatisation centre around potential loss of present and future jobs. However, there is not enough evidence to suggest that privatisation *per se* destroys jobs. Be that as it may, the focus on efficiency improvement in units with surplus manning usually leads to short-term reduction in jobs, even if there is no privatisation. In countries with significant levels of unemployment and a small proportion of labour force engaged in the organised sector, this can create a major social problem. Hence the emphasis on job security measures and creation of a social security net. However, a country's ability to provide such security effectively depends mainly on its economic health including low rates of inflation and unemployment, high growth of gross national product, and low debt and deficit.

The trade unions are against privatisation due to fear about job loss and potential adverse effects on the dynamics of trade unions and their rights. Trade unions ability to impede privatisation in general and adjustment and restructuring in particular, seem to be inversely re-

lated to the political will of the government to meaningfully carry out the process involved. To begin with, the free trade union movement had the ideological dilemma that opposition to privatisation is opposition to free enterprise itself. The unions were also handicapped by the growing dissatisfaction of the public with the unsatisfactory performance of the public services. In several countries, after privatisation, the trade unions have gained rights. This is particularly so in the case of Indonesia and former USSR where the right to organise, right to collective bargaining and right to strike have been restricted or denied not only in public services but also public utilities and parastatals. But, with privatisation, the restrictions have been generally removed. Trade unions, however, maintain that improvement in workers rights notwithstanding, in practice they find it more difficult to exercise them in private sector than in public sector, particularly, in developing countries.

The negative effect of privatisation on collective bargaining and trade union dynamics was experienced in some countries like Philippines and Japan. Also, in countries like Poland, the transformation of the economy diminished or altered the powerful role that work councils used to enjoy at the enterprise level. Though the employee ownership has occasionally raised suspicion about the effects of workers' capitalism, financial participation of employees in corporate turn-arounds and privatisation is on the increase in several countries.

### **Technological Change**

The interaction between technological change, particularly microelectronics technology, and industrial relations continues to have far reaching consequences in the world of work. Technological changes provide unprecedented opportunities for employers to gain control over

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the workplace and workers though, they would be well advised to shed or share power than seek to put the clock back. The transition from agriculture to industry, to service and to the present post-industrial, hightech information society resulted in a shift in emphasis away from brawn to brain or muscle to mind in the use of human energy. This rendered the old values, philosophy, beliefs



and management principles based on direction and control archaic and called for a shift to management based on consent and consensus. Physical labour can be monitored and controlled easily, in a relative sense, but not mental processes of work involving, among others, obtaining one's discretion and securing one's initiative.

**Financial participation of employees in corporate turn-arounds and privatisation is on the increase in several countries.**

Managerial policies and strategies concerning investment and use of new technology are usually aimed at securing one or several of the following objectives (Ozaki, et al, 1992):

- Reduction of labour input in work processes, either to reduce labour costs or to cope with labour shortages
- Greater efficiency of operations through closer managerial control and production processes
- Higher quality of products or services through greater precision of operations and speedier delivery of information made possible by the computer
- Improvement of the ability to produce custom-built products in small batches, and to adapt production to the diverse and changing demands of clients.

The union policies and strategies on new technology vary across countries. In developing countries, they tended to oppose new technology for fear of loss of employment, earnings and control over work processes as also due to apprehensions concerning the effects of new technologies on social relations, union dynamics, health and safety, etc. In some industrialised market economies, however, unions have made significant efforts to develop coherent policies on technology, aimed at making new technology instrumental in humanising work and generally enhancing workers' well-being as well as in improving the efficiency of industry (Ozaki, et al, 1992) through:

- Legislative reforms enabling union/worker participation in decision-making on technological change (eg. Codetermination Act, 1976 of Sweden)
- Participation in joint project groups for developing new technology and new forms of work organisation (Sweden)

- Shift of emphasis in collective bargaining from quantitative objectives (related to the level of pay) towards qualitative objectives (aimed at influencing the content of human labour through integrated jobs in which planning, preparations, execution and supervision are integrated into one job and stress on semi-autonomous team work)
- Building up technical resources within unions and workers through union group work, specialist help, training of works council members, etc.
- Realisation about the need for trade unions to assume greater responsibility in the wake of economic recession and crisis of competitive pressures. For instance, in Italy in December 1984, a protocol was signed between the Institute of Industrial Reconstruction (IRI – the largest holding company for public sector enterprises) and the three major union confederations, providing for the involvement of the unions in most decisions on reorganisation and technological innovation from the planning phase. The agreement between Steel Authority of India Limited and several federations of trade unions concerning modernisation of its plant at Burnpur in June 1989 could also be cited as a relevant example in this regard.

### **Freedom/Rights, International Standards & Trade**

Human freedom and human development issues are gaining currency. Global comparisons based on Human Freedom Index and Human Development Index (UNDP, 1991) brought the issues concerning human freedom, equality, poverty, human survival and environmental degradation (The Earth Summit, Rio, 1992) to the centre stage. Universal primary education, primary health care, family planning, safe water and the elimination of malnutrition have been identified as realistic human goals for the year 2000 A.D. which require an investment of around US \$ 20 billion a year. UNDP estimates that developing countries can save over US \$ 10 billion a year by merely freezing their military expenditure at current levels and developed countries can contribute US \$ 25 billion if they provide 3 per cent of peace dividend through cuts in defence spending. The UNDP has been stressing that just as economic growth is necessary for human development, human development is critical to economic growth; high levels of human development tend to be achieved within the framework of high levels of human freedom and a workable political strategy; national budgets and international aid can be restructured in favour of human development; nearly US \$ 50 billion a year can be



released in developing countries alone for more productive purposes.

Greater respect for international labour standards and protection of human rights such as the eradication of all forms of discrimination have become a major concern of international organisations. International aid and trade will increasingly be linked to labour standards and human rights issues. Carpet makers in India who use child labour, for instance, have been denied entry to sell in Europe. Competitive strategies based on cheap labour and denial of basic trade union rights in export processing zones will boomerang. Chinese exports to the tune of US \$ 100 to 150 million a year based on the output from forced labour in prisons and labour camps are now being threatened since public policies in several industrialised countries do not favour import of goods and services generated through use of forced labour. Those who do not see the interrelationship among employment, international trade, international labour standards and human rights issues will soon find themselves in a quandary.

**Despite verbal commitment to free trade and borderless world, regionalism and protectionism are raising their ugly head.**

Despite verbal commitment to free trade and borderless world, regionalism and protectionism are raising their ugly head. Already three regional groupings have emerged: US, Canada and Mexico, European Community and Asia-Pacific rim. The Apartheid in South Africa may be part of history, but racial tensions are spreading in Europe manifesting in organised attacks on migrants and refugees. In India we have our share of problems with ethnic and regional differences and sub-national aspirations leading, among others, to unstructured situations in industrial relations.

#### **Quality, Standards, Patents & Environmental Issues**

Demand for quality, standards, intellectual property rights and ecologically friendly products is growing. Quality is not free and requires a distinct orientation and a new value system. Strict Standards (ISO 9000, for instance) need to be understood and complied with lest even entry into global markets be denied. In the wake of threatening reports about the environmental degradation several countries are passing strict legislation that may affect businesses who fail to pay heed to the writing on the wall. A recent German legislation, for instance, requires

the manufacturers to assume responsibility for collecting certain packages back and dispose them off properly without polluting the environment.

Prevention of industrial disasters is on the top of the agenda since industrial installations are a potential source of hazard. As the World Labour Report, 1992 noted, "Bhopal has become a symbol of what can go wrong." New approaches include a fresh directive from European Community that classifies installations according to degrees of risk and indicates what kind of notification manufacturers must give to the authorities. Germany alone has already classified, 3000 sites. It is a daunting task for developing countries like India which are making half-hearted attempts to set environmental courts, etc. The 1993 International Labour Conference is likely to adopt a convention and/or recommendation on the subject to guide countries minimise the risks from hazardous installations.

Occupational safety and health is another major issue. We do not yet know enough about the full effects and consequences of new technologies and materials (chemicals, for instance) on occupational safety and health. The problem is not confined to work sites alone. Their transportation could be dangerous too. Also, new forms of organisation and employment is leading to an increasing use of home work and scattered offices. Far reaching legislative changes of the type India had undertaken alone cannot help. The employers, employees, union leaders and factories inspectors need to be trained to comply with the requirements. When it comes to old installations and work sites, often there could be a trade off between occupational safety and employment security—a dilemma that is difficult to resolve in an economy with rampant unemployment and underemployment.

#### **Changes Affecting HR/IR Perspectives**

The transition and transformation occurring in the world led to shifts/changes that affect human resource and industrial relations perspectives. The description in table 1 is illustrative, not exhaustive. The transition occurs on a continuum and we may find plurality where aspects associated with the past coexist with the present posing additional dilemmas for those responsible for managing work systems in such diverse, and complex settings.

It is both difficult and unwise to generalise the effects of the myriad, complex and rapid changes occurring at various levels within and outside enterprises, nations, regions and in the world on industrial relations. Industrial relations is culture specific. There are significant institu-



tional differences in industrial relations across countries. The persisting difficulties within European Community in evolving a common social policy substantiates this.

**Table 1:** Changes Affecting HR/IR Perspectives

Aspect	Past (around II World War)	Present/Future
Political	Few Democratic independent countries	Surge of Democracy Few colonies
Economic systems	Diverse	Converging
Economic activities	Mainly agricultural, Some industry	Service and High-tech
Technology	Machine tending	Predominantly microprocessor based
Wealth base	Land and Capital	Knowledge and Know-how
Corporate Ownership	Emphasis on public sector and nationalisation upto early 1980s	Focus on private sector initiative
Corporate organisation	Rise of modern corporation, multinationals	Emergence of global firms
Work organisation	Classical, bureaucratic, pyramidal hierarchies	socio-technical systems; flat structures and integrative networks
Social base	Inequitous, Colonial	Emphasis on equity and human freedom
Human energy use	Muscle and machine-tending skills	Increasing emphasis on mental faculties
Management	By direction and control	By consensus and commitment

Although future trends can be anticipated to some degree, policies and programmes seldom lead, or even keep up with, changes in economic and social conditions. Most of the policies that guide us today were based on yesterday's conditions and experience. As times changed, their relevance can be called into question. As change continues to unfold between now and the year 2000, many of the policies from past decades are likely to become irrelevant to the needs of the 1990s and beyond (Hudson Institute, 1987). Subject to these limitations the following observations could be made about HR/IR perspectives for the future.

The changing world order keeps economies in a stage of transition and flux. Only change is permanent. Political systems, economic conditions and technologies are changing. Decline in faith in public sector led to new opportunities for private initiative. The demographic

changes require us to learn to manage a rapidly changing diverse workforce.

New technologies, new jobs, new skills, workforce with new characteristics, new work practices, new work organisations... The problem is not just with coping with what is new and let the new coexist with the old, but in adjusting with rapid changes.

The forces of globalisation and competition will require high performance systems and thus call for developing disciplined and skilled workforce; and, sustaining their motivation and commitment by finding a match between their own and that of organisational expectations and needs.

**The forces of globalisation and competition require high performance systems and call for developing disciplined and skilled workforce.**

Industrial relations systems and policies are a product of industrialisation strategies and to some extent reflect the stages of growth and vulnerability of economies. Significant institutional changes occurred in countries which had faced serious economic crises.

Structural adjustment pressures and technological changes give employers greater power and discretion to influence workplace industrial relations. Unions in most parts of the world have become more vulnerable today than ever before. They are losing old clout, but gaining basic rights of freedom of association, right to collective bargaining and right to strike that had been denied to them till recently in Central and Eastern Europe as also public sector in some countries, but their ability to use such rights could be much less in private sector under the changed situation. If employers seek to put the clock back and control workers with old notions of hire and fire, it might result in counterproductive outcomes. The only way to foster healthy, productive, peaceful and purposive relations between employees and employers and union and management lies in securing cooperation between the partners for common goals through joint consultation and striving for equitable balance between their divergent interests through negotiations in good faith. Humanising the workplace even as flexibility is maximised and empowering the workforce with skills, competence, say and stake, will harmonise the requirements of material growth



with social well-being, and productivity improvement with quality of worklife.

**The only way to foster healthy, productive, peaceful and purposive relations between employees and employers lies in securing cooperation between the partners for common goals through joint consultation.**

In several countries, the major changes in industrial relations are seen in terms of decentralisation and bargaining with local unions with much reduced effective influence and intervention from national federations of trade unions and government. Bargaining at other levels, particularly centralised bargaining is becoming less common with the weakening of centralised trade union structures and emphasis on instrumental orientation and pragmatism based on perceptions concerning enterprise level economics. There is a new resurgence of corporatist, enterprise unions, particularly in North America and several countries in South-East Asia. The new industrial relations practices seem to focus in some cases on individualised contracts replacing collective bargaining, skill development and direct two-way communications with employees.

Rapid changes call for adjustment or adaptation. It requires restructuring at macro and micro levels to bridge the gap between current and expected (competitive) levels of performance. Enterprise restructuring involves changes in firm's product, processes, markets, etc.; changes in management and organisation; education and retraining; plant relocation, specialisation, modernisation, mergers, acquisitions, divestitures, leveraged buyouts, recapitalisation, down-sizing and clarifying the relationship between government and public enterprise. Flexibility has become the catch word in adjustment/adaptation process. As Kanawaty et al (1989) argue, flexibility in human resource management may be viewed differently, according to the context, as the ability to:

- Reduce or increase employment or wage levels with ease
- Increase mobility
- Make more elastic use of skills for-greater occupational flexibility
- Introduce non-conventional working arrangements such as part-time work, temporary work,

subcontracting, disguised wage work, self-employment, etc.

Against this backdrop, employers want to dispense with feather-bedding and restrictive work practices through bargaining and joint consultation if they cannot unilaterally act in these matters. The concept of wage flexibility introduced in Singapore in mid 1980s is gaining currency in the Asia-Pacific region (National Wages Council, 1985)

Financial participation by employees is likely in the years ahead. The Pepper Committee report and the European Community recommendation on the subject has brought the issue into sharp focus with employers' organisations generally favouring voluntary arrangements at the discretion of employers at the company level (Venkata Ratnam, 1992), in the wake of structural adjustment and privatisation financial participation is being encouraged by governments and international donor agencies. Grant of shares through free distribution (in several Central and East European countries) which is popularly referred to as "voucher privatisation", distribution of shares on concessional terms, establishment of Employee Stock Ownership Plans (ESOPs) and management/employee buyouts are becoming a common element in the privatisation strategies. According to a World Bank study (Vulsteke, 1988) about 5 per cent of the completed privatisations (20 out of 392) during 1980-87 were through worker/management buyouts. 12 of these were in the UK and 5 in Cote d' Ivory. Chile, Denmark and Gambia also reported one case each. In Philippines, the tripartite industrial peace accord (May 1990) provided, among others, that, "Workers and Employers agree to recommend to the Asset Privatisation Trusts that in case of sale or privatisation of government owned or controlled corporations, the workers affected should be given the right of first refusal to purchase the company or shares/interest thereof." Alexandria tyre company in Egypt followed the ESOP programme. In Hungary and Poland, 20 per cent of the shares have been earmarked for employees through legislation. In Pakistan 26 per cent of the shares in Allied Bank were allotted for purchase by employees on the eve of privatisation with a promise of another 25 per cent shares in the same bank a year hence. 6 out of 55 privatisations carried out in Pakistan during 1991-92 were through employee buyouts. It is too early to assess whether this trend will be irreversible. Much depends on the industrial and economic progress and prosperity as also the preferences of employees for ready cash vis-a-vis long term capital appreciation. The effects of such employee financial participation on corporate governance and performance are still to be seen and the



available evidence and experience on the subject have been mixed.

Human resource policies influence the nature and quality of industrial relations at firm level. A major challenge awaits the human resource function to effect the changes with a human face and human concern limiting the negative effects on employment conditions and industrial relations without violating the regulatory-moral, legal and contractual-framework defining mutual rights and obligations of unions and employees. The transfer of ownership clarifies managerial objectives and fosters new patterns of industrial relations. Also, as Colling's (1991) analysis suggests, change in the external environment will be mediated by the needs and perceptions of actors within the process and may expose managers to a range of contradictory pressures.

**Human resource policies influence the nature and quality of industrial relations at firm level.**

### Perspectives for India

From the second most industrialised nation in Asia at the time of independence India has "de-graduated" to the bottom of the top ten in 1990s. Its economic growth is nullified by population growth. It ranks 12th in the World GNP in 1990, but 154 in terms of per capita GNP. India's share in world exports declined from 1.4 per cent in 1955 to 0.5 per cent in 1990; its share in world imports also declined from 1.3 per cent to 0.7 per cent during the corresponding period. The World Competitiveness Report declared India to be the least competitive among the 10 newly industrialised countries. Our strongest resource-human resources-is our weakest link. Much less than 50 per cent of our organised workforce have either technical skills or studied beyond matriculation. Our people's skills are sought after world over and fetch much coveted foreign exchange remittances, not the products and services that they render, here in India. The 1992 UNDP Report on Human Development pronounced that India ranks rather low (121st in a total of 160 countries) in terms of Human Development Index. We are the world's largest democracy yet we score 15 out of 45 in terms of Human Freedoms Index. We need to introspect to arrest the fall. We can be what we want to be: as individuals, as an enterprise and as a nation.

**The industrial relations policy and legislation are out of tune with our new economic policy and industrialisation strategies.**

The industrial relations policy and legislation are out of tune with our new economic policy and industrialisation strategies. There is a crying need for legal and institutional reform. Thrice in the past, when labour law reform bills were introduced in the Parliament the then Government in power fell. Instead of endlessly waiting for political reforms at macro level, corporate leaders from both management and unions should take joint initiatives to reform the industrial relations scene at the enterprise level.

Tensions in Central-State relations and politicised polarisation on labour matters which are in the "concurrent list" of our Constitution make the Government thinking on the subject less representative particularly because the State governments are ruled by several national and regional level parties. The employers organisations too are not quite representative of employers. Despite their alleged national character, the membership base of most organisations is limited. The cumulative membership strength of all unions submitting returns is less than 2 per cent of the total labour force in the country and those covered by collective agreements less than 1 per cent of the workforce. Thus even the one dozen and odd "national trade union federations" are not quite representative and recent studies point to their waning influence. The continued decline in employment in organised sector which itself stands at less than 10 per cent today is accelerating their marginalisation. Since early 1970s, tripartism suffered a set back and needs revitalisation.

**The employers organisations too are not quite representative of employers. Despite their alleged national character, the membership base of most organisations is limited.**

What about bi-partism? Unfortunately, here too, as Ganguly (1989) observed, "We find ourselves face to face with a possibly unintended but nevertheless unholy alliance of management and labour in building an economy of poor performance and high cost for the benefit of a few



at the cost of many." Employees' wages double in the organised sector every six to seven years without reference, whatsoever, either to individual or company performance. Labour costs as a proportion of total costs vary from less than 2 to about 60 per cent from petro-chemicals to coal; yet, we wish to evolve uniform pay and benefit schemes. In recent years, certain unconventional trends in collective bargaining have manifested themselves (Venkata Ratnam, 1991b), the full impact of which is not known yet.

The highly protective legislation through stringent job security regulations of 1976 introduced to provide job and income security backfired and effectively reduced the demand for employees in the organised subject in the years that followed (Fallon & Lucas, 1991). When not only did the rate of growth of jobs decelerate in both public and private sectors, but there was also a decline, in absolute terms, of employment in organised private sector during mid-1980s.

The above description of Indian industrial relations perspectives is illustrative of the range of concerns. We may juxtapose these in the light of the developments in other parts of the world to discern lessons, if any, for us.

### References

- AIMA** (1992), "AAMO-11th International Management Conference on Asia-Pacific Region-Management in Transition. 1-4 Nov. 1992, New Delhi." New Delhi: Asian Association of Management Organisations and All India Management Association.
- Campbell, D.**, (1991), "Globalisation and Strategic Choices in Tripartite Perspective: An Agenda for Research Policy Issues." Geneva: International Institute for Labour Studies. DP/46.
- Colling, T.**, (1991), "Privatisation and Management of IR in Electricity Distribution". *Industrial Relations Journal* (Oxford), Vol. 22 (2) Summer.
- Fallon, P.R. & Lucas, R.E.B.** (1991), "The Impact of Changes in the Job Security Regulations in India and Zimbabwe." *The World Bank Economic Review*. Vol. 5(3).
- Ganguly, A.K.**, (1989), "Productivity and Employment." *The Business Standard*. 20-24, April.
- Hecker, S. & Hallock M.** (Eds.), (1991), "Labour in a Global Economy: Perspectives from the US and Canada." Eugene, Oregon: University of Oregon Books.
- Hudson Institute**, (1987), "Workforce 2000: Workers for the Twentyfirst Century." Indianapolis.
- ILO**, (1991), "The Development of Sound Labour Relations: Report of the ILO/Japan East Asian Sub-regional Tripartite Symposium. Hongkong, 25-28 March 1991." Bangkok: The Author.
- ILO**, (1992), "World Labour Report". Geneva: The Author.
- ILO**, (1992b), "Adjustment and Human Resource Development". Report IV-International Labour Conference. 79th Session. Geneva: ILO.
- IMD & WEF**, (1992), "World Competitiveness Report". Lausanne and Geneva:
- JAWA**, (1992), "Japanese Automobile Industry in the Future: Towards Coexistence with the World Consumers and Employees". Tokyo: Confederation of Japan Automobile Workers' Union.
- Kanawaty, G. et al**, (1989), "Adjustment at the Micro Level." Geneva: ILO Management Development Branch. (Mimeo)
- National Wages Council**, (1985), "Report of the Committee on Flexible Wage System" Singapore.
- Dzaki, M. et al**, (1992), "Technological Change and Labour Relations". ILO, Geneva:
- Reich, R.**, (1991), "The Work of Nations: Preparing Ourselves for 21st Century Capitalism." Alfred A. Knopf, New York.
- Venkata Ratnam, C.S.**, (1991), "Privatisation: Role of Employers, Organisations", ILO, Geneva: (Mimeo)
- Venkata Ratnam, C.S.**, (1991b), "Unusual Collective Agreements". New Global Business Press, New Delhi.
- Venkata Ratnam, C.S.**, (1992), "Managing People" Global Business Press, New Delhi.
- Venkata Ratnam, C.S.**, (1992), "Financial Participation by Employees". ILO, Geneva, Bureau for Employers' Activities (Forthcoming).
- Vulsteke, Charles**, (1988), "Techniques of Privatisation of State Owned Enterprises". 3 Volumes. World Bank, Washington, D.C.
- UNDP**, (1991), "Human Development Report". New York.

"We desire a more closely integrated world economy in which competition is no longer confined by regional or national boundaries."

— Nobuo Matsunaga Japanese ambassador to the United States.



# Conditions of Employment: Need for Liberalisation & Integration

J.L. Rastogi

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*Though the conditions of employment have a crucial impact on the effective working of all sectors little attention has been paid to evolve an integrated system for determination of these in our country. Because of slow/inadequate growth of collective bargaining, unilateral determination of conditions of employment still dominates the Indian scene with all its associated dysfunctions. What is needed is an integrated approach in this direction aiming at a planned transition from unilateralism to bilateralism, argues the author.*

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In spite of more than one hundred years of industrialisation and commercialisation and consequent growth of the employment in India, the methods for determination of conditions of employment remain immature, unbalanced and disjointed. Although we have more of collective agreements than is popularly believed, by and large, conditions of employment are unilaterally dictated/imposed and the workers' right to participate through representatives of their own choosing continues to be a distant dream.

**By and large, conditions of employment are unilaterally dictated/imposed and the workers' right to participate through representatives of their own continues to be a distant dream.**

McGregor (1967), while enunciating a new managerial strategy consistent with the goals of an organisation, on the one hand, and the behavioural science knowledge and motivational nature of man, on the other, observed: "Management must seek to create conditions (an organisational environment) such that members of the organisation at all levels can best achieve their own goals by directing their efforts towards the goals of the organisation". The conditions of employment are one of the important constituents of the work environment, and are a natural concomitant of the emergence and expansion of employment. In so far as people are working in natural surroundings and on their own, conditions of employment may not be that relevant. But when they are working away from the natural surroundings under a different type of work discipline, viz. working in separately demarcated work places with tools and equipment supplied by the organisations under the direction of their



immediate managers, these assume special significance. The conditions of employment are an integral part of the contract of employment. These may, however, be express or implied. While the express conditions are made explicit in the written contracts of employment or in other official documents like the personnel manuals, standing orders or conduct rules, the implied ones are based on conventions/practices of the trade/industry concerned or on understanding between the actors involved. But the express conditions of employment over-ride the implied ones and are legally enforceable. Because of their significance in the working of modern organisations, determination of conditions of employment is one of the basic functions of any industrial relations system. Thus the methods used for the purpose in any country at a particular point of time would depend on the stage of development of the industrial relations system.

### Two Levels of Methods

Figure 1 illustrates the two levels of methods—used for determination of conditions of employment. While the micro level methods are more operational in the sense that conditions of employment derived through these are relevant to specific situations and get implemented as soon as formalised, the macro level methods are more consultative/advisory and conditions of employment evolved at this level have to be ratified/adopted by the actors concerned and implemented.

### Unilateral Determination

The micro methods for determination of conditions of employment may be either unilateral or bi-lateral. Unilateral determination is adopted in situations where the actors are not equal in strength, or where the employees have been deprived of the right to participate as a result of policy or expediency. However, even this level methods

may have differing shades. The traditional form of unilateral method had been *master-servant* relationship under which the employers as masters enjoyed absolute authority over employees as servants and exercised their prerogative by dictating conditions of employment which were more beneficial to the masters than to servants. Some of the employers, with a view to ensuring acceptability of the conditions of employment by the employees, deviated a little and provided for some sort of information sharing with the latter. Thus instead of dictating conditions of employment, the employers while still determining these 'sold' these to the employees by giving their own rationale for adopting specific conditions, of course without any right to employees to question their wisdom/decision in this regard. Or alternatively, the employers instead of giving their own rationale for specific conditions of employment, presented their decisions in this regard and invited questions from the employees.

**Unilateral determination is adopted in situations where the actors are not equal in strength, or where the employees have been deprived of the right to participate as a result of policy or expediency.**

### Bilateral Determination

The non-judicious use of discretion by the employers in determination of conditions of employment under unilateralism led to undue exploitation of labour resulting in rise of trade unions and consequent, although gradual transition to bilateralism. In the unionised sector, bilateralism in determination of conditions of employment followed its own course and moved, through four stages,

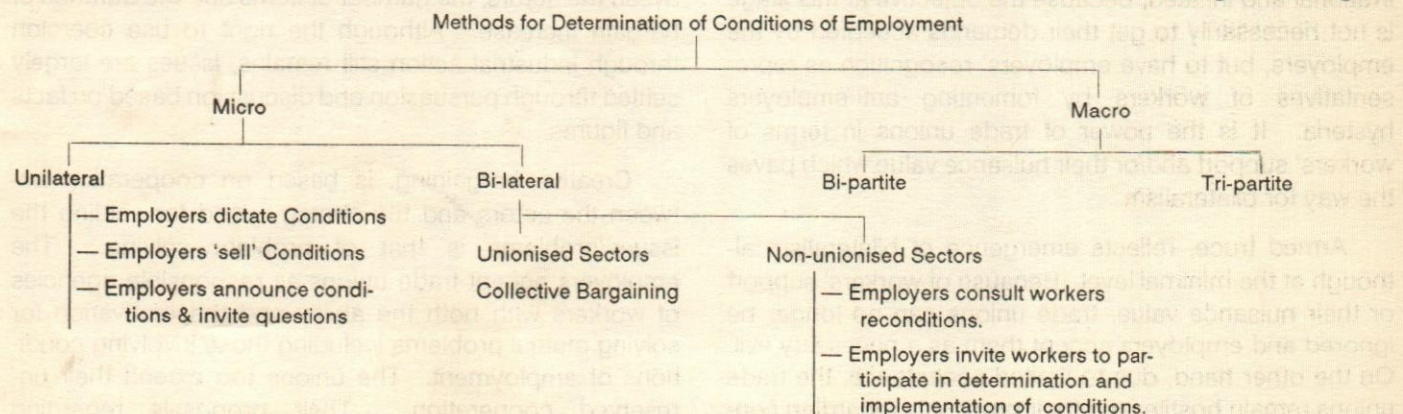


Fig. 1



viz., militant opposition, armed truce, working harmony and creative bargaining, to maturation as illustrated in Fig. 2.

The first stage in the continuum, i.e., militant opposition, immediately proceeds bilateralism, or what we may call initial contact phase in the relationship between the

rational. The negotiations between the employers and trade unions at this stage take the form of crisis bargain with limited items for a limited period. At this stage also, the coercive power of the actors determine their mutual role in determination of conditions of employment.

Working harmony, represents a transition between

Stages of Bi-lateralism in determination of Conditions of Employment in Unionised Sector

Dimension	Militant Opposition	Armed Truce	Working Harmony	Creative Bargaining
1. Type of Relationship	Conflict (Win-lose power struggle)	Acceptance but opposition (Emergence of mutual relationship)	Compromise (Splitting the difference)	Cooperation (Problem solving)
2. Employers' attitude towards unions	Total opposition	Acceptance of the union as a necessary evil	Acceptance of inevitability of unionism	Acceptance of the union as a responsible agency of workers with ability and willingness to solve mutual problems
3. Union Proposals	Irrational	Irrational and Non-rational	Non-rational	Rational
4. Type of Bargain	Non bargain (It is a pre-bargain stage)	Crisis Bargain (Term bargain, limited items)	Transition between crisis bargain and continuous bargain (Subjects gradually increasing)	Continuous bargain (Variety of issues, term bargain as well as day to day settlement)
5. Method		Right to strike/lockout always there		
	Struggle for power and coercion settles the bargain.		Persuasion and discussion settle the issues.	based on facts and figures

Fig. 2

employers and the organised workers/trade unions. It reflects conflict between the actors based on win-lose power struggle. Being external agencies impinging on employers' prerogatives, they not only oppose trade unions or refuse dealing with them, but also do everything in their power to discourage/dismantle them. The attitude of trade unions is equally coercive. Their proposals to the employers regarding conditions of employment are highly irrational and inflated, because the objective at this stage is not necessarily to get their demands accepted by the employers, but to have employers' recognition as representatives of workers by fomenting anti-employers hysteria. It is the power of trade unions in terms of workers' support and/or their nuisance value which paves the way for bilateralism.

Armed truce, reflects emergence of bilateralism although at the minimal level. Because of workers' support or their nuisance value, trade unions can no longer be ignored and employers accept them as a necessary evil. On the other hand, due to limited acceptance, the trade unions remain hostile, and their proposals regarding conditions of employment continue to be irrational and non-

armed truce, and creative bargaining. It is a stage of compromise between the employers and trade unions through splitting the differences in determination of conditions of employment. The employers accept the inevitability of trade unions in industrial relations. However, the negotiations between the actors are based on non-rational proposals/expectations to be rationalised through compromise. Because of improving relationships between the actors, the number of items and the duration of bargain increase. Although the right to use coercion through industrial action still remains, issues are largely settled through persuasion and discussion based on facts and figures.

Creative bargaining, is based on cooperation between the actors and the strategy used for settling the issues/problems is that of problem solving. The employers accept trade unions as responsible agencies of workers with both the ability and the motivation for solving mutual problems including those involving conditions of employment. The unions too extend their unreserved cooperation. Their proposals regarding conditions of employment are rational, based on facts and



a realistic assessment of the situation. The negotiations take the form of continuous bargaining incorporating both term settlement and day today negotiations. The processes of persuasion and discussion help settle the issues, and the right to industrial actions is seldom used by the actors.

### Limited Bilateralism

But in sectors where trade unions do not emerge, or where the employers keep them at bay by keeping ahead of union demands, some sort of limited bilateralism is initiated by the latter unilaterally to provide workers a sense of involvement in determination of conditions of employment. It assumes two forms—consultative and participatory. Under the consultative method, although the final authority regarding determination of conditions of employment is vested in the employers, the proposals are presented to the workers and their views/suggestions invited before final decision. On the other hand, under the participatory method, workers participate in evolving appropriate conditions of employment.

### Macro Level Determination

The macro level determination of conditions of employment is mainly bilateral and refers to higher level negotiations between the actors, viz., one or more employers' associations, on the one hand, and one or more trade union federations, on the other. By their very nature, conditions of employment so arrived at are general and the constituents are morally obliged to adopt them to their own specific needs. This level of determination brings about certain degree of uniformity and standardisation of conditions of employment, particularly in the organised sector thereby minimising inter-unit migration of workers.

However, things are not as simple in practice today as they seem to be. With the growing complexity of the environment and changing concepts, industrial relations are no longer a purely bilateral function. Irrespective of the stage of development of industrial relations in any country, there is always a third party concerned/interested in determination of conditions of employment viz., the Government as a custodian/guardian of social/national interests. Thus the Government may intervene in industrial relations at any time where the actors fail to regulate their own relations in a fair and amicable manner, or in doing so, overlook the broader social/national interests. It may do so either by laying down the minimum norms/standards or conditions of employment, or the rules of the game. These minimum norms/standards and procedures serve as the base for bilateralism.

**With the growing complexity of the environment and changing concepts, industrial relations are no longer a purely bilateral function.**

Matters have been further complicated with the emergence of the Quasi-Government sector, involving the Government in the process of industrial relations in dual capacity, viz., as a custodian/guardian of social/national interests and as the employer of a sizeable/large workforce in its industrial/commercial activities. This new role places an obligation on the Government to serve as the ideal employer setting examples for others to follow in determination and enforcement of conditions of employment, at the same time taking adequate care of the broader social/national interests.

### The Indian Situation

The prevailing practices in determination of conditions of employment in India may be grouped into three models, as in Fig 3.

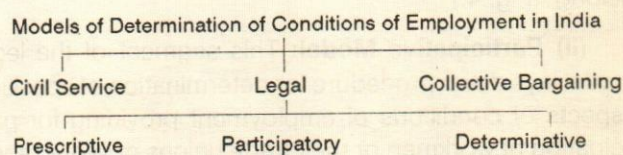


Fig. 3

**1. Civil Service Model:** This model is unilateral in nature and is commonly used in the Government sector which is mainly concerned with the performance of the sovereign functions. The base of this model is provided by the Constitution of India which lays down the basic guidelines for the purpose. The function of determination of conditions of employment is performed by the Executive, e.g., in exercise of the power vested in it by Arts. 73(1) and 162 of the Constitution. Although the civil servants have no right to bargain vis-a-vis conditions of employment, the system provides for some sort of consultation with their representative organisations when any formulation or modification of conditions of employment is contemplated. These conditions of employment come into force after these have been notified in the official Gazette of the Government concerned. Various types of civil service conduct rules regulating recruitment, conduct and discipline of civil servants are a product of this model.



**2. Legal Model:** This model is also largely unilateral in character, and conditions of employment, a result of Government intervention in the process in its capacity as a custodian/guardian of social/national interests. Under this model, the conditions of employment are determined either by the Statutes and/or Statutory Instruments; or by following the statutory procedures; or through judicial interpretation of the statutory provisions and determination of the rights of the actors arising therefrom. Thus this model for determination of conditions of employment may be grouped into three constituent Models:

**(i) Prescriptive Model:** Under this model, the minimum norms/standards of specific aspects of conditions of employment are prescribed by the Statutes and/or Statutory Instruments. Here the objective is to protect the weaker actor against severe exploitation; and to provide safe and healthy work environment and such other conditions/benefits/facilities at or outside work which are essential for maintenance and promotion of human dignity. The Statutes provide their own infrastructure to ensure compliance with their provisions and spirit. This model, however, does not discriminate along sectors—private and public—hence the minimum norms/standards of conditions of employment have to be observed by all covered organisations, irrespective of the sectors to which they belong. (Fig. 4.)

**(ii) Participative Model:** This segment of the legal model lays down procedure for determination of specified aspects of conditions of employment providing for participation of workmen or their trade unions or other representative bodies. The most important Statute reflecting this model is the Industrial Employment (Standing Orders) Act, 1946. Although the basic objective of this Statute according to its Preamble is to make employers in covered industrial establishments define with sufficient precision the conditions of employment under them and to make the said conditions known to workmen employed by them, it promotes fairness and reasonableness in the

provisions of the Standing Orders by providing for an active participation of workmen, or their trade unions or other representative bodies, and vesting a statutory obligation on the Certifying Officer/Appellate Authority to adjudicate in this regard, besides bringing about certain degree of uniformity in conditions of employment by listing matters to be taken care of in the Schedule, and laying down the minimum/norms/standards relating to these in the Model Standing Orders. Under S.3 every employer has to submit to the Certifying Officer five copies of the draft Standing Orders proposed by him for adoption, satisfying specified conditions, in his industrial establishment within six months from the date on which the Act becomes applicable to such establishment. According to S.5. the Certifying Officer, on receipt of the draft forwards a copy thereof to the trade union, if any, of the workmen, or where there is no such trade union, to the workmen in the manner prescribed, together with a notice requiring objections if any, which the workmen may desire to make to the proposed Standing Orders, to be submitted to him within fifteen days from the receipt of the notice. After giving the employer and the trade union or prescribed representatives of the workmen an opportunity of being heard, the Certifying Officer decides if any modification to the draft is essential and makes his order in writing accordingly. Thereafter he certifies the Standing Orders and mails copies thereof authenticated in the prescribed manner to the employer and to the trade union or other prescribed representatives of workmen within seven days of such certification. However, under S.4 of the Act it is a statutory function of the Certifying Officer or the Appellate authority to adjudicate upon the fairness or reasonableness of the provisions of any Standing Orders.

**(iii) Determinative Model:** Under this model, conditions of employment are determined through the use of dispute settlement procedures in interpretation of the provisions of relevant Statutes and/or Statutory Instru-

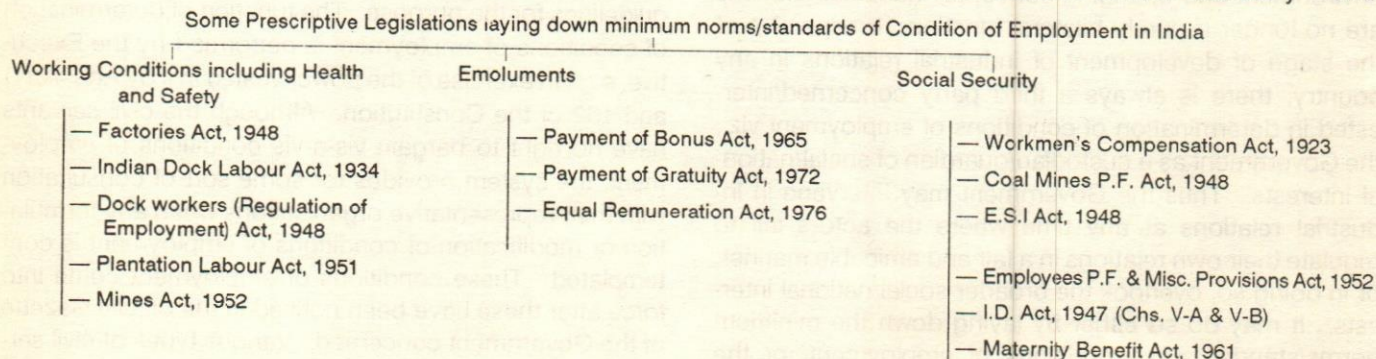


Fig. 4



ments and rights of the actors arising therefrom. The Industrial Disputes Act, 1947, is the most significant Statute in this regard in our country prescribing conciliation, arbitration and adjudication as procedures for the purpose. All these procedures, however, provide for external involvement intervention as illustrated in Fig. 5

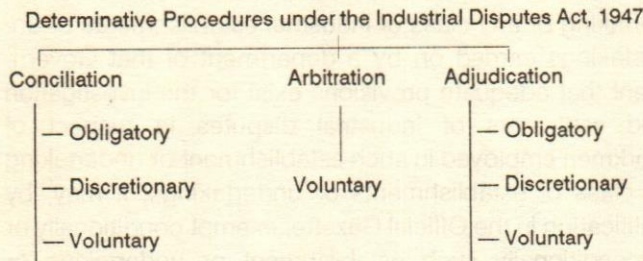


Fig. 5

While for conciliation and adjudication, statutory authorities are to be appointed/constituted by the appropriate Government, viz., Conciliation Officers/Boards and Labour Courts/Industrial Tribunals respectively (National Tribunals, however, are to be constituted by the Central Government alone), reference of an industrial dispute to and selection of arbitrator(s) are voluntary by agreement between the actors. Again while conciliation is an extension of mutual negotiations with the involvement/intervention of conciliation authorities, arbitration and adjudication are quasi-judicial in character and the authorities concerned have to adopt a judicial approach in determination of the disputes.

**While conciliation is an extension of mutual negotiations with the involvement/intervention of conciliation authorities, arbitration and adjudication are quasi-judicial in character.**

Thus the conciliation authorities promote fair and amicable settlement of industrial disputes by holding conciliation proceedings. On the other hand, the arbitration/adjudicating authorities hold judicial proceedings expeditiously and submit their awards to the appropriate Government within reasonable/prescribed time. Every settlement arrived at in the course of conciliation proceedings, every arbitration award where a notification has been issued by the appropriate Government under S.10-A (3-A) giving an opportunity to the employers and workmen who are not the parties to the arbitration agreement but are concerned in the dispute, for presenting their

case before the arbitrator(s), and every award of the Labour Court, Tribunal or National Tribunal is binding not only on all the parties to the dispute and all other parties summoned to appear in the proceedings unless the authority concerned records the opinion that they were summoned without proper cause, but also on the heirs, successors or assigns of the employer in respect of the establishment and all persons employed on the date of the dispute or become employed subsequently in the establishment.

The conditions of employment arrived at under this model remain operative for agreed/specified period of time and even subsequently until the expiry of two months from the date on which a notice in writing is given by any party bound by the settlement or award to the other party of its intention to terminate it.

**3. Collective Bargaining Model:** This model for determination of conditions of employment is, bilateral in character, hence presumes certain degree of organisation of workers, and also equality of strength between the actors concerned. The conditions of employment are determined through negotiations, between an employer, a group of employers or one or more employers' organisations, on the one hand, and one or more representative workers' organisations, or in the absence of such organisations, the representatives of workers duly elected and authorised by them, on the other, conclusions of which are reduced into black and white in what are known as collective agreements. Thus depending on the pattern of development of industrial relations in a particular sector, negotiations may take place at micro (single unit) or macro (multi units) level. While the conditions of employment arising out of micro level negotiations are specific to the needs of a particular unit, those resulting from macro level negotiations are general in nature and have to be adapted to the needs of specific constituent units of the negotiating agency.

S.2(p) of the Industrial Disputes Act, 1947, provides legal sanction to conditions of employment determined under this model. Thus any agreement regarding conditions of employment arising out of negotiations between an employer and his workmen otherwise than in the course of conciliation proceedings to be legally enforceable has to take the form of settlement where it has been signed by the parties in the prescribed manner and copies thereof have been sent to an officer appointed in this behalf by the appropriate Government and the Conciliation Officer. However, such conditions are binding only on the parties to the agreement.



## Dysfunctional Approach

Although various models for determination of conditions of employment evolved to serve particular needs of specific sectors, they are complementary in nature and together optimise human satisfaction and endeavour. However in our country no conscious efforts have been made to integrate these to yield a viable system. Their influence over each other, if any, has been only minimal. While the civil service model virtually remains a closed system, the legal model, in spite its variations, lacks a sense of direction creating a dependency culture in industrial relations; and the collective bargaining model is still awaiting recognition as a useful framework for determination of conditions of employment.

**Although various models for determination of conditions of employment evolved to serve particular needs of specific sectors, they are complementary in nature and together optimise human satisfaction and endeavour.**

The civil service model as already indicated lacks the necessary dynamism to adapt itself to the changing employment scenario in the Government Sector. The employment in this sector has multiplied and the activities are highly diversified extending to manufacturing/processing, public utilities/services, trading/commercial, promotional/developmental and finance/insurance. However the civil service model confines itself to regulating terms of employment, viz., recruitment, conduct and discipline of civil servants, totally ignoring the physical conditions of employment particularly relevant to the civil servants involved in activities other than the sovereign functions, leaving them to be taken care of by different protective legislations under the legal model. Again certain segments of the civil servants have deliberately been kept outside the purview of the participative/determinative legal models. For instance, according to S.13-B of the Industrial Employment (Standing Orders) Act, shall not apply to an industrial establishment in so far as the workmen employed therein are persons to whom the Fundamental and Supplementary Rules, Civil Services (Classification, Conduct and Appeal) Rules, Civil Services (Temporary Service) Rules, Revised Leave Rules, Civil Service Regulations, Civilians in Defence Service (Classification, Control and Appeal) Rules or the Indian Railway Establishment Code or any other rules or regulations that

may be notified in this behalf by the appropriate Government in the Official Gazette apply.

Similarly, under S.36-B of the Industrial Disputes Act, the appropriate Government has been empowered to exempt departmental undertakings from the provisions of the Act. Thus "where the appropriate Government is satisfied in relation to any industrial establishment or undertaking or any class of industrial establishments or undertakings carried on by a department of that Government that adequate provisions exist for the investigation and settlement of industrial disputes in respect of workmen employed in such establishment or undertaking or class of establishments or undertakings, it may, by notification in the Official Gazette, exempt conditionally or unconditionally such establishment or undertaking or class of establishments or undertakings from all or any of the provisions of the Act".

But in spite of rising consciousness and unionisation amongst civil servants including officers, the transition to the collective bargaining model for determination of conditions of employment seems to be a distant dream due to the rigid and obsolete attitude of the Government towards its own employees.

Various shades of the legal model, although benevolent in nature, have their own limitations. Over-emphasis on protecting the interests of the weaker actor through legislative/quasi-judicial intervention in industrial relations has developed a dependency culture in workers. Thus instead of attaining self-reliance in dealing with the employers in determining conditions of employment and their mutual rights and obligations, the workers look towards the Government, the designated officers and/or quasi-judicial authorities for protection of their rights and promotion of their interests. The discriminative/discretionary use of legislative provisions by the Government has already been discussed.

The state of the collective bargaining model for determination of conditions of employment in India is more pathetic. In spite of its recognition as probably the best framework, for regulating bilateral relations including conditions of employment throughout the world, it could only make a limited success in our country, even though there are more of collective agreements in India than popularly believed. The collective bargaining model is not necessarily antithetical to the legal model. Rather some of the provisions of the Protective/Participatory models are supportive of the concept of collective bargaining:

1. One of the objectives of the I.D. Act is to promote collective bargaining. As already discussed, S.2(p) of the Act provides legal sanctity to written agree-



ments arrived at between the employer and workmen otherwise than in the course of conciliation proceedings satisfying the specified conditions.

2. The procedures of conciliation and arbitration provided by the I.D. Act are directly compatible with the concept of collective bargaining. Conciliation is nothing but extension of mutual negotiations in the presence of the conciliation authority, while reference of industrial disputes to arbitration is purely voluntary, and the parties are free to name any person(s) of their choice through mutual consent, as arbitrator(s).
3. Various protective legislations prescribe only the minimum norms/standards of working conditions leaving the parties free to adopt these to specific situations through mutual negotiations.
4. A number of labour legislations contain exemption clauses under which the appropriate Government has been authorised to exempt industrial establishments, conditionally or unconditionally from all or any provisions of particular Acts, if it is satisfied that the terms and benefits available to workers are "substantially similar or superior to" or "are on the whole not less favourable to the employee than" those provided under these, thus leaving scope for the parties to improve upon these through negotiations.

However, in spite of these supportive aspects, the legal model could have little impact on transition to the growth of collective bargaining model. What is lacking in the legal model for determination of conditions of employment is, as already pointed out, absence of a sense of direction. Each of the constituents of the legal model has its own narrow objectives and ensures fairness/reasonableness, imposed from outside rather than aiming at these through development of free, healthy and self-reliant bilateral relations. Thus although inadequate growth of the collective bargaining model is generally attributed to the weak institutional base and employers' hostility, the Government's apathy in this regard is perhaps the most important single contributing cause. Not granting freely negotiated collective agreements an independent identity and covering them as a part of settlements directly speaks of the attitude of the Government towards the collective bargaining model.

### **Need for an Integrated Approach**

The various models for determination of conditions of employment should not be regarded as isolated systems.

They are complementary and constitute an integrated whole. While the civil service model, though unilateral in nature, can provide the leadership in initiating conditions of employment that are fair, equitable and motivating, the legal model can protect that constituency in the industrial relations system which is not in a position to take care of its own interests by laying down the minimum norms/standards of conditions of employment, encouraging participation of workers, their trade unions or other representative organs in their determination, or ensuring justice in interpretation and enforcement of these. Besides, the legal model ought to ensure certain degree of uniformity and standardisation in conditions of employment. However, while attaining their own immediate objectives, the civil service model and various facets of the legal model should aim at promoting and strengthening the collective bargaining model. Being based on people's participation/involvement, the latter has a definite edge over other models. Besides being compatible with the democratic ideals/norms/priorities, by helping them to evolve/negotiate their own conditions of employment through representatives of their own choosing, the collective bargaining model not only provides them the necessary terms and environment to lead an honourable life, but also gives them a sense of self-confidence, prestige and commitment so essential for achievement, excellence and productivity.

To evolve high standards of conditions of employment, India should adopt an integrated approach towards their determination. The objectives and scope of various models used for the purpose may be clearly defined. While the collective bargaining model, because of its superiority over other models, may be adopted as an integral part of the Government liberalisation programme on the labour front, the civil service model (except in relation to employees performing sovereign functions) and various facets of legal model may be continued to supplement the collective bargaining model until the transition is complete.

As already discussed, the basic pre-conditions for development of collective bargaining are available in the country. These have to be identified and strengthened, and the deficiencies removed. Some of the suggestions of the author for promotion of collective bargaining in India (Rastogi, 1981) still remain valid. To expedite a smooth transition to free collective bargaining, the following steps should be immediately taken:

- Collective bargaining should be declared as an integral part of India's national industrial relations policy. To provide it a constitutional sanctity, it



should be incorporated as a Fundamental Right under Art. 19(1) in Chapter III, or at least as a Directive Principle under Art. 39 in Chapter IV of the Constitution of India.

- I.L.O. Convention No. 98 concerning the application of the Principles of the Right to Organise and to Bargain Collectively, and Recommendation No. 91 concerning Collective Agreements, should be ratified/implemented and the details of these should serve as the basic guidelines for development of collective bargaining in India.
- Collective bargaining should be adopted as a part of the Corporate Personnel Policy in all industrial/commercial undertakings in the public sector, and as a basic management/administrative philosophy in all Government Departmental undertakings for determination of the rights/privileges and duties/obligations of the parties to an industrial relations situation, and terms and conditions of employment of workers.
- Collective bargaining should be introduced as a statutory requirement in all other establishments employing 50 or more persons during a specified period of time, with an authority to the appropriate Government to extend it to other establishments employing such number of persons less than 50 as may be prescribed.

However, drastic trade union reforms are needed to make collective bargaining a success in our country. In this connection, some of the recommendations of the National Commission on Labour are likely to be very useful. For example, compulsory registration of trade unions as recommended by the Commission would remove many of the unscrupulous unions from the scene. Similarly, further restriction on outsiders as union executives, development and encouragement of worker-leaders, and limitations on simultaneous holding of political offices as recommended by the Commission, would help strengthen trade unions in the country. But the issue of union recognition for the purposes of collective bargaining presents the most ticklish problem to be taken care of. To be acceptable any solution has to be pragmatic, particularly in a multi-union situation like ours. For the purpose of effective collective bargaining, recognition should be accorded only to the majority unions because only these would be in a position to honour their commitments. However, where majority unions do not exist, the competing unions may be encouraged to constitute their joint negotiating panels with the majority support, and the necessary recognition may be granted to

these. Again, acceptance of the National Commission's recommendation regarding statutory prescription of exclusive rights of the recognised unions, and effective prohibition and penalisation of unfair labour practices both on the part of the employers and workers/unions as prescribed under the I.D. Act, would remove much of the confusion and conflicts from Indian industrial relations scene.

**Drastic trade union reforms are needed to make collective bargaining a success in our country.**

To make collective bargaining more meaningful, collective agreements negotiated and signed between an employer or a group of employers and recognised union/panel of trade unions should be provided a separate status under the industrial relations law and be registered to be legally enforceable. Any collective agreement so registered should automatically extend to all workers employed in the establishment, whether union members or not.

In addition to the existing authorities under the Industrial Disputes Act, a Collective Bargaining/Industrial Relations Advisory and Administration Service may also be introduced both at the Centre and the States to take care of all aspects of initiation and promotion of collective bargaining. Such an agency may be entrusted with the following functions:

- Advising the parties on all aspects of collective bargaining, including negotiating procedure, contents and format of the agreement, and association of recognised unions with its implementation;
- Helping the parties in resolving jurisdictional and recognition disputes; and
- Registering collective agreements negotiated and duly signed by the parties.

Only such an integrated approach regarding determination of conditions of employment, and a planned transition to the collective bargaining model for the purpose would be an effective step towards introduction of industrial democracy in general and workers' participation in particular in the country.

#### References

- McGregor, Douglas, The Professional Manager, McGraw-Hill Book Company, New York, (1967).
- Rastogi, J.L., Collective Bargaining—The Indian Scene, The Economic Times, New Delhi, December 12, (1981). □



# Productivity & Trade Unionism: The Case of British Steel

P.K. Mohanty

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*This paper describes the developments in British Steel to improve productivity through re-organisation during the 1980s. While the improvements in productivity may not be claimed to be due to trade unions alone, there is no denying the fact that the unions also contributed in the move to increase productivity by creating awareness among workers and by helping management in all the changes effected.*

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A number of studies have found that productivity is frequently higher in union establishments than in otherwise identical non-union establishments in the same industry (Freeman & Medoff, 1979). In particular, the resource model of trade unions does not deny that union leaders are interested in procuring better wages and conditions for their members. It stresses that the introduction of unions to a workplace may raise productivity to an extent that compensates, or even exceeds the rise in wages brought about (Cameron, 1987). But Pencavel (1977) found a significantly negative impact of unionisation on productivity. Strikes are a manifestation of collective voice, and greater unionisation leads to more strikes resulting in lower productivity. Therefore, the relationship between productivity and trade unionism is not clearly established. But it could be argued that trade unions enhance productivity through their expression of collective voice in a positive manner; by improving morale and co-operation among workers, by reducing exit behaviour leading to lower quits, and by inducing management to alter production methods and adopt more efficient working practices. Workers can have higher profits from improved productivity arising from the improvement in workers' morale and the cost saving effects of lower quit rates. This paper deals with the developments in British Steel (Llanwern Works) to improve productivity through the re-organisation in the 1980s and the role of unions in doing so. One of the key aspects of the management of change through re-organisation has been the linking of pay awards over flexibility and performance.

## Background

The industrial relations systems of British Steel underwent substantial changes throughout the 1980s. The traditional system was marked by its multi-union and centralised nature, as national level negotiations over pay took place between the British Steel Corporation (BSC)



and individual unions separately (except for the craft unions which united into the National Craftsmen's Co-ordinating Committee) (Bacon *et al*, 1991). The 1970s continued to be symbolised by centralised collective bargaining in a multi-union framework. Negotiations over pay took place between the BSC and separate unions at the national level, and other terms and conditions by the TUC Steel Committee uniting the unions into a 'cohesive negotiating body' (Kelly, 1984). Following privatisation in 1988, British Steel was organised into five main business units: General Steels, Strip Products, Stainless Steels, Diversified Products and Distribution. General Steels and Strip Products are the two major businesses which employ about 80 per cent of the company's employees (IRS Employment Trends, 1991). After privatisation, British Steel withdrew recognition from TUC Steel Committee and ceased national bargaining (Upham, 1990). Bargaining over pay was devolved to the individual business units.

### Determination of terms and conditions at British Steel

#### Pre-decentralisation:

- (i) British Steel : Basic terms and conditions  
: Pensions  
: Post severance benefits
- (ii) Works : Local wage negotiations/  
severance

#### Post-decentralisation:

- (i) British Steel : Pensions
- (ii) Business level : Basic terms and conditions  
: Severance
- (iii) Works : Local wage negotiation

### Trade union organisation

The steel industry in Britain has in common with many others, a complex multi-union structure. About 100% of British Steel employees are unionised, including and up to the level of departmental managers. The ISTC has remained the dominant union in the industry which consists of mainly the process workers, but also has a large number of staff grade workers within its ranks (clerical, technical and the supervisors). A number of craft unions

**The steel industry in Britain has in common with many others, a complex multi-union structure.**

(AEU, GMB, UCATT, EETPU and MSF) representing maintenance workers are organised under the umbrella of the National Craftsmen's Co-ordinating Committee (NCCC) (Keep, 1991). The Steel and Industrial Managers Association (SIMA), a part of EETPU has national recognition for middle managers with ISTC and sole recognition for senior managers. The other major union in the industry used to be the National Union of Blast-Furnace Men (NUB) which eventually merged with the ISTC in 1985. There are currently seven trade unions with recognition rights at Llanwern.

**Table 1:** Analysis of manning by trade unions at Llanwern

SIMA	61
ISTC/SIMA	310
ISTC	656
NCCC	79
GMBTU	—
EETPU	104
Total Staff	1210
ISTC	1619
NCCC	5
GMBTU	156
EETPU	243
AEU	559
TGWU	59
UCATT	33
Total Works	2674
Total	3884

- ISTC : Iron and Steel Trade Confederation
- SIMA : Steel and Industrial Managers Association
- NCCC : National Craftsmen's Co-ordinating Committee
- GMBTU : General Municipal Boilermakers Trade Union
- EETPU : Electrical Electronic Telecommunications & Plumbing Trade Union.
- AEU : Amalgamated Engineering Union.
- TGWU : Transport and General Worker's Union
- UCATT : Union of Constructional and Allied Technical Trades

### Industrial Relations Climate at Llanwern

Up to the mid 1970s the industrial relations climate at the works was uncondusive with a number of damaging strikes. The unions were reluctant to accept even the most minor change or management decision without a long debate and this in turn meant that many plant managers and engineers were spending the majority of their time in meetings with trade union representatives. The unions often saw an increase in manning as a satisfactory conclusion to disputes arising from changes in working practices or the use of contractors.



In the period May to July, 1984, a joint BSC/TUC SICC (Steel Industry Consultative Committee) was established "to enquire into the causes of persistent industrial relations difficulties at Llanwern which led up to the closure of the works in February and to make recommendations to the Corporation and to the trade unions on the steps which should be taken to place industrial relations at Llanwern on a sound basis for the future".

Among its many recommendations, the Committee of Enquiry laid the foundations for the establishment of a Works Council where matters of common interest could be debated. The Works Council in turn provided the foundations of the multi-union/management 'Slimline Committee' which after the 1980 national strike has become the focal point of works-wide negotiations.

**The Works Council in turn provided the foundations of the multi-union/management.**

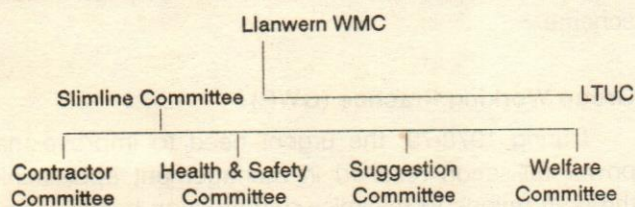


Fig. 1: Major forums for discussion at Llanwern

Figure 1 illustrates the major forums of discussion at Llanwern. The Works Management Committee (WMC) consisting of all senior managers meets every week to review the operations of the organisation. The Llanwern Trade Union Committee (LTUC) consisting of representatives of all unions meets at least once a month to discuss the proposals before meeting the management in the slimline committee, which meets once a month. Other committees like contractor, welfare and suggestion meet once a month and Health and Safety, once a quarter.

### Drive for increasing productivity

In 1974, BSC reached an agreement with the craft unions to introduce Work Measured Incentive Schemes (WMIS) to improve productivity and in 1975, concluded a similar enabling agreement with the ISTC. The Corporation also entered into discussion with the unions nationally through the TUC Steel Committee to bring about the necessary changes, and a series of emergency meetings

in January 1976 culminated in an agreed joint statement which included the following:

"Both BSC and the unions concerned believed that the corporation should be transferred into a profitable, high-wage, high productivity industry comparable with its major European competitors. If these objectives are to be achieved, changes will have to be made now to reach European levels of productivity". (Monopolies & Mergers Commission, 1988).

Despite the application of substantial work study resources between 1974 and 1980, BSC described the improvement in manpower planning achieved as disappointing, especially when set against a background of declining demand and accelerating losses. In particular, national productivity commitments usually proved ineffective, and required further local negotiations and payments in order to achieve any change, which was then too little and too late.

In 1979, the Corporation concluded that in order to reduce manning and increase flexibility, it had to establish a direct link at local level making pay improvements dependent on the prior achievement of agreed performance targets. This would, in turn, necessitate a shift in the focal point of pay negotiations from nationally agreed general rate increases to works level multi-union agreements. In pursuance of this policy, the corporation initially refused to concede any national pay increase which led to an official dispute lasting three months. A Court of Inquiry under the Chairmanship of Lord Lever recommended an 11 per cent increase but supported the introduction of local productivity bargaining, which was accepted by all parties as the basis for settlement of disputes.

The works Lump Sum Bonus (LSB) Schemes are a new development since 1979. They have largely replaced traditional general pay bargaining at national level by means of linking pay improvements to achieved performance at local level.

### The Strip Products Schemes

In the three integrated Strip plants including Llanwern, the LLSBs have four elements: productivity, product cost, delivery-to-time and quality. Each element has a scale of bonus payments, although the scales vary from plant to plant depending on each plant's particular circumstances. For instance, the productivity level expected in a plant depends on the plant's facilities, such as the number of blast furnaces. When a plant's configuration changes, the productivity scales are adjusted. (IDS study, 1991).



**Productivity:** This is a direct measure of the man hours required per tonne of steel produced in the relevant quarter.

**Product cost:** As the product cost falls, the bonus increases on a sliding scale. Product cost is the cost of cold rolled coil.

**Delivery-to-time:** The bonus increases on a sliding scale as the percentage of deliveries made on time increases. For example, at Llanwern, for every two per cent increase in deliveries-to-time above 80 per cent, a one per cent bonus is paid.

**Quality:** This is a measure of the amount of prime (top quality) product produced, as a percentage of the liquid steel used in the production process. The higher the percentage of prime product, the less the non-prime product made and the less liquid steel wasted in the various stages of production. As the prime percentage increases, so does the bonus.

**Slimline:** In December 1979, in view of the continuing excess of capacity to demand, the BSC Board decided that the manned capacity of the Corporation should be reduced from 21.5 m to 15 m tonnes of liquid steel. In January 1980, the Board accepted the Welsh Division's recommendation that the best overall business solution would be to concentrate on reducing the manned capacity (slimline). At Llanwern works, the planned reduction of 4454 had all been achieved by the end of 1980. Thereafter, under each slimline, further reductions were effected mainly in the name of 'productivity/restructuring' and 'transfer to contractors'.

All employees remaining in employment participated in the new local Lump Sum Bonus Schemes, which were a central features of the negotiations of changes in configuration, manning, working practices, severances etc. Each works negotiated its own bonus scheme, but all were designed to provide a payment of 10 per cent of earnings for optimum achievement of all management's objectives. In the event under slimline, Llanwern paid a bonus of 6.9 per cent.

**All employees remaining in employment participated in the new local Lump Sum Bonus Schemes.**

In negotiating the requirements of the Corporate plan, slimline II for 1981, these bonus schemes were revised to

set new targets for the payment of an optimum 10 per cent bonus. The Slimline III negotiation for 1982, provided for the payment of an optimum 11.5 per cent bonus. The optimum earnings under the bonus arrangement increased to 17.5 per cent under Slimline IV. At Llanwern, the bonus structure under Slimline IV provided 5 per cent for the achievement of 4.13 man hours per tonnes plus 6.5 per cent for the achievement of a cold rolled coil product cost of £20.2.75 plus 6 per cent for the achievement of a delivery target of 85 per cent of material delivered to time, i.e., a potential bonus yield of 17.5 per cent. The Slimline V agreement for 1984 introduced an overall ceiling on Lump Sum Bonus earnings of 18 per cent. Slimline VIII introduced the third bonus element related to quality and customer complaints and in addition to maintaining the 18 per cent ceiling on gross bonus yield, capped the fourth factor at 4 per cent.

The execution of subsequent slimline agreements has created a productivity consciousness among the employees by linking pay increases to performance improvements. Agreements II to VIII contain a moratorium clause. The purpose of this clause is to totally prohibit increases in earnings other than those directly achieved through the application of the local lump sum bonus scheme.

### **Group Working Practice (GWP)**

During 1978-79, the urgent need to improve manpower utilisation resulted in management approaching the craft unions to minimise demarcation between traditional trades and between craftsmen and ancillaries, resulting in a reduction of 10-12 per cent in manning. This became known as the Group Working Practice concept. There was considerable opposition to this concept, particularly from the ASB (Boiler makers) and the agreement was not signed until May-June 1980 when the implementation was overtaken by the more radical proposal in the Slimline I agreement, though the long conditioning of the craft workforce to changes in demarcations and restrictions helped to prepare the way for the early implementation of the Slimline I changes. An agreement in this regard was executed between management and the craft unions at Llanwern in October, 1980 with regard to restructuring of the works maintenance; organisation and the introduction of single mechanical and single electrical disciplines. The principal objective of this agreement was the implementation of maintenance performance standards, reduction of maintenance cost and development of individual skills through:

- More effective utilisation of the Llanwern works maintenance force



- The development of craft skills and knowledge through comprehensive training programmes, linked to competency testing/assessment.
- The further development of the principles established in Group Working Practice and successful slimline agreements in which individual craftsmen were working to the limits of their current and required competence.

The move towards single craft grades is leading to the disappearance of many traditional grades in the steel industry such as pipe fitters, platers and welders. The training of production workers to perform simple craft tasks is enabling the restructuring of craft activities into a more diagnostic and preventive field of maintenance than was previously the case. The development of flexibility is extending to new forms work organisation in teams. Team working has not been uniform but has taken specific forms in different plants and for different process operations. At Llanwern, flexible crewing has been production workers taking on more traditional craft tasks, and moving towards greater productivity within the production environment. While both are committed to an engineering restructuring programme involving single mechanical and electrical crafts, Llanwern has used the opportunity to create centrally-based craft forces.

### Profit Centre Concept

The Central Engineering Workshop Profit Centre concept has been in operation since 1st April, 1981 tendering directly for work on plant in competition with outside contractors.

The general philosophy of the profit centre concept was that central engineering service could be carried out in several ways by a BSC employed force, by selling off the CEW to a contractor, to contract all repair and refurbishment to local or national contractors. The management at Llanwern decided that it would be most beneficial to the works as a whole to make the CEW a profit oriented organisation within BSC, influenced by the fact that the installation existed and the workforce were knowledgeable of the site situation. Negotiations to change the bonus from tonnage to profit linked failed at Llanwern. Though the profit earned is not due to labour productivity alone, the concept certainly provides motivation to the workforce. The flow back of ideas from the shop floor for improving productivity which are channelled through the works suggestion scheme are rewarded monetarily.

### Productivity increase

Productivity expressed in terms of man hours per tonne (liquid steel) improved by 48 per cent from 7.9 to

**Table 2:** Labour Productivity at Llanwern (Man hours per tonne of liquid steel)

Year	Man hours
1981	4.87
1982	5.11
1983	3.72
1984	3.86
1985	3.99
1986	3.77
1987	3.61
1988	3.21
1989	3.30
1990	3.31
1991	3.18

4.08 man hours per tonne over the period 1979 to April, 1982. The results for the second half of 1982 reflected a marked deterioration in the market place and the average figure for 1982 was 5.11 man hours per tonne. Since that date, improvements have continued and in 1983, it reduced to 3.72 man hours per tonne. The best figure (3.18 man hours per tonne) was achieved in 1991. In negotiating the slimline agreements, it was ensured that in the event of an increase in demand requiring an increase in manned capacity, productivity improvements would not be lost.

### Implications for Indian Trade Unions

The structure of trade unions in India is completely different from British unions. The Indian unions are general in nature, while the unions in Britain are predominantly craft ones. The workplace industrial relations in India is characterised by single union negotiation in the face of multiplicity of unions. There is hardly any example of all unions coming together for discussion on important issues nor is there any forum for discussion with management by all unions. As a result, the unions are divided among themselves and therefore inter-union rivalry is a common feature at the workplace level resulting in more disputes and low productivity.

**The Indian unions are general in nature, while the unions in Britain are predominantly craft ones.**

Table 3 reveals the low productivity in Indian Steel Industry compared to its UK counterparts.



**Table 3:** Employment in Steel Industry and Crude Steel Production in UK and India

Year	Employment (thousands)		Crude Steel Production (million tonnes)	
	UK	India	UK	India
1975	190.7	345.0	19.77	7.99
1980	134.0	—	11.28	9.51
1985	60.7	290.0	15.72	11.93
1986	56.9	290.0	14.73	12.19
1987	55.0	287.0	17.41	13.12
1988	55.2	290.0*	19.07	14.30
1989	54.4	290.0*	18.80	14.61
1990	52.6	290.0*	17.90	14.96

Source: International Labour Organisation, 1992.

\* Estimate

It requires a more concerted effort by the management and all unions in India to improve productivity. Since the unions are general in nature, it would be better for the management in the interest of the organisation to consult all unions so as to cover all sections of workmen. A regular forum can be established for discussion by all unions in India (like TUC) before meeting the management jointly. The formation of a multi-union management committee (like slimline in British steel) would be helpful in discussing all important matters of the plant, including productivity issues. This way, the management would be able to ensure cooperation of all unions and the incidence of inter-union rivalry would be minimised. The management and the present recognised union should think in terms of this approach and initiate the move. The introduction of a more flexible approach linking pay and productivity may be considered in order to ensure more pay for workmen and productivity increase for the organisation. These changes may help in achieving better industrial relations at the work place level.

### Conclusion

The developments in British Steel during the 1980s resulting in higher productivity may not be claimed to be due to trade unions alone. There is a close relationship between the job losses through subsequent slimline agreements at Llanwern and the productivity gains. The union power has been weakened after the decentralisation of bargaining and the management might have intensified the pace of work taking advantage of the union's

position. Labour productivity is an indicator which measures many changes that have little or nothing to do with labour, such as better design, management organisation, or marketing; or have only a potential relationship: the rare of capital investment, technological innovation, new management techniques (Mac Innes, 1990). It may be concluded that the unions at Llanwern were involved in the management of changes that led to increased productivity.

### Acknowledgement

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### References

- Bacon, N., Blyton, P. & Morris, J, 'Steel, State and Industrial Relations: Restructuring Work and Employment Relations in the Steel Industry' paper presented at the conference on International Privatisation: Strategies and Practice at St. Andrews, Scotland, 1991.
- Cameron, Samuel, 'Trade Unions and Productivity: Theory and Practice', *Industrial Relations Journal*, Vol. 18, 1987.
- Freeman, P.B. & Medoff, J.L., 'The Two Faces of Unionism', Public Interest, Fall, 1979.
- IDS Study, 492, October, 1991.
- IRS Employment Trends, 474, October, 1990.
- Keep, E. 'Report on British Steel', Industrial Relations Research Union, University of Warwick, 1991.
- Kelly, J. 'Management Strategy in the reform of Collective Bargaining: Cases from the British Steel Corporation', *British Journal of Industrial Relations*, Vol. 22, 1984.
- MacInnes, J. 'The Future of This Great Movement of Ours' in Patricia Fosh and Edmund Herry (Ed), 'Trade Unions and Their Members', MacMillan, 1990.
- Monopolies and Mergers Commission, 'Report on the efficiency and costs in discharging its function of the BSC', HMSO, 1988.
- Pencavel, J.H., 'The Distributional and Efficiency Effects of Trade Unionism in Britain' *British Journal of Industrial Relations*, No. 15, 1977.
- Upham, M. 'Passages on to the path to privatisation: the experience of British Steel', *Industrial Relations Journal*, Vol. 21, 1990. □



# New Product Development: Uncertainty in Technovation

P.N. Rastogi

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*Technovation is the process of creating new technologies of far-reaching importance. It is an inherently uncertain and disorderly process as it usually lacks any prespecified structure, and direction. This paper outlines a few heuristic approaches toward imparting a degree of structure and definition to the technovation process. The methods are also relevant and applicable for coping with technical uncertainty involved in the development of new products.*

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Technovation is a disorderly, and highly uncertain process. Operating as it does at the frontiers of extant knowledge, it usually tends to be highly unstructured, ill-defined, and poorly understood. Such a situation renders the task of identifying and evolving a promising strategy of R & D, exceedingly difficult. In the absence of a clear basis for identifying a problem's nature and structure, howsoever imperfectly, a coherent and logical strategy for its investigation, analysis, exploration of alternatives, and solution, cannot be worked out properly. On account of the uncertainty surrounding a technovation problem, techniques for the generation of creative ideas are usually employed toward identifying new concepts for coping with the problem. These techniques though useful, do not however, provide either a definition of the problem, or an elucidation of its structure and scope. Techniques like brainstorming, synectics or attribute listing, may at best only suggest some new ideas and insights. They do not address the lack of definition and approach, characterizing a technovation problem. The ambiguity, and lack of clarity and direction surrounding a technovation endeavor, require ways and means of structuring the problem conceptually and analytically. A well-thought-out structuring approach/method would not by itself reduce the problem's uncertainty, but would serve to clarify and even elucidate its nature and dimensions, thereby rendering it more manageable.

**In the absence of a clear basis for identifying a problem's nature and structure, a coherent and logical strategy for its investigation, and solution, cannot be worked out properly.**



## The Heuristic Structuring Methods

This paper outlines some methods for a tentative conceptualization and structuring of a technovation problem. These methods may jointly serve to clarify the various facets of a given problem, and the issues involved therein in a preliminary manner. They may as such provide meaningful though inadequate help toward identifying the nature and requirements of a research design and project formulation. These methods are based on the concepts and paradigms drawn from artificial intelligence, cognitive science, technological forecasting, and management science and can be listed as follows:

- Morphological Matrix Analysis
- Relevance Tree Analysis
- Problem State-Space Method
- Knowledge Classification Matrix
- Network of Information, and
- Sequence Specification Procedure

### Morphological Matrix Analysis

This method seeks potential means/ways for accomplishing specified technological capabilities. It was developed by Zwicky (1962). Its procedure is as follows:

- A problem is disaggregated into distinct parts/components or parameters. The latter are treated individually; they have no hierarchic relationships.
- For each part/parameter, several possible solution alternatives are identified and listed. The listing should be as complete as possible.
- Overall solutions to the given problem are then obtained by taking one of the possible solution alternatives to each part, and viewing them together. Solutions to each part, must be compatible/feasible i.e., match with the corresponding solutions to other parts, in their assemblage or combination. Such an assemblage represents a 'morphological matrix'.

**Overall solutions to the given problem are obtained by taking one of the possible solution alternatives to each part, and viewing them together.**

- The 'best' overall solution is then selected from the possible assemblages/combinations of mutually consistent solutions to each of all the parts of the problem, on the basis of selected criteria.

This procedure thus involves a systematic examination of all possible/realizable combinations of solutions for separate parts of the problem.

### Relevance Tree Analysis

A relevance tree arranges in a hierarchical order the objectives, subobjectives, methods, techniques, tasks, projects, and subtasks etc; pertaining to a problem domain in sufficient disaggregated detail. It ensures that all possible or potential ways of achieving the objectives have been found, and placed at appropriate levels in an inverted tree structure. The relevance of individual subtasks, tasks, projects, techniques, and subobjectives etc; to the overall objectives is then evaluated.

The broad pattern of analysis under this method may be represented as in Fig. 1.

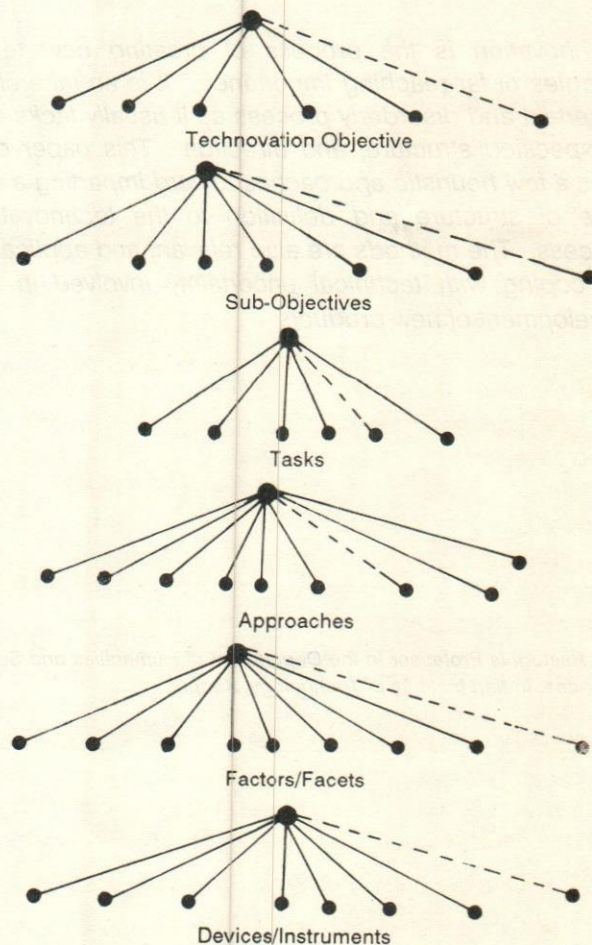


Fig. 1. Pattern of Analysis in Relevance Tree



A path toward realizing specified objectives consists of goals, subgoals, etc. at progressively lower levels. The goals at a higher level can be addressed only when each of the subgoals at its lower levels have been met.

### Problem State-Space Method

In this method, the goal is represented in the form of a desired situation consisting of an OBJECT, or list of objects. Problem-solving consists of attempting to change the current situation into the desired one. In this context, three main types of operational goals are defined as follows:

- Transform an object A into an object B.
- Reduce a difference between object A and object B by modifying object A.
- Apply Operator Q to object A.

Associated with the operational goal types are procedures for achieving the goals. These methods can be understood as problem-reduction operations.

**Problem-solving consists of attempting to change the current situation into the desired one.**

The analysis here assumes that the differences between a current object and a desired object can be defined and classified into types. The operators can also be classified according to the kinds of differences they might reduce. Problem-solving effect focuses on selecting a relevant operator to apply to the current object. The essence of the method is to identify a sequence of operators (and objects) along a path that appears to be promising. Backup is tried if a current path becomes unpromising (i.e., elimination of a difference introduces a new one that is more difficult to eliminate).

A *goal state* may be viewed as the end node in a graph. A solution to a state space problem is a finite sequence of applications of Operators that changes an initial state into a goal state. A state space problem is then the triple (S,O,G), where the complete specification of a state space problem has the following three components:

- One is a set [O] of operators or operator schemata.
- One must define a set [S] of one or more initial states, and
- One must define a set [G] of goal states.

Several operators can be applied at any given point, or the same operator can be applied in different ways. A problem space is a concept area that is defined by all the possible states that could be generated by the *elements* and *operators* of a particular domain. It is also visualised as a graph in which the nodes represent all possible states of partial or complete solution of a problem, and arcs represent operators that transform one state to another. Finding a solution to the problem under consideration is represented by the isomorphic problem of finding a path from the node representing an initial state to a node representing a goal state.

### Knowledge Classification Matrix

This approach classifies all the relevant available or possible knowledge about a technovation problem into two broad categories:

State of the Art, and  
Zone of Uncertainty

Each of these categories is further classified into two sub-categories. State of the Art Knowledge, for example, is divided into:

(1) Known and (2) Knowable.

The known category refers to the knowledge that is available for use by the technovator. The knowable category refers to the knowledge that is not available to the technovator at the moment, but which can be obtained by him from various professional or secondary sources.

Knowledge perceived as relevant but coming under Zone of Uncertainty is also similarly divided into two sub-categories:

(3) Partially or Inadequately, and

(4) Unknown

Subcategory (3) refers to the areas of relevant knowledge that are currently under investigation or development at various laboratories/R & D centres in the world. The reported research findings are, however, piecemeal, sketchy, and essentially incomplete. Subcategory (4), on the other hand, refers to that perceived body of knowledge, that is deemed to be necessary for problem-solving, but is currently assessed as unknown or unavailable.

The schema of this method may be depicted as in fig. 2. The problem-solving effort in this method is thence directed toward identifying, designing, and using, techniques, and experimental approaches, i.e., new research



routes to progressively reduce the problem's zone of uncertainty. The research routes may, however, focus only on the specific and limited aspects of the needed but not-known area of knowledge in terms of applied research, rather as pure research aiming at discovery.

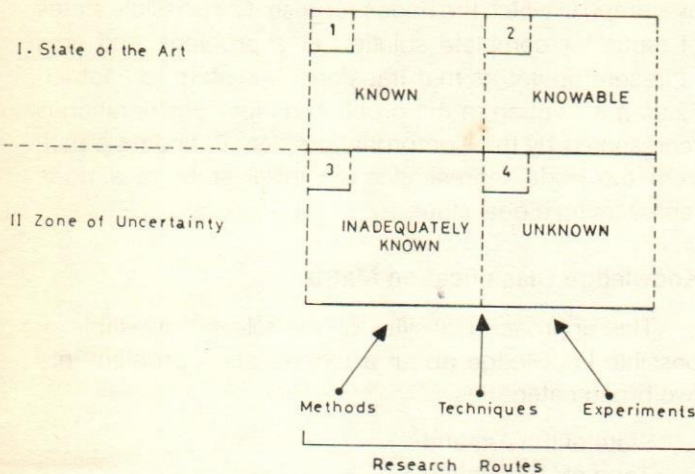


Fig. 2. Knowledge Classification Matrix

### Network of Information

In this method, the techno-scientific data and information are searched for, systematized, and organized in terms of the following four categories:

- (a) Recent Research Results.
- (b) Techno-Scientific Capabilities possible through (a).
- (c) Technical Components possible on the basis of (b).
- (d) Resultant Systems possible through configuring (c).

Recent research results ( $r_1, r_2, \dots, r_k$ ) refer to published or available R & D findings in the technovator's domain(s) of interest. They are combined to depict potential techno-scientific capabilities becoming available, i.e., those capabilities which can be generated or created on the basis of recent research findings. Techno-scientific capabilities, potential as well as, actual, ( $s_1, s_2, \dots, s_j$ ) can then be combined toward visualizing possible technical components ( $t_1, t_2, \dots, t_m$ ). Technical components, both possible and extant, can then be joined or configured to produce possible resultant end-systems ( $ES_1, ES_2, \dots, ES_n$ ). The nature of this method may be represented as in fig. 3.

In terms of its information categories, and their underlying assumptions, this method can be used to provide

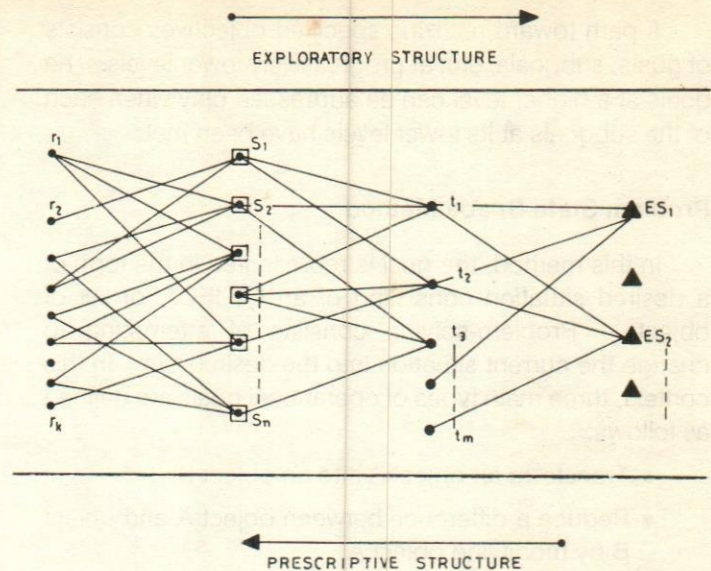


Fig. 3. Network of information method

two types of structuring assistance for technovation efforts:

- By exploring the possible techno-scientific capabilities, and potentially realizable end-systems, that might result from extensions and combinations of recent research results, the route toward realizing a possible future, relevant technology (ies), may be indicated. This type of structuring assistance is exploratory.
- Proceeding in a reverse direction, i.e., by determining what research results are required to achieve a desired capability, and/or an end-system, a prescriptive route of R & D may be indicated. The method thence serves to specify as to what needs to be accomplished in terms of R & D results, to facilitate the process of technovation.

### Sequence Specification Procedure

This procedure focuses on identifying and organizing a set of steps toward reaching a specified technological objective in terms of an ordered sequence. The steps may consist of the following:

- Necessary pre-requisites in terms of structural elements, processes, or functions.
- The break-throughs or innovative development needed for meeting the above pre-requisites, and
- The alternatives that are available or possible in the context of needed and innovative developments.

The technological developments necessary (i.e., the pre-requisites, and innovative breakthroughs) to achieve the specified objective, need to be listed and described in







# Import of Technology & Productivity Growth in Indian Industry

Bishwanath Goldar

*Technological advancement is usually a major source of productivity improvement. But in Indian industries, while there has been a significant inflow of advanced technology, there has been no appreciable rise in productivity. The author analyses the problems encountered in indigenisation of foreign technology and concludes that local R & D efforts and development of indigenous technology would go a long way in ensuring productivity growth.*

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Empirical studies on the technology-productivity nexus carried out for the American industries by Terleckyj (1974), Scherer (1982, 1983), Griliches (1984) and others have shown that technological advancement is a major source of productivity improvement. These studies have brought out that the rate of improvement in productivity achieved by a firm or an industry depends crucially on the R & D efforts of the firm/industry and that the flow of new advanced technology embodies in intermediate inputs and capital goods resulting from the R & D efforts of input suppliers. Similar conclusions have been reached in the studies of Odagiri (1985) for Japanese industries and Cuneo and Mairesse (1984) for French industries. The positive relationship between the levels of technology and productivity found in the studies mentioned above is quite expected since an advance in technology should enable the firms to utilise resource in a more efficient manner.

While there has been a significant inflow of advanced foreign technology into Indian industries over the last four decades, there has been no appreciable improvement in productivity.<sup>1</sup> Most studies on productivity in Indian industry (Banerji 1975; Mehta 1980; Brahmananda 1982; Ahluwalia 1985, 1991; Goldar 1986; etc.) have found a decline or a low rate of growth in productivity in Indian manufacturing not only at the aggregate level but also for most industries. Further, growth rate in productivity for industries in which the inflow of advanced foreign technology was relatively high is not in general significantly higher than that for industries in which the inflow of foreign technology was relatively low (table 1). These findings indicate that the application of imported advanced tech-

1. Since changes in partial productivities (e.g. labour productivity) may occur as a result of factor substitution, the concept of total factor productivity is useful for analysing changes in resource-use efficiency. The term 'productivity' is used here in this sense.



nology in Indian industry did not result in any substantial gain in resource-use efficiency.<sup>2</sup>

**Table 1:** Technology Import Intensity and Productivity Growth—  
Selected Indian industries

Industry	Technology import intensity (av. 1975-6 to 1977-8) (per cent)	Growth rate of Productivity (1960-1 to 1985-6) (per cent p. a.)
Man-made fibres	1.63	0.4
Fertilizers	1.51	1.3
Transport equipment	1.35	0.4
Woollen textiles	1.32	-1.4
Non-electrical machinery	1.28	2.0
Metal products	1.25	-2.2
Paper	1.15	-0.7
Basic industrial chemicals	1.03	-1.7
Rubber products	0.86	-2.3
Printing & publishing	0.83	0.9
Electrical machinery	0.58	1.2
Glass & glassware	0.54	-0.7
Cotton textiles	0.31	0.2
Dye-stuffs & paints	0.28	-2.9
Tobacco products	0.22	-3.1
Non-ferrous metals	0.21	-7.3
Pharmaceuticals	0.16	1.7
Food products except sugar	0.16	-1.9
Jute textiles	0.14	0.1
Sugar	0.12	-2.3
Cement	0.09	-0.5
Beverages	0.09	-0.2
Average		
— top 10 industries	1.221	-0.33
— bottom 10 industries	0.178	-1.62

**Notes:**

Technology import intensity is computed as the ratio of expenditure on royalty, technical fees and imported equipment to sales.

Data have been drawn from RBI Bulletin, May 1980 (Finances of Medium and Large Public Limited Companies) and Ahluwalia (1991, Table 2.4). Industrial classifications in the two sources could be matched for 22 industries, shown here. In some cases, productivity (TFP) growth estimates for several disaggregated industries were combined using value added weights.

The correlation coefficient between the two variables is found to be 0.31. It is not statistically significant.

2. This is the general picture, though there may be isolated cases in which technological advance did result in considerable saving of resources and reduction of cost.

Why did technology imports made by Indian industry fail to raise industrial productivity substantially? This is the question this paper addresses itself to. The paper draws on the available literature on technology acquisition and application in Indian industries to indicate some of the factors that may provide an explanation.

**The application of imported advanced technology in Indian industry did not result in any substantial gain in resource-use efficiency.**

**Volume of Production**

Edquist and Jacobsson's study (1985) of hydraulic excavators in India and Korea is quite revealing. In 1983, there were two producers of hydraulic excavators in Korea—Samsung Shipbuilding and Heavy Industries (SHI) and Daewoo Heavy Industries (DHI), producing respectively 633 units and 1149 units. In India, Larsen and Tubro Ltd. (L&T) was the major producer of hydraulic excavators. Its production in 1983 was 68 units, much lower than the production volumes of SHI and DHI of Korea. DHI was producing excavators under licence from Hitachi of Japan. SHI of Korea and L&T of India were both producing excavators under licence from Poclain of France.<sup>3</sup> While the price charged by SHI and DHI were 25 per cent and 50 per cent respectively higher than the price of hydraulic excavators in industrialised countries, the price charged by L&T was three times the price of the same machines produced by Poclain of France and about double that of the Korean machines. This high price of hydraulic excavators produced by L&T is mainly due to the low volume of production, which may in turn be attributed to the small size of the domestic market. In the first half of the 1980s, several new firms were allowed to enter the hydraulic excavator industry, each having a production volume even lower than that of L&T. Thus, Bharat Earth Movers Ltd. (BEML) produced 10 units in 1983; the production of Hindustan Motors was less than that. The cost disadvantage caused by low volume of production was naturally more acute for these firms. Even with a low domestic content of 20-30 per cent, the price of excavators produced by BEML was three times the price in industrialised countries.

3. SHI took licence in 1974 and production began in 1977. L&T took licence in 1973 and production began in 1975.



**When the small size of the domestic market leads to low volume of production, it is not possible to realise the potentialities that the new technology has to offer.**

The same scenario applies also to many other products of Indian industry. When the small size of the domestic market leads to low volume of production, it is not possible to realise the potentialities that the new technology has to offer.<sup>4</sup>

### Indigenisation

Till recently, a firm importing technology was normally subject to a phased import substitution program imposed by the government. The process of indigenisation gave rise to many problems which adversely affected efficiency and raised the cost of production. Thus, efficiency gains emanating from technology imports were partially lost over time due to the phased manufacturing programmes. While discussing the problems that L&T faced in the process of indigenisation, Edquist and Jacobsson (1985, p. 2057) write,

"In the beginning, L&T thought that it would be very easy to manufacture hydraulic excavators as they had been supplying a lot of custom designed machinery and plants. For example, they thought that it would be easy to put in an Indian engine and tracks. However, they ran into immense problems in the process of indigenisation. They also had problems with the supply of components of a high quality and performance. For example, Poclain had an air-cooled engine but in India they could only get a water-cooled one. In India they could get tracks for large shovels which do not move often, but these were inappropriate for hydraulic excavators. Vendors were not interested in modifying components because of the small volumes demanded by L&T. The small demand also meant a high price of the components, and

4. It should be pointed out here that firms can get around the difficulties created by the small size of the domestic market by resorting to exports. It will enable the firms to reap scale economies, achieve higher capacity utilisation and spread the cost of technology acquisition and adaptation over a larger volume of output. This can be done with relatively greater ease in an economy following an outward-oriented industrialisation strategy than an economy following an inward-oriented one.

L&T had to invest a lot of effort in indigenisation. For example, using a water-cooled engine implies a different layout than using an air-cooled one. The lack of high quality steel also made it imperative for them to design a thicker boom."

Similarly, in his study of Bharat Heavy Electricals Ltd. (BHEL), Surrey (1988) notes that securing indigenous supplies of materials and components for the production of power equipment (in sufficient quantity and right specifications) has been a serious problems with BHEL. While setting up captive facilities<sup>5</sup> within BHEL eased this difficulty somewhat, it gave rise to several other problems. To quote,

"Backward integration solves some problems but often brings new ones, e.g., the need for new types of technical expertise, new markets to fill the capacity of the captive facilities, and the need to upgrade these facilities to comply with downstream product innovation (making them more specific to downstream requirements and perhaps making it more difficult to find suitable work for them). All these problems arose with the Central Foundry Forge. Mastering the technology was all the more difficult because of the need to supply forgings for different designs of turbines produced at Hardwar, Hyderabad and Bhopal. Partly because of the increase in the size of turbines beyond its own casting and forging capacity, BHEL had to import a large proportion of its castings and forgings—even though capacity utilisation of the Central Foundry Forge was very low (22 per cent in 1981-82)" (Surrey, 1984: 367-368).

To what extent the cost of production will rise as a result of indigenisation differs from product to product. Also, it depends on the level of indigenisation already achieved. Beyond a threshold level (say 50-60 per cent), cost escalation due to further indigenisation becomes more and more pronounced.

### Indigenous Technological Development

For adequately exploiting the imported technology, the recipient firm must have a certain minimum amount of skill relating to design evaluation and interpretation, plant operation and maintenance, and quality control. Further, in many cases, to make imported technology more useful,

5. Steel castings and forgings and boiler tubing posed acute problems. To set up captive facilities within BHEL, the Central Foundry Forge was built at Hardwar and the Seamless Steel Tube Plant at Tiruchirappalli.



it needs to be changed and adjusted to suit the need of the Indian firm. For example, it may be necessary to change the imported technology to reduce the production scale, to simplify the production process, or to modify the product characteristics to suit the Indian market. In this context, the R&D activity of technology importing firm assumes great significance, since it provides the necessary knowledge, skill and experience.

**For adequately exploiting the imported technology, the recipient firm must have a certain minimum amount of skill relating to design evaluation and interpretation, plant operation and maintenance, and quality control.**

Studies on R&D in Indian industry show that R&D intensity of Indian firms is quite low. Alam's study (1985) covering 211 firms reveals that most firms spent less than one per cent of their turnover on R&D. For only one firm the relevant ratio was found to be more than five per cent. The same picture emerges from R&D intensities reported in other studies (for example, Kumar 1987). The low R&D activity in Indian firms must have made adequate exploitation of imported technology difficult.

Another issue to be considered is the development of indigenous technological capabilities. Since R&D efforts of Indian firms have been low and much of these efforts directed to indigenisation programme and product diversification, there has been very little R&D activity directed to technology development. Also, the restrictions imposed by the government on payments for imported technology made Indian firms go for small technological packages. In consequence, while Indian firms imported technologies of recent vintage and also acquired sufficient skills to operate and often adapt them, they rarely acquired the skill and experience required for absorbing the basic knowledge and the process of technical change involved in the technology. As a result, while technology import enabled Indian firms to carry out profitable operations, it rarely prepared them to undertake innovative activities (Alam, 1985). Because of low R&D efforts directed to technology development and import of smaller technology packages (not containing the elements needed for innovation), the development of indigenous technological capabilities suffered. This tendency was reinforced by the existence of a highly protected domestic market which provides little incentive to innovate.

**While technology import enabled Indian firms to carry out profitable operations, it rarely prepared them to undertake innovative activities.**

Further the business environment in which Indian manufacturing firms functioned favoured repeated technology imports rather than development of indigenous technological capabilities. Edquist and Jacobsson write: "Recently, when L&T started considering production of an excavator model in a size between the 90 CK and the 300 CK, the design department thought that they would definitely be capable of scaling down the existing design themselves. However, the design department was not allowed by management to try themselves—although they claim they could certainly have done it—and a licence was instead taken on the Poclair 160 model." This was done because in terms of time and money it was cheaper to import the technology. As Dy. General Manager of L&T observed, "Our objective is not design, but profits."

The consequence of slow progress in indigenous technological capabilities is brought out sharply by the following example which Alam cites in his study (1985, p. 2077):

"A large Indian heavy machinery manufacturer imported technology at about the same time as a Japanese firm in the late 1960s. At the time of its collaboration, the Indian firm was at the forefront of the international technological level in the field. However, it has remained technologically stagnant since then and requires new technical collaborations to update its technology. On the other hand, the Japanese firm, which began with the same technological level as the Indian firm has emerged as one of the three largest manufacturers of these machines in the world. Interestingly, the Indian firm has recently collaborated with the Japanese firm to update its technology."

## Conclusion

During the last four decades, there has been a significant inflow of advanced foreign technology in Indian industries. But, in terms of productivity improvement, the performance of Indian Industries has been quite poor. The failure of Indian industry to take adequate advantage of technology imports may be attributed to low volumes of production (small size of domestic markets), the govern-



ment imposed phased manufacturing programmes, low R&D intensity of domestic manufacturing firms and slow progress in the development of indigenous technological capabilities.

**Liberalisation would go a long way in easing the difficulties faced in exploiting the potentialities of efficiency improvement offered by imported technology.**

Since the early 1980s, considerable emphasis has been placed on technology upgradation and productivity improvement in Indian industries. During the last two years, the economic policies of the government (especially industrial and trade policies) have been substantially liberalised. This liberalisation would go a long way in easing the difficulties faced in exploiting the potentialities of efficiency improvement offered by imported technology. In particular, the requirement on domestic firms importing technology to go in for a phased manufacturing programme has been done away with. The new economic policies discourage industrial fragmentation and encourage establishment of plants of economic size. Further, in the new, emerging economic environment, characterised by greater openness and competition, one would expect greater inducement for local R&D efforts and development of indigenous technological capabilities.

#### References

**Ahluwalia, I.J.**, (1985). *Industrial Growth in India, Stagnation since the Mid-Sixties*, Oxford University Press, Delhi.

- Ahluwalia, I.J.**, (1991). *Productivity and Growth in Indian Manufacturing*, Oxford University Press, Delhi.
- Alam, G.**, (1985). "India's Technology Policy and its Influence on Technology Imports and Technology Development," *Economic and Political Weekly*, Special Number.
- Banerji, A.**, (1975). *Capital Intensity and Productivity in Indian Industry*, MacMillan, Delhi.
- Brahmananda, P.R.**, (1982). *Productivity in the Indian Economy: Rising Inputs for Falling Outputs*, Himalaya Publishing House, Bombay.
- Cuneo, P. & Mairesse, J.**, (1985). "Productivity and R & D at the Firm Level in French Manufacturing," in Z. Griliches (ed.) (1984).
- Edquist, C. & Jacobsson, S.**, (1985). "State Policies, Firm Performance and firm Strategies: Production of Hydraulic Excavators and Machining Centres in India and Republic of Korea," *Economic and Political Weekly*, Special Number.
- Goldar, B.**, (1986). *Productivity Growth in Indian Industry*, Allied Publishers, New Delhi.
- Griliches, Z.**, (ed.) (1984). *R&D, Patents and Productivity*, University of Chicago Press, Chicago.
- Kumar, N.**, (1987). "Technology Imports and Local Research and Development in Indian Manufacturing," *Developing Economies*, Vol. 25, No. 3, September.
- Mehta, S.S.**, (1980). *Productivity, Production Function and Technical change*, Concept Publishing Company, New Delhi.
- Odagiri, H.**, (1985). "Research Activity, Output Growth and Productivity Increase in Japanese Manufacturing Industries." *Research Policy*, Vol. 14.
- Scherer, F.M.**, (1982). "Inter-industry Technology Flows and Productivity Growth," *Review of Economics and Statistics*, Vol. 64, No. 4, November.
- Scherer, F.M.**, (1983). "R&D and Declining Productivity Growth," *American Economic Review*, Vol. 73, No. 2, May.
- Surrey, J.**, (1988). "Electric Power Plant in India: A Strategy of Self-Reliance," *Economic and Political Weekly*, Vol. 23, No. 8, February 20.
- Terlecky, N.E.**, (1974). *Effect of R&D on Productivity Growth of Industries: An Exploratory Study*, Washington: National Planning Association. □

Beware of the flatterer, he feeds you with an empty spoon.

— COSINO DE GREGGIO



# Symbiotic Marketing: The Conceptual Dimensions

P.N. Udaya Kumar, M. Basheer Ahmed Khan & M.T. Thiagarajan

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*Two types of cooperation among economic entities can be envisaged: joint ventures and or business symbiosis. Business symbiosis is an ignored area. It can be practised in all the functional areas like Financing, Personnel, Production, Marketing and even Research & Development. This paper examines the definition of 'symbiotic marketing'. A model is also built up to explain the nature of symbiotic relationships incorporating the dimensions proposed by the pioneers. This model evolves concepts like Axis, Domain Similarity, Intimacy, Multitude, Extent Duration and Direction which enable in determining the possible cooperation of the symbionts.*

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The major motivating forces behind any joint activity are the facts that the human being is not omniscient (Gronhaug, 1990) and omnipotent, and the resources available at an individual's disposal are limited (Fusfeld & Carmela, 1985). To develop himself and the society he lives in, he is required to cooperate and coordinate a major part of his activities with those of others. And in such unavoidable acts of cooperation and coordination, the objective of self-benefit is, in most circumstances, not undermined. This becomes more profound when two organizations with the ultimate motive of generating more profits, agree to participate in a joint activity. The motivator thus, of any joint activity is the 'benefits that the participants would forego in the absence of such joint activity'. In other words, only the additional benefits that accrue from a mutual cooperative action mobilize the participants to take part in the joint activity.

The perception of such additional benefits results in the joint activity or interorganisational cooperation. In the commercial world it is practised through two modes, joint ventures and organisational exchange. In the former, two individuals or organizations promote jointly, a new entity with separate organizational identity for executing economic activities, either connected partly or fully with the existing business or entirely a new business, for varying organizational objectives. In organizational exchange, two or more firms share different resources for complementing their weaknesses with each other's strengths alongwith developing synergy in their activities. Levine & White (1961) define organizational exchange as 'any voluntary activity between two organizations which has consequences, actual or anticipated for the realization of their respective goals or objectives'. This process of organizational exchange develops the foundation for the application of the concept of symbiosis, to the business activities.



Joint ventures have attracted adequate attention (Harrison, 1987; Lynch, 1990; Ohmae, 1989). But, little has been done on the nature and process of 'Business Symbiosis'. An academic milestone in the track of organizational exchange was laid by Lee Adler (1966). However, for about two decades, almost nothing significant was done in this line (Arndt, 1979; Venkataraman, 1981). The second major contribution came from Rajan & Daniel (1986), in which they expanded the scope for explaining the nature of symbiotic marketing relationships. They concentrated more on the compatibility of marketing symbiosis as an alternative strategy in different growth opportunities of Philip Kotler (1986). They considered Time, Proximity, Number, Level and Focus of relationship dimensions, in the process. Any unlimited cooperation among the intraindustry units, carries a potential for their developing into unfair trade associations, like cartels, which are detrimental, to the end-user. The present study attempts to assimilate the various dimensions suggested by the pioneers, into a simple model by embodying it with the concept of 'Domain Similarity' of Van De Ven & Walker (1984).

### A Conceptual Overview

Symbiosis, a word more familiar to the nature's scientists, has its roots in a Greek word *Symbion*, meaning 'the style of living together of dissimilar organisms in a mutually beneficial relationship'. The existence of a sort of 'mutual interdependence' beneficial to both, can be concluded from the above. Such an interdependence is not inevitable for the survival of the organisms, but is sought for an efficient living, and is prolonged as long as it does not threaten the life of the participants. For example, the African Buffalo bird, making its residence on the back of the Rhinoceros or African Buffalo, partakes of gnats etc., that also reside on the host. And in turn, it warns the host when danger impedes by emitting a loud squawk and fleeing off (Adler, 1966). This relationship at any point of time is not inevitable and is not the only source of the survival for either of the organisms.

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Symbiotic marketing, as defined by Lee Adler (1966, p. 30) is 'the alliance of resources or programmes, be-

tween two or more independent organizations designed to improve the marketing potential of each'. A glance at the definition, gives us three phrases, in comprehending the meaning of Symbiotic Marketing: (a) the alliance of 'resources or programmes', (b) between two or more 'independent organizations', and (c) designed to improve the 'marketing potential' of each. The first phrase 'the alliance of resources or programmes', defines the scope of the concept and identifies the resources or programmes that have potential to develop symbiosis. The difficulty exists in identifying the resources or programmes that can be shared. Quite realistically, all the resources can be shared. Determining the boundaries of the concept, identification of different marketing resources that create/develop symbiosis becomes critical. Adler (1966, p. 34) aptly sums up the objective as 'every function performed in a corporation, including financing, manufacturing and research & development, is ultimately intended to sharpen the claws of the firm as a marketer'. This is the preliminary objective of any organization, i.e., to create, maintain and develop a customer. The veracity of the statement was at an acceptable degree, when it was made, approximately two and a half decades ago when generalization, rather than specialization, was in vogue and when a clear demarcation among the functional areas of management had not completely taken place. But, in the age of specialization and superspecialisation, the primary and more direct objective of the manufacturing/production function remains the 'creation of highest product-form utility with lowest possible cost per unit', and that of financing, the least cost funds acquisition, and so on. Marketing remains the secondary objective to/for all other functions. There is no dearth of instances, where the survival of a firm is at risk due to the conflict between the Production Manager/Finance Manager and the Marketing Manager. We acquire more and improved manufacturing facilities to serve more markets or to enhance the product-form utility, but most often these two (major objectives for marketing), are outweighed by the cost of production, the primary area of manufacturing function. Similarly, financing has its own pivotal function of providing funds at the lowest possible cost and risk.

Symbiosis is possible among and within the different functional areas of a business. Symbiotic marketing studies only those relationships that develop symbiosis and generate synergy among the activities and programmes that are directly or primarily connected with and/or become part of marketing function of a firm. The study of symbiosis in different functional areas requires different methodological approaches. Alliance of resources or programmes is possible only when two or more inde-



pendent firms are willing to participate in the act of pooling certain resources and then sharing the pool as per the norms agreed-upon. An independent organization has unadulterated control over its finances (*Economic independence*), as well as on the operations (*operational independence*). A firm retaining only either of the two and lodging the other to an external entity (any firm or individual, not directly involved in the business activities of the unit, for instance, financiers (economic), or licensor/franchiser (operational), cannot be considered as an 'independent organization'. The basic characteristic of symbiotic alliance is an inevitable relationship between the firms. But, the relationship is sought to increase the efficiency of each of the participating firms. Simultaneously, the absence of such relationship poses no threat to the survival of any of the member-firms. Symbiotic marketing provides the same degree of liberty in tailoring the activities to the firm's needs, as in the absence of any marketing alliance. But, in a dominant-dependent relationship, most often, the dominant partner determines the degree of liberty of dependent firms, as in most cases the dependent firm cannot survive in the absence of the dominant, and so it is placed on a lower pedestal during the negotiations. Thus, to participate in a symbiotic relationship, the firm should possess *absolute independence* and should not be dependent on or dominate the other symbiont.

The third and the final phrase 'designed to improve the marketing potential of each', explains the objective of Symbiotic Marketing. Marketing Potential means 'the capacities or capabilities of a firm that lie potent which can further be developed and improved to make actively instrumental in the marketing of a firm's products'. Thus, only those alliances that result in the increment or improvement of the marketing potential of the participating firms are considered to be Symbiotic Marketing Agreements.

**Symbiotic marketing studies only those relationships that develop symbiosis and generate synergy among the activities and programmes that are directly or primarily connected with and/or become part of marketing function of a firm.**

#### Characteristics of Symbiotic Agreements

- The participating firms are *absolutely independent* (both economically and operationally) in nature.

- The relationship is created among firms functioning at the *same level of economic activity* i.e., manufacturer with manufacturer, trader with trader etc. In other words, the relationship can't be identified with the traditional marketer-marketing intermediary relationship. (Adler, 1966. p. 29; Rajan & Daniel, 1986. p. 7)
- Firms participate in a symbiotic marketing agreement *voluntarily*, i.e. no external force, excepting the improved efficiency, can influence the management to opt for a symbiotic relationship.
- All the participating firms maintain both their *organizational and marketplace identities*, during and even after the agreement period. The presence of a manufacturing facility by which the firm is identified, is called 'organizational identity'. The recognition, by the customers, of a product as the produce of a manufacturing facility, with organizational identity, is 'marketplace identity'. For instance, in licensing/franchising agreements, the licensor's/franchiser's brandname is popularized. Alongwith sharing the agreed facilities, the firms unconsciously share the two dimensions of the identity. More valuable 'marketplace identity', is shared by the licensor/franchiser, as his brandname is used, though the organizational identity is retained by the licensee/franchisee. Thus, by making the franchisee to accept his brand name, the franchiser develops his own market identity. But, when such relationships cease to exist, the licensee/franchisee, having no market identity, finds it hard to survive on its own.
- The *resources or programmes*, being shared are *directly connected with or form part of the marketing function* of the participating organizations.

#### Areas of Interaction

Symbiosis can be developed by all the resources of an organization. 'These resources may include distribution facilities, sales force, research, market development, production, technical personnel, and/or finances' (Adler, 1966, p. 30). A broad and simple method of classification of business symbiosis is based on the functional areas of business, like Finance, Personnel, Production, Marketing, Research & Development etc. Thus we have Symbiotic Financing, Personnel symbiosis, Symbiotic Production, and similarly Symbiotic Marketing. As no empirical evidence is available as to which resource/activity is to be assigned to a class of symbiosis, the basis for such allocation should be the intensity of influence of the relationship



on the organizational functions. The greater the intensity of the influence, the more, it is described as the Symbiosis of that function. For instance, TVS Whirlpool has agreed to manufacture a part of its washing machines for ONIDA, on ONIDA brandname (Advertising & Marketing, August 1991). The agreement though had an indirect impact on marketing, especially for TWL, its direct effect is on the production department/facilities of both the organizations. Thus, it is better branded as *production symbiosis*, rather than as symbiotic marketing. The nature of symbiotic relationships in business, and its areas of interaction with all the functional symbiotic relationships are presented in Fig. 1. While explaining the nature of a relationship, Axis, Intimacy, Number, Life span, Direction, Extent and Domain Similarity dimensions are considered.

**Axis of Relationship:** The practice of organizational exchange in marketing is either by sharing the existing marketing resources or by jointly promoting/creating a resource and then sharing the same, as per the norms decided on, by the participants. When a firm has a perception of underutilization of a resource like distribution network, sales force, etc., it can be shared with another firm, which needs similar resources and is reluctant to invest huge amounts for generating the same, for various reasons. Viklik, a local brand of shampoo, manufactured by Sree Amar Enterprises, Guntur (A.P.), a small scale unit, is distributed by Crane Betel Nut works, also based at Guntur. Crane has a wide spread distribution network inside Andhra Pradesh, and with its physical distribution facilities, identified the unutilised additional capacity and the same has been extended to Viklik. On the other hand, Viklik has easy access to an already established distribution network and is relieved of the burden of investing huge amounts of money and effort, for developing the same, for its low priced shampoo. Another major advantage for Viklik comes in the form of reduced gestation time required for the launch of its product over a geographically wider market.

**Another major advantage comes in the form of reduced gestation time required for the launch of its product over a geographically wider market.**

The second focal point is the joint promotion of new facilities. Here, the participating firms jointly develop a facility/resource for the combined use by the symbionts. Most of the promotional programmes, of late, are of this

nature. An ideal example for 'joint promotion of new facilities' is the Very Large Scale Integrated Circuit Technology Research Association (VLSI/TRA), which was established in 1976 as a four-year, \$ 200 million project for conducting fundamental research, with five Japanese mainframe computer manufacturers as members. (Fusfeld & Carmela, 1985) As a countermove, the U.S. electronic industry, formed a R & D Consortium, Microelectronics and Computer Technology Corporation (MCC), participated by 16 U.S. electronics manufacturers. (Bower & Rhenman, 1985)

**Direction:** A symbiotic relationship can be either *Unilateral*, i.e. sharing of one's resources by the other, or *Reciprocal*, i.e. sharing of each others' resources by each of the participants.

*Unilateral:* Through an agreement, Godrej distributes Veltette shampoo, through its well established distribution channels and facilities, throughout the country. Here, the resource, the distribution channels and facilities, is an operational asset of Godrej, and Veltette's contribution is only to the extent of sharing the resource. But, Godrej, is not sharing any of the resources available with Pharmicare, the producers of veltette shampoo. Thus, the direction of resource sharing, i.e. Veltette sharing Godrej's resource, is one-sided and is called unilateral marketing symbiosis.

*Reciprocal:* Major percent of agreements that take place are reciprocal in nature. Each of the parties agrees to deliver covers and articles on the other's behalf, within the geographical zone it operates. Thus, each of the parties own definite resources that are shared by all the parties to the agreement, thus creating reciprocal marketing symbiosis.

**Extent:** Symbiosis can be extended over either *only one or a few activities, or the whole function*. The former, known as activity-based relationship, can be either *Unidimensional*, (sharing only one activity) or *Multidimensional* (sharing more than one activity). And the latter, jointly conducting the whole function is known as *Functional Symbiosis*. In a unidimensional relationship, only one marketing activity like distribution, advertising, sales force, promotional programmes, warehousing etc., is shared, whereas in multidimensional relationship, more than one of such activities are involved in sharing. The functional symbiosis is carried on, either through floating a new marketing organization or through integration of the marketing departments of the participating firms. All functional symbiotic agreements are 'integrative' in nature, i.e. they develop a single strategy for achieving the



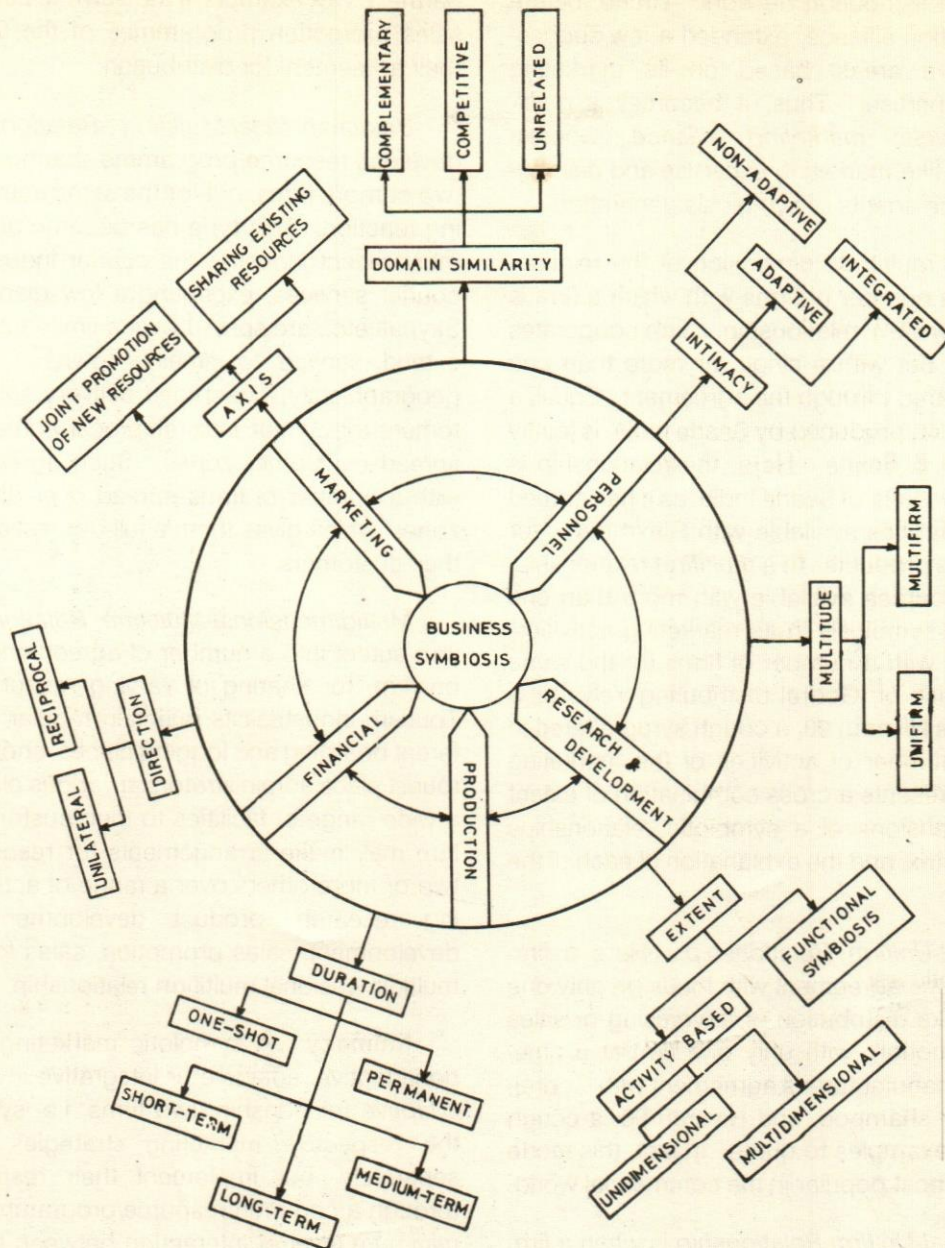


Fig. 1. Nature of Symbiotic Relationships in Business

marketing objectives of all the symbionts simultaneously, whereas the converse is not always true.

In the recent few issues of 'Omega', a management science journal, there appeared a notification stating that five publications viz., *Management Science*, *The Journal of Operations Research Society*, *Omega*, *Naval Research Logistics Quarterly* and *Journal of Operations Management*, formed a consortium with the objective of avoiding the redundancy in effort of refereeing for simultaneous multiple submissions, for publication (*Omega*, 1992). As

all these journals have the similar objectives, the elimination of multiple submissions will make refereeing process more efficient and thereby decrease the time required. This interpublication relationship is a *unidimensional symbiotic alliance*. The authors now receive a faster response from their publishers and are assured that one submission is sufficient for the article to be published in any of the five journals with similar objectives. Viklik-Crane example, prior to be branded as Viklik, the shampoo was marketed under the name 'Nimie', but its failure was attributed to poor quality, unimpressive packaging



and lack of proper distribution network. Crane, before making the distribution alliance, extended a few suggestions, in the above areas, based on its marketing knowledge and expertise. Thus, it becomes a *multidimensional symbiotic marketing alliance*, wherein marketing activities like marketing expertise and distribution facilities form the agents of symbiosis generation.

**Multitude:** The multitude dimension of the relationship determines the number of firms with which a firm is cooperating. In a 'Unifirm' relationship, a firm cooperates with only one firm, but with a single or more than one resources being shared through the agreement. Equal, a low protein sweetener, produced by Searle India, is jointly marketed by Glaxo & Searle. Here, the relationship is unifirm from the view point of Searle India, as it has agreed to share only the facilities available with Glaxo India, for the distribution of its products. In a *multifirm* relationship, a firm uses the resources available with more than one firm for developing symbiosis in its marketing activities. These relationships with a number of firms for the same activity as in the case of, Godrej distributing Velvette, a shampoo, as well as Nivaran 90, a cough syrup offered in sachets, or for a number of activities of the marketing function. Table 1 presents a cross combination of extent and multitude dimensions of a symbiotic relationships with the ensuing matrix, and the explanation of each of the quadrants follows it.

**Unidimensional-Unifirm Relationship:** Here a firm enters into a symbiotic agreement with focus on only one marketing activity like distribution or advertising or sales force or sales promotion, with only one firm at a time. Velvette shampoo manufacturer's agreement with Godrej, for distributing their shampoo, and Nivaran 90, a cough syrup, are just two examples to quote. In fact, this mode of symbiosis is the most popular in the commercial world.

**Multidimensional-Unifirm Relationship** is when a firm makes an agreement for sharing more than one activity or programme of its marketing function, with only one

partner as for example, if the Velvette people participate in sales promotion programmes of the Godrej, alongwith their agreement for distribution.

**Unidimensional-Multifirm Relationship:** One firm develops resource/programme sharing relationships with two or more firms, but for the same activity of the marketing function. This type has become popular among the most recent industry, the courier industry. Most of the courier services, excepting a few giants like Blue Dart, Skypak etc., are spread over a limited zone and basically extend service to smaller towns. For providing a geographically widespread delivery service to their customers they enter into reciprocal agreements with firms spread over other zones. Such agreements are made with a number of firms spread over different regions or zones, which gives them a full-domestic network to serve their customers.

**Multidimensional-Multifirm Relationship** is when a firm enters into a number of agreements with more than one firm, for sharing of varying resources/programmes. Tourism industrialists maintain regular contacts with different boarding and lodging places, shopping complexes, tourist place administrators at various places for providing a wide range of facilities to their customers. Similarly, a firm may make arrangements for resource sharing with two or more others over a range of activities like marketing research, product development, new product development, sales promotion, sales force etc., under a multidimensional multifirm relationship.

**Intimacy:** A symbiotic marketing contact may be nonadaptive, adaptive or integrative in nature. In a *non-adaptive* relationship, two firms, i.e. symbionts, develop the respective marketing strategies individually and separately, but implement their respective strategies through a common resource/programme. It denotes the minimum level of interaction between the firm and such interaction is limited only to the act of sharing the resource/programme. But, in many a case, a new

**Table 1:** Cross Combination of Extent and Multitude Dimensions

	One firm	Two or more firms
One activity	<p><i>Unidimensional-Unifirm</i></p> <ul style="list-style-type: none"> <li>● A distributing through B</li> <li>● A product-promoting with B</li> <li>● A advertising tie-ups with B</li> </ul>	<p><i>Unidimensional-Multifirm</i></p> <ul style="list-style-type: none"> <li>● A distributing through B for <math>Z_1/P_1</math></li> <li>● A distribution through C for <math>Z_2/P_2</math></li> <li>● A distribution through D for <math>Z_3/P_3</math></li> </ul>
Two or more activities	<p><i>Multidimensional-Unifirm</i></p> <ul style="list-style-type: none"> <li>● A distributing, product-promoting, advertising tie-ups with B</li> </ul>	<p><i>Multidimensional-Multifirm</i></p> <ul style="list-style-type: none"> <li>● A distributing through B product-promoting with C advertising tie-ups with D</li> </ul>

A, B, C, and D — Independent firms;  $Z_1$ ,  $Z_2$ , and  $Z_3$  — Different market segments and  $P_1$ ,  $P_2$ , and  $P_3$  — Different products



modifications in the strategy becomes unavoidable for the synergistic nature of the activity, through the overall strategy remains intact. Then, it is known as *Adaptive Symbiosis*. Cases are not rare, where the complete strategy of the two or more symbionts, is one and the same. In other words, the participants develop a strategy that cater the objectives of all the symbionts, and in turn, the symbionts, if need arises, may make a few changes in their schedules to meet the strategy requirements. They are known as *integrative symbiotic strategies*.

**Duration:** Basically, a symbiotic relationship can be either one-shot, permanent or time-based. Time-based relationship can in turn be either short-term, long-term or medium-term. In a one-shot relationship, the exchange/resource sharing is limited to a single activity or a set of activities. But, as soon as the activity gets over, the relationship also ceases to exist. Most of the joint sales promotions are included in this category. *Permanent Relationship* is permanent in the sense that as long as the participating firms undertake such activity or are in business, the relationship is active. To be more comprehensive, the life span of the sharing activity is not determined at the time of making the agreement, but by the life of the activity, or one or more of the symbionts. *Time-based Relationship* is when an agreement is effected by two or more participants to extend their cooperation in marketing resource sharing, over a specified time period, i.e. not permanent or one-shot. It can be either short-term, medium-term, or long-term. *Short-term* is when a relationship ends or is intended to terminate, voluntarily and smoothly, within a period of 12 months, i.e. less than a year. *Medium-term* is when a symbiotic relationship extends over a period, more than one year, but is less than three years. *Long-term* is whenever the planned period of a marketing resource exchange relationship is more than 3 years, but has a time limit.

Here, need arises to differentiate between a one-shot relationship and time-bound relationship, as in many cases the former extends over a period, sometimes even over years. A one-shot relationship is mainly *activity-based*. The participants agree to share an activity or a set of activities. The activity/ies may extend over a period of a day, a week, a month or a year or more. The base of the relationship rests on the activity dimension. The sharing contracts become ineffective as soon as the activity is completed. For example, the world's largest computer R & D project, Very Large Scale Integrated Circuit Technology Research Association (VLSI/TRA), is membered by the five principal Japanese mainframe computer manufacturers, and extended over a period of 3 years, from 1976 to 1979, and generated 1000 new patents that

helped build Japanese leadership in many areas of the computer and related areas (Lodge & Walton, 1989). On the other hand, the time-based relationship converges its light onto the *time dimension*. As soon as the time ends, the relationship also terminates, but at what stage the activity is insignificant.

**Domain Similarity:** Symbiosis is practised by firms manufacturing related products i.e. either competitive or complementary or unrelated products. The concept of Domain similarity, as proposed by Van de Ven & Walker (1984, p. 599) has been adopted to study the plausible relationships among the related and unrelated products. They define it, as 'the degree to which organizations have the same services, clients and personnel skills'. They further write that high, moderate and low degrees of domain similarity represent the competitive, complementary and unrelated nature among the products (Van de Ven & Walker, 1984, p. 601). The competitive or highly domain similar products or firms, have almost the same customers, serve the same needs of the customers and use almost similar personnel skills in the process. The unlimited scope of cooperation and coordination especially in the areas like pricing, demand and supply control, among such highly domain similar products/firms should tend to lead to the formation of cartels. However we should not let the fear for cartelisation take us to a society where unnecessary wastage and underutilization of scarce resources are inbuilt characteristics. We must welcome cooperation even among competitors as long as they retain their competitive fragrance and above all, intend to sharpen their competitive edge though such cooperative alliance. Cooperation among competitors is possible and such cooperation should have a limited scope, encompassing the activities like marketing research, sponsorship programmes, new product development etc. The Detroit big three—General Motors, Ford and Chrysler—have formed a consortium to devise the plastic car of the future, (Advertising & Marketing 1991, Dec.).

**High, moderate and low degrees of domain similarity represent the competitive, complementary and unrelated nature among the products.**

On the other hand, the unrelated or low domain similar products also have limited scope of interfirm cooperation. The products are said to be unrelated, when



they serve, or intend to serve entirely different needs. As the basic difference lies in the needs they serve, the unrelated firms might exhibit complementarity or commonality in relation to the segments they cater, the personnel skills and physical facilities they utilize while marketing their products. This perception of complementarity or commonality among the unrelated products develop the potential for interfirm cooperation and coordination and thus, the scope of such interaction is limited to the existence of complementarity or commonality in the customer groups they serve and skills and facilities they use. The unrelated products marketing symbiosis is acceptably exploited by HMV houses, the prerecorded audio cassette marketers, based at Bangalore, by entering into agreements with ice-cream makers, like Dollops and Vadilal, for attaching ice-cream parlours to their HMV Houses (*Advertising & Marketing*, 1991 June). Chitra Thangai Prabhakar, proprietor, explains the commonality as 'both are forms of entertainment'. The success of the alliance can be assessed from their intentions to start two more Lopstops (HMV House + Ice-cream Parlour) at two other places in the city. The writeup also says the alliance partners have plans of joint product promotions like offering free audio cassettes with bulk ice-cream orders and so on.

The scope of interorganisational cooperation among moderately domain similar/complementary products/firms, is the widest. When two products together satisfy a need of the customer and in the absence of one of the products, the utility/efficiency of the other is either nullified or reduced (considerably), then the products are complementary in nature. In domain similarity terms, the products have higher correlation in the market segments they serve, the need they fulfill and the skill and facilities they utilize. There exists a fraternal feeling among the moderately domain similar firms as a change (increase/decrease) in the sales of one product, brings a respective change (increase/decrease) in the sales of the other product, though not definitely linearly, unlike in those of competitors (inversely related) and unrelated (independent of each other) products/firms. This fraternal feeling would help them in overcoming the barriers (like cartelisation, unfair trade practices) for cooperating in areas like product improvement programmes, advertising, sales force, distribution channels, and thus widening the scope of symbiotic marketing for moderately domain similar products/firms. The complementarity in the markets they target, the skills and facilities they utilize, further extend their scope to other activities which are

possible among unrelated products, subject to existence of commonality in the market segments they serve.

## Conclusion

Symbiotic marketing is an innovative perspective of 'exchange' process, where two or more independent organizations with, almost competing objectives of making more profits come together to help each other, for optimising the gains. Cooperation in the business activities is inevitable and advancement is made towards a point, where determining the scope of interorganisational cooperation, instead of restricting it, even among competitors, is becoming essential.

## References

- Adler, Lee, (1966), "Symbiotic Marketing", *Harvard Business Review*, November-December.
- Advertising & Marketing*, (1991), "TWL-Onida Double Strength", August.
- Advertising & Marketing*, (1991), "Clean Cars", December.
- Advertising & Marketing*, (1991), "HMV Houses—Two in one", June.
- Arndt, Johan, (1979), "Toward a Concept of Domesticated Markets", *Journal of Marketing*, Fall, Vol. 43.
- Bower, Joseph L., & Rhenman, Eric A., (1985), "Benevolent Cartels", *Harvard Business Review*, July-August.
- Fusfeld I. Herbert & Haclish, Carmela S. (1985), "Cooperative R & D for Competitors", *Harvard Business Review*, Nove.-Dece.
- Gronhaug K., (1990), "The Incentive Fallacy in Cooperative Arrangements", *Omega J. of Management Science*, Vol. 18 (5).
- Harrison S. Jeffrey, (1987), "Alternatives to Merger—Joint Ventures and other Strategies", *Long Range Planning*, Vol. 20, No. 6.
- Kotler, Philip, (1986), "Marketing Management: Analysis, Planning and Control", 5th Ed., Englewood Cliffs, NJ; Prentice-Hall.
- Levine, Sol & White, Paul E. (1961), "Exchange as a Conceptual Framework for the Study of Interorganisational Relationships", *Administrative Science Quarterly*, 5.
- Lodge, George, & Walton, Richard (1989), "The American Corporation and its New Relationships", *California Management Review*, Spring, 31/3.
- Lynch, Robert P. (1990), "Building Alliances to Penetrate European Markets", *Journal of Business Strategy*, March-April, 11.
- Ohmae K., (1989), "The Global Logic of Strategic Alliances", *Harvard Business Review*, 89/2.
- Omega, (1992), "Special Notice", Vol. 20, No. 5/6, Sept.-Nove.
- Rajan P., Varadarajan & Rajarathnam, Daniel (1986), "Symbiotic Marketing Revisited", *Journal of Marketing*, Vol. 50, January.
- Van de Ven H., Andrew & Walker, Gordon (1984), "The Dynamics of Interorganisational Coordination", *Administrative Science Quarterly*, 29.
- Venkataraman, N., (1981), "Marketing Synergy: A Key to Increased Productivity", *Productivity*, Vol. XXIX, (1). □



# Leadership Effectiveness & Managerial Response to Conflict Strategies

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*Management of organizational conflict plays an increasingly significant role in team management and strategies of organization development. This paper explores the relationships between organization environment-based need assessment, leadership styles and the conflict strategies.*

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Organizational conflicts have been considered from several angles. Conflict is popularly considered to have its source in personal processes and the individual's personality plays a significant role in giving rise to conflict and tension (Chanin & Schneer, 1984; Jones and Melcher, 1982; Baron, 1989; Mills and Smith, 1985). Conflicts are caused in an interpersonal context, where interpersonal variables and communication processes contribute largely. (Volkema & Bergmann 1989; Musser, 1982; Brown, Yelsema & Keller, 1981; Barefoot & Strickland, 1982; Frank and Battel, 1981). Conflicts are believed to be caused by groups within organizations such as union and management (Stagner & Rosen, 1965) or two and more interest groups such as staff and line (Nelson, 1984). Of late the cultural influences that tend to cause certain types of conflicts have also been explored (Kozan, 1989). In addition, there has been a theoretical corollary put forth by Smith (1989) which explains that conflict at times erupts at locations far remote from the place of its origin. He illustrated this point from a long term participant observation study. Eventhough such assumption is not fully tested with the database, it seems to communicate a viewpoint that the source of conflict may not be exactly the same always. Hence, there is a need to reexamine a conflict against a broader convass within which the antecedents of the conflict are properly identified besides exploring a possibility of its origin lying elsewhere in the organization. Kabanoff (1985) has broadened the arena of conflict in organization by relating it to the structural role theory. He stressed that the conflict is aroused at the psychological level as a result of incompatible expectations among people, about their influence, their desire to protect valued roles and to maintain a sense of freedom.

As it appears, the analysis of conflict leads to several focal issues, but irrespective of difference in points of view, the techniques of conflict management applied by several researches remain relatively restricted (Blake,



Shepard & Mouton; 1964, Rahim 1986, Pareek, 1982 Kilmann & Thomas 1977; Sayeed, 1990a). Most of the researchers generally agreed that conflicts need to be resolved by using one or more conflict management techniques (Renwick 1975a, Pareek 1982; Bose & Pareek 1986; Sayeed, 1990a, Sayeed 1990b). In view of the diversity in conflict strategies Sayeed (1990b) attempted a factor analysis on the conflict strategies data obtained across 8 conflict topics and defined the factorial independence of the conflict strategies, that included following rules, avoiding, compromising, consulting, confronting, forcing, toning down and accommodating. The structure of conflict behaviour was previously purported to vary along two dimensions – assertion and cooperation. Recently Dave and Holland (1989) have reported three dimensional structure of conflict strategies viz., openness, distance and control. In the same line of thinking, Sayeed (1990b) also showed that confronting behaviour in conflict management was highly valued by the managers as compared to a style of forcing or avoidance. It was also emphasized that conflict management styles do tend to vary across two dimensions, namely, Reciprocal Problem Solving Style and Authoritative System Supported Style and the former was valued much higher than the latter. Thus some work has been done on the conflict behaviour, conflict management strategies and related areas but little work seems to have been done relating organization climate based need assessment (viz. needs for control, affiliation, influence, achievement, extension and dependency) and conflict management strategies managers opt. for. It is also very little known whether leadership styles as conceptualized by LPC measure (Fiedler, 1967) alongwith contingency variables do relate to conflict management strategies. The present paper is, therefore, intended to explore the aforementioned relationships in a multivariate framework.

### Study 1 – Method

*Sample and Procedure:* Data were collected from 101 managers working in various industries representing a wide range of product mix and functions. The respondents belonged to different types of organizations including light and heavy engineering concerns, chemical firms, pharmaceutical and agro-based industries and financial institutions. Predominantly 60 per cent of the respondents were from public sector undertakings, whereas the rest represented Private Sector industries. Out of the sampled managers, 29 belonged to various units of a single engineering organization. The respondents belonged to the lower side of the middle age bracket and most of them had bachelor's degree in science, engineer-

ing or social sciences. Out of the 120 managers approached for data collection, 101 provided usable questionnaires, indicating a response rate of 84.2 per cent.

**Confronting behaviour in conflict management was highly valued by the managers as compared to a style of forcing or avoidance.**

*Instrument:* The questionnaire consisted of Least Preferred Coworker (LPC) Scale, Situational Control Measures [i.e., leader member relations (LMR), task structure (TS), and position power (PP)] and Conflict Management Strategies Scale (CMSS) Sayeed (1990a). The questionnaire was systematically prepared with separate instructions for various sub-scales. The LPC scale consisted of 18 bipolar semantic differential terms describing a least preferred coworker. All the 18 items of LPC scale had a uniform 8 point response format. The LPC Scale is designed to measure the leadership orientation of the respondents in an indirect way. The higher score on the scale characterizes respondents' leadership style as relationship motivated, whereas the lower score characterizes him to be a task-motivated leader. The situational control measures comprising leader-member relation (8 items), task structure (10 items) and position power (5 items) were rated on different scaling format.

The Conflict Management Strategies Scale (Sayeed, 1990a) was designed to have 8 well-portrayed conflict situations in which superior managers can play a dominant role. The situation required the respondents to appraise the critical incident as posed in the 'conflict situation' and indicate on a 7 point scale as to which of the strategies out of relevant strategies will be most or least applicable. The respondents were asked to assess all the strategies in a given situation and indicate their preference for each one of them. In the present study, only one type of conflicting situation was analyzed.

Table 1 reports descriptive statistics about 8 conflict Management Strategies. Means, SDs and rank order of the strategies are reported. The most frequently applied strategies are associated with higher ranks and least applicable strategies are represented by lower ranks.

It can be seen that problem solving or participation oriented conflict management strategies such as confrontation and toning down differences were regarded highly preferable followed by a mix of participative and non-par-



**Table 1:** Means and SDs of Conflict Management Strategies (N = 101)

Conflict Management Strategies	$\bar{X}$	Rank	SD
Following Rules	4.90	(3)	2.12
Compromising	4.31	(4)	2.39
Forcing	3.23	(6)	2.20
Consulting	3.86	(5)	2.12
Confronting	5.52	(1)	1.97
Avoiding	1.81	(8)	1.63
Toning down	4.97	(2)	2.09
Accommodating	3.18	(7)	1.93

ticipative strategies such as following rules, compromising, consulting, forcing, accommodating and avoiding. The trend of findings suggest a predominant orientation to use problem solving participative strategies; yet combination of various strategies having theoretically lesser proximity to problem solving are often preferred. For example, following rules had a mean value of 4.90, quite comparable with toning down and consulting. This is suggestive of situational differences that probably tended to determine selection of strategies that appeared to be different from each other. Nevertheless they have been preferred. The most significant point is that the first and spontaneous selection of strategies considerably favoured problem solving reflecting participative orientation in conflicting situation.

**The first and spontaneous selection of strategies considerably favoured problem solving reflecting participative orientation in conflicting situation.**

Table 2 reports 4 factor ANOVA between leadership styles, situational control dimensions and two conflict management strategies, viz., following rules, and avoiding. Each one of the independent variables has two levels which made the design of analysis  $2 \times 2 \times 2 \times 2$  factorial design. A close analysis of the table revealed that the main effect was not significant for following rules. Task structure, being a situational control variable showed significant difference with respect to following rules. Amongst six 2-way interactions, LPC  $\times$  PP showed significant interaction effect, and the rest of the 3-way and 4-way interactions failed to show any significance. Avoiding being a non-participative conflict management strategy showed simple main effects significant for Posi-

tion Power (PP). Amongst 2-way interactions, LPC  $\times$  PP term was marginally significant and the rest of the terms for all combinations failed to show any statistical significance.

**Table 2:** 4-way ANOVA between Leadership Styles, Situational Control Variables and CMS (N = 101)

Source of variation	Following Rules		Avoiding	
	Mean Square	F	Mean Square	F
<i>Main effects</i>	6.09	1.42	4.87	1.76
Least Preferred Coworker (LPC)	1.75	0.41	5.51	1.99
Leader Member Relation (LMR)	0.43	<1	3.39	1.22
Position Power (PP)	3.71	<1	16.54	5.98*
Task Structure (TS)	16.43	3.84*	0.36	<1
<i>2-Way Interaction</i>	6.76	1.58	1.91	<1
LPC $\times$ LMR	0.62	0.15	0.59	<1
LPC $\times$ PP	18.22	4.25*	9.97	3.61 <sup>a</sup>
LPC $\times$ TS	1.32	<1	0.80	<1
LMR $\times$ PP	8.20	1.91	0.02	<1
LMR $\times$ TS	1.25	0.29	0.23	<1
PP $\times$ TS	5.54	1.29	0.04	<1
<i>3-Way Interaction</i>	3.15	<1	1.11	<1
LPC $\times$ LMR $\times$ PP	4.08	<1	2.15	<1
LPC $\times$ LMR $\times$ TS	6.38	1.49	0.25	<1
LPC $\times$ PP $\times$ TS	0.09	<1	0.01	<1
LMR $\times$ PP $\times$ TS	1.06	<1	2.24	<1
<i>4-Way Interaction</i>	8.66	2.02	0.13	<1
LPC $\times$ LMR $\times$ PP $\times$ TS	8.66	2.02	0.13	<1
Explained	5.67	1.32	2.14	<1
Residual	4.28	—	2.76	—
Total	4.49		2.67	

\* $p < 0.05$  a = Approaching significance

Table 3 reports 4 factor ANOVA with two levels of interactions between leadership styles (low and high), situational control variables each having low and high scores and forcing as a conflict management strategy.

With respect to compromise, the main effects were found to be significant ( $F = 3.63, p < 0.01$ ). The simple main effect for LPC also showed significant difference for task and relationship oriented style. Although all the two-way interaction terms failed to show statistical significant, only one term for 3-way interaction, viz., LPC  $\times$  LMR  $\times$  PP showed significance ( $F = 3.98, p < 0.05$ ). With regards to consulting being another participation based conflict management strategy, LPC  $\times$  PP, and LMR  $\times$  PP



terms showed significance whereas the rest of the other terms including the main effects failed to show statistical significance.

**Table 3:** 4-way ANOVA between Leadership Styles, Situational Control Variables and CMS.

Source of Variation	Forcing	
	Mean Square	F
<i>Main effects</i>	9.92	2.18
Least Preferred Co-worker (LPC)	0.09	<1
Leader Member Relations (LMR)	24.82	5.45*
Position Power (PP)	0.0	<1
Task Structure (TS)	18.03	3.97*
<i>2-Way interaction</i>	9.84	2.16*
LPC × LMR	10.86	2.39
LPC × PP	18.22	4.01*
LPC × TS	0.00	<1
LMR × PP	18.25	4.02*
LMR × TS	20.39	4.48*
PP × TS	0.32	<1
<i>3-Way interaction</i>	1.55	<1
LPC × LMR × PP	0.00	<1
LPC × LMR × TS	4.99	1.09
LPC × PP × TS	2.18	<1
LMR × PP × TS	1.01	<1
<i>4-Way interaction</i>	4.18	<1
LPC × LMR × PP × TS	4.18	<1
Explained	6.62	1.45
Residual	4.54	—

\*p < 0.05

Confrontation as one of the participative strategies solving interpersonal conflicts with greater openness failed to merge as a significant variable and showed most of the interaction effects as non-significant excepting one. For instance, the 3-way interaction LPC × LMR × PP tended to show significant F ratio suggesting the combined effect of leadership styles and two situational control variables which included leader member relations and position power.

Amongst the other two participation-based conflict management strategies, toning down also showed some importance in the scheme of analysis whereas accommodating failed to emerge as an important factor. The main effects for toning down strategy or 3-way interaction was significant yielding an F ratio of 2.83, p < 0.05. The other two 3-way interaction terms including LPC × LMR × TS; and LPC × PP × TS were statistically significant.

## Study 2—Method

*Sample:* Data were collected from a random sample of 157 junior and middle level managers working in 5 geographically dispersed divisions of a multiproduct public sector undertaking. The company specialized in manufacturing consumer utilities and heavy industrial machinery. In view of the nature of study concerned with assessing several managerial and organizational processes, it was considered appropriate to confine the data collection to lower and middle management excluding non-supervisory and senior managerial group, with the results that 45 per cent of respondents represented lower management cadre while 55 per cents represented middle management group. Almost all the respondents (97 per cent) had 5 or more years of service in the company. The educational background considerably varied among the respondents, which included engineering and non-engineering disciplines with a minimum of graduation attained in the subject.

*Instrument:* Pareek's organizational climate Index (1981) consisting of 12 subscales was administered to the company executives in small groups. Of the 12 dimensions of the study, 3 dimensions of communication, decision making and trust were chosen that appeared to bear some relationship with conflict management strategies, while the fourth dimension of the study evaluated those strategic processes essential for preferring certain conflict management options. Although the organizational climate dimensions explored a multitude of organizational practices perceived by the respondents, the items of communication, decision making trust (6 items in each scale) have been designed to tap six psychological orientations or needs essential for the growth and integration of individuals in organization, viz., control, affiliation, expert influence, achievement, extension and dependency (Pareek, Rao and Pestonjee, 1981). One of the major outcomes or dependent variables considered relevant in the present study is the strategic managerial behaviour helpful in managing conflicts. As mentioned earlier, one of the subscales of Pareek's organizational climate index was used to top 6 basic strategies of managing conflicts, viz., confrontation, avoidance, third party intervention, forcing, following norms (and/or appealing to principles) and consulting. All the items were measured on a 5-point rating scale ranging from '1-not at all true' to '5-definitely true'.

## Data Analysis

Data analysis was carried out using multiple discriminant function subroutines developed by Overall and



**Table 4:** 4-way ANOVA between Leadership Styles, Situational Control Variables and CMS.

Source of Variation	Compromise		Consulting		Confrontation		Toning. down		Accommodating	
	Mean Square	F	Mean Square	F	Mean Square	F	Mean Square	F	Mean Square	F
<i>Main effects</i>	19.26	3.63**	2.87	<1	2.83	<1	5.08	1.27	4.37	1.17
Least Preferred Coworker (LPC)	54.95	10.47**	6.94	1.56	1.44	<1	1.92	<1	12.45	3.35
Leader Relation (LMR)	1.33	<1	0.36	<1	1.10	<1	13.23	3.32	3.82	1.03
Position Power (PP)	3.71	<1	4.74	1.07	10.81	2.76	0.74	<1	0.87	<1
Task Structure (TS)	10.31	1.95	2.73	<1	0.46	<1	11.26	2.82	6.93	1.86
<i>2-Way interaction</i>	4.34	<1	8.04	1.82	1.48	<1	5.03	1.26	3.67	<1
LPC × LMR	13.70	2.61	2.35	<1	0.10	<1	0.94	<1	0.49	<1
LPC × PP	0.85	<1	1.86	4.94*	0.43	<1	4.46	1.12	3.53	<1
LPC × TS	0.28	<1	0.27	1	5.58	1.43	5.46	1.37	0.77	<1
LMR × PP	0.68	<1	19.23	4.34*	1.16	<1	5.98	1.50	3.50	<1
LMR × TS	0.06	<1	9.02	2.03	0.01	<1	4.02	1.01	5.83	1.57
PP × TS	6.03	1.15	0.05	<1	0.81	<1	4.83	1.21	7.01	1.89
<i>3-Way interaction</i>	9.92	1.89	2.37	<1	8.77	2.24	11.27	2.83*	2.51	<1
LPC × LMR × PP	20.89	3.98*	0.70	<1	20.87	5.33*	3.53	<1	0.79	<1
LPC × LMR × TS	1.73	0.33	0.35	<1	1.48	<1	22.88	5.76*	2.58	<1
LPC × PP × TS	3.46	<1	4.99	1.13	5.14	1.31	20.08	5.05*	5.00	1.34
LMR × PP × TS	10.12	1.93	0.99	<1	3.41	<1	0.63	<1	2.96	<1
<i>4-Way interaction</i>	1.04	<1	5.37	1.21	1.52	<1	0.66	<1	4.34	1.16
LPC × LMR × PP × TS	1.04	<1	5.37	1.21	1.52	<1	0.66	<1	4.34	1.16
Explained	8.37	1.59	4.74	1.08	3.75	<1	6.46	1.62	3.81	1.02
Residual	5.24	—	4.42	—	3.92	—	3.97	—	3.71	—
Total	5.71	—	4.48	—	3.89	—	4.35	—	3.73	—

\*p &lt; 0.05    \*\*p &lt; 0.01

Klette (1971). The programme provides mean values of conflict management strategies broken down by communication, decision making and trust items, tapping the 6 aforementioned needs. The low, moderate and high groups of communication, decision making and trust were obtained by collapsing adjacent categories of the 5 point scale. The lower group was obtained with 1 and 2 scores added together, score 3 was regarded as moderate and 4 and 5 were considered as high. Besides providing group means on original variables, the results also report canonical variate means for conflict management strategies. Two factor ANOVA was also obtained with the means of communication, decision-making and trust as independents and conflict management strategies as dependents.

## Results

Table 5 reports the means of conflict management strategies broken down by communication items reflecting the needs for control, affiliation, expert influence, achievement, extension and dependency. Besides this, canonical variate means weighted by discriminant function coefficients are also reported together with respective  $\chi^2$  values testing the significance of the discriminant function. Excepting control, expert influence and extension, the other need domains viz., affiliation, achievement and dependency, all significantly influenced conflict management means as reflected in the canonical variate means of the respective functions. Apart from statistical analysis, what is revealing is the U-shaped relationship



**Table 5:** Conflict management means broken down by the items of communication dimensions and discriminant function results

Communication	Group	Conflict Management Strategies means						Canonical variation mean	
		Confrontation	Avoidance	Third Party intervention	Force	Following norms/ideals	Consulting	Discriminant function	$\chi^2$
Control orientation	Lo	3.2	3.4	2.9	3.5	3.4	2.9	5.1	4.70
	Mo	3.1	3.3	3.1	3.1	3.4	3.0	4.6	
	Hi	3.2	3.5	3.1	3.5	3.6	3.2	5.1	
Affiliation orientation	Lo	2.9	3.3	2.9	3.3	3.1	2.8	4.6	25.48***
	Mo	2.9	3.4	3.1	3.6	3.5	3.0	5.1	
	Hi	3.4	3.5	3.2	3.3	3.8	3.4	5.6	
Influence	Lo	2.9	3.1	2.9	3.5	3.2	2.7	4.5	14.07
	Mo	3.2	3.4	3.0	3.4	3.6	3.1	5.1	
	Hi	3.3	3.6	3.2	3.4	3.6	3.3	5.3	
Achievement	Lo	2.5	3.1	2.9	3.7	3.1	2.6	2.3	51.23***
	Mo	2.2	3.4	3.3	3.9	3.2	3.1	2.8	
	Hi	3.4	3.6	3.2	3.2	3.8	3.4	3.6	
Extension	Lo	2.9	3.4	3.1	3.5	3.7	3.1	1.7	13.46
	Mo	3.3	3.4	3.0	3.3	3.4	3.4	1.1	
	Hi	3.3	3.6	3.1	3.4	3.6	3.2	1.4	
Dependency	Lo	3.6	3.8	2.7	3.0	3.9	3.5	1.9	28.05**
	Ho	3.0	3.4	3.2	3.4	3.3	3.0	0.8	
	Hi	3.1	3.4	3.2	3.6	3.5	3.1	0.8	

\*\*\*p &lt; 0.001

between communication and conflict strategies. A frequency count of conflict management mean values (higher than or equal to 3.5 across 6 need areas) suggested that the following organizational norms/ideals for managing conflicts played a dominant role, followed by the options of force, avoidance, confrontation and consulting in that order.

Table 6 reports conflict management strategies in relation to decision-making evaluating the influence of six motivational needs against the dependent variables (i.e. conflict management strategies). The discriminant function for control, affiliation, expert influence, extension and dependency needs as part of decision-making process of the organization were significant well beyond 0.01 level. The canonical variate means for low, moderate and high groups that have reflected the basic trends amongst the means of conflict management strategies showed positive linear trend for control, expert influence, extension and dependency needs ( $p < 0.01$ ) whereas a U-shaped pattern was noted for affiliation need ( $p < 0.01$ ). Although the achievement orientation showed positive linear trends amongst the means of conflict management strategies, the value of the  $\chi^2$  was not significant ( $\chi^2 = 4.49$ , ns).

The frequency counts of conflict management means values higher than or equal to 3.5 across 6 decision-

making dimensions revealed that "following norms/ideals" played a vital role followed by force, avoidance and consulting. The least important conflict management strategies were confrontation and third party intervention.

Table 7 reports conflict management means for the six need areas under the dimension of trust. Control, expert influence, achievement, extension and dependency needs have significantly discriminated the mean values of conflict management strategies ( $p < 0.01$ ). The canonical variate means revealed linear trend amongst the means of conflict management strategies. The frequency counts for various conflict management strategies based on the mean value higher than 3.5 revealed that "following norms/ideals" for resolving conflicting issues was regarded highly significant, whereas force, avoidance and confrontation showed lower degree of importance in that order.

**"Following norms/ideals" for resolving conflicting issues was regarded highly significant, whereas force, avoidance and confrontation showed lower degree of importance.**



**Table 6:** Conflict management means broken down by Decision-making variables and discriminant function results

Decision Making	Group	Conflict Management Strategies Mean						Canonical variate	
		Confrontation	Avoidance	Third party intervention	Force	Appealing to Principles	Consulting	Mean	$\chi^2$
Control	Lo	3.3	3.4	2.9	3.1	3.7	3.2	1.8	25.69**
	Mo	3.1	3.6	3.3	3.4	3.5	3.3	2.7	
	Hi	3.0	3.4	3.1	3.8	3.5	3.0	2.7	
Affiliation	Lo	3.4	3.2	2.9	3.5	3.6	3.1	2.2	29.69***
	Mo	2.7	3.0	3.2	3.8	3.2	3.7	1.6	
	Hi	3.3	3.7	3.1	3.2	3.6	3.4	2.7	
Influence	Lo	2.9	3.4	2.8	3.2	3.1	2.8	5.4	38.98**
	Mo	2.9	3.4	3.0	3.4	3.6	3.1	6.0	
	Hi	3.5	3.5	3.3	3.5	3.9	3.5	6.6	
Achievement	Lo	3.1	3.5	2.9	3.5	3.5	3.0	3.0	4.49
	Mo	3.1	3.4	3.1	3.3	3.5	3.2	3.2	
	Hi	3.3	3.4	3.2	3.5	3.7	3.3	3.4	
Extension	Lo	2.6	3.1	3.0	3.5	3.0	2.7	4.0	41.48***
	Mo	3.0	3.4	3.0	3.6	3.3	3.1	4.5	
	Hi	3.4	3.6	3.1	3.3	3.9	3.4	5.3	
Dependency	Lo	3.2	3.4	2.9	2.9	3.4	2.9	3.6	25.44**
	Mo	3.3	3.5	3.2	3.4	3.5	3.0	4.0	
	Hi	3.1	3.4	3.1	3.6	3.6	3.3	4.5	

\*\* p < 0.01    \*\*\* p < 0.05

**Table 7:** Conflict management means broken down by Trust variables and discriminant function results

Trust	Group	Conflict Management Strategies Mean						Canonical variate	
		Confrontation	Avoidance	Third party intervention	Force	Appealing to Principles	Consulting	Mean	$\chi^2$
Control	Lo	3.5	3.6	3.0	2.9	3.8	3.4	0.0	25.20**
	Mo	3.1	3.4	3.4	3.3	3.8	3.2	0.3	
	Hi	3.1	3.4	3.0	3.7	3.4	3.1	0.9	
Affiliation	Lo	2.8	3.0	3.2	3.4	3.3	3.0	3.4	13.21*
	Mo	3.2	3.4	3.1	3.5	3.7	3.1	3.8	
	Hi	3.3	3.6	3.0	3.4	3.6	3.3	4.1	
Influence	Lo	2.6	3.2	2.8	3.6	3.2	3.6	3.1	41.72**
	Mo	3.1	3.4	3.1	3.7	3.6	3.3	3.9	
	Hi	3.5	3.6	3.2	3.2	3.8	3.4	4.3	
Achievement	Lo	2.8	3.3	3.0	3.9	3.2	3.0	0.0	18.75**
	Mo	3.1	3.6	3.0	3.5	3.6	3.1	0.6	
	Hi	3.3	3.5	3.1	3.2	3.7	3.2	0.9	
Extension	Lo	2.6	3.0	2.7	3.5	2.9	2.4	3.9	44.90**
	Mo	2.9	3.3	3.1	3.8	3.4	3.1	4.5	
	Hi	3.5	3.6	3.2	3.2	3.2	3.4	5.3	
Dependency	Lo	2.7	3.1	3.0	3.6	3.4	2.9	3.6	46.59**
	Mo	3.4	3.6	2.9	3.4	3.4	3.3	4.5	
	Hi	3.6	3.8	3.3	3.2	3.8	3.5	4.8	

\*\* p < 0.01    \* p < 0.05

Table 8 reports ANOV results using 6 × 3 factorial design in which 6 types of conflict management strategies and 3 groups (low, moderate and high) of communica-

tion, decision making and trust dimensions were analyzed separately. The main effects of communication, decision-making and trust dimensions were highly significant.



Similarly, differences amongst the groups for all the dimensions were also found significant. More specifically, amongst conflict management strategies, significant mean differences were noted under communication, decision-making and trust dimensions, and also the three groups of communication, decision-making and trust significantly differed when analyzed in relation to conflict management strategies thereby suggesting that across conflict management strategies, varying impact of low,

**Table 8:** Two-way ANOVA between means of low, moderate and high group of communication, decision making and trust dimensions and conflict management strategies (ANOVA on group means)

Source	SS	DF	MS	F
Total	9.26	107		
Between	4.97	17	0.29	6.14*
1. CMS(A)	3.65	5	0.73	15.34**
2. Communication (B)	0.86	2	0.43	9.05*
A × B	0.45	10	0.04	0.94
Error	4.28	90	0.05	
Total	7.86	107		
Between	4.46	17	0.26	6.97**
CMS (C)	3.03	5	0.60	16.09**
Decision-making (D)	1.08	2	0.53	14.27**
C × D	0.36	10	0.04	0.95
Error	3.39	90	0.04	
Total	10.36	107		
Between	6.31	17	0.37	8.23**
CMS (E)	3.61	5	0.72	16.02**
Trust (F)	1.69	2	0.84	18.80**
E × F	1.00	10	0.10	2.22*
Error	4.06	90	0.05	

Note: CMS = Conflict Management Strategies

\*  $p < 0.05$     \*  $p < 0.01$     \*\*  $p < 0.001$

moderate and high groups was significantly noticed. Nevertheless, the interaction effects for communication, and decision-making dimension were not significant, while interaction effect between trust and conflict management strategies were clearly significant ( $F = 2.22$ ,  $p < 0.05$ ).

## Discussion

Even though the nature of independent variables for study 1 and 2 differed, the dependent variables chosen for both the studies conceptually dealt with conflict management options exercised by managers. The first study evaluated leadership styles and managerial situational control made up of three contingency variables viz. leader

member relation, task structure, and position power as independent variables whereas the second study considered 6 psychological needs of the individuals assessed through 3 organizational climate dimensions, viz., decision making, trust and communication. The dependent variables, across both the studies incorporated options or strategies of conflict management managers generally applied in the context of managing their subordinates and handling various organizational problems. The two different samples were restricted to managerial groups and thus bore greater commonality across the samples.

The results brought out a predominant trend of participation based conflict strategies such as confrontation and toning down which have closer association with the managers's role-making functions and his attitude to enlarge the scope of negotiating latitude with subordinates. Comparing the conflict management options of the present study with an earlier research (Sayeed, 1990), the importance of a set of conflict management options can be confirmed. It was noted that 5 of the 8 strategies had exactly the same ranks resulting in a correlation of 0.69 order. As per the rank order given to the conflict strategies, confronting and toning down preceded following rules. Since following rules was opted as the 3rd best strategy, probably it has reduced the positive influence of participation based conflict management strategies referred to above. This process may lead to compromising at times. In one sense, compromising could be regarded meaningful but when it becomes a consistent style of functioning it results in a quiescent tendency devoid of challenge seeking and thus more close to role-taking managerial behaviour (Graen, 1976).

The overall analysis suggested that the leadership styles of managers do not seem to discriminate the preference of conflict management strategies excepting compromise. This emphasized that the relationship motivated leaders and the task motivated leaders showed greater concurrence on the chosen options.

**Compromising when becomes a consistent style of functioning it results in a quiescent tendency devoid of challenge seeking.**

The situational control variables such as leader-member relations, position power and task structure prominently showed significant main effects with regards



to following rules, avoiding and forcing, but failed to suggest significant difference with regards to conflict management strategies such as compromising, consulting, confronting, toning down and avoiding. Applying the conceptual framework based on clustering of conflict strategies (Sayeed, 1990b), it can be argued that situational control variables as perceived by the managers bring out some differences in the conflict strategies of authoritative system supported style, which composed of forcing, avoiding, and following rules, but failed to equally discriminate amongst the conflict strategies forming part of the reciprocal problem-solving style. Individually situational control factors of a leadership context are less relevant to the reciprocal conflict management style, but at the same time they respond to the authoritative conflict management style.

Although the abovementioned results are individually clear, the picture turns out to be more complex with two way and three way interactions, thereby supporting the conceptual importance of situational control variables in Fiedler's Model (1967). As a result of this interaction between LPC and position power, there was a significant F ratio for following rules. In the same way the interaction terms between leader-member relations and position power, leader-member relations and task structure separately indicated significant F ratios for the strategy of forcing, thereby indicating that the leader member relations, position power and task structure perceived by the managers to be more favourable resulted in choosing a strategy of application of force. While the above was true, 3-way interaction term among the situational control variables failed to give way to applying force in the conflict management process. When all the three occur together, the tendency is to apply less of force than the other strategies.

Fiedler's argument (Fiedler, 1967) that situational control factors do have a bearing on the leadership style was significantly upheld with regards to compromising, consulting, confronting and toning down differences, forming part of reciprocal problem solving style. A closer look on the interaction terms in which LPC was included as one of the variables selectively indicated that leadership styles with leader member relation and position power significantly discriminate compromising and confronting strategies whereas leadership styles together with leader member relations and task structure showed significant difference in toning down. LPC together with position power showed significant difference in consulting. As a whole leader-member relations and position power tended to largely influence the leader's tendency to

be effective in selecting problem solving oriented strategies besides emphasizing the point of view that leadership style alone does not seem to relate well with conflict management strategies (Sayeed 1990b). In addition, even though situational variables failed to indicate a significant 3-way interaction there were at least two way interactions signifying the importance of leader member relations and positions power with regards to consulting.

In comparison with study 1, the findings of study 2 strongly confirmed the linkage between organizational practices (viz., communication, decision-making and trust) reflecting the personal needs of organizational members and conflict strategies. This is amply confirmed even in two-way ANOVA using three levels of organizational practices (i.e. low, moderate, and high), and 6 factors of conflict management options. More specifically, out of 18 items of communication, trust and decision making, only 4 items, (or 22 per cent) concerned with the needs for control, expert influence, extension and achievement failed to discriminate conflict management strategies, whereas 14 (or 78 per cent) showed significant discriminatory power in the conflict management strategies. Hence it lends support to our arguments that large organizations are instrumental in producing certain motivational forces that lead to preferring certain types of conflict management strategies such as following organizational norms/ideals in resolving conflict, force and avoidance as against third party intervention, confrontation and consulting. This argument is duly substantiated by relatively low mean values of third party intervention, confrontation, and consulting. However, the discriminant function results revealed that by and large, there is relationship between personal needs assessed through organizational climate dimensions of communication, decision-making and trust, but it was more so with the 6 need measures of trust. The need measures of communication such as control, influence and extension failed to relate with conflict management strategies.

**Large organizations are instrumental in producing certain motivational forces that lead to preferring certain types of conflict management strategies.**

A peculiar finding appeared to be a U-shaped curve obtained for canonical variate means of conflict management strategies. It suggests that low and high groups of various need areas had a similar tendency to choose a



higher rating point while middle group preferred lower rating point of the conflict management strategies.

Apart from the overall picture depicted above, a significant finding turned out to be manager's stress on appeal to principles/following norms as a method of managing conflicts which was followed by a back-up strategy of force and then avoidance. Even though appeal to principles/norms is conceptually closer to negotiation, suggesting application of empathy in managing conflicts, it is considered highly desirable. At the same time managers were found susceptible to using force and avoidance after a brief attempt made in favour of appeal to principles/norms. Surprisingly, confrontation and consulting did not figure in the constellation of either dominant or back up conflict strategies, thereby suggesting a strong tendency among the managers to prefer a chain of conflict strategies comprising of following norms/ideals force and avoidance.

These findings appear to be contradicting the findings of Study 1, wherein confrontation and toning were largely preferred by the managers. Using force in confrontation, toning down and appeal to principles/norms/ideals is suggestive of humane management system and problem solving orientation. The findings seem to complement each other. In essence, managerial tolerance in using dominant strategy consistently over time signifies respect for organizational traditions and norms. If the organization has built up such a culture only then "appeal to principles" or negotiating may contribute to managing conflicts at the work place effectively. Then, there would be exclusive disregard to the application of force. If the case is not so, that back up strategies would take precedence as the dominant strategies for resolving the conflicts. Managerial leadership, therefore, seems to play a significant moderating role between the dominant and back-up conflict management strategies.

## References

- Barefoot J.C. & Strickland L.H.**, (1982), Conflict and dominance in television-mediated interactions, *Human Relations*, 35.
- Baron F.**, (1989), Personality and Organizational Conflict: Effects of the type A behaviour pattern and self monitoring, *Organization Behaviour and Human Decision Process*, 44.
- Blake, R.R. Shepard H.A., & Mouton, J.J.**, (1964), Managing intergroup Conflict in Industry, Houston, Gulf Publishing Co.
- Bose K. & Pareek**, (1986), The dynamics of conflict management styles of the Bankers, *Indian Journal of Industrial Relations*, 22.
- Brown C.T., Yelsema, P. & Keller P.W.**, (1981), Communication Conflict predisposition: Development of a Theory and instrument, *Human Relation*, 34.
- Chanin M.N. & Schneer J.A.**, (1984), A study of the relationship between Jungian personality dimensions and Conflict handling behaviour, *Human Relation*, 37.
- Dave, W.F. & Holland, C.L.**, (1989), The structure of conflict behaviour of managers assessed with self and subordinate ratings, *Human Relations*, 42.
- Fiedler F.F.**, (1967), *A theory of leadership effectiveness*, McGraw-Hill, New York.
- Harry Franks & Battel M.F.**, (1981), Communication Conflict, *Human Relation*, 1981, 34.
- Jones, R.E., & Meicher B.H.**, (1982), Personality and preference for modes of conflict resolution, *Human Relations*, 35.
- Kabanoff B.**, (1985), Potential influence structures as source of interpersonal conflict in groups and organization, *Organizational Behaviour and Human Decision Process*, 36.
- Kilmann R.H., & Thomas, K.W.**, (1977), Developing a forced choice measure of conflict handling behaviour. The MODE instrument *Educational and Psychological Measurement*, 37.
- Mills R.D. & Smith L.**, (1985), Conflict handling and personality dimensions of Project Management Personnel *Psychological Report*, 57.
- Musser, S.J.**, (1982), A model for predicting the choice of conflict management strategies by subordinates in high stakes conflicts, *Organizational Behaviour and Human Performance*, 29.
- Nelson R.E.**, (1984), The strength of strong ties, social networks and intergroups conflict in organization, *American Management Journal*, 1989, 32.
- Overall J.E., & Klette, C.J.**, (1972), Applied Multivariate Analysis, McGraw-Hill, New York.
- Pareek**, (1982), *Managing Conflicts and Collaboration*, Oxford-IBH, New Delhi.
- Pareek U., Rao, T.V. & Pestonjee, D.M.**, (1981), *Behavioural Process in Organization*, Oxford and IBH, New Delhi.
- Rahim, M.A.**, (1986), *Managing Conflicts in Organization*, New York, Praeger.
- Renwick, R.A.**, (1972a), Perception and Management of Superior Subordinate Conflicts, *Organizational Behaviour and Human Performance*.
- Stagner, R. & Rosen, H.** (1965), *Psychology of Union Management Relation*, Belmont, Brooks/Cole Publishing Co., Calif.
- Sayeed, Q.B.**, (1990a), Managerial response to handling conflict situations: An appraisal of conflict management strategies. *Decision*, 17.
- Sayeed**, (1990b), Conflict Management Styles: Relationship with leadership styles and moderating effect of esteem for co-worker, *Indian Journal of Industrial Relations*, 26.
- Smith K.K.**, (1989), The movement of Conflict in Organization: The joint dynamic of splitting and triangulation, *Administrative Science Quarterly*, 34.
- Kozan M.K.**, (1989), Cultural influences on styles of handling interpersonal conflicts: Comparisons among Jordanian, Turkish and US Managers, *Human Relations*, 42.
- Renwick P.A.**, (1975b), Impact of topic and source of disagreement on conflict management, *Organizational Behaviour and Human Performance*.
- Volkema R.J. & Bergmann T.J.**, (1989), International conflict at work: An Analysis of behavioural responses, *Human Relations*, 42. □



# Verdoorn's Law of Productivity Growth

T.L.N. Swamy

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*Output growth is one of the important factors in determining total factor productivity (TFP). This paper examines the correlation between growth rates in TFP and output in respect of Andhra Pradesh manufacturing industries for the period 1961-82. The results of the analysis indicated the validity of Verdoorn's Law of Productivity Growth.*

Since productive efficiency governs the rate of economic growth particularly in developing economies, it becomes important to examine the various determinants of productivity growth. Apart from factors such as unionization ratio (trade unionism), concentration ratio (market structure), rate of change in the level of capacity utilisation and effective rate of tariff protection, output growth also determines the rate of growth of total factor productivity (TFP) in respect of any industry. Growth rates in output are positively associated with growth rates in TFP due to two important factors namely Technical progress (TP) and Economies of scale (ES). TP may be treated as exogenous or endogenous. If it is taken as exogenous, then higher rate of growth in output may lead to higher rate of growth in productivity because of one or more of the following reasons.

- Faster output growth will permit greater addition of new and superior capacity which will enable higher growth in productivity.
- Rapid growth in output may shorten the lag in application of new knowledge because it attracts better managers or it reduces uncertainty or it forces quicker replacement or it leads to labour resistance to technological change.

If TP is considered as endogenous, different people have advocated different arguments. Arrow (1962) viewed it as a process of learning and argued that learning is a result of experience arising out of attempts to solve a problem and therefore cumulative investment, a measure of experience, will determine productivity. While Schmookler (1966) argues that an industry in which output grows fast, undertakes greater investment. This creates a situation where machines manufacturer find it worthwhile to devote greater effort for improving the quality of machines. As a consequence, one would expect a positive association between long period growth rates in output and productivity. The other factor i.e. economies of scale may be both internal and external. Some of these economies are technological in nature and

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get covered under the technological progress. The important source of scale economies is specialisation and hence different firms may specialise in different products within the same industry or different workers may specialise in different jobs within the same firm. Output growth is very important in determining the extent to which such specialisation can be attained. (Goldar, 1986) In view of its importance, quite a few studies examining the nature of relationship between output growth and productivity growth are available in literature. Verdoorn (1949) examined this empirical relationship by estimating the equation of the form

$$P = \alpha + \beta Q$$

where P = productivity growth and Q = output growth and  $\alpha$  and  $\beta$  are parameters and  $\beta > 0$  for the industrial data drawn from a number of countries. This equation was later popularized as Verdoorn's law. He observed a constant long run relationship between output growth and productivity growth, Kennedy (1971) observed a strong correlation coefficient between output growth and productivity growth for Irish manufacturing industry for the period 1946-66. Reddaway and Smith also noticed a close association between the rate of growth of output and productivity growth for 14 British manufacturing industries. Similarly Katz (1969) observed a strong positive association between TFP growth and output growth for Argentine manufacturing. Goldar (1986) has also examined the determinants of productivity in Indian manufacturing sector for the period 1960-70 and found that one percent higher growth in output is associated with 0.4 per cent higher growth in TFP. All these studies were based at aggregate level for different countries and most of them were carried out for developed nations. However, no concrete attempt has been made to examine the determinants of productivity growth at aggregate level of any developing region in a given national boundary. Such studies are highly useful in understanding whether such relationship holds good in respect of even a developing economy. This paper examines the relationship between growth rates in TFP and Output in respect of Andhra Pradesh manufacturing industries for the period 1961-82.

## Data

The data relating to all two digit level industries of AP for the period 1961-82 have been obtained from the census sector of ASI reports published by the Govt of Andhra Pradesh. Data of prices relating to industrial products and consumer price index for industrial workers at Hyderabad center have been obtained from Chandok series and the RBI Bulletins of various years.

## Methodology

Since TFP estimates are necessary for examining Verdoorn's Law, we have estimated TFP index for manufacturing sector by using Divisia Index which was introduced by Solow (1957) and discussed by Griliches and Jorgensen (1966). Divisia index received wide popularity in the recent past for measuring TFP growth accurately over time or across regions. Its qualities are highlighted by Christenson and Jorgenson (1970) also. Divisia index satisfies the factor reversal test and time reversal test. Its functional form is derived as follows:

Assuming a production function which is homogeneous of degree one, we have

$$Y = AF(K, L) \quad (1)$$

where Y is gross value added, K is capital, L is labour and A is Hicksian efficiency parameter

Differentiating equation 1 with respect to time

$$Y' = A' F(f_K K \cdot K'/K + f_L L L'/L)$$

and dividing through time by Y = Af, we get

$$\frac{Y'}{Y} = \frac{A'}{A} + \frac{Af_K \cdot K}{Y} \frac{K'}{K} + \frac{Af_L \cdot L}{Y} \frac{L'}{L} \quad (2)$$

where AfK and AfL denote marginal products of capital and labour and the terms in the square brackets are the elasticities of value added with respect to capital and labour respectively. Under the assumption that the economy is in a competitive equilibrium so that the factors are paid the value of their marginal products, output elasticities become equal to the income share of the two factors of inputs i.e, SL and SK, we get,

$$Y'/Y = A'/A + [(S_L L'/L) + S_K (L'/L) + S_K (K'/K)] \quad (3)$$

This is the form of Divisia index. By transforming equation 3, we get,

$$A'/A = U'/Y - [S_L (L'/L) + S_K (K'/K)] \quad (4)$$

Thus the growth of TFP is measured as a difference between the rate of growth of valued added and rate of growth of total factor input. The above functional form is for continuous time framework and to apply it for real world, a discrete time approximation is needed. The Translog index is a discrete version (developed by Tornquist) of the continuous Divisia index. It is given as

$$ga^{TL} = \delta \log Y_t - [S_{L(t)} + S_{L(t-1)}]/2 \delta \log L_{(t)} \\ - [1 - S_{L(t)} + 1 - S_{L(t-1)}]/2 \delta \log K_t$$

In estimating this, we have employed gross valued added as a measure of output and man hours spent as



labour input. Regarding capital input, we have adjusted fixed capital input for its capacity utilisation by using the method of output capital ratio which was used by Panic (1978) and Statistics Canada (1978).

## Results

Verdoorn's equation is estimated by using the ordinary least squares technique and results are presented as follows:

Estimates of Verdoorn's Law for Manufacturing Industries in Andhra Pradesh: 1961-82:

Equation:\*

$$P = -5.20116 + 0.543864 Q^{**} \quad R^2 = 0.55$$

(0.112055)

\* = Equation is of the form  $P = \alpha + \beta Q$

where,

P refers to TFP growth

Q refers to output growth

\*\* = Significant at 1 per cent confidence level

Note: Figure in parentheses is value of standard error

It is evident that growth rates in output and productivity are positively associated in respect of manufacturing industries of AP and the relationship is statistically significant. The estimate suggests that 1 percent higher growth rate in output is associated with about 0.5 per cent

higher growth rate in TFP during the study period supporting Verdoorn's Law.

## References

- Arrow, K.J.**, The Economic implications of Learning by Doing Review of Economic studies, June, 1962.
- Christensen & Jorgenson**, "US Real Product and Factor Input 1929-57", Review of Income and Wealth, March 1970.
- Goldar, B.N.**, Productivity Growth in Indian Industries, Allied Publishers, new Delhi, 1986.
- Griliches Zvi & Jorgenson Dale W.**, "Sources of Measured Productivity Changes, Capital Input", American Economic Review, Vol 56, No. 2, May 1966.
- Katz J.M.**, Production function, Foreign Investment and Growth, North Holland Publishing Company, 1969.
- Kennedy K. A.**, Productivity and Industrial Growth, Clarendon Press, Oxford, 1971.
- Panic M.**, "Capacity Utilisation in UK Manufacturing Industry", Discussion Paper. No., 5, National Economic Development Office, 1978.
- Reddaway, W.A. & Smith A.D.**, Progress in British Manufacturing Industries in the Period 1948-54. Economic Journal, March 1960.
- Schmookler, J.**, Inventions and Economic Growth, Cambridge (Mass) Harvard University Press, 1966.
- Solow, R.M.**, "Technical Change and the Aggregate Production Function". Review of Economics and Statistics, August 1957.
- Statistics Canada Daily** (1978).
- Verdoorn, P.J.**, "Fattori Che regolano lo Sviluppo Della Productivity del lavoro L". Industria, 1949. □

"As I grow older, I pay less attention to what men say.  
I just watch what they do".

— Andrew Carnegie



# Andhra Pradesh Manufacturing Sector : Productivity Trends

S. Venkata Seshaiyah & V. Kodandarami Reddy

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*In order to monitor the progress of an industry or enterprise, it is essential to make a scientific appraisal of the trends in productivity. This paper examines the productivity trends in some industries of Andhra Pradesh manufacturing sector for the period 1976-86. The total factor productivity was measured by using the Divisia Indices. The impact of technical progress was observed in Cotton Textiles industry. Tobacco and Beverages and Paper and Paper Products industries exhibited technical retrogression. The food products industry also registered technological retrogression but it was found to be insignificant.*

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Productivity can be defined as the contribution of all the inputs, combined in some composite fashion. Productivity can either be total or a partial measure. The total factor productivity compares the total output to weighted composition of inputs—usually capital and labour. Several studies have been conducted for assessing productivity in Indian industry and some of them suggest a declining trend in total factor productivity. This paper examines the productivity trends in some industries of the A.P. manufacturing sector.

## Data

To examine the trends in productivity the time series data on gross output, capital stock, wages, fuel consumed and labour input of A.P. manufacturing sector are employed. The data for the study are taken from the various issues of Annual Survey of industries and Bureau of Economics and Statistics, for the period 1976-86. The following four industrial groups of A.P. manufacturing sector have been taken for studying the above objectives.

- Cotton Textiles
- Tobacco and Beverages
- Food Products
- Paper and Paper Products

## Methodology

The Divisia Index is the best among all other indices in terms of quality and efficiency to measure the Total Factor Productivity (TFP) in the case of multiple inputs and outputs. This method was introduced by Solow (1957) and applied by Jorgenson and Griliches (1967) and Christensen and Jorgenson (1969). This method was adopted to measure the total factor productivity.

The methodology for measuring the productivity is based on a model of production and technical change,



the production function for each industry giving output as a function of capital input, labour input and fuel consumed input and time. It is assumed that the production process is characterized by constant returns to scale for each industry, such that the proportional increase in all inputs results in a proportional change in output.<sup>1</sup>

Let the production functions be

$$VQ = F(K, L, C, T)$$

where, VQ is value added output, K is capital input, L is labour input, C is fuel consumed input and T is time.

Denoting the factor prices by P, marginal shares of input factors can be defined as

$$M_k = \frac{P_k \cdot K}{P_q \cdot Q}; M_l = \frac{P_l \cdot L}{P_q \cdot Q} \text{ and } \frac{P_c \cdot C}{P_q \cdot Q}$$

Under CRTS for each industry, the value shares for all three inputs sum to unity.

The rate of technical change  $M_t$  may be defined as the rate of growth of output with respect to time, holding K, L and C constant.

$$M_t = \frac{\partial \ln VQ(K, L, C, T)}{\partial T}$$

Under CRTS, the rate of technical change for each industry can be expressed as the rate of growth of the corresponding industrial output less a weighted average of the rates of growth of input factors capital, labour and fuel consumed, the weights being the corresponding value shares.

$$M_t = \frac{\partial \ln VQ}{\partial T} - M_k \cdot \frac{\partial \ln K}{\partial T} + M_l \frac{\partial \ln L}{\partial T} + M_c \frac{\partial \ln C}{\partial T}$$

$M_t$  is the Divisia quantity index of the rate of technical change.

If,

$$\frac{\partial \ln I}{\partial T} = M_k \frac{\partial \ln K}{\partial T} + M_l \frac{\partial \ln L}{\partial T} + M_c \frac{\partial \ln C}{\partial T}$$

then, the Divisia index of the industrial rate of technical change is given by

$$M_t = \frac{\partial \ln VQ}{\partial T} - \frac{\partial \ln I}{\partial T}$$

Here  $\frac{\partial \ln I}{\partial T}$  is the Divisia index of inputs. The Divisia index of total factor productivity is now defined as:

$$A(t) = \frac{VQ(t)}{I(t)}$$

where,  $A(t)$  is the Divisia index of TFP for time  $t$ ,  
 $VQ(t)$  is the value added for time  $t$ ,  
 $I(t)$  is the Divisia index of inputs for time  $t$ .

### Computational Procedure<sup>2</sup>

If the data is considered at any two discrete points of time, say  $t$  and  $(t-1)$ , the average rate of technical change ( $\bar{M}_t$ ) can be defined as:

$$\bar{M}_t = \left[ \frac{\Delta \ln VQ(t)}{\Delta \ln I(t)} \right] - \left[ \bar{M}_k \Delta \ln K(t) + \bar{M}_l \Delta \ln L(t) + \bar{M}_c \Delta \ln M(t) \right]$$

$$\bar{M}_k = \frac{1}{2} [M_k(t) + M_k(t-1)]$$

$$\bar{M}_l = \frac{1}{2} [M_l(t) + M_l(t-1)]$$

$$\bar{M}_c = \frac{1}{2} [M_c(t) + M_c(t-1)]$$

$$\Delta \ln VQ(t) = \ln VQ(t) - \ln VQ(t-1)$$

$$\Delta \ln K(t) = \ln K(t) - \ln K(t-1)$$

$$\Delta \ln L(t) = \ln L(t) - \ln L(t-1)$$

$$\Delta \ln M(t) = \ln M(t) - \ln M(t-1)$$

Here  $\bar{M}_t$  is also called the translog index of the rate of technical change.

Divisia index of inputs for time  $T$ ,  $I(t)$  can be obtained from the following relationship.

$$\ln I(t) - \ln I(t-1) = \bar{M}_k \Delta \ln K(t) + \bar{M}_l \Delta \ln L(t) + \bar{M}_c \Delta \ln M(t)$$

$$I(t) = I(t-1) \left[ \text{anti-log} \left\{ \bar{M}_k \Delta \ln K(t) + \bar{M}_l \Delta \ln L(t) + \bar{M}_c \Delta \ln M(t) \right\} \right]$$

At the initial point, i.e., at  $t=1$ ,  $I(t-1) = I(0) = 1$

The Divisia index of total factor productivity is now given by

$$A(T) = \frac{VQ(t)}{I(t)}, t = 1, 2, \dots, n$$

( $n$  = Number of time periods)

These indices can be shown with the help of fixed base index numbers.

1 For a clear exposition on the methodology on the measurement of TFP using Divisia Index see Kendrick and Vaccara (1980).

2 See Kendrick, and Vaccara, (1980).



## Empirical Results

The computed Divisia indices of TFP for the four industries under study are presented in tables 1 to 4. The growth rates of total factor productivity are also computed and then they are tested for their significance.

**Table 1:** Distribution of Input Aggregates ( $I_t$ ), Value Added ( $V_t$ ) and Divisia Indices of Total Factor Productivity in Cotton Textiles Industry

Year	$I_t$	$V_t$	$A_t = \frac{V_t}{I_t}$	Divisia Index
1977-78	0.7253	2101.7189	2897.5600	100.00
1978-79	0.8177	3259.1181	3985.3238	137.54
1979-80	0.5670	2872.6610	5066.1535	274.84
1980-81	0.5823	2923.1223	5019.9593	173.24
1981-82	0.5557	2134.8392	3841.2970	132.57
1982-83	0.5318	2492.1058	4685.9949	161.72
1983-84	0.7844	3780.8534	4820.9579	166.34
1984-85	0.6407	4064.6848	6344.1311	218.94
1985-86	0.6873	3240.6632	4715.0636	162.72

Growth Rates : 5.43\*

Computed 't' Value : 2.32

\*Indicates significance at 5 per cent level.

**Table 2:** Distribution of Input Aggregates ( $I_t$ ), Value Added ( $V_t$ ) and Divisia Indices of Total Factor Productivity in Tobacco and Beverages Industry

Year	$I_t$	$V_t$	$A_t = \frac{V_t}{I_t}$	Divisia Index
1977-78	1.0258	6789.581	6623.723	100.00
1978-79	1.2165	8967.533	7374.616	111.33
1979-80	1.0911	4963.948	4548.978	68.67
1980-81	1.3135	4491.340	3420.670	51.16
1981-82	1.5226	5591.453	3672.084	55.43
1982-83	3.3039	13112.756	3969.953	59.93
1983-84	1.9237	7446.729	3832.037	57.85
1984-85	1.5339	7447.154	4857.895	73.34
1985-86	2.4020	7129.714	2970.714	44.85

Growth Rate : -7.44\*

Computed 't' Value : 2.61

\*Indicates significance at 5 per cent level.

**Table 3:** Distribution of Input Aggregates ( $I_t$ ), Value Added ( $V_t$ ) and Divisia Indices of Total Factor Productivity in Food Products Industry

Year	$I_t$	$V_t$	$A_t = \frac{V_t}{I_t}$	Divisia Index
1977-78	0.7220	6496.1404	8996.8013	100.00
1978-79	0.5850	1932.9136	3302.4725	36.70
1979-80	2.4362	6633.0495	2722.6026	30.26
1980-81	1.0662	10806.3640	10134.5450	112.64
1981-82	2.5659	11139.7380	4341.4545	48.25
1982-83	2.8670	3541.7324	1235.3200	13.73
1983-84	5.2595	8032.0000	1527.3117	16.97
1984-85	3.9857	14342.0000	3598.4400	40.50
1985-86	3.8362	19429.0000	5064.6473	56.29

Growth Rate : -8.39<sup>NS</sup>

Computed 't' Value : 0.95

NS:Indicates not significance at 5 per cent level.

**Table 4:** Distribution of Input Aggregates ( $I_t$ ), Value Added ( $V_t$ ) and Divisia Indices of Total Factor Productivity in Paper and Paper Products Industry

Year	$I_t$	$V_t$	$A_t = \frac{V_t}{I_t}$	Divisia Index
1977-78	1.4875	2991.7144	2011.2122	100.00
1978-79	1.4761	2793.6090	1898.4482	94.39
1979-80	1.5863	2308.9243	1455.4582	72.36
1980-81	1.8628	2448.5437	1314.4200	65.35
1981-82	2.1826	3662.6225	1678.0853	83.43
1982-83	2.0592	2833.6490	1376.0342	68.41
1983-84	2.2351	2441.5011	1092.3150	54.31
1984-85	3.0980	3039.6567	981.1674	43.78
1985-86	2.8897	3022.3290	1045.8791	52.00

Growth Rate : -8.18\*\*

Computed 't' Value : 5.61

\*\*Indicates significance at 1 per cent level.

### Cotton Textiles

At no point of time did the index for TFP in cotton textiles industry stay below 100. The index increased over time with mild fluctuations. The maximum TFP (218.94) was achieved during 1984-85. The rate of growth of TFP of this industry is 5.43 per cent, significant at 5 per cent level. This indicates the impact of technical progress in this industry.

### Tobacco and Beverages

During the entire period of study, the Divisia index of total factor productivity stayed below 100, except in the year 1978-79. The index was equal to 111.36 in 1978-79



and in the remaining years the index has decreased with mild fluctuations. The growth rate was found to be -7.44 per cent which is significant at 5 per cent level. This declining growth rate indicates that there is technological retrogression in the industry during the period of study.

### Food Products

The index of TFP decreased steadily over time with mild fluctuations. The highest TFP was observed in the year 1980-81. A negative growth rate of -8.39 per cent is observed for the food products industry. However this was found to be insignificant at 5 per cent level. This indicates that there is no technical progress in the industry during the period of study.

### Paper and Paper Products

The index of total factor productivity in paper and paper products industry stayed below 100. The index has decreased steadily with mild fluctuations. A negative

growth rate of -8.18 per cent is observed for this industry. This was found to be significant at 1 per cent level. This shows that there is technological retrogression in paper and paper products industry during the period of study.

Thus, the impact of technical progress is observed only in Cotton Textiles industry, whereas in other three industries there is technological retrogression.

### References

- Christensen, Laurits, R. & Jorgenson, Dale, W., (1969), The Measurement of U.S. Real Capital Input 1929-1967, Review of Income and Wealth, Ser 15, No. 4 (December).
- Jorgenson, D.W. & Griliches, Z., (1967), "The Explanation of Productivity Change", The Review of Economic Studies, 34.
- Kendrick, J.W., & Vaccara, B.N., (1980), "New Developments in Productivity Measurement and Analysis", Studies in Income and Wealth, The University of Chicago, 44.
- Solow, Robert, N., (1957), Technical Change and the Aggregate Production Function, Review of Economics and Statistics, 39. □

## ESSAYS INVITED UNDER 1993 ANNUAL APO ESSAY CONTEST

### - "Productivity in the Age of Competitiveness" -

The APO, as part of its extensive programme to promote productivity development in Asia and the Pacific region, is inviting entries for the 1993 APO Essay Contest on the theme "Productivity in the Age of Competitiveness." Essays are invited from any individual in APO member countries to this annual contest which carries a first prize of US\$4,000, three second prizes of US\$2,000 each, and six third prizes of US\$1,000 each.

The contest aims at catalyzing the productivity movement in the industrial, service, and agricultural sectors through the collection and dissemination of outstanding essays prepared by individuals in APO countries.

The entry essay should be an original contribution and should not have been published or printed before elsewhere. The essay should be written in English and its length should not be longer than 30 typewritten pages on A4 papers excluding graphs, illustrations, diagrams, and references. An abstract of less than 200 words summarizing the contents and conclusions of the essay should be included.

The criteria for selecting the best essays are: (1) rich in content, information and analysis; (2) innovative and reflective; (3) sharp, consistent, persuasive and clear; and (4) contents are of contemporary interest and are of applied relevance to cope with productivity-related issues.

The essay should be sharply focused. Description of productivity and competitiveness concepts, unless these are new and unique, may be avoided. It is suggested that dynamic linkages between productivity and competitiveness be highlighted. Futuristic views on how productivity can function as a key element in enhancing competitiveness will be highly regarded. Though a rigorous statistical analysis is not required, supporting data is desirable. The contribution should be based on in-depth treatment of the subject.

Two copies of the essay must be submitted to the APO Secretariat not later than 31 July 1993. The envelop containing the essay must be clearly marked "APO Essay Contest 1993." Prize winners of earlier Essay Contests will not be eligible to participate. A Screening Committee of well-known experts on productivity and development will undertake the screening and selection of the entry essays. For further information, please contact the APO or the national productivity organizations in APO member countries.

Source: APO News March 1993



# Male & Female Labour Productivity in Agriculture – A Comparative Analysis

R.K. Sharma, Brij Bala, T.V. Moorti & B.L. Kaistha

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*The present study highlights the male and female labour productivities in hill agriculture. The study shows that the marginal value productivity to factor cost ratios were less than one for both male and female labour because of its surplus availability on farm as well livestock enterprises. The resources were also found to be underutilized in both the cases. There is possibility of substitution of female labour for male labour in livestock. The reverse is true for the farm. Off-farm employment opportunities should be made available especially for women. Efforts should also be made to increase the productivity of resources through their balanced and enhanced use, reallocation etc.*

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In India, the majority of the population is dependent on agriculture for income and employment. Female labour constitutes a major portion of total agricultural labour particularly in the hilly areas due to lack of off-farm employment opportunities and other socio-economic demographic factors. In addition, the females are fully responsible for taking care of household and livestock also. It has generally been observed that the female labour is comparatively more efficient than their male counterparts in performing some of the operations but there are no studies pertaining to this issue. The present investigation was taken up with the following objectives:

- To work out the resource-use productivities of various resources on farm and livestock.
- To compare the resource productivities of male and female labour on farm and livestock.
- To examine the substitutability of male and female labour on the farm and livestock.

## Methodology

The study pertains to Kangra district of Himachal Pradesh. Four villages from two development blocks of Nagrota and six from Dehra were selected randomly. The cultivators in the selected villages were classified into three categories viz., marginal farms (< 1 hectare), small farms (1-2 hectare) and large farms (> 2 hectare). A sample of 120 farm households was selected by simple random sampling through proportional allocation method. In all, 66 marginal, 33 small and 27 large cultivators were selected for detailed analysis. The primary data were collected through survey method for the year 1990-91.

The log-linear production function was fitted for the farm as a whole and livestock enterprise. The functional form of the model was as:

$$Y = b_0 x_1^{b_1} x_2^{b_2} x_3^{b_3} x_4^{b_4} x_5^{b_5} e^u$$



where

- Y = Per hectare income from the whole farm in rupees  
 $b_0$  = Constant term  
 $x_1$  = Capital in rupees (which included per hectare expenditure on seed, bullock labour and plant protection measures)  
 $x_2$  = Per hectare expenditure in rupees on fertilizers and farm yard manure  
 $x_3$  = Per hectare requirement of male labour in days  
 $x_4$  = Per hectare requirement of female labour in days  
 $x_5$  = Per cent irrigated to total area under a particular crop  
 $b_i$  = elasticity coefficient  
 $e^u$  = random variable.

The model used for livestock enterprise was as:

$$Y = b_0 x_1^{b_1} x_2^{b_2} x_3^{b_3} x_4^{b_4}$$

where

- Y = annual income from livestock in rupees  
 $b_0$  = constant term  
 $x_1$  = male labour in days  
 $x_2$  = female labour in days  
 $x_3$  = annual expenditure on feed and fodder in rupees  
 $x_4$  = annual expenditure on concentrates and health care in rupees  
 $b_i$  = elasticity coefficient  
 $e^u$  = random term.

The marginal value productivities for various factors of production were worked out as follows:

$$MVP_{(xi)} = b_i \frac{\bar{Y}}{\bar{X}_i}$$

where,

- $MVP_{(xi)}$  = The marginal value productivity of  $X_i$   
 $\bar{Y}$  = The value of output at its geometric mean level  
 $\bar{X}_i$  = The value of  $i^{th}$  input at its geometric mean level

The efficiencies of male and female labour were compared using the following formula:

$$\frac{b_{ij} \bar{Y}_j}{\bar{X}_{ij}} = \frac{b_{ik} \bar{Y}_k}{\bar{X}_{ik}}$$

$$b_{ij}' = b_{ik} \frac{\bar{Y}_k \cdot \bar{X}_{ij}}{\bar{Y}_j \bar{X}_{ik}}$$

and the significance was computed using F-test.

$$F = \frac{b_{ij} - b_{ij}'}{S^2(b_{ij}) + \frac{\bar{X}_k \bar{X}_{ij}}{\bar{Y}_j \bar{X}_{ik}} S^2(b_{ik})}$$

$$b_{ij} = b_{ik} \frac{\bar{X}_{ij}}{\bar{X}_{ik}}$$

where

- $\bar{Y}_j$  = mean of output in  $j^{th}$  situation  
 $\bar{Y}_k$  = mean of  $X_i$  in  $k^{th}$  situation  
 $\bar{X}_{ij}$  = mean of  $X_i$  in  $k^{th}$  situation  
 $2_{(b_{ij})}$  = variance of  $b_i$ 's in  $j^{th}$  situation  
 $2_{(b_{ik})}$  = variance of  $b_i$ 's in  $k^{th}$  situation

## Results and Discussion

### *Input-Output Relationship for the Farm*

To examine the input-output relationship for the farm as a whole with respect to crops, the total annual income from all the enterprises (major and minor) was taken together. The expenditure incurred on all the factors of production involved in the production of crops grown throughout the year was considered and then the relationship of various factors with the value of output was worked out. The results thus obtained are presented in table 1. The explanatory variables explained about 78 per cent (marginal farms) to 97 per cent (large farms) of total variations on the farm as a whole. The elasticities of inputs were generally positive and significant. The negative values of elasticity coefficients were not significant except for capital input ( $X_1$ ) under small farms.

The returns to scale measured in terms of the sum of elasticity coefficients ( $\Sigma b_i$ ) was greater than one under all the three categories under discussion. Further, the value of  $\Sigma b_i$  increased with the increase in farm-size. This shows that there is substantial scope for increasing the use of inputs particularly on large farms. The female labour input ( $X_4$ ) on marginal farms showed negative and non-significant response, which might be due to its surplus availability. On small farms all the five exogenous variables were found to be significant. The variable input capital ( $X_1$ ) exhibited negative sign. This might be because the farmers had to purchase the seeds etc., from



the market for vegetables at higher cost. In the case of large farms, the four variables were found to be significant with positive signs. The expenditure on fertilizers exhibited negative and statistically non-significant response towards the value of output. The reason for this might be the expenditure in the wrong direction—application of only nitrogenous fertilizers, and low variations in the use among farms.

TABLE 1: Input-output relationship for whole farms

Explanatory Variables	Regression Coefficients			All-farms
	Farm-Size			
	Marginal	Small	Large	
X <sub>1</sub>	0.4200* (0.0490)	-0.0507* (0.0012)	0.5186* (0.1186)	0.3795* (0.0564)
X <sub>2</sub>	0.3443* (0.0730)	0.4800* (0.0482)	-0.6268 (0.3263)	0.3107* (0.0706)
X <sub>3</sub>	0.3194* (0.1221)	0.4315* (0.860)	0.2796* (0.0796)	0.3061* (0.0706)
X <sub>4</sub>	-0.1200 (0.6820)	0.2581* (0.0581)	0.2202* (0.0408)	0.2461* (0.0467)
X <sub>5</sub>	0.1845** (0.1042)	0.2096* (0.0659)	0.3525** (0.1928)	0.1085* (0.0394)
Constant term	1.9976	0.2590	0.3848	0.1315
b <sub>i</sub>	1.2682*	1.3285*	1.3709*	1.3509*
$\bar{R}^2$	0.7880	0.9385	0.9746	0.9656

Note: Figures given in parentheses represent standard errors.

\*shows significance at 1 per cent probability level.

\*\*shows significance at 5 per cent probability level.

When the pooled data were analysed, the regression coefficients for all the five explanatory variables were found to be positive and significant. The magnitude of elasticity coefficient for capital (X<sub>1</sub>) was maximum and that for per cent irrigated area (X<sub>5</sub>) was minimum. Thus, the capital input (X<sub>1</sub>) was found to be the most effective input on large farms whereas, it was not required to be added on small farms, which might be because of adequate use of the input by small farmers. The elasticity coefficient for all the three variables i.e., the expenditure on fertilizers and manure (X<sub>2</sub>), male labour (X<sub>3</sub>) and female labour (X<sub>4</sub>), was found to be the highest on small farms. The marginal farms showed the minimum response towards fertilizers and manure (X<sub>2</sub>) whereas, the male and female labour inputs were observed to be the least important on the large farm group. The per cent irrigated area was found to be the most responsive on large farms and exhibited minimum response on marginal farms.

#### Input-Output Relationship for Livestock

Livestock was the major enterprise undertaken by all the farmers in the study area, alongwith agriculture. The

number of cattle and their breed varied with the farm size. The large farmers had improved breeds of cattle especially that of milch animals. The milk production from cattle was influenced by their breed, physical health, their adaptability to a particular climate, amount and type of feed and fodder, concentrates, etc., given to them besides the management factor. Of all these factors a few have been quantified and summarised in table 2.

TABLE 2: Input-output relationship for livestock

Explanatory Variables	Regression Coefficients			All-farms
	Farm-Size			
	Marginal	Small	Large	
X <sub>1</sub>	0.2504* (0.0636)	0.2137** (0.1037)	0.1828** (0.0671)	0.2084* (0.0545)
X <sub>2</sub>	-0.5038 (0.2991)	0.5983* (0.0914)	0.2794* (0.0737)	0.2588* (0.0399)
X <sub>3</sub>	0.6336* (0.0615)	0.8618 (0.6255)	0.3236* (0.1149)	0.5044* (0.0585)
X <sub>4</sub>	0.2315* (0.0559)	0.1920** (0.0900)	-0.7071 (0.4537)	0.1288* (0.0603)
Constant term	1.0748	0.8631	0.2513	0.8981
b <sub>i</sub>	1.1155*	1.0040*	0.7858*	1.1004*
$\bar{R}^2$	0.8763*	0.8920*	0.7648*	0.8315*

Note: Figures given in parentheses represent standard errors.

\*shows significance at 1 per cent probability level.

\*\*shows significance at 5 per cent probability level.

The adjusted coefficient of multiple determination explained about 80 per cent of the variations on all-farms situation. On marginal farms three out of the four exogenous variables were significant, bearing expected positive signs, explaining about 87 per cent of the variations in income from livestock. These variables were expenditure on feed and fodder (X<sub>3</sub>) with highest coefficient, male labour (X<sub>1</sub>) and expenditure on concentrates and medicines (X<sub>4</sub>). The elasticity coefficient for female labour was found to be negative but statistically non-significant which might be because of disguised employment of female labour on marginal farms. On small farms, all other variables were found significant except X<sub>3</sub>. This might be because the animals were grazed on common land and there was a little variation on the expenditure on feed and fodder. The magnitude of regression coefficient for female labour was higher than that for male labour indicating higher productivity of female labour. In case of large farms, the male labour (X<sub>1</sub>), female labour (X<sub>2</sub>) and expenditure on feed and fodder were estimated to be significant explaining about 76 per cent of the total variations. Negative and non-significant response was shown towards the expenditure on concentrates and medicines because the well-off large farmers were feeding sufficient



quantity of concentrates and providing necessary timely health care.

All the four explanatory variables were found to be positive and significant on all-farms situation. The expenditure on feed and fodder showed maximum response followed by female labour. The magnitude of regression coefficient associated with female labour was found to be greater as compared to male labour, probably because of the efficient performance of most of the operations pertaining to livestock by female labour. The elasticity coefficient for male labour ( $X_1$ ) was found to be significant on all the categories of farms. Female labour input ( $X_2$ ) was also significant except in the case of marginal farms. The magnitude of elasticity coefficient was higher on small farms as compared to large farms. The returns to scale ( $\Sigma b_i$ ) were greater than one in all the cases except large farms. This indicates that marginal and small farmers were still operating in the first irrational stage of production function whereas the large farmers operated in the rational zone. So the input-use must be enhanced on marginal and small farms for better results.

## Resource-use Efficiency

### Farm as a Whole

It is evident from table 3 that the pattern of additional expenditure on marginal farms should be as irrigation ( $X_5$ ), fertilizers and manure ( $X_2$ ) and capital input ( $X_1$ ). In case of small farms, the ratio turned out to be negative but non-significant for capital input ( $X_1$ ) indicating thereby that excessive expenditure was being made for seed etc., by small farmers. Irrigation ( $X_5$ ) deserved priority followed by fertilizers and manure ( $X_2$ ). On large farms, expenditure on irrigation ( $X_5$ ) must be given priority followed by expenditure for seed, bullock labour and plant protection

**TABLE 3:** Marginal value products (MVP) to factor-cost ( $P_{xi}$ ) ratios for the farm as a whole

Explanatory variables	Farm-size			
	Marginal	Small	Large	All-farms
$X_1$	2.78	- 7.75	3.17**	3.94**
$X_2$	3.50*	9.35**	—	3.96*
$X_3$	6.16 (0.22)**	12.88 (0.46)*	16.24 (0.58)*	13.72 (0.49)*
$X_4$	5.20 (0.20)*	11.70 (0.45)*	14.30 (0.55)*	13.00 (0.50)*
$X_5$	14.77**	20.14*	10.55*	12.88*

Note: MVP's and MVP to factor-cost ratios are same for all inputs except male and female labour  
MVP to factor-cost ratios for male and female labour are given in brackets.  
\*shows significance at 1 per cent probability level  
\*\*shows significance at 5 per cent probability level

measures ( $X_1$ ), especially in cash crops like potato and vegetables. The all-farms situation indicates that the priority for additional expenditure should be on irrigated area followed by the fertilizers ( $X_2$ ) and capital ( $X_1$ ). The MVP ratios for male and female labour were almost equal in all-farms situation. The value was less than one, indicating that these two inputs were being over utilized. The most important factor on all-farms situation was irrigated area ( $X_5$ ). It registered highest MVP ratio on small farms and lowest on large farms. The magnitude of ratios for male and female labour was less than one on all the categories of farms showing surplus labour in the agricultural sector.

### Livestock Enterprise

Table 4 presenting the marginal value productivity to factor-cost ratios for various factors associated with livestock production, indicates that the pattern of expenditure on marginal farms should be on concentrated and health care ( $X_4$ ) followed by feed and fodder ( $X_3$ ). No further expenditure was required to be made for male and female labour because their marginal value productivities were less than their respective wage rates.

**TABLE 4:** Marginal value products (MVP $_{xi}$ ) to factor-cost ( $P_{xi}$ ) ratios for livestock

Explanatory variables	Farm-size			
	Marginal	Small	Large	All-farms
$X_1$	14.84 (0.53)**	10.92 (0.39)*	9.52 (0.34)*	10.46 (0.37)*
$X_2$	—	16.64 (0.64)*	9.10 (0.35)*	10.92 (0.42)*
$X_3$	1.62**	—	1.49*	1.46*
$X_4$	1.86*	1.49**	—	1.79*

Note: MVP's and MVP to factor-cost ratios are same for all inputs except male and female labour  
MVP to factor-cost ratios for male and female labour are given in brackets.  
\*shows significance at 1 per cent probability level  
\*\*shows significance at 5 per cent probability level

On small farms, additional expenditure should be on concentrates and other health improvement measures ( $X_4$ ). In case of large farms, the feed and fodder ( $X_3$ ) was found to be the most remunerative. The MVP to factor-cost ratios for male and female labour were almost the same indicating that both the male and female labour were equally efficient in livestock operations.

The pooled data for all the three categories indicates that the additional expenditure on concentrates and health care of cattle should be given first priority to obtain the maximum possible yield of milk.



The MVP ratio for female labour was higher than male labour because of comparatively efficient performance of the most laborious operations on livestock like fodder collection feeding, dung work, milking and preparation of milk products by the former. The magnitude of the MVP to factor-cost ratios for feed and fodder ( $X_3$ ) and concentrates and medicines ( $X_4$ ) were highest on marginal farms. On the other hand the MVP ratios for both the male and female labour were less than one on all the categories of farms.

### Comparison of Male and Female Labour Efficiency

#### For the Farm as a Whole

The results shown in table 5 indicate that the marginal value productivities were higher for male labour only on small farms. On large farms, equal efficiency was observed indicated by the non-significant difference in elasticity coefficients. These non-significant results for male labour might have appeared because of the inclusion of vegetable crops.

TABLE 5: Comparison of male and female labour efficiencies for whole farm

Farm-Size	$b_{ij}$	$b'_{ij}$	$b_{ij} - b'_{ij}$
Marginal	—	—	—
Small	0.4315	0.2551	0.1764*
Large	0.2796	0.2282	0.0514
All-farms	0.3061	0.2443	0.0618

Note:  $b_{ij}$  Elasticity coefficient for male labour  
 $b'_{ij}$  Elasticity coefficient necessary to yield marginal employment of male labour equal to that of female labour  
 $b_{ij} - b'_{ij}$  When +ve indicated that marginal employment was higher for male labour and reverse was true for -ve sign  
 \* Shows significance at 1 per cent probability level  
 \*\* Shows significance at 5 per cent probability level

#### For Livestock Enterprise

The comparison of male and female labour efficiencies on livestock yielded negative and significant difference in the actual and estimated elasticities for male labour (table 6). This indicates that the female labour was comparatively more productive than male labour in performing livestock operations. This was because most of the operations like collection of green fodder which they performed alongwith weeding, dung work, milking and preparation of milk products etc., were performed efficiently by female labour.

TABLE 6: Comparison of male and female labour efficiencies for live-stock enterprise

Farm-Size	$b_{ij}$	$b'_{ij}$	$b_{ij} - b'_{ij}$
Marginal	—	—	—
Small	0.2137	0.5558	- 0.3421*
Large	0.1828	0.2652	- 0.0824**
All-farms	0.2084	0.2449	- 0.0365**

Note:  $b_{ij}$  Elasticity coefficient for male labour  
 $b'_{ij}$  Elasticity coefficient necessary to yield marginal employment of male labour equal to that of female labour  
 $b_{ij} - b'_{ij}$  When +ve indicated that marginal employment was higher for male labour and reverse was true for -ve sign  
 \* Shows significance at 1 per cent probability level  
 \*\* Shows significance at 5 per cent probability level

### Conclusions

The comparison of male and female labour efficiencies indicated that the productivity of male labour was higher than female labour in case of farm enterprises and reverse was true for livestock enterprise. The results indicated that the inputs were underutilized and the farmers were operating in first zone of production function. Therefore, efforts should be made to use these resources efficiently through reallocation and timely use of resources alongwith their balanced and enhanced use. As the marginal value productivity to factor-cost ratios were highest for irrigation factor in case of farm and medicines & concentrates in case of livestock, the expenditure for these inputs needs to be enhanced either by diverting it from other factors or by additional expenditure, if possible.

The labour input was found surplus in both the cases which needed immediate withdrawal. This may be made possible by diverting the labour from agriculture to non-agricultural sector for which non-farm enterprises within the villages should be created particularly small scale industries. As the female labour was efficient in case of livestock enterprise, it can be substituted for male labour. The reverse is true for the farm. The extension workers must organise demonstrations and training camps, especially for women in order to enhance their knowledge and awareness. The females should be made aware of their capabilities and opportunities around them which they might explore to engage themselves in non-farm jobs to increase their overall productivities. This will lead to economic independence of female. □



# Factors Influencing Jute Productivity

S. Pathak

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*The paper deals with some psycho-personal, socio-economic and communication factors responsible for variability in jute productivity. The results of the study indicate that the knowledge level of the farmers is the single most important factor.*

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Past research studies have established the relationship between certain socio-economic and agricultural infrastructural factors and the adoption of jute technologies (Pathak & Majumdar, 1978; Pathak, 1986; 1989). However, the relationship between socio-economic factors and jute productivity has not been studied so far. Hence, the present study was undertaken to identify some psycho-personal, socio-economic and communication factors responsible for the variation in jute productivity. It is presumed that the factors that influence the adoption of jute technologies may affect the productivity of jute as well. The paper discusses the extent to which some of the above factors can help in explaining the variation in jute productivity.

## Methodology

A sample of 50 marginal farmers was randomly chosen from a group of farmers with land holdings up to 1 ha and another set of 50 small farmers from a different group with land holdings of 1-2 ha from 10 villages situated in Barrackpore and Barasat sub-divisions of North 24-Parganas in West Bengal. Data were collected from each respondent through survey method with the help of a specially developed schedule.

## Independent Variables

In all, 19 variables pertaining to psycho-personal, communication and socio-economic characteristics of the farmers were selected for this study. The measurement techniques adopted were from earlier studies: in respect of education and occupation (Pareek & Trivedi, 1964); mass media contact and use of personal cosmopolite source of information (Sagar, 1983); risk taking willingness and owning responsibility (Mishra, 1979); economic motivation (Moulik, 1965); knowledge level (Pathak, 1978a) and progressiveness (Sharma et al, 1972).

Age, family size and family work-force were measured according to the chronological age of the respondents,



total members and male and female adult members in the respondents' family, respectively. Area owned and cultivated by a farmer was considered as the measure of the farm size. Percentage of area irrigated was taken as the index of irrigation potentiality. The proportion of areas sown under jute to the total cultivated area converted into percentage was taken as jute crop intensity. Fragmentation index was the number of non-contiguous plots divided by total area. Farmers' goals and managerial skill were measured with the help of specially developed 4-point scales.

### Dependent Variable

Productivity, in this study, is the fibre yield obtained by a respondent farmer from a plot (per ha) by utilising the available resources at his disposal. It was measured with the help of Crop Yield Index (Yang, 1980) as follows:

$$\text{Productivity (Crop Yield Index)} = \frac{\text{Fibre yield obtained by a respondent}}{\text{Average fibre yield obtained by total respondents}} \times 100$$

The correlation coefficients between each independent variables and the jute productivity were calcu-

lated for marginal, small and pooled sample of farmers, separately. Multiple linear regression analysis with 19 independent variables were also computed to predict the variation in jute productivity.

### Results

Only 5 independent variables showed significant and positive relations with jute productivity in all the three categories of farmers. These are: owning responsibility, economic motivation, farmers' goals, progressiveness and managerial skill. Jute crop intensity showed significant association with jute productivity in small and pooled sample of farmers, while occupation and fragmentation index were positively significant in small farmers. Similarly, use of personal cosmopolite source of information was significant in the pooled sample of farmers.

In the case of marginal farmers, the partial regression coefficients of two independent variables, i.e., goals and knowledge level were positively significant. Knowledge of the technologies is basic to their adoption which eventually results in higher production. This may also raise farmers' goals for maximum production and profit from jute. However, another variable, education showed sig-

TABLE 1: Correlation coefficient (*r*) and regression coefficient (*b*) between jute productivity index and 19 independent variables for marginal, small and pooled sample farmers

Independent variables	Marginal farmers		Small farmers		Pooled sample farmers	
	<i>r</i> value	<i>b</i> value	<i>r</i> value	<i>b</i> value	<i>r</i> value	<i>b</i> value
Age	-.22	-0.0052	-.06	0.2229	-.15	-0.0973
Education	-.14	-4.1793*	.10	-0.1907	-.03	-2.7502
Occupation	-.21	-5.5587	.35*	2.9727	.10	-0.0373
Family size	-.13	-0.0194	-.20	-0.0787	-.15	0.0903
Family work force	-.12	-0.6073	.07	-0.5328	-.01	-0.6832
Economic status	.02	0.1542	.08	1.1068**	.04	0.5346*
Farm size	-.08	10.6216	-.18	-12.3478**	-.08	-3.8384
Irrigation potentiality	.13	0.0841	.21	0.2131*	.17	0.0491
Jute crop intensity	.17	0.0499	.30*	0.1257	.21*	0.0784
Fragmentation index	.09	0.4966	.28*	1.1272	.14	-0.1863
Mass media contact	-.15	0.3180	.07	0.2533	-.04	0.6237
Use of personal cosmopolite	-.25	0.4853	-.21	1.2592*	.22*	-0.4586
Risk-taking willingness	-.16	1.4560	-.07	1.7678*	-.11	1.1221
Owning responsibility	.35*	-0.7679	.28*	-0.9951	.32**	-0.8110
Economic motivation	.38*	-0.4353	.34*	-0.5800	.36**	-0.2851
Farmers' goals	.54*	1.2071*	.34*	0.9086	.46**	-0.5772
Knowledge level	-.01	1.9339**	.21	1.7284*	.10	1.1174*
Progressiveness	.31*	-0.3671	.30*	-0.8665	.31**	-0.5574
Managerial skill	.47**	-0.7504	.32*	-0.4095	.40**	-0.4295
	R <sup>2</sup>	0.6205		0.6874		0.4497

\* Significant at 0.05 level \*\* Significant at 0.01 level; without stars not significant.



nificant but negative contribution to jute productivity. It appears that educated marginal farmers did not devote intensive care to jute cultivation probably because of their interest in other fields of occupation. The present finding is contrary to the results reported by Sagar (1983) that the productivity of crops (including jute) was positively and significantly correlated with the level of education of the marginal farmers. The regression coefficients of the other 11 independent variables were not significant. The coefficient of multiple determination ( $R^2$ ) shows that all the 19 independent variables jointly explained 62.05 per cent of the variability in jute productivity.

In the case of small farmers, five independent variables such as economic status, irrigation potentiality, use of personal cosmopolite source of information, risk-taking willingness and knowledge level contributed significantly and positively to the prediction of jute productivity. However, another variable i.e., farm size showed significant but negative coefficient with jute productivity. Negative relationships between farm size and productivity of crops have also been reported by Rudra, (1968); Bardhan, (1973); Bhattacharya and Saini, (1972); Saini, (1979). The partial regression coefficients of the other 13 variables were not significant. However, the coefficient of multiple determination ( $R^2$ ) shows that all the 19 independent variables were collectively responsible for 68.74 per cent of the variability in jute productivity.

When the analysis was done for pooled sample of farmers, the partial regression coefficients were positively significant in the case of only two variables viz. economic status and knowledge level of farmers. This shows that these variables contributed positively and significantly to the prediction of jute productivity. The phenomenon of such relationships may be explained by the fact that the farmers who enjoy higher economic status have better access to production factors such as seeds, fertilizers, irrigation, credit and information sources like newspapers, radio etc. granting access to information about improved jute production technologies leading to higher productivity. The regression coefficients of the other 17 variables were, however, not significant. The coefficient of multiple determination ( $R^2$ ) indicates that all the 19 independent variables jointly accounted for 44.97 per cent of the variation in jute productivity.

## Conclusion

The foregoing results revealed that different independent variables contributed significantly to the produc-

tivity of jute in different groups of farmers. However, among various psycho-personal and socio-economic factors studied, knowledge level of the farmers emerged as the most significant single variable determining the jute productivity in all the three categories of farmers. The study thus suggests that in order to boost-up the productivity of jute in the country, the extension agencies involved in jute development should make vigorous efforts to enhance the knowledge of farmers by organising suitable training programmes, field days, farmers' fairs, field demonstrations and by extensive use of radio, newspapers, farm bulletins, television etc.

## References

- Bardhan, P.K.** 'Size Productivity and Returns to Scale: An Analysis of Farm Level Data in Indian Agriculture' *Journal of Political Economy*, Vol. 81(6), 1973.
- Bhattacharya, N.L. & Saini, G.R.** 'Farm Size and Productivity: A Fresh Look', *Economic and Political Weekly*, Vol. 7(26), 1972.
- Mishra, S.P.** *A Study of Farm Entrepreneurship in a Backward District of Bihar*, Ph.D. Thesis (Unpub.), I.A.R.I., New Delhi, 1979.
- Moulik, T.K.** *A Study of Predictive Value of Some Factors of Adoption of Nitrogenous Fertilizer and the Influence of Sources of Information on Adoption Behaviour*, Ph.D. Thesis (Unpub.), I.A.R.I., New Delhi, 1965.
- Pareek, U. & Trivedi, G.** *Manual of the Socio-Economic Status Scale (Rural)*, Manasayan, New Delhi, 1964.
- Pathak, S. & Majumdar, A.K.** 'Multivariate Regression Analysis of Adoption Behaviour of Jute Farmers', *Indian Journal of Extension Education*, Vol. 14(3 & 4), 1978.
- Pathak, S.** *Perceived Attributes of Elements of Communication Process and Fidelity of Communication*, Ph.D. Thesis (Unpub.) B.C.K.V.V., Kalyani, West Bengal, 1978a.
- Pathak, S.** 'Correlation of Knowledge, Attitude and Adoption of Improved Practices of Jute Cultivation', *Jute Development Journal*, Vol. 6(2), 1986.
- Pathak, S.** 'Infrastructural Factors Associated with Adoption of Jute Production Technologies', *Journal of Maharashtra Agricultural Universities*, Vol. 14(1), 1989.
- Rudra, A.** 'Farm Size and Yield Per Acre' *Economic and Political Weekly*, Vol. 3 (26-28), 1968.
- Sagar, R.L.**, *Study of Agro-Economic, Socio-Psychological and Extension Communication Variables Related with Farmers' Productivity of Major Field Crops in Haringhata Block*, Ph.D. Thesis (Unpub.) B.C.K.V.V., Kalyani, West Bengal, 1983.
- Sharma, K.A.L.M., Reddy, A.G.V. & Murti, A.S.** 'A Guttman Scale to Measure Progressiveness of Farmers', *Interdiscipline*, Vol. 9(4), 1972.
- Saini, G.R.**, *Farm Size, Resource Use Efficiency and Income Distribution*, Allied Publishers Pvt. Ltd., New Delhi, 1979.
- Yang, W.Y.**, *Methods of Farm Management Investigation*, F.A.O. Agricultural Development Paper No. 80, F.A.O., Rome, 1980. □



# Resource Use Efficiency in Tea Plantations

Sib Ranjan Misra

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*This paper examines how efficiently resources like labour and capital have been utilised in tea plantations. The conclusions that emerge from this study are that inputs are not generally utilized to the optimum available capacity. Even under the existing technology, sufficient potentials exist for improving the productivity with proper allocation of the existing resources. A well-knit rehabilitation programme is essential.*

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The tea plantations is one of the oldest and well organised industries in India. India remains the world's largest producer, consumer and exporter of tea. This industry makes substantial contribution to the Government revenues. The share of tea in total export earnings was about 11 per cent in the year 1988-89. Directly or indirectly, this industry provides employment to about 18 lakh people. The tea industry has provided a stimulus to the development of communications and transport and forestry. Plantation is an instrument of modernisation in the sense that it opens up previously backward regions and creates a social overhead capital and transforms primitive economies into money economies. In view of the importance of this industry in our economy, its sustained development is imperative. The basic objective of such a programme of development would be to increase the production of tea so as to make it available to the consumers at home at a reasonable price and also to generate sufficient exportable surplus so as to retain and improve the country's position in the world market (Misra, 1986).

But, unfortunately, this industry has been under stress which has reached critical proportions these years. Inefficient use of resources may be one of the factors for the present dismal state of affairs. It would, therefore, be interesting to examine how efficiently the resources have been utilised in tea plantations. The tea industry is labour intensive. Most of the field operations are still done manually. Mechanisation has been limited to the factory where only small proportion of labour is employed. Even the large plantations have not introduced any major mechanical labour saving devices. Marginal improvements have taken place only in the tools used in field operations. Of course, there have been some changes in cultural practices related to, among others, manuring, shade and weed control, eradication and control of disease and pests, pruning, spraying and soil conservation practices. Most plantations are using in varying ways and



degrees, these new inputs. A large number of them have moved out of the traditional pattern of cultivation mainly by adopting these biological innovations.

## Methodology

In order to examine how efficiently resources are utilised in tea plantations, we have selected plantations from two distinct tea-producing regions of West Bengal—Terai-Dooars and Darjeeling. The two regions have no significant considerable homogeneity in the environmental conditions and tea is a plant which is very much sensitive to changes in environmental factors. So, in order to ensure a greater degree of homogeneity with respect to environmental factors among the plantations, two separate samples—one from Terai-Dooars and the other from Darjeeling—have been obtained. Also, to see the extent of variations, if any, in efficiency of resource use due to changes in size of operations, two samples from each size-class were drawn. The size-groups are defined as follows:

Large size — 200 hectares & above,

Small size — Below 200 hectares.

The materials utilised for the study have been scanned through both published and unpublished documents. Data on total wages, output, costs on capital, both fixed and variable, have been recorded in the published balance sheets of the respective plantations. The reference period for the study is 1991.

To express the input-output relationship per hectare in tea plantations, a simple model based on the conventional neoclassical production function of the Cobb-Douglas type is used: (Klein, 1978)

$$Y = AL^a K_1^b K_2^c$$

- where, Y = Physical output of tea measured in kg.  
 L = Labour input measured in mandays.  
 K<sub>1</sub> = Expenditure on intermediate material inputs like fertilisers, chemicals, etc.  
 K<sub>2</sub> = Expenditure on fixed capital  
 A = Constant term or scale parameter, and  
 a, b, and c = The partial output elasticities of labour, intermediate material inputs and capital, respectively.

The value of marginal product is obtained from the production function by differentiating the function with respect to a particular variable.

There are no product quality variations. Of course, there are some unsatisfactory points about input 'labour'.

No quality differences of labour have been taken into consideration. Female labour being specialised is treated at par with male labour. Labour is employed on both permanent and casual basis. Labour includes both managerial and non-managerial. Nevertheless, inclusion of an unsatisfactorily defined variable, i.e. labour in this case, is better than excluding altogether a relevant variable. Fixed capital (K<sub>2</sub>) includes sprayers, sprinklers, roads, internal vehicles, buildings, fencing materials, factories and godowns, tools and implements etc. The 'flow' services of capital have been considered. Capital is measured as the sum of annual depreciation calculated by the straight line method on the total book values of the individual assets. Intermediate material inputs are, among others, fertilisers, chemicals for plant protection, fuel and power, viewed as capital; they provide 'stock' services. They are exhausted in one use. These inputs activate nutrient intake capacity of the plants. All these inputs are treated as a single input. The average prices of these inputs, the acquisition costs, are assumed to be similar for all the plantations; this assumption is tenable for cross sectional data of plantations in the same region.

## Results

Table 1 gives the elasticities of output with respect to input-labour, intermediate material inputs and capital. Judging by the value of R<sup>2</sup>, it appears that all the functions provide a good fit for the underlying data. All the elasticities are positive and less than one, indicating decreasing marginal productivity of factor inputs. In large and Terai-Dooars plantations, the elasticities of output with respect to these inputs are higher than those for these inputs in the small and Darjeeling plantations indicating that output would increase at a relatively larger proportion in larger plantations than in the small plantations in response to a given increase in a particular input when all the other inputs are held constant. The sums of these coefficients of different inputs derived from all the functions clearly indicate that the returns to scale are higher in large and Terai-Dooars Plantations. Land is being cultivated more intensively in these plantations through judicious application of other inputs.

An input factor is considered to be used efficiently if its marginal value productivity (MVP) is sufficient to offset its acquisition cost (AC). An examination of the table reveals that MVPs of the different inputs vary by location and size. The highlights of the estimates are in order. The MVP of labour is less than the wage rate in small and Darjeeling plantations: whereas, large and Terai-Dooars plantations have got marginal value productivity of labour



**Table 1:** Resource use of the inputs

Size-class/Region		Resources			R <sup>2</sup>
		Labour	Intermediate material inputs	Capital	
Large plantations	E	0.52 (0.47)*	0.34 (0.15)**	0.46 (0.21)**	0.82
	MVP	Rs. 7.91	Rs. 1.87	Rs. 1.47	
	AC	Rs. 5.20	Re. 1.00	Re. 1.00	
Small plantations	E	0.23 (0.11)**	0.32 (0.29)*	0.18 (0.10)*	0.68
	MVP	Rs. 3.45	Re. 1.00	Re. 1.00	
Plantations in Darjeeling	E	0.15 (0.12)*	0.24 (0.9)*	0.25 (0.10)*	0.75
	MVP	Rs. 2.85	Re. 1.08	Re. 0.95	
	AC	Rs. 6.92	Re. 1.00	Re. 1.00	
Plantations in Terai-Dooars	E	0.31 (0.14)**	0.58 (0.30)*	0.44 (0.31)*	0.74
	MVP	Rs. 6.84	Rs. 1.85	Rs. 1.96	
	AC	Rs. 5.20	Re. 1.00	Re. 1.00	

E = Elasticity coefficient of input

AC = Acquisition cost or price of input

MVP = Marginal value productivity of input

\* Significant at 5 per cent level

\*\* Significant at 1 per cent level

Note. Figures in the parentheses indicate standard errors

higher than the wages paid to the labourers. The MVPs of capital and intermediate material inputs appear low in small and Darjeeling tea plantations. The low MVP of labour suggests that the employment of resource has already reached a point at which additional unit yields a very little output and so indicates excess employment of human labour. On the other hand, MVPs of intermediate material inputs and capital appear to be significantly higher as compared to one-rupee investment. It appears that scope exists to divert investment from excessive use of human labour to intermediate material inputs and capital.

### Policy Implications

Small plantations face problems, mostly because of their size. The small planters are generally hardpressed for funds as a result of which they cannot afford to buy modern expensive machines. In small plantations, roll-breaking and fermentations (or oxidation) are not done perfectly; drying and firing leave much to be desired and hardly is there any grading. Because of paucity of working capital, and sometimes lack of knowledge pertaining to biological innovations, they cannot adopt intermediate material inputs or biological innovations which increase productivity. Apart from the technical economies being lost in small plantations, (C.H.H. Rao, 1976), other commercial advantages of capital product and other markets could not be availed of. These advantages or lack of these are of significance in the context of oligopsony in buying and oligopoly in selling services including capital by intermediaries in markets.

Due to inefficient utilisation of manpower and bad planning and layout, there is also underemployment in some gardens generally of size not exceeding 200 hectares. Some redundant labour is carried on the rolls due to poor management, tradition or other circumstances. These planters cannot readily vary such basic inputs as labour which are more or less fixed. Owing to the nature of the terrain in Darjeeling, the number of workers on each hectare is the highest, even though the product is the lowest. But rationalisation of labour use has been made possible to a certain extent in large plantations and Terai-Dooars areas. Market opportunities are exploited fully and more skillfully. The use of sprinklers, sprayers and other implements has reduced not only production uncertainty but have also augmented productivity substantially (Misra, 1984).

**Because of paucity of working capital, and sometimes lack of knowledge pertaining to biological innovations, they cannot adopt intermediate material inputs or biological innovations which increase productivity.**

Topography and presence of peculiar characteristics of each plantation are responsible for variations in efficient use of resources and productivity. In Darjeeling, tea (which is considered the best quality tea) is produced in



small quantity because plucking is strictly limited to two tender leaves and a bud; while in the case of coarse plucking which is generally done in Terai-Dooars, there is no such restriction. Perennial plucking is not possible in Darjeeling. This feature explains the misuse of labour and other inputs, resulting in lower yield per hectare (Clark, 1959).

Apart from this fact, it is also observed that the age of the bushes governs the yield of tea to a great extent. (Bardhan, 1970) A large proportion of bushes in plantations situated in these regions consist of overaged, debilitated and obsolete uneconomic bushes (i.e. about 80 per cent in sample small tea plantations as on 31st March, 1986), an overwhelming proportion of the standing tea bushes has outlived their optimum economic life.

Apart from strengthening the resource position of the plantations, even under the existing technology, sufficient potentials exist for improving the productivity through proper rational allocation of the existing resources, particularly in small Darjeeling plantations.

There is too much of ad-hocism in matters of the industry. There has been no effective perspective plan for about 25 years. The Government, the labour and the management have a tendency to blame one another for the industry's ailments. A well-knit rehabilitation programme is the need of the day. Rehabilitation of the used land should be carried out with thorough deep ploughing, harrowing, levelling, subsoiling, full rest under

a cover crop for at least two years and proper manuring. The high percentages of vacancies and old age of the bushes point to the need for undertaking infilling, replanting and replacement planting. But planters are sometimes reluctant to go in for such extensive replantation. The 'demonstration' effects of large and efficient plantations are lost on the small and inefficient holdings on organisational and social isolations. Both these factors account for wide technological gap. A system should be devised to bridge the gap. This also calls for a reorganisation and consolidation of the units into optimum sized undertakings. If the unit is retrievable, cost of rehabilitation is smaller than that required for setting up a new unit. A flourishing tea plantation would ultimately be a better source of revenue than a languishing one.

### References

- Bardhan, P.K.**, 'Report of an Enquiry into Foreign-owned plantations in Kerala' Part I, (Kerala Government), November, 1970.
- Edwards, Clark**, 'Resource fixity and Farm Organisation' *Journal of Farm Economics*, No. 41, 1959.
- Hanumantha Rao, C.H.**, 'Technological change and Distribution of Gains in Indian Agriculture', The Macmillan Company of India Limited, 1976.
- Klein, Lawrence R.**, *An Introduction to Econometrics*, Prentice Hall India, 1978.
- Misra, Sib Ranjan**, 'Size-Productivity Relationship in Tea Plantations—A fresh look', *Productivity*: Oct-Dec., 1984.
- Misra, Sib Ranjan**, 'Tea Industry in India', Ashish Publishing House, New Delhi, 1986. □

Wealth, it is necessary to remember, is not a static or limited quantity that can only be divided or looted by those who do not possess it; wealth is produced; its potential quantity is virtually unlimited.

— Ayn Rand



# Productivity of Agricultural Officers of Punjab National Bank

S.P. Singh & S.N. Laharia

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*Socio personal factors play a vital role in the productivity of individuals in all organizations. This study analyses the influence of several variable factors on the productivity of Agricultural Officers of Punjab National Bank and presents suggestions to improve the situation.*

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Productivity is a universal and simple concept. It reflects the relationship between output and input expended in any work situation (Monga, 1992). It is the efficiency with which resources as a whole including capital as well as manpower are employed in production. It is the level of performance relative to some standard which may reflect earlier achievements by others, the person himself or a standard developed for the purpose. It can be qualitative or quantitative, or both (Carrol & Tosi, 1978). Qualitative measurement does not require any pre-standard, while the quantitative evaluation does. A particular level may be considered high by one person, but the same level may be only 'satisfactory' or even 'unsatisfactory' for another. In the present study, an attempt has been made to measure job productivity of Agricultural Officers (AOs) both qualitatively and quantitatively.

The socio-personal factors/traits play a very important role in increasing the productivity of the individuals in every organisation. These factors affect the productivity of Agricultural Officers also, either directly or indirectly through interaction. Hence, efforts were made to identify the characteristics/traits which are associated with the individual's performance in the organisations as well as other variables which have a bearing on their productivity. The present study was undertaken with the following specific objectives:

- To measure the productivity of Agricultural Officers (AOs) working in Punjab National Bank.
- To find out the association between their personal, socio-psychological and organisational factors/variables and productivity.
- To identify the variables predicting their productivity and the influence of each variable on productivity.



## Methodology

The study was conducted in Uttar Pradesh in 1991. Ex-postfacto research design and multi-stage sampling techniques were adopted for the study. Punjab National Bank was selected because it is a leading bank and has the maximum branches in the State. In the next stage, Meerut, Agra, Kanpur and Lucknow zones were selected randomly. A complete list of names and addresses of the AOs working in the zones was collected from the concerned zonal branch offices. Out of 300 AOs, all the 285 AOs having service experience < 3 years as AOs were selected. The data were collected with the help of pretested mailed questionnaire especially designed for the study purpose. Only 275 AOs returned the complete questionnaire.

## Measurement of Productivity

'A productivity scale' was constructed to measure the productivity of Agricultural Officers. On the basis of job chart obtained from the Bank and discussion with senior officers of the bank and behavioural scientists, 30 indicators (16 qualitative and 14 quantitative) of productivity were identified as suggested by Reddy (1988). The qualitative indicators were: examining the technical feasibility and economic viability of the loan, mobilisation of deposits from farmers, preparation of area development schemes, introducing banking innovative methods, identification of subsidiary enterprises, identifying feasible market yards, identifying the feasible agro-service centres and improving existing market yards etc. The quantitative indicators of productivity were dispersal the loans, undertaking farm inspections during crop period, receiving loan applications, scrutinising loan applications, assisting farmers in filling up and submitting of loan application, sanction of loan, recovering the loan, organising farmers fair, attending fertility camp (animal husbandry) and attending other branches etc.

The importance of these indicators was judged by 20 senior officers of the Bank comprising senior Branch Managers and Regional Managers. They were requested to rank the statements on 5-point continuum, i.e. very important, important, somewhat important, not important and not at all important, which were assigned 4, 3, 2, 1 and 0 score respectively. The total as well as mean score of each indicator was worked out and only statements having mean score of 3.25 were retained as the indicators for this study. Thus at the final stage, only 20 indicators (12 qualitative and 8 quantitative) were retained in the productivity scale. Some of the independent variables indicating personal, socio-psychological and com-

munication factors/traits of the Agricultural Officers were measured with the help of scales already developed, such as, level of aspiration (Kilpatrick and Cantril, 1960), job satisfaction (Laharia, 1978), achievement motivation (Jhansi, 1985), conformity (Rao, 1968) and communication behaviour (Akhouri, 1973). Other variables were measured by developing suitable index for the study.

## Results

On the basis of mean productivity scores and standard deviation, the respondents were classified into three categories, viz., low, medium and high. Table 1 shows that majority of the respondents (56.36 per cent) belonged to medium level of productivity, followed by 24.73 per cent in high level while a small percentage (18.91 per cent) had low level of productivity. Similar observations have been reported by the earlier scientists in their respective studies (Janardhan, 1980; Kumar, 1984; Talukdar, 1984; Reddy, 1988; Singh and Laharia, 1990; Singh and Sharma, 1991).

**Table 1:** Distribution of Agricultural Officers according to their level of Productivity

N=275				
	Level of job productivity	Score range	Frequency	Percentage
Low	$(\bar{X} - \text{ISD})$	Below 38.09	52	18.91
Medium	$(\bar{X} - \text{ISD})$	38.10-56.85	155	56.36
High	$(\bar{X} + \text{ISD})$	Above 56.86	68	24.73

Mean value = 47.92, Standard Deviation = 8.93

## Association between productivity & socio-psychological factor

The correlation coefficients were worked out to find out the association. The values have been presented in table 2. Out of 17 independent variables, only 11 were found to have positive and significant correlation with the productivity. These variables were: type of recruitment, income, organisational climate, general facilities, supervisory capacity (consideration), job satisfaction, attitude towards job, conformity, moral, achievement motivations and communication behaviour of the respondent. Only three variables namely, age, experience and job stress had negative but non-significant association with productivity while the remaining variables had no significant association with productivity. It suggests that normally productivity increases with increase in job satisfaction, moral, achievement motivation and attitude. Its negative correlation with job stress is also justified because stress affects productivity adversely. The inverse relationship of age and experience with the productivity needs further



probing. The results get support from previous studies (Kumar, 1984; Sohi and Kherde, 1984; Jhansi, 1985; Singh and Sharma, 1991).

**Table 2:** Correlation between Productivity of Agricultural Officers with selected independent variables

Variables	Coefficient of correlation
Age	-0.1372
Experience	-0.0083
Training received	0.0997
Perception of work load	0.1005
Type of recruitment	0.3989*
Income	0.4762*
Organisational climate	0.2901*
General Facilities	0.3635*
Supervisory capacity	
— Initiating structure	0.0931
— Consideration	0.2532*
Level of aspiration	0.1588
Job satisfaction	0.3007*
Job stress	-0.1033
Attitude towards job	0.0680*
Conformity	0.5963*
Morale	0.4002*
Achievement motivation	0.2964*
Communication behaviour	0.2793*

\*Significant at 5 per cent level of probability.

### Multiple Regression Analysis

The eleven variables, which were found significantly correlated with productivity, were fitted in multiple regression equation to analyse the contribution of these variables in predicting the productivity of Agricultural Officers (Table 3). The table revealed that out of 11 variables the regression coefficient of only five variables viz. supervisory style (consideration), job satisfaction, attitude towards job, conformity and morale of the respondents were significant. These five variables which had significant positive relationship could be termed as good predictors of the AO's productivity. The coefficient of multiple regression determination ( $R^2$ ) is 0.7459 which indicated that all the 11 variables together explained 74.59 per cent of the total variation in the productivity. The 'F' value (41.3384) was also found to be significant. It suggests that attention should be paid on these five important dimensions to increase the productivity of AOs. The findings are in conformity with the earlier observations reported (Dakhora and Bhilegoankar, 1987; Singh and Laharia, 1990).

**Table 3:** Regression Coefficient of Agricultural Officers productivity with the significant independent variables

Variable	Regression coefficient 't' value	SES	't'
Type of recruitment	0.9508	1.8837	0.5047
Income	2.5814	1.5392	1.6771
Organisational climate	1.2107	1.7732	0.6821
General facilities	1.7205	1.3751	1.251
Supervisory capacity (consideration)	3.9719*	1.4997	2.648
Job satisfaction	4.9408*	1.7246	2.864
Achievement motivation	0.1567	1.2005	0.130
Attitude towards job	5.3920*	1.7633	3.058
Conformity	6.8522*	1.4791	4.632
Morale	4.6410*	1.5337	3.026
Communication behaviour	0.8218	1.7599	0.467

\* Significant at 1 per cent level of probability

$R^2 = 0.7459$

F value = 41.3384

### Path Analysis

Multivariate path model was used to find out the direct and indirect effects of the significant independent variables on the productivity of AOs. The values of the path coefficients of selected independent variables have been presented in table 4. The variables have been arranged from high to low total direct effect. Table 4 shows that conformity has the maximum direct effect on productivity followed by income, job satisfaction, attitude towards job, morale and general facilities. The minimum direct effect on productivity was shown by the organisational climate variable. However, it has more indirect effect on the productivity of AOs. Attitude of AOs towards their job shows the maximum influence on productivity followed by type of recruitment and organisational climate. Variables such as, organisational climate, morale and job satisfaction were most important as substantial indirect effects of maximum variables were channelled through each of these variables.

**conformity has the maximum direct effect on productivity followed by income, job satisfaction, attitude towards job, morale and general facilities.**

It implies that the Agricultural Officers having more feeling of conformity to rules, norms and culture are more productive. This is logical also as it must be providing



**Table 4:** Path coefficients—Direct and indirect effect of selected significant independent variables on productivity of Agricultural Officers

Variable	Total direct effect	Total indirect effect	Substantial indirect effects channelled through other variables
Conformity ( $X_1$ )	0.3451	0.2512	0.1093 ( $X_3$ ), 0.1033 ( $X_4$ ), 0.0386 ( $X_9$ )
Income ( $X_2$ )	0.2977	0.1785	0.0888 ( $X_8$ ), 0.0562 ( $X_1$ ), 0.035 ( $X_{11}$ )
Job satisfaction ( $X_3$ )	0.2538	0.0469	0.0325 ( $X_5$ ), 0.0267 ( $X_1$ ), -0.039 ( $X_9$ )
Attitude towards job ( $X_4$ )	0.2504	0.3176	0.2491 ( $X_5$ ), 0.1270 ( $X_{10}$ ), -0.0585 ( $X_8$ )
Morale ( $X_5$ )	0.1933	0.2069	0.1906 ( $X_3$ ), 0.1555 ( $X_4$ ), -0.1392 ( $X_{11}$ )
General facilities ( $X_6$ )	0.1480	0.2155	0.3628 ( $X_1$ ), 0.0299 ( $X_{10}$ ), -0.1772 ( $X_{11}$ )
Achievement motivation ( $X_7$ )	0.1027	0.1937	0.1937 ( $X_{11}$ ), 0.0966 ( $X_3$ ), 0.0301 ( $X_5$ )
Type of recruitment ( $X_8$ )	0.0935	0.3054	0.1440 ( $X_1$ ), 0.1345 ( $X_5$ ), 0.0269 ( $X_9$ )
Communication behaviour ( $X_9$ )	0.0649	0.2144	0.1995 ( $X_{11}$ ), 0.1003 ( $X_5$ ), -0.0854 ( $X_{10}$ )
Supervisory capacity (consideration) ( $X_{10}$ )	0.0362	0.2170	0.2691 ( $X_{11}$ ), 0.1073 ( $X_5$ ), -0.1594 ( $X_3$ )
Organisational climate ( $X_{11}$ )	0.0127	0.2744	0.1592 ( $X_5$ ), 0.1206 ( $X_1$ ), -0.0024 ( $X_6$ )

maximum support and appreciation from the colleagues and seniors in the organisation. The results are in line with earlier findings (Talukdar, 1984; Reddy, 1988).

### Policy Implications

On the basis of findings of the study, it can be concluded that most of the Agricultural Officers working in Agra, Meerut, Kanpur and Lucknow zones of Punjab National Bank have medium level of productivity.

The study suggests that steps need to be taken to increase the job satisfaction and morale of the Agricultural Officers. Efforts should be made to inculcate positive attitude and a feeling of conformity among them. The supervisory staff should also follow a humanistic approach to monitor, supervise and evaluate their work.

### References

- Akhouri, M.M.P.** Communication behaviour of extension personal : An analysis of Haryana Agricultural Extension System, Ph.D. thesis (unpub.), IARI, New Delhi, 1973.
- Carrol, S.D. & Tosi, H.L.,** Organisational behaviour, St.Clair Press : Chicago, 1978.
- Dakhora, K.M. & Bhilegaonkar, M.G.,** Level of job satisfaction of Veterinary Extension Personnel, Indian Journal of Extension Education 23 (1&2), 1987.
- Janardhan, K.S.** A study of job performance and job satisfaction of Agricultural Extension Officers' and factor associated with them, M.Sc. thesis (unpub.), APAU, Hyderabad, 1980.
- Jhansi, G.R.,** Scientific productivity of Agricultural Scientists. An activity analysis approach, Ph.D. thesis (unpub.), APAU, Hyderabad, 1985.
- Kilpatrick, F.P. & Cantril, H.,** Self anchoring scale. A measure of individual's unique reality words, Journal of industrial Psychology 16(1), 1960.
- Kumar, D.,** A study of factors affecting productivity of Agricultural Officers of nationalised banks, M.Sc. Thesis (unpub.), HAU, Hisar, 1984.
- Laharia, S.N.,** A study of personal and organisational influencing the productivity of agricultural scientists, Ph.D. thesis (unpub.), HAU, Hisar, 1978.
- Monga, R.C.,** Dynamics of productivity management, Productivity 33(1), 1992.
- Rao, T.N.,** Generalized Conformity Jendency Test, Samastri Press, Baroda, 1968.
- Reddy, P.V.,** Job productivity of Technical Officers—A study on State Bank of India in Andhra Pradesh, M.Sc. thesis (unpub.), A.P. Hyderabad, 1988.
- Singh, S.P. & Laharia, S.N.,** Job satisfaction among Veterinary Surgeons, Poultry Guide 27(3), 1990.
- Singh, S.P. & Sharma R.K.,** Job productivity of veterinary surgeons in Uttar Pradesh. Indian Journal of Dairy Science 34(4), 1991.
- Sohi, J.S. & Kherde, R.L.,** Job performance and job prediction of livestock supervisors as perceived by their superiors. Maharashtra Journal of Extension Education 4(1), 1984.
- Talukdar, R.K.,** Productivity of Agricultural Development Officers in Haryana : A factor analysis study, Ph.D. thesis (unpub.), HAU, Hisar, 1984. □



# Common Myths About ISO 9000

ISO 9000 series of standards in a short time has assumed top priority in the agenda of Indian industry and business. It is not just the fear of restriction of entry into the European market that has given the standard this status but it is the fact that Indian companies want to take advantage of the liberalised economic environment in the

country for improvement of their own management systems. If the liberalisation policies maintain the present pace, within no time we will face international competition on our own soil.

Here are a few common myths about the ISO 9000 series of standards and also the realities about them:

MYTH	REALITY
1. ISO will give certification to 9001, 9002 & 9003	The job of ISO (International Organisation for Standardisation) is only to establish the standards, review and revise them at appropriate intervals. Therefore nobody will get ISO 9001, 9002 or 9003 certification. But the member countries of ISO, in their respective areas of jurisdiction, adapt these standards and rename them. (Like IS 14000 in India, Q-90 in USA, BS 5750 in UK etc). These are technically equivalent to ISO 9000 standards. Since ISO standards are popular by that name, obtaining an equivalent standard is deemed to be getting an ISO 9000 standard.
2. Getting ISO 9000 certification ensures exports to EC	ISO 9000 is only a condition for entry in to the European market, i.e., it only guarantees an entry, not a sale. There is no guarantee of business as it depends entirely on the needs and requirements of the customer.
3. ISO 9000 will be used as a trade barrier by European Community	Restricting entry into EC markets using ISO 9000 was to prevent the large and powerful nations of the European Community from dumping their shoddy and substandard goods on smaller nations, in the new open market system. The same logic extends to India. This offers us an opportunity to improve the quality of our products. It should, therefore, not be treated as a trade barrier.
4. All the 3 standards are applicable to one company.	Only one of the contractual situations (9001, 9002 or 9003) is applicable to a company. The company should decide in which areas of operation it is in and accordingly arrive at the applicable standard.
5. Certificate once obtained is valid for ever.	ISO 9000 equivalent certification is issued for a period of 3 years. During the 3 years, six-monthly unannounced visits are made by the certifying agency to verify adequacy and compliance of the system.



- | MYTH   | REALITY   |
|--|---|
| 6. ISO 9000 does not require TQM efforts   | If found wanting, the certification is withdrawn. At the end of 3 years, a reassessment is done.<br>TQM covers a wider spectrum of activities of which the quality system is only a part. ISO 9000 series standards are only one of the series most widely accepted) that provide guidelines to evaluate the performance of the system. The guidelines for internal quality assurance (ISO 9004) are more inclined towards concepts of TQM. For continued sustenance of a quality system, TQM efforts are a must. |
| 7. ISO 9000 company can supply goods without any liability, into EC Markets.                                 | A sound quality system (Proof: ISO 9000 certification) is expected to produce a standard product. However there exists a clause of product liability, for companies supplying in Europe. As per the EEC Act if a product failure causes physical or mental injuries to a customer, the company is liable to pay a minimum penalty of 70 million ECU's (Rs. 22 crores). The company is guilty unless proven innocent.  |
| 8. For export to a particular country, certification has to be obtained only from an agency of that country. | This used to be the case initially. But now, certifying agencies are networking internationally so that certifications are accepted and are valued in different countries on a reciprocal basis.  |
| 9. Readymade software packages can get a company ready for ISO 9000  | Software packages can only supplement the efforts for obtaining ISO 9000 by reducing the documentation time.  |
| 10. ISO 9000 certification can be displayed as a logo on the product.  | ISO 9000 is a system standard and not a product standard. Therefore it cannot be displayed on the product. But the packagings can display the logos.  |
| 11. Obtaining ISO 9000 is difficult but maintaining it is easy.  | Reality is just the opposite. There are unannounced surveillance visits, after which certification can be withdrawn if the system does not comply with the conditions. When a certificate is withdrawn, this fact needs to be advertised also. This advertisement is detrimental to the interests of the company.   |
| 12. ISO 9000 is applicable only to export oriented companies.  | Obtaining ISO 9000 is a demonstration to the customer, of the sound nature of a company's quality system which ensures quality products. It is also a contract between the supplier and a customer. Therefore, if a domestic customer insists on ISO 9000, the company will have no chance but to go in for ISO 9000 certification, even if it is not exporting.  |

For exports to Europe, (which accounts for 25 per cent of total Indian Exports), ISO 9000 certification is vital. A list of Indian companies which obtained certification so far is given in Annexure-I. Indian companies should take this opportunity to provide quality products consistently by effecting system improvements as per the guidelines of the standard. That the government is also serious in the quality front is amply demonstrated by its decision to set

up the National Quality Council (NQC), which will be the apex body in the country for promotion of quality consciousness.

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Asstt. Director (TQM)  
National Productivity Council  
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## Annexure-1

## LIST OF CERTIFICATED UNITS IN INDIA ISO 9000

Sl. No.	Name of unit	Place	ISO standard	Year of certification
1.	M/s Ralliwolf Limited	Bombay	ISO 9002	1989
2.	M/s Sundram Fasteners Ltd.,	Madras	ISO 9002	1990
		& Krishnapuram	ISO 9001	1991
3.	M/s W.S. Industries Ltd.	Madras	ISO 9001	1991
4.	M/s Kirloskar Cummins Ltd.	Pune	ISO 9001	1991
5.	M/s Kirloskar Brothers Ltd.	Kirloskarvadi	ISO 9001	1991
6.	M/s London Rubber	Virudunagar	ISO 9002	1991
7.	M/s Ponds India Ltd.	Kodaikanal	ISO 9002	1991
8.	M/s Crompton Greaves Ltd.	Bombay	ISO 9001	1991
9.	M/s Crompton Greaves Ltd.	Ahmednagar	ISO 9001	1992
10.	M/s Widia (India) Ltd.	Bangalore	ISO 9002	1992
11.	M/s Widia (India) Ltd.	Hyderabad	ISO 9001	1992
12.	M/s Kirloskar Electric Co. Ltd.	Bangalore	ISO 9001	1992
13.	M/s Kirloskar Electric Co. Ltd.	Bangalore	ISO 9002	1992
14.	M/s Modi Xerox	Rampur	ISO 9002	1992
15.	M/s Brakes India Ltd.	Madras	ISO 9002	1992
16.	M/s Continental Devices (India) Ltd.	New Delhi	ISO 9002	1992
17.	M/s Sundram Abex Ltd.	Madras	ISO 9002	1992
18.	M/s Mukund Ltd.	Bombay	ISO 9002	1992
19.	M/s Audco India Ltd.	Madras & Maramalainagar	ISO 9001	1992
20.	M/s Audco India Ltd.	Madras & Maramalainagar	ISO 9002	1992
21.	M/s Kirloskar Brothers Ltd.	Karad, Maharashtra	ISO 9001	1992
22.	M/s Kirloskar Brothers Ltd.	Karad, Maharashtra	ISO 9002	1992
23.	M/s Siemens Ltd.	Nasik	ISO 9001	1992
24.	M/s The English Electric Company of India Ltd.	Madras	ISO 9001	1992
25.	M/s Parry Engineering & Exports Ltd.	Madras	ISO 9002	1992
26.	M/s Peico Electronics & Electrical Ltd.	Pune	ISO 9001	1992
27.	M/s Micro	Bangalore & Nasik	ISO 9001	1992
28.	M/s Crompton Greaves Ltd.	Madras	ISO 9002	1992
29.	M/s PMT Machine Tool Automatic Ltd.	Pune	ISO 9002	1992
30.	M/s Intersil (India) Ltd.	Bombay	IECQ/ISO 9002	1992
31.	M/s Usha Rectifier Corpn. (I) Ltd.	Nainital	IECQ/ISO 9002	1992
32.	M/s Continental Device India Ltd.	New Delhi	IECQ/ISO 9002	1992
33.	M/s J.V. Electronics Ltd.	New Delhi	IECQ/ISO 9002	1992
34.	M/s Kirloskar Pneumatic Ltd.	Pune	ISO 9001	1993
35.	Sundershan Chemicals	Pune	ISO 9001	1993
36.	Bharat Heavy Electricals	Trichnapally	ISO 9002	1993
37.	Bharat Electronics Ltd.	Kotdwara	ISO 9002	1993
38.	Indian Telephone Industries Ltd	Bangalore	ISO 9002	1993
39.	TI Diamond Chains	Madras	ISO 9002	1993
40.	Salem Steel Plant	Salem	ISO 9002	1993
41.	Tata Bearings Ltd		ISO 9001	1993



# Cart Modernization — A Boost to Rural Development

In spite of the progress achieved in the development of our transport system, the traditional bullock-cart still plays a very substantial role. Yet, while most of our efforts are directed towards development of more efficient alternate systems of transport, little or no worthwhile efforts have been directed to improve the traditional bullock cart. It is estimated that there are 15 million bullock carts in the country and their contribution in the transport of goods and personnel is estimated at around 56 per cent. Over 60 per cent of all goods carried from farm to market are moved by bullock cart.

## Design Deficiencies

In rural areas, most of the carts are of the traditional type and owned by individual farmers and the same animals are also used for agricultural activities. The farmer, in addition to using the cart for his own on and off-the-farm transport requirements, may also hire it out to other local farmers. Although details vary, the salient features of the traditional cart are common throughout India. It has two large (diameter 1 to 1.75 m) wooden, usually spoked wheels, each enclosed in an iron rim. The wheels are mounted on a wooden or forged iron axle and run on loose-fitting steel bushes. The axle is contained in a wooden block on to which a platform is fitted. This runs forward to a simple yoke to which a pair of animals are harnessed.

There are deficiencies in the design of traditional carts resulting in the inefficient use of the animals:

- The carts are excessively heavy, weighing over 300 Kilograms. The heavier the cart, the lower the useful load that can be carried.
- The traditional wooden wheel is heavy, has inefficient bearings and fairly high rolling resistance, and damages surfaced roads.
- The yoke of carts usually consists of a simple wooden beam resting on the neck of the animals with wooden attachments and ropes to keep the

yoke in place. This type of yoke is inefficient since it transmits power from the animal through the relatively weak neck, rather than through the strong shoulders. The yoke rubs on the neck and frequently causes open sores which can become cancerous.

- The cart is balanced by the animals. However, carefully the cart is loaded by the operator, part of the load bears down on the animals neck during use.

## Improvisation of Rural Transport Carts

The modernisation of rural animal drawn carts, if it results in the augmentation of carrying capacity, decreased strain to the animals and the elimination of damage to roads, would give a great boost to the national economy in general and to the rural economy in particular. If the carrying capacity could be doubled, (and this has been achieved with pneumatic tyres), the incomes of the rural people dependent on this system would also double. No nationwide data regarding the income generated by the bullock-cart transportation system for a variety of freight, in cities and in villages, are available. On a conservative estimate, it would aggregate Rs. 1,000 crores, assuming an average working year of 100 days and a daily income of Rs. 10 per cart.

**The modernisation of rural animal drawn carts would give a great boost to the national economy in general and to the rural economy in particular.**

If improved designs could eliminate or even reduce the vertical weight carried by the animals (not hauled by them), either through better harnessing or through a third wheel, the effective pull at the draw-bars or the floating beams can be increased, the economic life of the bul-



locks, which is at present around ten years, could be increased by at least one year. Even a ten per cent increase in their working life would save the country and the animal-owners Rs. 200 crores.

Any saving on account of road damage, if that could be prevented, would be a clear social gain. According to a Report on Road Development in Madras Presidency (1948), the cost of repairing the damage caused by one bullock-cart to road surface over a period of 12 months was assessed at Rs. 254, which was higher than the contemporary cost of the bullock-cart itself (Rs. 150 in 1934). As bullock-cart designs have not improved significantly since 1948, the road repairs necessary would remain comparable in real terms to this day. Without hazarding an estimate of the cost of any necessary repairs, one could justifiably argue that the savings to the national exchequer on account of the reduced road damage would be phenomenal.

**Another advantage to the rural economy through improved cart design would be the contributory employment potentiality.**

Another advantage to the rural economy which could be consolidated through improved cart design would be the contributory employment potentiality, it can generate at stable and higher levels of income. Improvement would come as a great boon to the over 200 lakh people employed by the system directly and indirectly, part time and full time. Much of this employment, located in the non-organized sector, would be seasonal and fetch only low levels of remuneration. With improvements in design, the bullock-cart, and the transportation system based on it, could be made viable, and it could be equipped to play a much more stimulating role in the transport economy, particularly in the rural areas. Employment in the bullock-cart system would then be a multiple of that provided by trucks with an equal carrying capacity. The bullock-cart is furthermore an excellent example of appropriate technology for short-distance goods transportation. The capital cost of employing a single notional person in the bullock-cart is just Rs. 3,000 whereas the corresponding figure for the truck system would be ten times that figure. Ours being a capital-scarce, labour-surplus economy, the relevant technology for us would comprise labour-using and capital-saving systems. As a further advantage, the bullock-cart can use inherited skills and need not wait upon the generation of new ones; fresh training for these calls for massive investments. The new jobs would not be

**A rationalized and viable bullock-cart system could effect spectacular savings in fossil fuel.**

confined only to cart operators, but would extend to manufacturing and repairing artisans. If the bullock-carts were further neglected, the system would lose out without a fair chance. The carts may well be displaced by automobiles, but employment in the transportation sector would in the process be reduced considerably. On the other hand, if the efficiency of the carts were increased, a viable and autonomous rural transportation sector could be fostered. Its contribution to increasing rural levels of living could be palpably felt within a generation.

#### **Fuel Savings through Bullock Cart System**

A rationalized and viable bullock-cart system could effect spectacular savings in fossil fuel. Thanks to a legacy of neglect of rural transport, automobiles are making inroads into the system. Whereas the energy for automotive trucks is derived entirely from wasting fossil assets, bullock-energy is of biological origin and is reproducible. Furthermore, the disaggregated energy units, which the bullocks represent, favour employment-intensive small-scale operation. With improved designs, it should be possible to reassign some of the short-distance traffic now carried by trucks and tractors to the bullock-cart system, or failing that, certainly arrest the substitution of carts by automobiles. It may even be possible to effect a reverse substitution—both in the cities and the villages. The resultant saving in fuel and costs generally would be enormous. There is an inherent specialization of carrying function which would suggest mutually exclusive spheres of operation for the railways, the trucks and the bullock-carts. In fact, it should be possible to organize a system of bullock-cart relays through improved designs and stage stations in order to:

- improve economic traffic between villages, pressing into service the extension of the road system effected under five-year plans; and
- ensure that the cost of carrying goods of rural origin and for rural consumption accrue in the rural areas in part at any rate. It would be best of course if this objective could be achieved, through the market mechanism of rate and price structures.

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# Performance of State Road Transport Undertakings in India

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*The State Road Transport Undertakings in India constitute the single largest network providing commutation facilities to about 68 million passengers per day. This report analyses the performance of STUs in India since 1981-82 through 1991-92 based on both financial and physical indicators. The report also examines the impact of recent macro level policy changes on the working environment of these undertakings. The study highlights the strengths and weaknesses of the STUs and suggests measures to make them efficient.*

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The exigencies of the current resource crunch and the poor return on investments made in public sector have compelled a fresh thinking on the role of this sector in the vital area of transport infrastructure. This is evident from the Eighth Five Year Plan document that says, "A well-integrated, multi-modal system, relying on application of the state of the art technology will be an essential element in the transport scenario..... road transport will continue to remain a dominant mode of transport.... In view of the huge investments required for developing the transport infrastructure, the private sector will have to be encouraged to play a more significant role essentially aimed at improving the operational systems such as in the areas of freight forwarding transport, expressways, creation of dedicated berthing facilities at ports, cargo handling equipments, etc." This paper analyses the performance of the State Road Transport Undertakings (STUs) in India since 1981-82 through 1991-92 based on both financial and physical indicators. We also endeavour to examine the impact of recent macro level policy changes on the working environment of the STUs in the country. The study highlights the strengths and weaknesses of the STUs and suggests measures to make the STUs efficient in the evolving competitive environment in the country.

The need for reorienting the working of the STUs with a view to make them financially healthy is becoming increasingly obvious. It is crucial to make every state undertaking responsive to the norms of social accountability for the investments which went into the building up of these undertakings. State Road Transport Undertakings are such organisations where considerable investments are successively committed by the State and Central Governments for the development of passenger transport in India since 1951. Except seven STUs out of a total 68 in 1991-92, all are incurring financial losses (Economic Survey, 1992-93; CIRT, 1993). This poor financial perfor-



mance apparently has been the main cause for the poor image of these undertakings.

**It is crucial to make every state undertaking responsive to the norms of social accountability for the investments which went into the building up of these undertakings.**

Though there are acknowledged weaknesses in their operation, STUs, in general, were providing yeoman service to meet the transportation needs of the underprivileged regions and sections. It may be noticed that in 1991-92, STUs provided concessional services worth Rs. 24123 lakhs to students and others (CIRT, 1993). STUs also contributed immensely towards the industrialization and economic modernization process undertaken during the post independence period, by helping mass transit of labourers from interior hinterlands to the urban centres. Notwithstanding these achievements over the past three decades considerable amount of inertia crept into the operational mechanisms which eventually led to an erosion of the financial assets and decline in efficiency in operation. As a consequence there is a feeling that since the essential infrastructure facilities have already been built up, market force could now play a better role to meet the transport requirements under the watchful eyes of the state so that the productive efficiency/rate of return on investment would not be hampered. The international funding agencies also support the option of denationalizing certain areas of operation in the passenger transport sector (World Bank, 1992). The future investment decisions in public sectors would be guided more by market forces than by the sectarian/social interests. Rate of return on investment would become increasingly a crucial factor in STU operations. In tune with the liberalized provisions in the Motor Vehicles Act, 1988, many state governments have granted increasing numbers of permits to private operators, and some states have denationalized a few routes (e.g. DTC & PTCL). The Government is considering changes in the Motor Vehicles Act to remove the ceilings on the number of state carriage permits that can be held by an individual or company (Pillai, 1992).

### **Profile of Road Transport Undertakings in India**

In India organized efforts in the passenger transport sector started just after independence whereas such an effort never picked up in the goods transport sector.

State participation in passenger road transport services commenced formally with the passing of the Road Transport Corporations Act in 1950. Since then, STUs have been formed in every State/Union Territory. Studies clearly brought out that in 1948 newspapers were writing editorials urging the Government to nationalise bus transport and to prevent the exploitation of the travelling public by inefficient private bus operators who were bereft of any social concern. (Padam, 1992).

By the 1960s public sector, albeit small in comparison to private sector was able to provide better buses, more kilometers of operation and fair wages to the workers. The amendments that were made to the Motor Vehicles Act in 1956 and the encouragement given by the Planning Commission resulted in the formation of several STUs all over the country. Today there are 68 STUs (List at Annexure 1) operate a fleet of nearly 1.04 lakh buses with an investment of over Rs. 3910 crores (Table 1). They employ over 7.56 lakh workers and carry about 6.8 crore passengers in a day. A broad profile of the Road transport sector in both passenger and goods is given in table 2. Considerable growth has been observed in the number of passenger and goods vehicles during 1981-91 compared to previous decades. A recent projection found that freight demand would increase from around 295 btkms at present to 800 btkms by 2001 while passenger transport is likely to grow from 1200 bpkms to 3000 bpkms (NPC, 1992 a).

The public sector operators do not enjoy a monopoly in the passenger sub-sector. In terms of vehicle ownership, they account for only about 37 percent. While there is total nationalization of stage-carriage operations in Maharashtra, Gujarat, and Haryana and near total nationalization in Andhra Pradesh, STUS play only a negligible role in states such as Bihar, Orissa, and West Bengal. In some states such as Rajasthan and Madhya Pradesh, STUs account for about a quarter of total stage carriage operations. In almost all states, passenger bus services to the rural interior and backward areas are provided by the STUs, private operators concentrate mainly on high density profitable routes (NPC, 1992 b).

### **Financial Performance of STUs**

Studies (Planning Commission, 1991) suggest that the major reasons for the poor financial performance of STUs are the high tax burden, lower freedom in fare fixation etc. It is also pointed out that many STU managements are keen in acquiring new fleet than giving attention to maintenance of existing vehicles. Significant improve-



Table 1: Main Features of the State Transport Undertakings in India

Name of STU	Buses on road (No.)	Fleet utilisation (%)	Capital (Rs. cr.)	Workers (Nos.)	Tax (Rs. lakh)	Pass. Km (in lakh)	Tot. Cost (Rs. lakh)
<b>Corporations</b> MOFUSSIL							
Andhra Pradesh SRTC	13472	93.4	955.17	117835	7931	598798	93608.55
Assam STC	502	57.3	66	6657	37	14106	3575.99
Bihar SRTC	598	39.2	—	11018	162	13281	5895.38
Gujarat SRTC	6985	85.1	462	22936	8487	322487	51436.54
Karnataka SRTC	7824	88.4	524	58189	9009	357057	58496.8
Kerala SRTC	2838	82.5	184	30571	1020	143025	23449
Madhya Pradesh SRTC	2404	82.6	—	22946	2235	80059	16587.66
Maharashtra SRTC	12914	86.7	910	112200	17780	517618	109079.6
North Bengal STC	786	88.2	58	6433	—	26904	—
Orissa SRTC	733	78.6	59	7547	394	24337	4710.04
Pepsu SRTC	957	91.1	57	5764	263	—	6282.29
Rajasthan SRTC	3002	88	212	24638	3583	12441	20621.54
South Bengal STC	372	70.3	—	3106	6	8333	1790.57
Uttar Pradesh SRTC	7161	88.6	200	57693	571	244661	38296.36
<b>Govt. Departments</b>							
Andaman & Nicobar ST	99	55.6	—	912	—	3005	—
ST Haryana	3279	95	—	19883	7753	—	24807.7
ST Punjab	2239	94.3	47	12549	673	77250	11317.78
<b>Companies</b>							
Annai Sathya TCL	522	93.4	14	3669	447	46066	3761.37
Anna TCL	688	92.8	14	5839	615	45737	5464
Cheran TCL	1364	96.1	32	10031	1037	72548	9491.11
Cholan Roadways CL	667	91.7	15	5877	574	46897	5598.19
Dheeran Chinnamalai TCL	660	98.5	22	5410	617	51217	5840.64
Jeeva TCL	771	95.3	16	5717	626	45741	5562.41
Kadamba TCL	211	85.1	16	1783	78	6923	1279.1
Kattabomman TCL	693	92.8	—	5476	567	42146	5464.82
Marudhu Pandiyar TCL	589	91.7	13	5111	542	44561	5133.5
Nesamony TCL	534	96.2	9	4263	429	34832	4023.37
Pandiyan Roadways CL	875	93.7	17	7993	523	56511	7071.18
Pattukkottai Azhagiri TCL	890	92.5	19	7399	881	64638	7461.37
Rani Mangammal TCL	581	95.1	14	4562	472	39871	4759.16
Thanthai Periyar TCL	931	94.3	30	7543	862	66868	7689.08
Thiruvalluvar TCL	844	91.3	31	9934	604	75429	9861.69
<b>Corporations</b> HILLY							
Himachal RTC	1528	95.1	—	8021	—	34090	8315.66
Jammu & Kashmir SRTC	318	34.9	—	6083	102	—	3234.47
Manipur SRTC	27	41.5	—	680	7	—	282.83
Meghalaya TC	99	58.9	—	935	1.4	2022	816.15
Tripura RTC	66	53.2	9	895	0.3	1072	461.76
<b>Govt. Departments</b>							
Mizoram ST	56	44.8	—	771	—	459	210
Nagaland ST	121	57.3	—	1045	5	1721	1018.77
Sikkim NT	107	77.9	—	1062	10	—	656

UPSRTC	-275	-1161	-809	-1566	—	252	4	-2328	-2474	-4041	-3342	-15741
A & NST	—	—	—	—	—	—	—	—	—	—	139	139
STH	-118	-90	-203	—	—	458	422	691	432	-518	-858	216
STP	-898	-1031	-1228	-1668	-1950	-1902	-1485	-2178	-2700	-3027	-2505	-20572
ASTCL	—	—	—	—	—	—	-10	1	1	-112	-115	-236
ATCL	—	38	50	29	2	-32	-205	-66	-51	-114	-18	-367
CTCL	—	16	63	92	—	3015	-152	-46	0	-200	-176	2611
CRCL	-141	60	-27	236	17	4	-281	-115	-147	-251	-186	-831
DCTCL	—	—	—	—	—	-5	-28	-5	8	-107	-56	-192
JTCL	—	—	-3	2	—	-20	-172	-4	7	-8	-35	-233
KDTCL	—	—	—	-46	—	—	—	-73	-46	33	-27	-159
KBTCCL	16	61	3	8	3	-59	-205	-94	-193	-337	-69	-866
MPTCL	—	—	361	—	1	-132	-238	-162	-159	-202	-87	-617
NTCL	—	—	—	—	8	-22	-42	-80	-148	-332	-236	-852



Table 1 (Contd.)

Name of STU	Buses on road (No.)	Fleet utilisation (%)	Capital (Rs. cr.)	Workers (Nos.)	Tax (Rs. lakh)	Pass. Km (in lakh)	Tot. Cost (Rs. lakh)
<b>Corporations</b>	<b>URBAN</b>						
Calcutta STC	914	77	143	13519	34	28922	7394.38
Delhi TC	3750	85.7	157	40904	287	189869	35001.59
<b>Municipal Undertakings</b>							
Ahmedabad MTS	612	82.3	52	6350	82	18840	4436.32
BEST Undertakings	2548	89.9	229	33520	904	96423	27794.1
Kolhapur MTU	83	83.8	6	1068	33	3418	623.2
Pimpri Chinchwad MT	137	49.6	2.81	2100	87	5746	1011.18
Pune MT	527	90.1	—	5534	159	16368	4348.78
Solapur MTU	94	89.5	5	943	16	—	329.07
Thane MT	60	84.5	11	757	51	1926	457.12
<b>Companies</b>							

Table 3 (Contd.)

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	Total
PRCL	11	10	6	25	46	-217	-247	-149	-162	-141	37	-781
PATCL	-172	-145	-151	22	17	58	-244	1	1	-199	-259	-1072
RMTCL	—	—	—	—	—	—	-146	6	—	-226	-20	-386
TPTCL	-142	48	103	143	40	65	4	9	13	15	-23	275
TTCL	-277	-82	1	43	-61	-20	-214	-257	96	-80	-72	-923
HRTC	-443	-377	-419	—	—	—	—	-1476	-1764	-1500	-2669	-8648
J & KSRTC	—	—	—	—	—	—	-696	—	-1122	—	-2229	-4047
MSRTC	-84	-131	-130	—	—	-44	-1	-58	-7	-93	-128	-676
MTC	—	—	—	—	—	—	—	-280	—	-169	-171	-620
TRTC	—	—	—	-149	-109	—	-219	-268	-247	-239	-286	-1516
MST	—	—	-88	69	51	57	—	—	—	-153	-114	-178
NST	—	—	—	—	213	204	-269	—	-295	-632	-695	-1474
SNT	—	—	—	—	—	—	—	33	—	-147	-95	-209
CSTC	117	—	-2320	-2754	—	-3227	-2418	-2402	-3249	-3628	-4116	-23997
DTC	-5577	-7315	-10106	-14226	-17692	-16376	-7930	-9958	-11985	-16754	-20270	-138189
AMTS	-227	-281	-371	-501	-523	-346	-674	-686	-709	-874	-803	-5941
BESTU	-1626	-1462	-2262	-2172	-2189	-2654	-3589	-4237	-4844	-4885	-3856	-33776
KMTU	-11	-2	-23	—	—	-48	-27	-19	-16	-11	4	-153
PCMT	-48	-40	-59	-61	-77	-54	-26	-39	-40	-59	-9	-512
PMT	-81	-122	-121	-35	0	20	62	-212	-251	-278	-452	-1470
SMTU	3	25	-14	-2	-30	186	5	—	—	-1	135	307
TMT	—	—	—	—	—	—	—	—	-44	-22	94	28
CTU	—	—	—	—	—	—	—	—	-558	—	—	-558
PTCL	-913	-778	-340	-708	-279	-490	-565	-297	-1561	-1544	-839	-8315
TOTAL	-17148	-23103	-27614	-36099	-34864	-34218	-29542	-42069	-55560	-56850	-64822	-421889

Source: CIRT (various years)

Table 4: Expenditure in Terms of a Rupee

## Comparative study of STUs and Railways

Year :	1990-91 :	STUs
	100 Paise	— 39 Ps. Personal Cost
		— 19 Ps. Fuel & Lubricating Oil
		— 12 Ps. Spare Pats, Tyres & Tubes
		— 10 Ps. Taxes
		— 6 Ps. Interest
		— 5 Ps. Other Expenses
		— 9 Ps. Depreciation.
Year :	1989-90 :	Railways
	100 Paise	— 41.7 Ps. Staff Wages & PF
		— 13.4 Ps. Fuel Charges
		— 8.9 Ps. Stores
		— 7.3 Ps. Dividend
		— 2 Ps. Development Works
		— 11.2 Ps. Misc. Working Expenses
		— 15.5 Ps. Depreciation Reserve Fund

Source: Economic Times, 11-6-1992.

A comparative expenditure chart worked out for Railways and STUs in terms of a rupee, reveals that there are glaring differences in expenditure pattern in these two public transport modes (table 4). STUs spent 39 paise for meeting the wage cost whereas it is as high as 42 paise in Railways. Taxes and interest together form 16 paise in STUs whereas in Railways total dividend comprises only 7.3 paise. It indicates that the social burden works out to be higher on STUs than on Railways.

## Growth Rate Analysis of Financial Performance

In 14 STUs (Assam, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Kerala, Manipur, Mizoram, Nagaland, Rajasthan, Sikkim, Tamil Nadu, Tripura, and Uttar Pradesh) out of a total of 28, the growth rate of operating expenditure exceeded that of operating revenue (table 5). In the case of an overwhelmingly large number of STUs, the growth rate in operating revenue far exceeded that in taxes. This implies that the increasing incidence of tax is not the major reason for the financial losses incurred by majority of the STUs.



**Table 5: Some Select Growth Rates (Percent/Annum) (1985-86 to 1990-91)**

States	Operating Revenue	Operating Expend.	Operating Surplus	Gross Profit	Depreciation R.F.	Taxes	Interest	Net Profit/Loss	Term Loan Repayments	Contribution to the Plan
Andhra Pradesh	14.85	14.73	15.14	14.06	20.07	11.20	8.52	6.01	22.78	16.07
Arunachal Pradesh	16.41	14.69	9.21	9.21	—	—	—	9.21	—	9.21
Assam	5.82	9.66	31.04	28.90	11.59	3.89	18.73	20.27	23.73	23.23
Bihar	6.91	12.23	22.44	25.79	7.31	-0.56	17.26	17.01	21.81	17.09
Goa (Kadamba)	12.84	9.24	30.26	30.20	3.05	10.15	30.77	—	-3.13	—
Gujarat	11.09	10.23	13.51	14.92	1.18	10.90	11.99	-1.12	—	5.54
Haryana	8.46	9.84	6.72	7.00	12.26	8.14	7.72	—	—	-5.22
Himachal Pradesh	6.37	11.16	—	—	5.74	18.75	13.16	34.21	17.60	45.86
Jammu & Kashmir	6.89	7.46	24.12	31.18	1.19	-5.57	12.52	7.05	1.46	7.49
Karnataka	13.01	10.36	17.48	23.56	13.73	19.03	15.68	—	19.16	142.95
Kerala	9.19	10.16	-31.18	—	6.24	-5.39	9.29	7.93	25.24	12.26
Madhya Pradesh	10.37	7.78	18.52	19.64	6.92	5.65	9.52	—	-1.04	—
Maharashtra	12.99	11.67	15.94	16.94	20.97	12.72	21.85	14.74	12.57	50.88
Manipur	4.33	7.36	12.61	7.97	-0.83	16.50	4.64	5.19	-25.40	-0.24
Meghalaya	11.14	10.97	10.37	—	16.23	53.34	15.44	1.05	—	-10.25
Mizoram	16.26	17.33	18.10	20.26	15.17	—	—	18.86	—	20.26
Nagaland	4.49	10.89	18.71	18.75	—	16.50	—	20.43	—	18.66
Orissa	6.79	1.66	—	—	6.22	7.39	2.12	-14.50	32.82	-10.10
Punjab Roadways	10.37	8.71	19.33	17.28	4.88	10.70	1.03	4.82	—	4.80
PEPSU RTC	10.90	7.09	34.85	40.85	8.15	11.20	10.42	2.74	—	-1.59
Rajasthan	8.07	11.14	0.94	2.39	10.53	6.13	12.70	—	18.42	—
Sikkim	11.96	12.91	38.64	45.53	—	28.49	—	67.30	—	52.05
Tamil Nadu	11.35	13.50	5.16	3.34	10.69	5.48	11.72	—	28.82	—
Tripura	11.33	14.31	18.56	24.53	7.72	0.00	5.17	18.68	63.35	27.55
Uttar Pradesh	11.76	10.98	14.06	13.80	15.34	12.17	7.47	7.40	20.58	4.25
Calcutta STC	13.16	9.14	4.73	-17.32	2.82	0.50	7.86	1.15	2.77	-5.16
North Bengal STC	31.72	18.52	-23.90	—	20.50	22.22	3.11	-15.80	-7.40	—
South Bengal STC	24.34	15.53	-10.21	—	17.76	6.99	12.25	6.44	3.48	—
Total	11.86	11.58	12.66	12.87	13.78	10.49	12.09	8.53	22.77	-5.81

Source: Computed from Planning Commission (1991)

**Physical Performance**

Since profitability cannot be taken as a criteria for evaluating performance of STUs we are considering only physical performance in the ongoing analysis. Physical performance of STU depends largely on vehicle productivity, which in turn depends on the age of the fleet. The norms adopted by different STUs for vehicle retirement are not uniform. While some retire after they have covered the targeted distance, others adopt age criteria for replacement. There is no uniformity even in the norm of stipulated distance which varies widely from 1.35 lakh kms to 8 lakh kms (table 6).

**Operational Performance Aspects**

The all India average of fleet utilisation which was 84 percent in 1984-85 gradually improved to reach a respectable 90 percent in 1989-90. While fleet utilisation is an efficiency indicator showing the proportion of vehicles put on road to the fleet held, vehicle productivity indicates average number of revenue earning kms. performed by a bus per day. In fact, without achieving a reasonable level of vehicle productivity, no STU can become financially viable. Table 7 gives vehicle productivity and fleet utilisation along with their ranking positions in respect of selected undertakings. An effective method for judging

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1986-87	7.23	1.67	8.90
1987-88	7.75	1.85	9.60
1988-89	8.66	1.93	10.59
1989-90	10.82	2.18	13.00
1990-91	12.34	2.08	14.42

Source: NPC (1992 a).

It has been found that the overall performance among the mofussil category of STUs are relatively better compared to hilly and urban STUs.

**Productivity Analysis**

Since STUs are operating in passenger transport sector, the output from the operations can be considered in terms of passenger kilometres (PKMS) as the result of the combined use of inputs such as labour (L), capital (K) and fuel (F). In a generalised form the functional relationships among these variables can be put as:

$$PKMS = f(L, K, F) \quad (1)$$

**Labour Productivity Ratios**

Labour Productivity is defined as a ratio of output (Passenger kilometres) to the number of persons employed in an STU. It has been found that the overall performance among the mofussil category of STUs are relatively better compared to hilly and urban STUs (table 12). Among mofussil STUs, Companies are having a distinctive edge over Corporations and Government depart-



Table 6: Norms adopted for declaring a Bus as an Overaged

Undertakings	In Kms (In Lakhs)	In Years
Andhra Pradesh	8.00	7.00
Arunachal Pradesh	1.35	7.00
Assam	5.50	8.00
Bihar	5.00	8.00
Goa (Kadamba)	6.00	7.00
Gujarat	6.00	—
Haryana	6.00	8.00
Himachal Pradesh	5.00	—
Jammu & Kashmir	5.00	10.00
Karnataka	7.50	10.00
Kerala	—	7.00
Madhya Pradesh	—	10.00
Maharashtra	—	—

Table 7: Vehicle Productivity and Fleet Utilisation (1989-90 Actuals)

Name of the STU	Vehicle Productivity		Fleet Utilisation	
	Kms per bus per day	Rank	% age of buses on road to the fleet owned	Rank
Tamil Nadu	330	1	93	4
Haryana	304	2	95	3
Andhra Pradesh	296	3	97	1
Gujarat	273	4	87	9
Punjab Roadways	251	5	96	2
Rajasthan	250	6	89	6
Karnataka	249	7	89	6
Maharashtra	248	8	87	9
PEPSU RTC	244	9	86	11

Table 12: Labour Productivity Ratios in STUs (Lakhs of Passenger Kms/Employee)

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
APSRTC	3.49	3.89	4.12	4.38	4.78	4.93	5.08	5.25	5.42	4.88	5.08
ASTC	2.82	2.32	2.32	1.94	2.41	2.43	2.43	2.21	2.16	2.11	2.12
BSRTC	—	1.79	—	1.53	1.47	1.57	1.78	2.04	—	—	1.21
GSRTC	4.89	4.94	5.33	5.63	5.61	6.27	5.85	5.95	6.23	5.81	5.77
KASRTC	4.88	5.61	5.58	5.92	5.75	5.16	5.60	5.93	5.95	5.91	6.14
KESRTC	3.38	3.23	3.27	3.53	0.32	3.63	4.14	4.38	4.48	4.37	4.68
MPSRTC	3.57	3.70	3.35	0.61	—	3.08	3.57	3.91	4.05	4.06	3.49
MHSRTC	3.75	3.50	3.73	3.63	4.58	4.68	4.78	4.99	4.95	4.57	4.61
NBSTC	1.69	1.71	—	1.44	—	—	—	—	—	—	4.18
DSRTC	3.50	2.96	3.59	3.61	—	3.09	3.56	3.52	3.93	3.62	3.22
PEPSURTC	5.97	6.41	5.91	5.82	6.21	—	5.75	6.06	5.77	6.16	—
RSRTC	4.01	4.34	4.74	4.96	4.65	4.64	5.11	4.84	4.89	4.15	5.05
SBSTC	1.97	1.81	1.71	—	1.93	1.71	1.84	2.58	2.73	2.59	2.68
UPSRTC	3.26	—	3.21	2.95	—	3.78	3.59	3.84	3.97	3.90	4.24
A & NST	—	—	—	—	—	—	—	—	1.26	1.38	3.29
STH	7.51	7.14	0.78	—	—	8.57	8.93	8.18	8.03	—	—
STP	6.25	6.90	7.09	6.43	6.77	6.25	6.52	6.50	7.09	5.82	6.16
ASTCL	—	—	—	—	—	—	7.28	8.20	8.48	8.70	12.56
ATCL	—	0.00	5.50	5.07	5.67	5.47	7.64	7.77	7.48	7.85	7.83
CTCL	—	6.76	7.01	6.96	7.03	6.22	6.32	6.53	6.68	7.27	7.23
CRCL	—	—	—	7.72	8.02	7.46	6.78	7.68	7.57	7.76	7.98
DCTCL	—	—	—	—	—	8.04	7.44	8.05	8.35	9.11	9.47
JTCL	—	—	7.01	6.72	6.74	6.90	6.78	7.77	7.80	8.37	8.00
KDTCL	—	4.55	—	4.05	—	—	—	6.80	4.42	3.97	3.88
KBTCL	5.62	6.63	6.62	7.97	7.70	6.79	6.95	6.92	7.13	7.17	7.70
MPTCL	—	—	8.17	7.60	8.10	7.25	7.24	7.54	7.70	8.36	8.72
NTCL	—	—	6.46	6.83	7.25	7.44	7.35	6.98	7.32	7.92	8.17
PRCL	5.82	6.75	10.28	7.65	7.69	7.14	7.17	7.77	7.31	7.92	7.07
PATCL	—	5.61	5.26	7.86	7.98	8.16	8.42	8.33	9.05	8.94	8.74
RMTCL	—	—	—	—	—	—	—	5.15	—	8.87	8.74
TPTCL	6.56	7.85	8.38	8.99	9.40	9.87	8.95	9.09	8.81	9.22	8.86
TTCL	6.05	6.42	6.51	7.44	6.52	8.05	7.32	7.93	8.28	8.44	7.59
HRTC	4.47	4.09	3.92	—	—	—	—	13.19	3.62	3.54	4.25
J & KSRTC	—	—	—	—	—	—	2.03	2.52	—	—	—
MSRTC	0.63	0.51	0.38	—	—	1.17	1.00	0.97	0.74	0.59	—
MTC	—	—	—	—	—	—	—	1.90	—	1.82	2.16
TRTC	—	—	—	1.57	1.82	—	1.99	1.94	1.93	1.67	1.20
MST	—	—	0.67	1.03	—	0.90	0.96	0.80	0.56	0.60	—
NST	—	—	0.03	3.82	3.76	1.41	1.49	1.38	1.27	—	—
SNT	—	—	—	—	—	—	—	0.36	0.36	—	—
CSTC	1.67	1.77	1.94	1.83	5.50	1.50	1.71	1.93	—	—	—
DTC	5.25	5.03	4.90	5.59	5.10	5.77	6.31	4.49	4.94	4.62	—
AMTS	2.74	2.78	2.00	2.08	1.88	1.92	2.19	2.06	2.18	2.24	—
BESTU	3.17	2.82	2.98	3.28	4.08	4.41	3.44	3.71	2.86	3.05	—
KMTU	—	—	3.16	—	—	3.30	3.85	3.68	3.28	3.65	—



**Table 12** (Contd.)

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
PCMT	—	5.23	4.06	3.72	3.61	3.87	3.66	2.90	2.38	3.00	—
PMT	2.23	—	2.64	2.45	2.87	3.00	3.15	3.23	3.36	2.84	—
SMTU	—	—	7.40	6.60	4.79	—	—	—	2.83	5.06	—
TMT	—	—	—	—	—	—	—	1.48	1.11	2.98	—
CTU	—	—	—	—	—	—	—	—	5.45	—	—
PTCL	4.50	—	4.12	4.47	4.45	4.62	4.60	5.19	4.86	5.10	—
All India	4.06	4.38	4.44	4.69	5.14	4.88	4.89	4.99	4.87	5.12	5.82

Source : Estimated from CIRT (various years)

ments. It clearly indicates that the major factor controlling the level of productivity is the style of management which acts as a catalyst for improving labour productivity in Company STUs. Most of the urban STUs which are operating in city environment show lower labour productivity than others. The efficiency in overall operation is considerably lower among the STUs which are operating in the cities mainly due to higher bus/man ratio.

### Capital Productivity Ratios

Capital is the most difficult of the inputs to measure both quantitatively and qualitatively especially in road transport sector. There is a problem of choice between gross capital stock and net capital stock in empirical analysis. On the theoretical plane, the net capital stock is preferred in productivity analysis for the reason that it reflects the true capital consumption due to the use of capital stock in the production process (Subrahmanian & Anandraj, 1992). The capital stock series at constant prices is generated here through the Perpetual Inventory Method (PIM) based on gross fixed assets and deprecia-

tion/discarding rate following the method developed by Christenson & Jorgenson (1969) for the measurement of U.S. real capital input.

**Urban STUs again exhibited low productivity levels compared to mofussil and hilly STUs.**

Capital Productivity is estimated in terms of capital required for producing a unit output i.e. passenger kilometres. The performance of the mofussil STUs are higher than others (table 13). Most of the STUs operating in Tamil Nadu revealed higher rates of performance as compared to others. Those STUs which exhibited higher labour productivity are again on the top with higher capital productivity as well. Urban STUs again exhibited low productivity levels compared to mofussil and hilly STUs, but marginal improvements occurred compared to labour productivity.

**Table 13:** Capital Productivity Ratios of STUs (Lakhs of Passenger Kms/Rs. lakhs of Capital at 80-81 Prices)

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
APSRTC	7.42	4.59	3.48	2.98	2.87	2.91	2.99	2.94	3.51	2.86	2.71
ASTC	7.65	3.54	2.62	2.00	1.44	1.07	1.00	0.89	0.91	0.81	0.73
GSRTC	8.38	4.54	3.33	2.66	2.18	2.69	2.39	2.51	2.71	2.41	2.27
KASRTC	9.46	6.24	4.27	3.42	2.93	2.63	2.81	2.74	3.04	2.67	2.50
KESRTC	16.54	9.55	6.71	5.21	0.42	4.95	4.86	5.60	4.63	3.80	3.48
MPSRTC	—	9.31	4.50	0.56	—	2.47	2.29	2.23	2.75	3.02	—
MHSRTC	20.22	11.76	9.38	7.36	5.26	4.09	3.49	3.25	4.11	3.04	2.65
NBSTC	18.06	10.66	—	1.39	—	—	—	—	—	—	2.78
OSRTC	6.75	2.71	2.53	2.04	—	1.75	1.80	1.61	1.61	2.03	1.91
PEPSURTC	10.72	6.69	4.45	3.47	3.08	—	2.74	2.46	2.77	2.61	—
RSRTC	7.61	4.61	3.55	3.45	3.11	3.05	3.13	2.89	3.21	2.36	0.26
SBSTC	—	1.63	0.75	—	0.67	0.60	0.64	0.87	1.08	1.76	—



Table 13 (Contd.)

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
UPSRTC	7.15	4.32	2.84	2.03	—	2.33	1.94	1.86	2.34	2.26	2.42
STH	—	13.65	0.75	—	—	12.66	14.72	9.67	9.41	—	—
STP	19.24	12.95	9.52	9.54	11.37	8.42	7.21	6.50	8.02	5.81	5.69
ASTCL	—	—	—	—	—	—	50.66	29.44	50.53	26.99	26.27
ATCL	—	—	18.51	12.84	11.51	10.07	8.79	8.91	11.08	11.05	10.36
CTCL	—	41.75	19.19	14.72	12.05	9.22	8.18	7.99	9.63	11.13	10.46
CRCL	—	—	—	11.38	6.91	7.02	6.82	7.72	8.25	8.41	8.31
DCTCL	—	—	—	—	—	44.46	25.42	21.02	31.67	22.50	17.10
JTCL	—	—	62.57	26.40	20.39	15.38	14.26	15.48	18.27	16.29	13.89
KDTCL	—	12.55	—	6.26	—	—	—	9.76	6.12	3.84	2.95
KBTCL	19.74	16.64	8.70	8.73	8.88	8.14	7.87	8.53	9.77	9.59	10.78
MPTCL	—	—	51.42	25.44	18.41	15.83	15.24	14.81	18.18	17.21	15.14
NTCL	—	—	50.16	27.92	18.04	14.91	13.61	10.28	15.50	14.84	13.95
PRCL	22.76	16.95	15.95	10.36	10.12	6.15	6.52	7.51	8.46	9.27	8.69
PATCL	—	10.69	7.78	9.03	8.64	9.23	9.67	9.41	11.56	11.11	10.43
RMTCL	—	—	—	—	—	—	—	33.90	—	—	55.81
TPTCL	11.77	10.39	8.87	9.18	9.55	9.84	9.63	9.67	10.90	10.58	9.51
TTCL	8.29	7.05	6.26	5.96	5.68	6.41	6.29	7.03	8.17	8.09	7.22
HRTC	—	6.13	6.07	—	—	—	—	43.24	11.30	3.45	4.47
TRTC	—	—	—	—	—	—	2.28	1.51	3.67	1.74	0.88
SNT	—	—	—	—	—	—	—	0.33	—	—	—
CSTC	—	—	1.97	0.93	0.83	0.93	1.14	0.94	0.96	0.87	—
DTC	4.46	2.66	1.91	1.59	1.14	1.38	1.45	1.12	1.24	1.19	—
AMTS	6.96	3.93	2.53	2.04	1.64	1.69	1.81	1.43	1.48	1.28	—
BESTU	7.88	3.90	3.16	2.76	2.97	2.89	2.11	2.06	1.76	1.71	—
KMTU	24.44	—	11.36	—	—	12.41	9.76	8.74	5.39	3.85	—
PCMT	—	33.43	7.32	7.97	6.81	5.40	9.35	7.07	5.86	7.22	—
PMT	—	—	5.17	3.20	4.17	5.27	6.74	8.37	4.85	4.76	—
SMTU	—	—	10.23	6.31	3.59	—	—	—	2.59	3.93	—
TMT	—	—	—	—	—	—	—	3.99	2.23	2.50	—
PTCL	25.12	—	11.30	10.58	9.70	9.42	8	8.60	9.29	10.65	—
All India	12.79	10.11	10.86	7.57	6.70	7.44	7.72	7	7.97	6.65	9.06

Source: Estimated from CIRT (various years)

### Fuel Productivity Ratios

Fuel Productivity can be perceived as the ratio of output and fuel input. Considerable improvement in fuel productivity has been observed during the last ten years. Most of the STUs exhibited considerable fuel productivity improvements over the years. In 1991-92 the highest fuel productivity is observed in the case of Anna Sathya Transport Corporation and the lowest is found in Rajasthan State Road Transport Corporation (table 14). The increase in fuel efficiency is a reflection largely of improvements in vehicle maintenance, engine technology, quality of roads, and the introduction of aerodynamic body

designs, radial tyres, multi axle vehicles etc. (NPC, 1992 a & GOI 1993).

### Total Factor Productivity Growth

Total Factor Productivity Growth Rates (TFPG) have been worked out for the last ten years wherever all the required data are available. For the estimation of TFPGI we have followed the method as detailed out below:

$$TFPG = \dot{Y} - \dot{X} \quad (2)$$

where  $\dot{Y}$  = Growth rate of Passenger kilometres

$\dot{X}$  = Growth rate of total input



**Table 14: Fuel Productivity ratios of STUs (Lakhs of Passenger Kms/K. Litre HSD)**

Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
APSRTC	1.51	1.72	1.85	1.88	1.93	1.98	2.00	2.01	2.05	2.00	1.98
ASTC	1.83	—	1.57	—	1.62	1.53	1.45	1.38	1.38	1.38	1.41
BSRTC	1.37	1.30	—	1.24	1.31	1.27	1.31	1.24	0.00	1.37	1.18
GSRTC	1.94	1.96	2.05	2.02	1.97	2.12	—	1.97	2.06	2.02	1.96
KASRTC	1.54	1.66	1.61	1.66	1.66	1.60	1.67	1.74	1.80	1.80	1.87
KESRTC	1.72	1.73	1.61	1.70	0.16	1.71	1.73	1.70	1.65	1.71	1.78
MPSRTC	1.50	—	—	0.20	0.00	1.32	1.44	1.51	1.64	1.75	1.51
MHSRTC	1.54	1.49	1.60	1.53	1.72	1.77	1.83	1.81	1.82	1.78	1.76
NBSTC	1.13	1.11	—	—	—	—	—	—	—	—	1.41
OSRTC	1.45	—	—	1.50	—	1.31	1.37	1.37	1.48	1.40	1.35
PEPSURTC	1.52	1.71	1.63	1.73	1.73	—	1.57	1.59	—	1.59	—
RSRTC	1.54	1.57	1.74	1.80	1.70	1.71	1.75	1.74	1.81	1.96	0.18
SBSTC	1.13	1.16	1.06	—	0.98	0.86	—	0.89	1.16	1.03	1.02
UPSRTC	1.59	1.57	1.48	1.37	—	1.68	1.48	1.55	1.58	1.64	1.72
A&NST	—	—	—	—	—	—	—	—	0.77	0.97	2.02
STH	1.64	—	—	—	—	1.73	1.75	1.67	1.71	—	—
STP	1.48	1.66	1.63	1.67	1.66	1.59	1.53	1.56	1.58	1.44	1.47
ASTCL	—	—	—	—	—	—	1.82	1.90	1.91	2.12	3.09
ATCL	—	—	1.37	1.38	1.36	1.32	1.80	1.76	1.81	2.34	2.00
CTCL	—	1.64	1.76	1.85	1.80	1.60	1.59	1.59	1.63	1.71	1.83
CRCL	—	—	0.00	1.93	1.88	1.46	1.77	1.71	1.77	2.03	2.09
DCTCL	—	—	—	—	—	1.77	1.90	1.71	1.76	1.96	2.09
JTCL	—	—	1.68	—	1.65	1.54	1.67	1.83	1.72	1.92	1.92
KDTCL	—	1.48	—	—	—	—	—	—	1.36	1.32	1.28
KBTCL	1.51	1.67	1.67	1.84	1.87	1.77	—	1.73	1.72	1.84	1.85
MPTCL	—	—	1.88	1.89	1.86	1.79	1.90	1.80	1.75	1.99	2.12
NTCL	—	—	1.84	1.95	1.88	1.86	1.79	1.77	1.86	2.07	2.19
PRCL	1.51	1.60	2.49	2.04	1.95	1.98	1.86	1.96	1.98	2.25	2.12
PATCL	—	1.44	1.40	1.88	1.90	1.89	1.86	1.84	2.07	2.17	2.19
RMTCL	—	—	—	—	—	—	—	1.71	—	1.99	—
TPTCL	1.51	1.69	1.83	1.98	1.93	2.02	1.97	2.00	1.89	2.06	2.18
TTCL	1.33	1.42	1.45	1.46	1.42	1.48	1.44	1.55	—	0.17	1.60
HRTC	1.23	1.18	—	—	—	—	—	3.74	—	1.09	1.04
J&KSRTC	—	—	—	—	—	—	—	1.53	—	—	—
MSRTC	—	—	0.80	—	—	1.04	1.06	1.18	1.16	1.12	—
MTC	—	—	—	—	—	—	—	1.20	—	0.91	1.10
TRTC	—	—	—	—	—	—	1.36	1.37	1.35	1.29	1.11
MST	—	—	0.56	0.71	0.78	0.82	0.93	0.91	0.77	0.81	—
NST	—	—	0.02	2.51	2.77	0.99	0.99	0.97	0.87	—	—
SNT	—	—	—	—	—	—	—	0.46	0.40	—	—
CSTC	1.43	0.23	—	1.72	—	1.36	1.46	1.44	1.43	1.45	—
DTC	2.12	12.88	2.04	2.35	1.99	2.23	2.50	2.07	2.24	2.31	—
AMTS	1.38	1.34	1.25	1.26	1.35	1.18	1.26	1.18	1.26	1.40	—
BESTU	1.62	1.45	1.50	1.66	2.01	2.05	1.65	1.74	1.63	2.38	—
KMTU	1.66	—	—	—	—	1.73	1.83	—	1.84	1.77	—
PCMT	0.00	2.13	1.90	—	1.31	1.30	1.34	1.22	0.96	1.18	—
PMT	1.17	—	1.30	5.34	1.31	1.34	1.38	1.34	1.46	1.26	—
SMTU	—	—	2.94	—	1.93	—	—	—	1.32	2.52	—



Years	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
TMT	—	—	—	—	—	—	—	—	1.23	1.43	—
CTU	—	—	—	—	—	—	—	—	1.41	—	—
PTCL	2.04	—	1.76	1.91	1.91	1.94	1.89	1.88	1.92	2.03	—
All India	1.53	1.95	1.59	1.80	1.65	1.59	1.62	1.61	1.56	1.66	1.70

Source: Estimated from CIRT (various years)

**Table 15:** Total Factor Productivity Growth (Translog) ratios of STUs (Percentages)

Years	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92
APSRTC	-2.97	-1.74	-0.93	-0.04	0.19	0.26	-0.04	1.27	-1.61	-0.26
ASTC	—	—	—	—	-2.51	-0.57	-1.10	0.10	-0.92	-0.79
GSRTC	-4.62	-2.19	-1.60	-1.52	1.40	—	—	0.66	-0.96	-0.41
KASRTC	-2.54	-2.71	-1.43	-1.15	-1.00	0.65	0.04	0.74	-0.85	-0.29
KESRTC	-2.93	-1.89	-1.03	-24.56	24.14	0.65	0.63	-0.47	-1.15	-0.22
MPSRTC	—	—	—	—	—	-0.24	-0.10	1.67	0.53	—
MHSRTC	-2.75	-0.59	-1.23	-0.98	-1.61	-1.01	-0.37	1.40	-2.14	-0.86
NBSTC	-2.05	—	—	—	—	—	—	—	—	—
OSRTC	—	—	—	—	—	—	-0.75	—	—	—
PEPSURTC	—	—	—	—	—	—	-0.59	—	—	—
RSRTC	—	—	—	—	—	—	-0.61	—	—	—
UPSRTC	—	—	—	—	—	—	-0.14	—	—	—
STH	—	—	—	—	—	—	-1.72	—	—	—
STP	—	—	—	—	—	—	-0.48	—	—	—
ASTCL	—	—	—	—	—	—	-1.71	—	—	—
ATCL	—	—	—	—	—	—	0.10	—	—	—
CTCL	—	-3.09	-1.06	-1.01	-1.92	-0.53	0.02	0.89	0.87	0.07
CRCL	—	—	—	-2.28	-0.78	0.07	0.80	0.23	0.53	0.17
DCTCL	—	—	—	—	—	-2.39	-0.79	1.75	-0.69	-0.79
JTCL	—	—	—	—	-1.42	-0.14	1.05	0.36	0.21	-0.72
KDTCL	—	—	—	—	—	—	—	—	-3.30	-1.84
KBTCL	0.07	-2.68	0.81	0.02	-0.90	—	—	0.54	0.15	0.56
MPTCL	—	—	-3.11	-1.30	-1.07	0.03	-0.09	0.65	0.56	-0.01
NCTL	—	—	-1.76	-1.68	-0.76	-0.48	-1.41	1.97	0.51	0.12
PRCL	-0.77	2.26	-3.22	-0.20	-2.30	0.09	0.89	-0.20	0.95	-0.87
PATCL	—	-1.67	2.49	-0.14	0.36	0.23	-0.16	1.37	-0.07	-0.28
TPTCL	-0.14	-0.51	0.55	0.23	0.38	-0.45	0.10	0.26	0.26	-0.40
TTCL	-0.69	-0.53	0.13	-0.64	1.24	-0.45	0.91	—	—	5.48
HRTC	—	—	—	—	—	—	—	—	—	1.57
TRTC	—	—	—	—	—	—	-3.40	6.70	-5.80	-5.79
CSTC	—	—	—	—	—	1.19	-0.24	—	—	—
DTC	-3.53	-3.73	-1.40	-3.10	1.68	0.74	-2.84	0.97	-0.42	—
AMTS	-3.86	-3.75	-1.33	-1.61	0.05	0.96	-1.62	0.44	-0.89	—
BESTU	-5.26	-1.23	-0.48	1.23	0.07	-2.85	0.14	-1.81	0.25	—
KMTU	—	—	—	—	—	-0.11	—	—	-2.01	—
PCMT	—	-8.63	—	—	-0.97	1.94	-2.11	-2.02	2.17	—
PMT	—	—	-2.54	-1.42	0.40	0.43	0.08	-1.30	-1.17	—
SMTU	—	—	—	—	—	—	—	—	4.91	—
TMT	—	—	—	—	—	—	—	—	2.36	—
PTCL	—	—	0.33	-0.30	-0.11	-0.44	0.64	-0.02	0.66	—
All India	-2.46	-2.18	-0.94	-2.13	0.67	-0.10	-0.46	0.67	-0.25	-0.28

Source: Estimated CIRT (various years)



Major inputs in STUs have been identified as labour, capital and fuel and the output as passenger kilometres. Therefore, for estimation purpose we consider only three major inputs (labour (L), capital (K) and fuel (F)). The TFPG can be expressed in terms of the weighted (weights being the respective cost shares) indices of the input growth rates. In a discrete series the TFPG according to the translog index can be defined as:

$$\dot{T}FPG = \dot{Y} - (\bar{w}l \dot{L} + \bar{w}k \dot{K} + \bar{w}f \dot{F}) \quad (3)$$

where  $\bar{w}l = \frac{wl1 + wl2}{2}$

$$\bar{w}k = \frac{wk1 + wk2}{2}$$

$$\bar{w}f = \frac{wf1 + wf2}{2}$$

Equation (3) is an index number version of the translog estimation of total factor productivity. From the estimates of TFPG, for various STUs it may be seen that Thiruvalluvar TCL tops the list (table 15). It may also be seen that only a few (six in 1991-92) STUs revealed positive total factor productivity growth rates. Again it is seen that Tamil Nadu Company registration STUs are relatively better.

### Working Environment and Social Objectives

Public sector undertakings in India have been defended for its contribution towards the social and economic development of the country since independence. While the social content bears ample justification, what was apparently lost sight of, was an ongoing concern both on the part of the state and on the part of public enterprises to improve efficiency, ensure higher productivity and avoid wasteful employment (Padam, 1992). STUs are particularly suffering from the dichotomy of competing claims. While social responsibilities were imposed on these undertakings, they were also being subjected to unfavourable comments for accumulated losses (Pathak, 1992).

#### (a) Social Surplus as a criterion of performance

If profitability is taken as a criterion of success, STUs are adversely affected due to a host of factors independent of managerial efficiency such as:

- (i) High rates of motor vehicle and passenger tax often have the effect, even in respect of efficient organizations; of converting profits into losses.
- (ii) Widely adopted practice of charging higher depreciation than what is justified on economic

considerations with a view to showing lower profits in the hope of avoiding payment of tax, resisting claims for increase in wages.

- (iii) Virtual absence of equity capital in most of the STUs. This could justify treating interest as a part of social surplus rather than cost.
- (iv) No freedom for fare fixation, inspite of cost increases due to price hikes of various resources and inputs needed by the undertakings. There is always a gap between the economic fares and actual fare permitted by the state governments.
- (v) Operation on socially obligatory routes and providing fairer concessions as well as free travel facilities to certain classes of travellers. The state expects STUs to cross-subsidize under monopolistic conditions and hope for surpluses in the overall context. In 1991-92 it has been found that STUs incurred Rs. 24123 lakhs as student and other concessions (Table 16).

In so far as taxes are concerned, paradoxically the STUs which are comparatively more efficient pay taxes at higher rates than the STUs which are less efficient; as if a penalty for being efficient (Pathak, 1992). In the predominantly nationalized states average tax is more than double of that in partially nationalized states. For instance, in 1989-90, the average tax burden in such states was Rs. 1.13 lakhs per bus as compared to only Rs. 50 thousand in the case of partially nationalized states. The former category consists of states like Haryana, Maharashtra and Gujarat whereas the latter category consists of remaining states like, M.P., Bihar, Orissa and Kerala.

Opening up of the rural interior and bringing the latter into the national mainstream is an outstanding contribution made by the STUs. The benefits of various improvements and modifications brought about by vehicle manufacturers and component manufacturers, at the instance of STUs and as a result of constant interaction between STUs and manufacturers could certainly be considered as an external benefit from the STU network which accrued to the society at large. The large number of vendors developed by STUs and regular monitoring of the quality of components and assemblies being effectively done through the instrumentality of Association of Road Transport Undertakings (ASRTU) and Central Institute of Road Transport (CIRT) have meant that private operators too get access to a large number of vendors of quality products. This helped in developing a level playing field for all the players in the transport sector.



**Table 16: Student and other Concessions** (Rs. lakhs)

STUs	1990-91	% Share	1991-92	% Share
Assam STC	40	0.18	—	21.41
Gujarat SRTC	3629	16.68	5164	21.41
Karnataka SRTC	7011	32.23	7272	30.15
Kerala SRTC	709	3.26	2000	8.29
Maharashtra SRTC	2636	12.12	346	1.44
North Bengal STC	25	0.11	29	0.12
Orissa SRTC	122	0.57	259	1.08
Rajasthan SRTC	800	3.68	1000	4.15
ST Haryana	1500	6.90	1900	7.88
ST Punjab	—	—	14	0.06
Anni Sathya TCL	124	0.57	130	0.54
Anna TCL	14	0.07	19	0.08
Cheran TCL	402	1.85	958	3.97
Cholan Roadways CL	11	0.05	32	0.14
Dheeran Chinnamalai TCL	183	0.84	199	0.83
Jeeva TCL	118	0.54	152	0.63
Kattabomman TCL	123	0.57	—	—
Marudhu Pandiyar TCL	6	0.03	44	0.19
Nesamony TCL	134	0.62	—	—
Pattukkottai Azhagiri TCL	161	0.74	199	0.83
Thanthai Periyar TCL	260	1.20	296.9	1.23
Thiruvalluvar TCL				
Himachal RTC	450	2.07	—	—
Manipur SRTC	0	0.00	0	0.00
Tripura RTC	6	0.03	4	0.02
Calcutta STC	85	0.39	97	0.40
Delhi TC	2100	9.65	2300	9.53
Ahmedabad MTS	118	0.54	—	—
BEST Undertakings	140	0.64	164	0.68
Kolhapur MTU	12	0.06	17	0.07
Pimpri Chinchwad MT	11	0.05	15	0.06
Thane MT	2	0.01	7	0.03
Pallavan TCL	809	3.72	1497	6.21
Total	21750	100.00	24123	100.00

Source: Performance Statistics of STUs, CIRT, 1993

In order to improve the performance of public sector undertakings, privatisation has emerged as a major public policy issue in the eighties in many parts of the world. Usually privatisation is perceived as (1) sale of all or some of the assets of public enterprises or other public entities (2) the leasing of such assets (3) the transfer of the management of such public entities (without transfer of ownership) to the private sector (Paul, 1988).

Programmes of privatisation are under way in several western countries such as the UK, US, Canada, France

and Italy. It was the return of a conservative government in 1979 that led to the emergence of a significant privatisation programme in the U.K. In the US, the growth of privatisation has been predominantly in the area of "contracting out" of public services. Among others, public transportation was also contracted out by many state and local governments. After a careful review of the performance of the privatised enterprises in UK Yarrow's (1986) conclusion is that there is no hard evidence to support the claim that improved financial performance reflects efficiency gains in all cases. On the other hand, the evidence from the US on contracting out claimed that private provision of services on the whole was more cost effective than their public counterparts.

In the post 1980 period when several LDCs, facing severe economic crises, designed policies and programmes for privatisation. A recent survey of such programmes in 28 LDCs shows that of their 3975 public enterprises, 35 were liquidated, 102 were closed, 85 were sold and 45 were leased or their management contracted out (Berg & Shirley, 1987). Compared to the privatisation programmes in UK and US, the LDC efforts seemed to have been quite modest in scale. The pace of progress has been slow. Liquidation and closures of firms rather than divestiture seemed to be the preferred policy in LDCs (Paul, 1988).

In Jamaica it is found that the World Bank assisted scheme which has started in 1986 initially improved the service of passenger transport. Due to the involvement of multiple package holders and vehicle owners, the variety of bus types continued making the spare parts availability difficult. Further, nobody was large enough to invest in maintenance facilities while at the same time the existing maintenance facilities deteriorated rapidly due to non use. This has resulted in deteriorating bus conditions and service (Manikutty & Raghuram, 1992). Other operational ill effects observed in Jamaica are (1) short circuiting of routes (2) overtaking each other (3) buses not plying during late evenings, (4) stopping at any point etc. Towards the end of 1989 further consultants were brought in to study the current system. There were also political mummbling suggesting a move to nationalise all the routes from 1990 onwards.

In Sri Lanka state monopoly of the government sector was abolished in April 1979. A survey conducted in 1985 revealed that only 15 percent of the private bus fleet was new at the time of introduction into service and 49 percent of the buses were medium sized and small. Low density routes were not touched by private operators. After meeting the high finance charges, which were needed to take



loans for the buses, many had no surplus left for continued investment (Wanasinghe & Wanasinghe, 1991). Thus the privatisation experience in Sri Lanka shows that neither the fare structure, quality of service nor productivity has improved. Competition has helped neither the public nor the private sector.

As in the case of Jamaica and Sri Lanka the quality of service provided by private bus operators in Thailand was low. The mini buses did not run the entire distance of the designated routes, but reduced the distance to achieve better turn around and profits. The buses were over crowded and there were complaints of haphazard driving (Dhiratayakinant, 1991). The privatisation in Thailand has been a series of adhoc decisions rather than a part of a well thought out policy. Still in comparison to Jamaica and Sri Lanka privatisation improved the situation in passenger transport scene (Gouri, 1991).

The country experiences bring forth a notable concept that the pressure of privatisation and nationalisation are essentially cyclical, reflecting a "grass is greener on the other side" syndrome (Manikutty & Raghuram, 1992). The exclusive focus on the sale of public enterprises with the deficit reduction objective in view has meant the neglect of other options which may well be more practiceable in the LDC context. It is imperative, therefore, that intermediate solutions be explored that fit the circumstances of LDCs and help governments at the same time to take positive steps towards solving the problem of public enterprises with poor performance. Contracting out parts of the production and distribution operations of public enterprises to the private sector is found to be one of the alternatives (Berg & Shirley, 1987).

**The exclusive focus on the sale of public enterprises with the deficit reduction objective in view has meant the neglect of other options which may well be more practiceable in the LDC context.**

## Conclusions

There has been considerable pressure on the public undertakings in India to become financially independent mainly due to fiscal and financial constraints. This may also be seen as a general continuum of a global shift towards privatisation. In such an international scenario all public sector undertakings were considered for critical scrutiny for its legitimacy of continuance. It has become

more or less clear that for their survival STUs should improve its productivity and profitability. The shifting of the incidence of inefficiency to the public exchequer will no longer be a feasible alternative.

A detailed analysis of last ten years data pertaining to all the STUs in India reveals that only a handful of them are making profits after paying taxes. The popular grievances among STUs have been undue political interventions in day to day functioning, less freedom for fare fixation, high taxes, and social subsidisation. According to an estimate given by CIRT and ASRTU, STUs in 1991-92 lost Rs. 24123 lakhs on account of social obligations alone. The hidden benefits to the society from the STUs include their contributions towards modernising the passenger road transport sector which in the absence would have remained devoid of required infrastructure, managerial skills and corporate attitudes. As an organised pressure group, STUs could secure from the vehicle manufacturers improved and fuel efficient engines. The fact that a few Corporations showed better performance in labour, capital and total factor productivities amply reveals the scope for emulating their initiatives by others. This indicates that company registration infact instils healthy internal competition which in turn gets reflected in higher levels of productivity and profitability. It should also be clear that the issue of ownership whether public or private, is less important than the managerial system and practices and employee attitudes in the context of rendering the STUs competitive, efficient and financially viable.

**It should also be clear that the issue of ownership whether public or private, is less important than the managerial system and practices and employee attitudes in the context of rendering the STUs competitive, efficient and financially viable.**

## References

- Central Institute of Road Transport (CIRT)**, "Performance Statistics of State Transport Undertakings", Published by CIRT for ASRTU, 1982 through 1993.
- Christensen, L.R. and Jorgenson, D.W.**, "The Measurement of US Real Capital Input, 1929-1967", Review of Income and Wealth, Series 15, Vol. 14, No. 4 December, 1969, p. 293-320.
- Elliot Berg and Mary Shirley**, "Divestiture in Developing Countries", World Bank Discussion Paper No. 11, 1987, p. 25-30.
- Geeta Gouri (Ed)**, Privatisation and Public Enterprises: The Asia Pacific Experience, Oxford University Press, Delhi, 1991.



- Government of India** "A Study on the Performance of STUs", Planning Commission, September 1991.
- Government of India**, "Report of the Working Group on Conservation of Petroleum Products through Improvement in Roads and Traffic Management", New Delhi, 1993.
- Government of India**, "Economic Survey 1992-93", Ministry of Finance, New Delhi 1993.
- Kariyudht Dhiratayakinant**, "Privatisation of the Bangkok Metropolitan Transit Organisation: A case Study", in Geeta Gouri *op. cit.*
- Kendrick, J.W. and Vaccara, B. (eds.)**, "New Development in Productivity Measurement and Analysis", NBER, University of Chicago Press, Chicago, 1980.
- Manikutty, S. and G. Raghuram**, "Privatisation in Road Transport: Lessons from Country Experiences", Indian Institute of Management, Ahmedabad, 1992.
- National Productivity Council**, "Report of the Working Group on Conservation of Petroleum Products in Unorganised segment of the Road Transport Sector", New Delhi, June 16, 1992 a.
- National Productivity Council**, "Theme Paper", and "Background Materials", National Seminar on the Role of State Road Transport Undertakings in the Changing Economic Scenario, National Productivity Council, New Delhi, September 4-5, 1992 b.
- Pathak, M.G.**, "The Myth of STUs loss", Financial Express, February 29, 1992.
- Pathak, M.G.**, "STUs: Taxation Policies and Resource Mobilisation", The Economic Times, June 11, 1992.
- Pillai, G.K.**, "Future of State Transport Undertakings in India", Paper Presented at the National Seminar on the Role of State Road Transport Undertakings in the Changing Economic Scenario, National Productivity Council, New Delhi, September 4-5, 1992.
- Samuel Paul**, "Privatisation, A review of International Experience", Economic and Political Weekly, February, 6, 1988.
- Shelton Wanasinghe and Sydney Wanasinghe**, "The Return of the Private Sector to the Road Passenger Transport Business: A case study of Privatisation of Bus Transport in Sri Lanka", in Geeta Gouri *op. cit.*
- Subrahmanian, K.K., and R. Anandraj**, "Technological Change in Indian Industry: A review of conceptual and measurement problems", Centre for Development Studies, Trivandrum, 1992 (mimeo).
- Sudarsanam Padam**, "State Transport — The New Economic Compulsions", The Economic Times, June 11, 1992.
- World Bank**, "Trends in Developing Economies — 1992", A World Bank Book, Washington D.C, 1992.
- Yarrow, G.**, "Privatisation in theory and Practice", Economic Policy, April 1986, p. 326.

"We desire a more closely integrated world economy in which competition is no longer confined by regional or national boundaries."

— Nobuo Matsunaga, Japanese ambassador  
to the United States.







# Energy Intensity in Iron & Steel Sector: An International Comparison

## NPC Research Division

In this age of 'global market', the competitive advantage of nations has assumed an important role in deciding as to which industries each country should concentrate on. With energy having since long been identified as the most critical input, its intensity serves as one of the indicators of industrial efficiency. An international comparison of energy intensity would portray, to a considerable extent, where each country stands in comparison to others.

'Energy Intensity' here, is defined as the quantity of energy consumed to produce one unit of output. 'Energy' includes all forms, measured in a common unit (Tonnes of Oil Equivalent; toe). The required data has been taken from 'Energy Balances of OECD Countries' and 'Energy Balances of non-OECD Countries' published by the International Energy Agency (Organisation for Economic Cooperation and Development), from time to time. The output on the other hand is measured in tonnes. This information has been compiled from the 'Yearbook of Industrial Statistics', brought out by the United Nations every year. The term 'Iron and Steel Sector' for the purpose of this study includes all categories classified under ISIC N. 371 (Table 1).

Table 2 gives the output in the Iron and Steel sector in various countries during all the years between 1985 and 1990 and the corresponding energy consumption figures. The table also gives the energy intensity ratios computed by the present study. The countries covered account among themselves for about 90 per cent of the world output in the sector. Since average energy intensity ratios for each country are likely to be sensitive to the composition of output, category-wise percentage shares for two years, 1985 & 1990, are presented in Table 3.

Although the information on energy and output have been compiled from two different sources, they are com-

patible since the IEA has gathered most of the information from the UN Energy Statistics Directory.

*Compiled by K. Suryanarayanan*

**Table 1** : Description of sub-classifications under ISIC No. 371

Code	Description	Code	Description
371-001	Thomas (basic) slag	371-043	Medium plates (3 to 4.75 mm)
371-004	Spiegeleisen & ferro-manganese	371-046	Sheets, Electrical
371-007	Pig iron, foundry	371-049	Sheets under 3 mm, cold-rolled
371-010	Pig, steel making	371-052	Sheets under 3 mm, hot-rolled
371-013	Other ferro-alloys	371-055	Tin plate
371-016	Crude steel for fittings	371-058	Galvanized sheets
371-019	Crude steel, ingots	371-061	Hoop & strip, cold-rolled
371-022	Ingots for tubes	371-064	Hoop & strip, hot-rolled
371-025	Semis for tubes	371-067	Railway Track Material
371-028	Wire rods	371-070	Wire, plain
371-035	Angles, Shapes & Sections	371-076	Tubes, seamless
371-036	Angles, Shapes & Sections	371-079	Tubes, welded
	80 mm or more (heavy)	371-085	Steel castings in the rough plate
371-037	Angles, Shapes & Sections	371-088	Steel forgings
	80 mm or more (light)	371-091	Wheel, wheel centres & axles
371-040	Heavy plates (over 4.75 mm)		



Table 2 : Output, Energy Consumption and Energy Intensity in Iron & Steel Sector

Country	Output ('000 metric tonnes)					Energy Consumption ('000 toe)					Energy Intensity (toe/mt)							
	1985	1986	1987	1988	1989	1990	1985	1986	1987	1988	1989	1990	1985	1986	1987	1988	1989	1990
Australia	16154	16932	16706	16284	16739	17706	2120	2210	2370	2340	2390	2510	0.131	0.131	0.142	0.144	0.143	0.142
Canada	39175	39356	41754	41580	42577	36518	6140	6290	6320	6530	7230	5350	0.157	0.160	0.151	0.157	0.170	0.147
China	113306	126091	135781	144083	149115	159634	68471	70351	72283	74268	77534	80944	0.604	0.558	0.532	0.515	0.520	0.507
France	58097	54652	54236	59414	61199	59271	8440	7440	6970	7600	7620	7980	0.145	0.136	0.129	0.128	0.125	0.135
Hungary	11131	11188	11065	10850	9991	8111	1642	1626	1788	1852	1667	1441	0.148	0.145	0.162	0.171	0.167	0.178
India	21568	22691	23826	25362	25580	25807	9594	9325	8769	8910	8015	7663	0.445	0.411	0.368	0.351	0.313	0.297
Indonesia	1401	1619	1686	2213	2163	2263	1997	2315	2365	1954	1585	1479	1.425	1.430	1.403	0.883	0.733	0.654
Japan	367725	345293	348009	344200	359049	357813	37240	34610	34890	38350	38320	38140	0.101	0.100	0.100	0.111	0.107	0.107
Pakistan	227	491	556	679	677	514	460	443	483	527	537	540	2.026	0.902	0.869	0.776	0.793	1.051
Philippines	521	572	486	541	568	572	617	617	634	650	669	687	1.184	1.079	1.305	1.201	1.178	1.201
Republic of Korea	49784	50855	54883	58601	64572	66120	4236	4251	4882	6264	7030	7158	0.085	0.084	0.089	0.107	0.109	0.108
Thailand	627	610	735	889	1044	1075	114	174	100	220	254	308	0.182	0.285	0.136	0.247	0.243	0.287
United Kingdom	48446	47055	55612	58721	57339	56299	7020	6370	6930	7350	7490	7630	0.145	0.135	0.125	0.125	0.131	0.136
United States	212520	196897	215125	235355	223574	220598	26600	22900	23960	26820	26210	24650	0.125	0.116	0.111	0.114	0.117	0.112
Former USSR	401984	415904	420250	424155	419175	404482	130186	133502	135192	100170	99804	103076	0.324	0.321	0.322	0.236	0.238	0.255
Former West Germany	115895	107163	104763	117851	119989	111962	16790	15240	14650	15940	16190	16490	0.145	0.142	0.140	0.135	0.135	0.147

Note : Category-wise composition of output is given in Table 3.







# Hazardous Waste Generation in Aluminium Smelters

NPC Pollution Control Division

India has produced 481,500 tonnes of aluminium during 1991-92 as against the installed capacity of 610,000 TPA. As part of the National Project on "Preparation of Comprehensive Document on Spent Pot Lining (SPL) Waste in Aluminium Industry", a study was conducted in all the aluminium smelters to find out the characteristics and specific waste generation factor.

Aluminium metal is manufactured by Hall-Heroult process involving two steps. The bauxite ore is first refined to get hydrated alumina and then alumina is subjected to reduction to convert into aluminium metal. Aluminium is produced by electrolysis of aluminium oxide in large flat bottom "Electrolytic Cell" or "pot" containing a molten bath of cryolite (sodium, aluminium, and fluoride), which serves as an electrolyte and as a solvent for the alumina. The consumption of raw materials depend upon the technology and recovery and recycle pattern adopted. The range of raw material consumption is given in table 1.

**Table 1 :** Raw Material Consumption in Indian Aluminium Smelters

S. No.	Raw Material	T/T of Product
1.	Alumina	1.905-2.0
2.	Cryolite	0.015-0.04
3.	Aluminium Fluoride	0.025-0.045
4.	Anode Paste	0.440-0.570
5.	Cathode	0.004-0.02
6.	Electricity (KW Units)	14,400- > 17,000

The pot life normally vary from 3 to 5 years depending upon the type of the pot lining material and the usage of the pot. With the continuous usage of pot, the cathode pot lining breaks down because of the penetration of aluminium and other bath constituents. At this stage, the potlining has to be replaced resulting in the generation of solid waste.

## SPL Waste

At the time of replacing the pot lining, the following types of wastes are generated:

1. Spent Pot Lining (SPL) consisting of Carbon cathode lining, Insulation bricks, Skimming, Cathode deposit
2. Collector Bars and
3. Metal plate

The skimming and cathode deposit of SPL portion and collector bars and metal plates are recycled & reused. The carbon cathode lining and insulation bricks are generated in the form of SPL waste. During operation of the cell, fluorides are absorbed into the cell lining. The SPL waste contains mainly carbon, fluorine, sodium, silica and aluminium with traces of iron and cyanide. The typical analysis of SPL is presented in table 2.

**Table 2 :** Typical Analysis of Spent Potting Waste

Parameter	Characteristics (% except pH)	
	Carbon Block	Insulation Brick
pH	10	10
Carbon	45-50	—
Aluminium	4-6	25
Silica	1-1.5	—
Iron	0.5-1	—
Sodium	15-20	19
Fluoride	10-12	8
Aluminium Carbide	0.2-0.5	—
Others	10-15	—

The quantity of SPL waste varies from 400 TPA to 12000 TPA depending upon the size of the pot and scale of operation. The specific waste generation ranges between 43 and 65 Kg/Ton of aluminium. Out of this about 26-32 Kg/Ton is the 'Cut One' and about 17-22 Kg/Ton is 'Cut Two' portion. With the existing production of 481.500 tonnes of aluminium (1991-92), the SPL waste generated, in the country, is about 20,700-26,000 TPA. At the maximum production capacity of 610,000 TPA, the expected SPL waste generation would be about 26,200-40,500 TPA.

Compiled by: A.K. Saxena



# Paddy Husk as Energy Source in Indian Industry

## NPC Energy Management Division

Paddy husk is an important energy source which has the potential of partially substituting conventional energy sources. Based on earlier NPC study, it has been estimated that paddy husk constitutes a major agro-industrial by-product accounting for 22% of all agro by-products in the country. This is the second largest available by-product next only to bagasse (table 1).

Table 1

By-product	% Availability
Paddy Husk	22.1
Bagasse	64.0
Groundnut Shellers	4.0
Cotton gin waste	0.4
Saw dust & Wood chips	1.8
Molasses	7.7
Total	100.0

### Major Issues in Utilisation

The major factors involved in the utilisation of paddy husk as energy source are:

1. Transportation to site (in case of other industries)
2. Selling price at site
3. Combustion systems & technologies
4. Cogeneration systems

In the case of items 1&2, the availability of paddy husk is the main issue to be sorted out. In item 3, the design improvements need to be incorporated depending on the constraints faced in the field to improve its efficiency. Finally, the cogeneration systems need to be scaled up from laboratory and pilot plants to demonstration units.

### Husk Availability as Energy Source

There has been no concerted effort to ascertain the actual availability of paddy husk as energy source. The estimates of paddy husk availability in general is only on the basis of paddy production on the assumption that paddy husk constitutes 20–22% by weight. Thus, if the production of paddy in the country is of the order of 100 m.tonnes, availability of paddy husk will be around 20–22 m.tonnes. The production of rice in 1989–90 was around 74 m.tonnes which accounts for about 110 m.tonnes paddy (@ 67% rice/paddy). Even the projected requirement by 1995 is a minimum of 75 m.tonnes of rice. So our paddy production by 1995 will not be less than 100 m.tonnes.

The paddy is processed in different ways. Let us now compare these different technologies in terms of the quality of paddy husk. Basically paddy processing consists of dehusking and polishing (Fig. 1). The developments in technology of paddy processing have resulted in greater yield & better quality of not only rice but also the byproducts. The present technologies in use in the country and their relation to paddy husk availability can be given as follows:

Technology	% share	Paddy husk availability
Handpounding	5–10	Paddy husk mixed with broken rice and rice bran (suitable for cattle feed only)
Hullers	29	Bran-husk mixture is generally used as cattle feed.
Shellers	9	Bran & husk are available as separate streams & can be used separately.
Modern mills	52	-do-



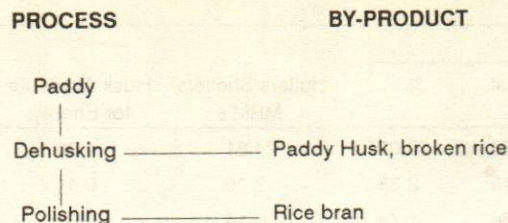


FIG. 1

It is assumed that about 80–90% paddy is processed in the milling industry. Only about 60% of the paddy is processed in shellers and modern mills. This means that the paddy husk suitable for energy use will be only 60% of total generated. The installed capacity of milling equipment is about 286.47 million tonnes with about 191 million tonnes being accounted for by shellers and modern mills. Thus we have ample capacity for milling in the country. But as per an NPC study, the average capacity of different types of mills during 1985 were as follows:

Hullers	— 0.3 t/hr @ 1000 hrs/year of operation
Shellers	— 0.6 t/hr @ 1200 hrs/year of operation
MRM's	— 1.0 t/hr @ 2400 hrs/year of operation

During the years 1985 to 1992, there has been growth rates as follows:

Increase in paddy production	— 30%
Increase in no. of Hullers	— 9%
Increase in no. of Shellers	— 11%
Increase in no. of MRM's	— 85%

From these figures, we can estimate the likely capacities of milling equipments assuming that the increased production load is taken by the MRM's in view of their better efficiencies:

Hullers	0.3 t/hr
Shellers	0.6 t/hr
MRM's	0.7 t/hr

For these operating parameters, the actual quantity of paddy to be processed in 1992 are calculated in Annexure I. It is estimated that the paddy processed in these mills would be about 90 m.tonnes of which about 65 m.tonnes account for those from shellers & MRM's. This corresponds to total a paddy production of 110 m.tonnes. Thus, the yield of paddy husk suitable for energy use will be around 12.87 m.tonnes only as against 22.0 m.tonnes totally generated in the country. The distribution of this availability of paddy husk for energy use from different regions will be as follows:

State	Percentage
Andhra Pradesh	: 38.55
Karnataka	: 11.34
Tamilnadu	: 10.39
Maharashtra	: 7.20
Kerala	: 6.98
Punjab	: 5.62
Uttar Pradesh	: 3.97
Assam	: 3.20
Gujarat	: 2.98
West Bengal	: 2.64
Haryana	: 2.58
Orissa	: 1.90
Total	: 97.35

Therefore any policy in terms of paddy husk distribution should take into account the statewise availability. It also becomes important that the industries located in these states in proximity to the rice mills may be advised to switch to paddy husk usage. This will reduce transportation costs and bring down the selling price also.

Compiled by S. Gopinath, □



## Annexure I

State	Estimate of Paddy Milled					Hullers/Shellers/ MRM's	Husk Available for Energy	%
	Hullers	Hullers/Shellers	MRM's	Total	%			
AP	1.38	2.98	21.83	26.20	29.02	24.81	4.96	38.55
Assam	0.09	1.36	0.70	2.15	2.38	2.06	0.41	3.20
Bihar	1.42	0.05	0.09	1.56	1.73	0.14	0.03	0.21
Gujarat	0.57	0.16	1.76	2.49	2.75	1.92	0.38	2.98
Haryana	0.24	0.00	1.66	1.91	2.11	1.66	0.33	2.58
HP	0.27	0.00	0.37	0.64	0.71	0.37	0.07	0.58
J&K	0.00	—	0.00	—	0.00	—	0.00	0.00
Karnataka	2.74	1.13	6.17	10.04	11.12	7.30	1.46	11.34
Kerala	4.02	0.01	4.48	8.52	9.44	4.49	0.90	6.98
Manipur	0.02	0.07	0.00	0.09	0.10	0.07	0.01	0.11
Maharashtra	1.86	0.41	4.23	6.49	7.19	4.64	0.93	7.20
MP	0.93	0.34	0.16	1.43	1.58	0.49	0.10	.077
Meghalaya	0.03	0.01	0.00	0.03	0.03	0.01	0.00	0.01
Nagaland	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Orissa	1.92	0.30	0.93	3.14	3.48	1.23	0.25	1.90
Punjab	1.32	0.32	3.30	4.94	5.48	3.62	0.72	5.62
Rajasthan	0.05	0.01	0.32	0.38	0.42	0.33	0.07	0.51
Sikkim	0.01	0.00	0.00	0.01	0.01	0.00	.00	0.00
Tamil Nadu	3.99	1.21	5.48	10.67	11.82	6.69	1.34	10.39
Tripura	0.21	0.01	0.00	0.22	0.24	0.01	0.00	0.02
UP	1.71	0.51	2.04	4.27	4.73	2.55	0.51	3.97
West Bengal	2.82	0.05	1.65	4.52	5.01	1.70	0.34	2.64
Chandigarh	0.00	0.00	0.05	0.05	0.05	0.05	0.01	0.07
Delhi	0.00	0.00	0.05	0.05	0.06	0.05	0.01	0.08
Pondicherry	0.05	0.06	0.06	0.17	0.19	0.12	0.02	0.18
And. & NIC IS	0.03	0.00	0.00	0.03	0.04	0.00	0.00	0.00
Arunachal P.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dadra & Nagar	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lakshadweep	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Goa	0.20	0.00	0.06	0.27	0.30	0.07	0.01	0.10
Mizoram	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	25.89	8.98	55.39	90.26	100.00	64.37	12.87	100.00



# News & Notes

## ROUTES TO ORGANISATIONAL TRANSFORMATION

Two stories of transformation over time in the manufacturing sector add to a picture of the variety of ways in which major organisational changes can be brought about. Each is a company with a single manufacturing plant, employing a few hundred people.

In one, adverse business conditions and a threat of liquidation in the mid-1980s, led the managing director to adopt a sweeping programme of change. This included the negotiation of an enabling agreement with trade unions to permit more flexible working practices; significant changes in management organisation, including a reduction in levels of hierarchy; harmonisation in terms and conditions between the shop floor and staff; major investments in computer integrated manufacturing (CIM) plant, with the capability of just-in-time (JIT) production scheduling; and the introduction of a 'cellular' organisation within the manufacturing process itself, where small groups of workers under a 'cell manager' took responsibility for producing complete sub-assemblies. All of this was underpinned by a total quality management (TQM) initiative, a new code of discipline and a new 'company culture' of flexibility and responsiveness to the customer, designed to 'equal or beat the Japanese'. Whilst these various change initiatives were phased over a number of years, the transformation originated in a specific crisis, when the managing director used a ballot to ascertain the workforce's backing for a programme of investment in new technology and the introduction of new working practices. Although the vote was positive, there followed a period of considerable suspicion and upset, including a brief strike, as employees adjusted to new strategies and roles.

In the other company, broadly similar technical and organisational elements were put in place but much more gradually, throughout the course of the 1980s. The

change began with a concern with lead times for the manufacture and delivery of products in a small batch operation, leading management of focus on improving production scheduling. The first step was the purchase of manufacturing resources planning (MRP2) computer system. Although the system, in theory, had the capability to tackle the problems that had been identified, production managers and staff found that some of its features clashed with procedures already in place which they did not wish to abandon. There began an extended period of learning about the new system, and deciding about which of its features to override and which to accept as a discipline. This led not only to significant changes in the system itself, but also to a series of incremental changes in operating procedures, culminating in a move to a more product-based form of shop-floor organisation.

These two cases highlight a number of general principles. First of all, the organisational transformations that are most traumatic and profound are those that concern basic conceptions of what the organisation is about and how people relate to it, in other words, values or culture. Although these two organisations ended up looking remarkably similar in many respects, the first achieved this only at the expense of a profound level of transformation in values and assumptions that was apparently not necessary in the second. The important point to note is the distinction between transformations in structural arrangements and transformations in values and culture. Some organisations appear to have in place values and cultures that permit the structural changes needed by turbulent environments to take place over time, relatively painlessly; others require a more profound level of change at the level of values.

**Source:** Richard Holli & Michael Norris, "Search for Innovation and Learning in organizations". *The Tavistock Institute Review*, 1991.



## WOMEN CONSTRUCTION WORKERS IN BOMBAY

Women building workers reported a variety of health problems and ascribed them to their work, according to an ILO study carried out in Bombay.

Many suffered from menstrual disorders, prolapse of the uterus and backaches. Miscarriages were not infrequent. Lifting weights was the primary cause of these problems. Almost all complained of muscular pain in their limbs. Handling bricks and gravel was the cause of wounds on their lower legs and hands. Two women had been hurt by falling at the worksite.

Safety equipment such as hard hats, safety boots, gloves, goggles and other prescribed safety gear were not provided. Many even lacked awareness of the value of safety equipment, and remarked that such gears would only interfere with their movements. Injuries were treated in summary fashion and the injured kept on working. Women building workers interviewed felt that if they were issued safety equipment, instructed on how to use it in their own language and allowed time to get used to it, they would then use it and many injuries could be avoided.

*Source: World of Work ILO, Dec. 1992.*

## HOW TO ENJOY WASTE WATER

People of Chindwara, an industrial town near Nagpur, dread the days between December and March. This is the time when the town reels under an acute water crisis. The ones who also suffer are the industries which need enormous quantities of water for their manufacturing process. Shutting down the plant due to non-availability of water could cost as much as Rs. 3 lakhs per day, so they are forced to spend lakhs of rupees to buy water during these months.

One such industry is Raymond Woollen Mills. To solve their problem WTD came up with a simple but effective solution. "Recondition the effluent from your process house for re-use," they told them. In other words, recycle waste water which is normally thrown away.

They loved the idea which, though not the brainchild of WTD, is a fairly new concept in India. Effluent from the dyeing and finishing mill is treated by an activated sludge process. The treated effluent then passes through a reverse osmosis plant to reduce the dissolved solids. The permeate is then recycled and used for the process house.

Not only is the customer's dependence on an external source of water supply considerably reduced, Raymond's will also be saving several lakhs of rupees every year.

Commenting on tertiary treatment of effluents, Tarun Mathur says, "We are confident that this concept is going to be a big winner in future." With so much to gain and nothing to lose, why not?

*Source: Fire side, Vol. 22, No. 4. Oct-Dec. 1992.*

## IMPORTANCE OF TRAINING

- 1 If the new employee does not possess all the skills required for the job, be willing to train. Each company is different, and it pays to invest in the training of the new employee.
- 2 One of the primary responsibilities of a manager is to teach, coach and develop employees. To ignore this responsibility is to court disaster. The pay-off in having an effective subordinate in the long-term will outweigh the effort that one spends in developing him.
- 3 Do not over-sell either the organisation or one's style. If the organisation or the manager is not what they are, the new employee will soon find out. Be candid with the new employee about what the organisation actually expects and what one is prepared to do.
- 4 Be supportive and find the time to help the new employee, especially in the first few days or even the first couple of weeks on the job. This is the time that the new employee needs support most. He will feel neglected and frustrated if he is unable to get the guidance from the manager – his immediate supervisor. Follow up with to see that he has comfortably fit into the organisation.
- 5 Take the time to go through the performance standards when the employee is new. This will allow the employee to know what is expected of him. Also, it will provide a more objective basis for performance appraisal later on.
- 6 After hiring a new employee, do not leave him to sink or to swim. Occasionally, one may really get an extraordinary person who will swim no matter what happens. Usually new employees do need assistance and support to get going. These people will turn out to be fine employees when they begin to get the hang of things in the organisation. The manager should help the new hire translate his



career mission into specific work activities that contribute to his department's objective.

- 7 Introduce the new employee to his colleagues. This will enable him to experience teamwork and learn the importance of good human relations in the organisation.
- 8 Help the employee to get in sync with the company. It helps a person to adapt to a particular situation by establishing and sorting out relationships within his new environment. It is like pointing the person in the right direction.

Source: *Productivity Digest*. June 1992.

### VENTURE CAPITAL AT THE CROSSROADS

As a vital force in the nation's economy and an important source of new jobs, innovative entrepreneurship represents the best chance for America to regain competitive advantage in the 21st century. Yet entrepreneurship of the kind that built the U.S. semiconductor, computer, and biotechnology industries cannot flourish without venture capital—and the venture capital industry, for a variety of reasons, currently faces serious threats to its survival.

These are among the assertions and conclusions of *Venture Capital at the Crossroads*, coauthored by Harvard Business School Class of 1954 Visiting Professor of Business Administration Jeffrey A. Timmons and Babson College professor William D. Bygrave. The authors chronicle the industry's beginnings, noting some of the extraordinary success stories that have become venture capital legends. In 1957, for example, American Research & Development invested \$ 70,000 to purchase 80 percent of the common stock of a small company founded by four MIT graduate students. By 1971 the common stocks of that company—Digital Equipment Corporation (DEC)—were worth \$355 million.

The authors then contrast this spectacular chain of events with what they term today's "incredible shrinking venture capital industry"—an industry that reached its zenith in 1987. Drawing on their combined quarter-century of research, course development, and direct involvement with venture capital and growth companies, Timmons and Bygrave analyze the changing structure and strategies of venture capital firms—as well as the changing economic and social climate—that have resulted in a growing distortion of the industry's historical role in the economy.

The "classic" venture capitalists—exemplified by such renowned individuals as General Georges Doriot, Arthur Rock, and Don Valentine—"brought a great deal more than capital to startups and young companies." Timmons observed. "They truly added value." These professionals understood the industries and markets to be served and brought to an entrepreneurial workplace an invaluable sense of reality perspective, and balance. They recruited key managers who could add experience, business acumen, and credibility to a management team—without jeopardizing the firm's entrepreneurial climate.

These venture capitalists had contacts; they could secure important customers and suppliers and were able to establish links with the managers and CEOs of other firms in the same business. They assisted with long-term planning and strategic thinking, often providing a dissenting voice or viewpoint that helped to overcome the tendency of entrepreneurial managers to begin thinking alike. ("People who work together closely tend to develop a conformity of thinking; dissenters surrender to the influence of the larger body of opinion," the authors warn. "Such convergence of opinion can be mistaken as evidence of correctness.")

The classic venture capitalists were also vital in communicating a sense of unwavering support for a young firm's management team, business plan, products and goals. "When plans go awry—missed deadlines, key accounts lost, unexpected resignations, and the inevitable cash and confidence crises—nothing is more disturbing than a backer with a weak heart and a weaker pocketbook." Timmons and Bygrave write.

As the 1970s and 1980s wore on, the venture capital industry, in the words of the authors, "turned ballistic." By 1987 new capital formation had risen to a rate nearly fifty times greater than that of the 1970s. And gradually, the classic model of the venture capitalist gave way to a new breed, whom the authors term "merchant capitalists." Merchant capitalists, they write, were "greedier" and "speedier" and did not add value to a company in the traditional sense. Instead, they emphasized financial engineering and short-term gains, "deal making transaction crafting and closing, and fee generating."

These venture capitalists exploited "hot IPO markets to harvest early and often" and favored later-stage LBO and MBO (management buyout) deals over startup backing to obtain better minimums and faster returns. In short, Timmons and Bygrave assert, the merchant capitalists threatened the historical tie between emerging companies and the venture capital industry that has served the nation well over the past several decades.



"There is something quintessentially American about venture capital-backed entrepreneurship," said Timmons. "It's one of our economy's great secret weapons." The authors note that in 1980 "formal venture capital was virtually nonexistent outside the United States." A decade later, they report, over half of the \$80 billion of venture capital under management worldwide was outside the United States. Most of the new venture capitalists abroad, however, are inexperienced, they write, and while proficient at analyzing risk and engineering financial deals, they are untrained in the difficult art of building businesses.

There are other hurdles, too, for foreign venture capitalists. Unlike the United States, in many nations—for example, Germany and the United Kingdom—banks are important sources of growth capital; but bankers, with an entrenched suspicion of fledging enterprises, gravitate away from startups toward established companies, LBOs, and management buyouts and buyins. ("After all," the authors note, "who ever heard of a bank making a loan to a startup entrepreneur with little or no collateral and no net worth?")

For these reasons and others, the authors believe that the United States's venture capital industry constitutes a fragile but real advantage over other industrial nations in the marshaling of resources to speed innovation and nurture new industries. To lose this advantage, Timmons said, "would signal dire consequences for our economy."

Timmons and Bygrave believe that the traditional venture capital industry has been severely weakened by "Washington's benign neglect." While they prefer free competition to the establishment of a national industrial policy, the authors do believe that the federal government could take steps to strengthen the industry. Specifically, they recommend increased support of "basic science in universities and national laboratories, support of R&D in industry," and support of entrepreneurial ventures through the purchase of their products. Timmons and Bygrave also suggest that the current capital gains tax be reduced to half the maximum rate on ordinary income or even eliminated for investments in certain categories of startups and early-stage companies (Investments that involve financial engineering and "real estate wheeling and dealing" would not be included, they note.)

*Venture Capital at the Crossroads* advocates in addition that American academic and social institutions rediscover the importance of creativity and entrepreneurship. "Our students largely ignore scientists, engineers and entrepreneurs who move society forward by creating new products, new companies, new jobs, and new industries,"

the authors write, "but they idolize financiers whose primary 'creation' for mankind is junk bonds."

Timmons noted that he is cautiously optimistic that the venture capital industry—particularly at the startup and early-stage investing levels—will see a significant recovery within the next few years. Although he noted that the number of dollars and deals presently under management in private venture capital partnerships has been declining steadily since 1987. Timmons described the range of current investment opportunities as the best in years.

According to Timmons and Bygrave, the venture capital industry has changed forever. "Internal and external forces have led to a transformation of the venture capital industry. Some of these changes will make for a healthier and more profitable industry in the 1990s. Still other changes pose danger signals with troubling implications for the nation, and point to a need for both alternative sources of venture capital, a more constructive national policy toward entrepreneurship, and a revival of classic venture capital."

**Source:** Gail Davison  
*Harvard Business School Bulletin* Oct. 1992.

### CONSULTANCY CHALLENGES IN FERTILIZER INDUSTRY

The decade of the nineties will be crucial for the long term development of the fertilizer industry in the country and challenges posed in different areas have to be met by consultants. Some of the areas which need immediate attention and the problem for which solution have to be found are as follows:

- (i) Improvement in capacity utilization of the existing plant.
- (ii) Adoption of energy conservation measures in existing & new plants. Computerisation of control systems.
- (iii) Utilisation of indigenous raw materials (Pyrites, rock phosphate etc.) for phosphatic fertilizer thereby reducing foreign exchange outflow towards import for such materials.
- (iv) Development of improved technologies through R&D efforts including new generation catalysts for ammonia and other fertilizer plants.
- (v) Schemes for treatment of effluent and control of pollution have to be developed which are cost effective, leading to recovery of valuable chemi-



cals/by products and also ensure cleaner environment.

- (vi) Consultancy organisation have to gear up the adopt new techniques in software services being rendered such as design, engineering, project management systems. Improvement in these services will lead to optimised plant designs, shorter implementation schedule, lower investments etc.
- (vii) Human resources development both for plant operation/maintenance and in consultancy organisations. New plants designs need highly skilled technical manpower who have to be adequately trained to deal with complexities of plant operations and maintenance of sophisticated machinery and equipment systems. Refresher courses should be introduced for improvement of skills of plants staff.

**Source:** *Department of Scientific and Industrial Research, consultancy capabilities in Fertilizer Industry in India, Aug. 1992.*

### IMPLEMENTING TQM

The steps outlined below are based on the understanding and experience of the author. Some of these steps are combined in actual practice particularly on training depending upon the type and size of the organisation and the efforts already put in by the organisation. It may be preferable to change the sequence of these steps based on the preparedness of each organisation, priorities and problems in implementation.

1. Collection and study of the literature to understand the various facets of Total Quality Management and studying the company's situation.
2. Interacting with outside professionals/consultants through workshops, seminars or training programmes and visits to other successful companies.
3. Organising an appreciation workshop for the Top Management and Senior Management in the company.
4. Declaration of the intention by CEO to introduce TQM in the company.
5. Establishing Quality Council or Steering Committee with clear cut mandate for directing the company to achieve total quality.
6. To constitute a working group to lay down company's Corporate Quality Policy.

7. Ensuring the communication of the quality policy to each and every person in the company through training, news letters, pledge cards, pocket cards etc.
8. To create an organisational framework in terms of assigning TQM responsibilities to individuals. The person directing TQM activity should preferably be at a senior level such as Vice-President or Executive Director.
9. Preparation of a training plan to impact attitudes of managers, supervisors and workers in all the functions of the company.
10. Conducting quality awareness through training/workshops covering all the employees.
11. Formation of Site Steering Committees and Promotion Programmes giving record of priority items at the unit/division level.
12. Establishing Quality Improvement Teams to identify, analyse and solve important quality problems and to encourage cross functional management.
13. Training of quality improvement teams in problem solving approach, tools and techniques.
14. Initiation of small group activities such as Quality Circles, Work Groups etc.
15. Establishment of the Organisation for Quality Circle Implementation.
16. Training of Quality Circle/QIT Facilitators, Leaders and Members on Approach, Tools and Techniques.
17. Designing and implementing a system for recognition and rewards based on evaluation of the projects taken up by Quality Improvement Teams and Quality Circles.
18. Institutionalisation of Quality Circles by documenting experiences and registration of quality circles and quality circles projects.
19. Functional or divisional TQM workshops to identify inputs, suppliers, outputs and customers internally.
20. Setting up of operational and control measurements and standards including bench marking.
21. Complete review of documentation, processes and quality records.
22. Identifying problem areas and weaknesses and upgrading the system to meet the requirements of ISO 9000 quality system standards.
23. Simultaneous Implementation of the systems and documentation process, procedures, job instruc-



tions etc. relating to contract review, design, procurement, process control, product identification, inspection and tests, non-conforming products, packaging and storage, after sales service etc. and preparation of quality manuals in accordance with ISO 9000.

24. Working out specific quality cost measurement system and integrating it with the company's existing financial management system.
25. Conducting quality review, follow-up and quality audit by involving top management on quality policy implementation, quality system, analysis of operational problems and cross-functional effectiveness.

**Source:** Ajit Singh,  
*World Class Quality,*  
ASSOCHAM, New Delhi 1993.

## COMPONENTS OF COST OF QUALITY

### FAILURE COSTS

#### a. Scrap and Waste

The net loss in labour, material and overhead resulting from defective products which are beyond salvage and hence are to be disposed.

#### b. Rework and Repair

The cost of redoing or repairing product which cannot be made to conform. In services, costs are incurred in correcting errors to ensure that work done meets quality standards before delivery to customers. Example: manpowers, material and overhead costs incurred in repairing non-conformance products.

#### c. Downtime

The cost of idle facilities resulting from defects such as printing press down due to paper breaks. Example: cost of operation time wasted as a result of downtime.

#### d. Customer Complaints

All costs of investigation and handling complaints due to poor quality. Example: manpower costs of maintaining complaints departments which could be derived from the percentage of time spent on handling complaint.

#### e. Correcting and/or replacing products after delivery to customers:

Includes manpower, material and overhead costs of correcting products which customers are unsatisfied with. Warranty charges are not included.

### f. Design corrective action

Manpower, material and overhead costs of all problem investigation and redesign efforts required to resolve product problems inherent in design.

### APPRAISAL COSTS

#### a. Incoming Materials Inspection (at own factory or supplier location):

The cost of determining the quality of incoming raw materials, whether by inspection on receipt, by inspection at the source, or by surveillance methods. Example: manpower costs of inspecting suppliers' materials.

#### b. Process Inspection

Planned inspections and tests to determine conformance of products to specifications. Example: Manpower and material costs of quality inspections at selected points throughout the overall operations process.

#### c. Materials and services consumed

Includes the costs of materials consumed or destroyed in the testing process. Example: tear-down inspections, over-voltage stressing.

#### d. Re-inspection

Cost of manpower and material incurred in inspection, test and audit because of defects.

### PREVENTION COSTS

#### a. Quality Planning

Costs of manpower and material in developing product inspection procedure, appraisal documentation system and quality standards to assure the continued achievement of acceptance Quality.

#### b. Supplier Rating

Costs incurred in developing and maintaining a system to ascertain each supplier's continued acceptability for future business.

#### c. Training

Costs of developing and conducting training programmes. Example: course fees, instructor's salary and training materials.

#### d. Quality Performance Reporting

Includes the manpower costs incurred in quality performance data collection, compilation and analysis.

**Source:** *Productivity Digest*, February 1993



## Book Review

### **Entrepreneurship Development in Public Enterprises:**

(Ed) Joseph Prokopenko and Igor Paviln ILO, Geneva, Oxford & IBH Publishing Co., New Delhi, 1992, pp. 208.

Public enterprises are a worldwide phenomenon – they were basically conceived, particularly in developing countries, as instruments of economic development and are performing a pioneering role in providing infrastructural facilities and products. However, the role of public enterprises has undergone close scrutiny in the 1980's in the developing countries; steps have been initiated to improve their performance, to check their financial burden on the government exchequer. The book under review is a welcome contribution in that context as it presents a number of cases in which the culture and practice of entrepreneurship were successfully introduced into the structure and activities of public enterprises.

The existence of 'blackhole' in public enterprises, where the distribution of firms in public sector is strongly skewed towards large organisations and the almost absence of small and medium firms, indicate not only a lack of competition in the economy, but also a monopoly of the entrepreneurial functions by the bureaucracy. Further absentee ownership, soft budget constraints, weak financial discipline, ineffective reward/punishment systems, lack of competition, but a strong position in the market, lack of initiative and motivation by employees due to low remuneration and rigid salary structure, have led to the development of public enterprises as inflexible and uninnovative with an inherent resistance to change, and the entrepreneurial restructuring of public enterprises is more than required.

Two broad options recommended for the development of entrepreneurship with public enterprises include:

- Establishment of new enterprises to increase competitiveness of public sector;
- Intrapreneurship – Entrepreneurship within public enterprises which involves transforming corporate managers into corporate entrepreneurs and intro-

ducing organisational changes which would permit and promote forms of entrepreneurship such as introducing new products, setting up new businesses or enterprises, or joint ventures. This can be done by making the organisation flatter and less hierarchical, by enabling more people to carry out managerial roles, reducing the number of middle managers, allowing individual business units to have management control of their own results.

The book has nine chapters. The first chapter discusses the compatibility of the culture of public enterprises and entrepreneurship. Next seven chapters are devoted to specific country cases to present the introduction of various successful entrepreneurship approaches and methods into the management of public enterprises and their subsequent revitalisation. The last chapter is a comparative analysis of the cases discussed in earlier chapters.

Chapter 1 sets out to prove that despite the apparent rigidity and bureaucratisation of decision making in the public sector, there is still room for flexibility and entrepreneurship provided that the government is politically willing. It raises a question: whether the transformed enterprises will remain public or not, and proposes that the management of the funds and the management of the assets should in one way or the other be privatised.

Chapter 2 analyses five cases in the UK on the transformation of public enterprises into employee stock ownership corporation. The cases show that if certain reasonable principles such as maximum enterprise sale price, maximisation of domestic ownership and maximum enterprise spread of ownership of assets are followed in the privatisation process, management led employee buy outs of parts or of whole enterprise may become dominant solution.

Chapter 3 illustrates the successful restructuring of the local economy of South Western Pennsylvania Economic Development District (SPEDD) in US through



an innovative institutions mechanism—the incubator—one of the most popular new business development instruments in many parts of the world.

A successful co-operative case from Czechoslovakia discussed in chapter 4. The case shows that although entrepreneurship cannot flourish within the state enterprises in centrally planned economies due to their bureaucratic set up, relatively autonomous co-operative managements can provide an environment in which the environmental spirit and entrepreneurial culture can be maintained by the development of an internal quasi market for products, labour and management.

Chapters 5 and 6 relate to restructuring of three cases in Yugoslavia. The Incubator approach was used to restructure the Iron and Steel works to make it competitive and to develop new product lines. In Tannery and Hide Processing Factory which was decided to be closed down by the Government, the liquidator diagnosed what was wrong and rescued the company with the active co-operation of the employees. The case of UTOK is one of successful turnaround strategy within a traditional industrial culture. Self management system in Yugoslavia provided management autonomy, motivated participative management to match the conduct of the undertaking with the local needs and indigenous initiative. The enterprise could survive by the strategy of self reliance based on human resources development and international marketing.

The Algerian case which was earmarked for liquidation shows, in Chapter 7, that increased managerial autonomy in operational management could foster the development of entrepreneurship by legal changes which promoted the process of marketisation through strategic guidance by a ministry and introduction of participation fund.

Chapter 8 relates to National Small Industries Corp (NSIC), one of the biggest public corporation in India to show the promotion of entrepreneurship by the development of small scale industries. The case highlights the importance of institutional support in areas such as supply of machinery, marketing, exports, prototype development and training.

The cases discussed in the book are live examples indicating the adoption of turnaround strategies and show how sponsorship can help, promote both public and private economic initiative by either turning the public enterprises into an entrepreneurial and intrapreneurial organisation or by helping small private business in the start up stages. The cases in the book would be a useful guide

for those involved in restructuring and turnaround strategies for organisation in India and other developing countries.

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**Total Quality Management for Software:** (Ed.) G. Gordon Schulmeyer and James I. McManus, *Van Nostrand Reinhold*, 1992, New York, 497pp.

Everybody likes a good quality product—one which is easy to use, does the job that is required of it, is good value and can be obtained quickly and reliably. Quality is important for the supplier (or developer) also because it helps sell the product and generate further business. However, quality cannot be relied on to come easily or cheaply, particularly when the product is as complex as software. Specific methods have to be used to identify and build in the quality required, including safeguards to check that it has been achieved. Additionally the customer will need the confidence that the supplier can produce a good quality product; and so certain steps have to be taken which require the involvement of both customer and supplier. Total Quality Management (TQM) is one such step and a framework through which a desired quality can be achieved. TQM is both a philosophy and a set of guiding principles that represent the foundation for a continuously improving organisation.

Successful companies have focused their attention on TQM over the past few years, resulting in products and services that customers want. Startling turnarounds (Ford, KODAK copiers, etc.) have resulted from implementation of TQM. What about software? How do the concept of TQM fit in? Is there a focused effort to apply TQM to software development? Who is doing what and how? Is there a payoff? The book under review, which is a collection of 18 papers, provides answers to these and other concerns of management for installing the quality improvement methodologies in their organisations.

The introduction written by Richard R. Brydges reviews existing TQM concepts in general. It explains the overall Total Quality Management Methods and sets the stage for software implementation. There are four parts in this book covering quest for software TQM, software directions to TQM, Methods for TQM in software and finally, Achieving TQM in software.

The first part consisting of four papers sets the stage for the quest for software TQM. The application of TQM in mission critical software development is explained. Here



the application of TQM to software in Japan is discussed. How software quality assessment through the In-Plant Quality Evaluation of the Defense Logistic Agency can lead a company to Total Quality principles in the software quality arena is elaborated. A practical implementation model of how TQM is applied to software development in a United States of America company concludes this part.

Software directions for TQM is the subject of five papers in part II of the book. The software development process is covered with an emphasis on the maturity model. To achieve total quality, defects in software must be eliminated. There is a chapter to provide an understanding of defects and so help eliminate them. To achieve software TQM one must go into a development project with an adequate understanding of the risks involved. Such risks are highlighted in this part of the book. This part concludes with a discussion of software reuse and its quality implications.

Part III of the book which consists of five papers, discusses methods of TQM implementation in software. A seminar is encapsulated in the chapter of TQM methods in software. Testing methods for software quality are covered in this part. Yogi Akao and Tadashi Yoshizawa's Quality Function Deployment (QWFD) methods as applied to software are shown to achieve satisfactory quality results.

Finally, part IV explains how to achieve TQM in software. At IBM, casual analysis of defects has been instrumental in reducing defects, and therefore in increasing total quality. One paper in this part written by Gordon Schulmeyer, who has earlier written the famous book of Zero Defect Software in 1990, is very useful as it provides the principles and methods for achieving Zero Defect Software. Statistical Process Control has been very successful in manufacturing, now see its application to software development. Many of the above concepts are tied together in the cleanroom software development methodology of Harlan Mills which concludes the book.

A brief summary of each chapter highlighting its main thrust is provided for the reader of the book to decide what is of most immediate interest. If information is required from another chapter for complete understanding, adequate cross-references have been supplied within each chapter. Thus, the editors of the book have done an excellent job of arranging the papers in four different scenarios of applications and tying the collection of papers to present to the readers in the form of a book. This book which includes both theoretical ideas and practical applications, provides in a single source a wide

spectrum of knowledge to assist managers and software developers alike in their quest to establish a TQM program for software development.

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**Economic Development and Food Problem** by Victor G. Rastyannokov: Agricole Publishing Academy, New Delhi, 1993, pp 207, Rs 250.

The food shortage problem is acute in the underdeveloped and developing countries. It could be attributed to both internal and external factors i.e. the very base of the individual country's economy and the laws of development of the World Capitalist Economy (WCE) respectively. The external factor or WCE creates dependency of backward and developing countries for several reasons (one such is food needs). Historically there are two periods of foods crisis—one from the beginning of the 50's to the end of the 60's, and the other from 70's onwards as identified in this volume in the developing nations of the East. In the first stage, the national strategies mainly aimed at economic growth rather than development, while in the second stage, the importance of development has been taken note of, to improve the living conditions of the lower bottom group in the society, without correcting the structural disorder that prevailed in the developing nations. Through land reforms, structural disorders were corrected in countries like Japan, Taiwan and they have overcome the problem of poverty and food crisis and simultaneously witnessed the processes of economic development.

The book under review contains four chapters contributed by six scholars (five out of the six are from the Institute of Oriental Studies, USSR Academy of Science, Moscow and one from the faculty of economics and law, Patrice Lumumba Friendship University, Moscow). The original version of the book was first published in Russian language in 1986. To facilitate the non-Russian academic community, the translated version was brought out in English in 1993 with partly updated data.

The papers contributed by the scholars in this volume are arranged by themes, under four different chapters and the contents provide an excellent basis for understanding the food crisis Vs economic development in general and more particularly in the case of the backward and developing countries. In this sense, the book may be regarded as highly valuable. The problems analysed are: is production enough to meet the nutritional requirements of the increased population? Can the potential of produc-



tion be fully utilised under existing social and economic conditions? Has the increasing population got any income to meet the nutritional requirements? And what incomes can they dispose off?

The increasing demand for food may be solved by the expansion of the area under cultivation and also through research and development in terms of technological modernisation in the agrarian sector. Added to this, irrigated agriculture demands maximum financial resources and utilisation of energy resources, development of bio-technology (this may promise to increase production and reduce costs) and intensive agriculture. The authors have expressed lacune of the above indicators in some of the developing countries. The technological modernisation in agriculture also gives rise to the problem of unskilled labour displacement, since nearly four-fifths of the total rural households are unemployed and underemployed in South Asia and South-East Asia. The production and supplying of a major part of the food produce is, however, concentrated at 'poles of growth' and 'centres' of agrosphere. In this context, the authors express doubts about achieving the food production level to that of the social food requirements.

No doubt the book gives the macro picture of demand for and supply of foodgrains between the two regions, but more effort could have been devoted to the intra regional peculiarities where the characteristic features of those countries are homogeneous, than inter region comparison. However, the book under review is a bold attempt at evaluating the economic development and food crisis in South-South East and Near East. This volume is a novel addition to the literature on the agrarian studies. This book is useful for researchers, administrators, policy makers and students of development economics.

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**Managing by Consultation: Global and Asian Experiences** by Rama Murthy Kuppachi: Sage Publications India Pvt. Ltd., New Delhi, 1992, pp. 226.

The management of human resources has always been a fascinating field and a considerable amount of discussion and research have been devoted to it. The research and findings of Japanese management have added new dimensions to managing human resources. Participation, involvement and cooperation are the watch words in the style of Japanese management. This book

on Managing By Consultation is certainly a welcome piece in this respect.

The book is divided into five parts. The first part provides the overview and sets the theme and elucidates the functional linkages of management process. It discusses briefly the past, present and future trends in management. It also presents some research findings in group dynamics and their impact on team-work and motivation for higher productivity.

The second part consists of Culture and Industrial setting. It brings out a clear picture of culture in terms of meaning and application. It considers some salient aspects of cultural linkages in managing human resources and offers a cross-country comparative review of cultural issues in management, culture-related assumptions and attitudes that distinguish typical traditional and modern societies, survey responses on managerial perceptions from India and Sri Lanka, including cultural integration and adaptation within multinational corporations in host country environs.

The third part is a global perspective on industrial democracy. It provides the historical context of the industrial revolution and its aftermath that led to the alienation of workers from work and subsequent evolution of the concept of industrial democracy and participative management in Europe, USA and other Asian countries. Four models of worker's participation at the enterprise level have been discussed, namely – the West German Mitbestimmung or Codetermination; the Yugoslav Self-Management; Israel's Collectives and Union-owned Enterprises; and Japanese Consensus Decision-Making. These models and experiences in employee participation cover a broad spectrum, ranging from voluntary to legislated forms; from direct, all - worker involvement in small units/teams, to indirect, represented forms; from informal, consensus modes of integration to formal consultative and cooperative process; from membership in shop level committees/teams to plant-wide committees, councils and assemblies to company board dictatorship and partial or full shareholding and ownership; from issues of shop floor concern about production, personnel and working conditions to company personnel policies, investment policies and priorities and international business issues; and from recommendatory to vetoing powers to decision-making with management at all levels. These results of participation vary from country to country.

The fourth part deals with the consultative process in the Asian context followed by the case of a multinational company. The case demonstrates the achievements of a



properly designed and executed model of participatory management. The book makes a good reading on the consultative approach to management. However, it relies heavily on the approaches already well known without giving clear cut direction and recommendation for consultative mechanisms likely to be useful in future. The book will be of value to those who want to understand the fundamentals of the process of managing by consultation.

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**Innovative Corporate Turnarounds:** by Pradip N. Khandwalla, New Delhi, Sage Publications, 1992, 279 pp., Rs. 250.

This interesting book discusses the nature and dimensions of turnaround management. The latter include the causes of sickness, the kinds of action that characterize turnarounds, the interrelationships between different turnaround actions, and the lessons to be learned from turnaround cases.

The book is based on a sample of 65 medium and large enterprises belonging to some fifteen different industrial sectors. The sample is drawn from 12 countries with preponderance of cases from India, U.K., and USA. The book thus uses a sample more representative of the world than any assembled previously. The reported studies of successful turnarounds have mostly been based on within-nation samples.

The book is divided into eight chapters. Chapter 1 outlines very briefly the particulars of the 65 enterprises which form the data base of the author's analysis. Chapter 2 identifies a set of 27 turnaround elements. The latter are classified into those that are 'basic' to most turnarounds, and those that trigger harsh or 'surgical' and 'humane' varieties of turnaround. The harsh and humane varieties are elaborated in chapters 3 and 4 respectively. Chapter 5 considers the operating context of turnarounds. Chapter 6 deals with the nature and effectiveness of management creativity as part of turnaround efforts. Chapter 7 describes the 'phases' and 'dynamics' of the turnaround phenomena. Chapter 8, the least one, restates major conclusions and advances 15 hypotheses regarding sickness in, and turnaround of, complex collectivities including organizations.

The author's claim of having delineated a 'phenomenology of turnaround management' is open to question. The so called 'turnaround elements' are the usual way of vigilant and proactive management goes

about coping with its extent and emergent problems in a highly competitive business environment. The latter is today characterized by increasing costs of material, energy, and labour; overcapacity of production facilities; saturated or dwindling markets for many products, shortening lifecycles of new products, and exacting competitive requirements of cost and quality in the global market place. In such a situation, managers constantly look for ways to improve in-house systems and procedures on the one hand, and quality and productivity on the other. Successful firms, as a rule, practise a process-oriented, systematic, and cross-functional approach toward problem-solving in order to retain a competitive edge. The tables given in chapter 7, do not serve to differentiate the specific or distinctive nature of actions for overcoming 'sickness' only as a particular class of problem situations.

The crux of the problem of turnaround lies in the prevention of debilitating losses, and building of a viable sales volume on a lower break-even point through a focus on cost reduction and/or differentiation of product lines. If a firm succeeds in doing this through internal efforts and/or external help, it will be able to remedy its sickness. The specific problem-solving measures would differ from case to case depending on the severity and nature of 'sickness'. The latter may be an outcome of either the failure of a firm's strategy and planning, or the inefficiency and highcost structure of its operations, or of uncontrollable exogenous impacts, or of more than one of these three factors. The author does not properly distinguish and highlight the distinction between the failures engendered by strategy, operations, and exogenous impacts, or their varying combination.

The writer's discussion of the sickness of Ferranti is a case in point. The key issue here is the firm's failure to implement effectively its technology leadership strategy. This basic issue has been ignored by the author. Why this firm failed to implement its strategy, and how it could have avoided such a failure, are necessary for understanding the dynamics of sickness here. Bereft of this analysis, the 'turnaround' of Ferranti with the help of UK government, becomes a rather ordinary case. Moreover, the 'turnaround' prescription for Ferranti as noted by the author, does not appear to have worked well, for according to recent reports, the company is again in difficulties.

The author's turnaround learning 'lessons' viz., learning to be a sober entrepreneur, to compete, to collaborate, to be efficient, to practise a mix of management styles, to look within, to institutionalize a culture of innovation, and so on are useful, but hardly distinctive of, or inferable from, the sick units. They are quite similar to



prescriptions given by numerous other writers like Peters and Waterman, Ouchi, Drucker, Quinn, Hayes and Wheelwright, among others. The recent concept of designing 'learning organizations' is also along the same line. These 'lessons' are the usual set of practices engaged in by successful firms, (who have never become sick), the world over. The 'lessons' or the 'turnaround' elements do not follow, or can be inferred from, the 'turnaround' situations only as the characteristics of 'turnaround management' *per se*.

The book has not undertaken any case studies of the failure of 'turnaround' efforts. For the derivation of valid inferences, the conjunction of both the method of agreement and the method of difference, is logically necessary.

Despite the foregoing weaknesses, this book represents a laudable endeavour. It is a seminal volume focussing on an increasingly important area of management.

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**Manufacturing Engineering** by John P. Tenner, Marcel Dekker, N.Y. 1991.

Manufacturing as a function plays a very important role in building up a product with the appropriate quality at an economical price. Manufacturing also provides a unique time-based competitive advantage by supplying products at the earliest time. This perspective is extremely relevant in developing countries since manufacturing activities are shifting gradually to a developing economics. It is, therefore, necessary that all the people concerned with manufacturing should have at least some amount of understanding regarding "Manufacturing Engineering". Manufacturing engineering is a comparatively newer systemic discipline dealing with the design, operation and control of manufacturing processes and systems. In this background, a practising consultant, Mr. Tanner has done a good job by revising his introductory text on manufacturing engineering by incorporating some of the new aspects which are more relevant in today's competitive world.

This book on manufacturing engineering essentially aims at providing introductory knowledge to students studying in different disciplines of engineering in technical colleges and universities. It has, therefore, outlined various micro-aspects with the help of small engineering applications. It has described, in short, various aspects related to production planning, cost estimation, facility planning, etc. It has also brought out a chapter on manufacturing research and development which is often ignored in such kinds of texts. Many progressive companies now recognize the importance of setting up ongoing research and development function in order to build up a competitive edge to a manufacturing business. Another noteworthy aspect of the book is the discussion of application of CAD/CAM in designing automatic manufacturing systems in the form of machining cell, flexible manufacturing systems, automatic assembly, etc. This aspect is drawing more attention in developing countries where level of manufacturing technology presently followed is quite low.

Manufacturability of products is an important element to be considered in the finalization of a product design. Quite often marketing and design people come up with a beautiful product design, incorporating sophisticated application of technological knowledge, but the design finally is proved to be costly to make on the shopfloor. The chapter on product manufacturability has discussed this aspect in detail.

Though this book renders good account of all the relevant manufacturing aspects, it has a few limitations which relate to the interface of manufacturing activity and human resources. It has, perhaps, by design, omitted discussion on problems faced in the application of engineering principles. Had it discussed some of the aspects like concurrent engineering, reverse engineering, manufacturing and competition, etc, its value to practising people could have been enhanced.

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# Population, Labour & Employment: A Select Bibliography

ACHARYA, LK: Educated unemployed square peg in round holes. *Fortune India*, 9(1), Nov 1, 1990, p 6-16.

ACHARYA, SARTHI & JOSE, AV: Employment and mobility: A study among workers of low income households in Bombay City. New Delhi, ILD-ARTEP, 1991, p 90.

ACHARYA, SARTHI: Labour use in Indian agriculture: Analysis at macro level for the eighties. *Indian Journal of Agricultural Economics*, 47(2), April-June 1992, p 169-184.

ALAGH, YOGINDER K: Agricultural employment planning in India. *Productivity*, 32(1), April-June 1991, p 1-7.

AIRD, JOHN S: Population studies and population policy in China. *Population and Development Review*, 8(2), June 1982, p 267-297.

ANKER, RICHARD & GHAZI, M FAROOQ: Population and socio-economic development, the new perspective. *International Labour Review*, 117(2), March-April 1978, p 143-55.

ASIAN PRODUCTIVITY ORGANISATION: Educated Unemployment in Asia. *Productivity*, 32(1), April-June 1991, p 101-109.

ASIAN PRODUCTIVITY ORGANISATION : Measures for rural employment generation. Tokyo, APO, 1991, p 564.

BALKRISHNA, C: Fault in our population policy. *Mainstream*, 15(29), March 1977, p 13-14.

BANCER, JOHN: Demographic change and Asian Labour markets in the 1990s. *Population & Development Review*, 16(4), Dec 1990, p 615-645.

BARNABAS, AP: Family Programme in India, a note on policy and performance. *Social Action*, 26(2), 1976, p 148-156.

BASANT, RAKESH & PARTHASARATHY, R: Correlates of inter regional variations in rural non-agricultural employment in Gujarat. *Indian Journal of Labour Economics*, 34(2), April-June 1991, p 111-121.

BASANT, RAKESH & PARTHASARATHY R: Inter regional variations in rural non-agricultural employment in Gujarat, 1961-81. Ahmedabad, Gujarat Institute of Area Planning, 1991, p 38.

BASU, KLAUSHIK: The broth and the cooks: The theory of surplus labour. *World Development*, 20(1), Jan 1992, p-109-117.

BEHAR, CEM: Malthus and the developments of demographic analysis. *Population Studies*, 41(2), July 1987, p 269-81.

BHAT, MARI: Fertility and mortality in colonial India. *Economic and Political Weekly*, 25(37), Sep 15, 1990, p 2107-2108.

BHATACHERJEE, DEBASHISH: Determinants of bargaining structure in India: An exploratory exercise. *Economic and Political Weekly*, 27(22), May 30, 1992, M71-M74.

BHATE, VAIJAYANTI AND SANJEEVANCE' MULAY: Population from Indian economic development. *Economic and Political Weekly*, 24(13), April 1989, p 700.

BHENDE, MJ: EGs and the poor: Evidence from longitudinal village studies. *Economic and Political Weekly*, 27(13), March 28, 1992, p A19-A22.

BLERESSEN, HERMAN J & ROY HOOVER: Population forecasting at the city level: An econometric approach. *Urban Studies*, 22(1), Feb, 1985, p 83-90.

BLOOM, DAVID E AND RICHARD, B Freeman: The effects of rapid population growth on labour supply and employment in developing countries. *Population and Development Review*, 12(3), Sept 1986, p 381-414.



- BORSCH-SUPAN, ANEL H: Panel data analysis of the Beveridge curve. Is there a macroeconomic relation between the rate of unemployment and the vacancy rate? *Economica*, 58(231) Aug 1991, p 279-97.
- BOSE, ASHIS & VIR NARAIN: Population perspective and policy in India, 1951 to 2001. *Social Science Probings*, 1(4), Dec 1984, p 439-91.
- BOSE, ASHIS: Utilisation of demographic data for policy-making planning, monitoring and evaluation – A note on some critical issues. *Economic and Political Weekly*, 22(1), March 14, 1987, p 471-473.
- BRONSTEIN, AS: Temporary work in Western Europe: Threat or complement to permanent employment. *International Labour Review*, 130(3), 1991, p 291-310.
- BUDHE, NIR: Contract Labour Act – An instrument of exploitation? *Economic and Political Weekly*, Jan 2-9, 1993, p 23-24.
- BURGESS, SIMON M: A symmetric employment cycles in Britain: evidence and an explanation, *Economic Journal*, 102,(411) March, 1992, p 279-290.
- BURSTEIN, PAUL: Legal mobilization as a social movement tactic the struggle for equal employment opportunity. *American journal of Sociology*, 96(5), March 1991, p 1201-1225.
- CEMERON, JOHN & IRFAN, MOHAMAMAD: Establishing people to help themselves – An employment and human resource development strategy for Pakistan in the 1990s. Geneva, ILO-ART EP, 1991.
- CAMP, SHARON L: Population, poverty and pollution. *Applied Research and Public Policy*, 6, Summer, 1991, p 5-17.
- CHADHA, GK: On measuring employment and earnings for weaker sections in rural India. *Indian Journal of Labour Economics*, 34(1), Jan-March 1991, p 28-40.
- CHAUDHRY, MAHINDER: India's Population policy target of a net reproduction rate of unity by the year 2000. *Journal of Family Welfare*, 33(4) June 1987, p 25-37.
- COALE, ANSLEY J: Population trends, population policy and population studies in China. *Population and Development Review*, 7(1), March 1981, p 85-97.
- DA COSTA, ERIC: The background to formulation of growth in employment 1990-200AD. *Quarterly Economic Report of the Indian Institute of Public Opinion*, 33(3), July-Sept 1990, p 19-22.
- DEERE, DENOLD R: Unemployment insurance and employment. *Journal of Labour Economics*, 9(4), Oct 1991, p 307-324.
- DASGUPTA, MONICA: Population and development policies and programmes in India, 1951-1987. New Delhi NCAER, 1991 p 152.
- DASGUPTA, SUGATA: The population explosion and development. Some myths, fallacies and remedies. *Gandhi Marg*, 5(1), April 1983, p 7-17.
- DAS, PULAK: Job search, migration and labour market segmentation. *Indian Journal of Economics*, LXXI (281), Oct 1990, p 215-223.
- DANTWALA, ML & OTHERS: Search for an employment oriented growth strategy – A discussion. *Economic and Political Weekly*, May 26, 1990.
- DASH, NRUSINGH PRASAD: Role of education in combating population explosion, *Yojana*, 34(21) Nov 16, 1990, p 14-17.
- DEMENY, PAUL: World Population trends. *Current History*, 88(534) Jan 1989, 17-19, p 58-59, 64.
- DESAI, UC: Professional policy making. The case of Indian Population Policy. *Indian Journal of Public Administration*, 22(4), 1976, p 692-704.
- DESPANDE, SUDHA: New economic policy and female employment. *Economic and political Weekly*, Oct 10, 1992.
- DHARIA, MOHAN: Reducing population growth to zero by AD2000. *Yojana*, 29(16), Sept 1985, p 10-13.
- DHARMALINGAM, A: Agrarian structure and population in India, a selective survey. *Economic and Political Weekly* 26(26), June 29, 1991, p A46-A62.
- DHARMALINGAM A: Fertility and mortality in colonial India, *Economic Political Weekly* 25(52), Dec 29, p 2868.
- D'MELLO, BERNARD: Thinking about the labour process: Some clues from Western studies. *Economic and Political Weekly*, 27(22), May 30, 1992, p M63-M70.
- DREZE, JEAN AND LANJOUW, PETER: Economic mobility and agricultural labour in rural India: A case study. London, London School of Economics, 1992, p 65.
- FAROOQ, GHAZI M: Population, human resources and development planning: Towards an integrated approach. *International Labour Review*, 120(3) May – June, 1981, p 335-49.



- FAROOQ, GHAZI M & F LANDIS MACKELL: Demographic employment and development trends: the need for integrated planning. *International Labour Review*, 129(3), 1990, p 301-315.
- GHOSH, ARUN: Eighth Plan: Challenges and opportunities. *Economic and Political Weekly*, 26(20), April 20, 1991, p 1017-22.
- GHOSH, A & CHAKRAVARTI D: The impact of population growth on investment, income and employment. *Demography India*, 1(2), 1979, p 44-50.
- GOPALAN, C: Population problem: Need for a total view. *Economic and Political Weekly*, 25(23), Aug, 18, 1990, p 1827-1830.
- GOON, AM & CHANDRAN, NK: Projecting India's population to 2001A.D. *Manpower Journal*, 18(2), July-Sept 1982, p 19-42.
- GOSH, PARIMAL: Communalism and Colonial labour: Experience of Calcutta Jute Mills workers, 1880-1930. *Economic and Political Weekly*, 25(30), July 28, 1990, p PE61-PE72.
- GOYAL, RP: Raising female age at marriage, priority in India's population policy and programme. *Demography India*, 18(1), Jan-Dec, 89, p 177-82.
- GUHA, SUMIT: Mortality decline in early twentieth century India: A preliminary enquiry. *Indian Economic and Social History Review*. 28(4), Oct-Dec 1991, p 311-391.
- GULATI, SC: Demographic determinants of the aging process: A cross country analysis. *Demography India*, 18(1&2) Jan-Dec 1989, p 211-25.
- GULATI, SC: Development determinants of demographic variables in India: A district level analysis. *Journal of Quantitative Economics*, 8(1), Jan, 1992, p 157-72.
- GUMBER, ANIL K: Occupational mobility of displaced families: A study of the Panam irrigation project in Gujarat. *Anvesak*, 19(1&2) June & Dec. 1989, p 151-173.
- HAJELA, PD: Demand management and work opportunities for all—some macrotheoretic considerations: *IASSI Quarterly*, 9(1&2) July-Dec 1990, p 37-50.
- HARS, AGNFS & OTHERS: Hungary faces unemployment. *International Labour Review*, 130(2), 1991, p 165-75.
- HARRISS, JOHN & OTHERS: Urban labour market structure and job access in India—A study of coimbatore. Geneva, International Institute of Labour Studies, 1992, p 146.
- HAQUE, T: Strategy for full employment in rural India. *IASSI Quarterly* 9(1&2) July, Dec 1990, p 13-19.
- HEHIR, J BRYAN: Development and Population: Polity perspectives and Catholic teaching. *Review of Politics*, 40(3), July, 1978, p 351-367.
- HIRWAY, INDIRA & UNNI, JEEMOL: Employment and occupational diversification of women in India. New Delhi, ILO-ARTEP, 1990, p 52.
- HOLDREN, JOHN P: Population and the energy problem. *Population and Environment*, 12, Spring 1991, p 231-255.
- INDIAN ECONOMIC ASSOCIATION: Relevance of malthusian economics. (Special conference Papers) *Indian Economic Journal* 26(1), July-Sept 1978, p 17-268.
- INDIA, MINISTRY OF LABOUR: Rural labour enquiry report on indebtedness among rural labour households (38th round of NSS) Shimla, India Government 1990, p 205.
- INDIRESAN, PV: Change agents for improved supply and demand for labour. *IASSI Quarterly*, 9(1&2) July-Dec 1990, p 69-83.
- JAGDISH RAJ: Food and population problem in India. *Australian Journal of Politics and History*, 29(2), 1983, p 392-402.
- JAIN, ANRUDH K: Revising the role and responsibility of the family welfare programme in India. *Economic and Political Weekly*, 24(49), Dec 4, 1989, p 2729-2737.
- JHA, MARKANDEYA: Agricultural labourers in debt: A case-study. *Yojana*, 34(17). Sept 16-30, 1990, p 23-24.
- JHALA, PJ: & THAKAR, PH: Priorities in work opportunities: Perceptions from Gujarat. *IASSI Quarterly*, 9(1 & 2) July-December 1990, p 84-87.
- JM: Economic liberalisation and employment. *Economic and Political Weekly*, June 13-20, 1992, p 1234-1235.
- JOHNSTON, WILLIAM B: Global work force 2000. The new world labour market. *Harvard Business Review*, March-April 1991, p. 115-127.
- JONES, GAVIN W: Recent and perspective population trends in Malaysia, *Journal of South East Asian Studies*, 16(2), Sept. 1985, p 262-80.
- JOSHI, NAVIN CHANDRA: Population crunch in Third World. *Commerce*, 157(4033), Sep. 10, 1988, p 35-38.
- JOSHI VASUDHA: Lessons from Maharashtra employment guarantee scheme. *Yojana*, 35 (18) Oct. 15, 1991 p 16-19, 22.



- KABRA, KAMAL NARAIN: Planning for full employment: A review of past strategy, policies and programmes. *IASSI Quarterly*, 9 (1 & 2), July-Dec 1990, p 88-110.
- KAILASH: Capital region is not the ultimate solution. *Mainstream*, 29 (13), Jan 19, 1991, p 32-34.
- KAKWANI, N & SUBBARO, K: Rural poverty and its alleviation in India. *Economic and Political Weekly*, March 31, 1991.
- KANNAN, KP: State and Union intervention in rural labour: A Study of Kerala, India. New Delhi, ILO ARTEP, 1990 p 79.
- KAPL, MARTIN & OTHERS: Unemployed and market-oriental reform in Czechoslovakia. *International Labour Review*, 130(2), 1991, p 199-210.
- KAPOOR, PN: Implications of the Provisional results of the census of India, 1991. *Journal of Family Welfare*, 39(3), Sept. 1991, p 10-17.
- KASHAPPAGUDAR, NB: Population trends in India. *Social Welfare*, 33(10), Jan 1987, p 28-31.
- KAUR, SATNAM: Plight of women agricultural labourers. *Kurukshetra*, 39(9), June 1991, p 13-16.
- KELLEY, ALLEN C: Economic consequences of population in the Third World, *Journal of Economic Literature*, 26(4), Dec 1988, p 1685-1728.
- KHANIJI, MK: Major issues in operationalising right to work. *Quarterly Economic Report of the Indian Institute of Public Opinion*, 33(3), July-Sept 1990, p 45.
- KONIG, ANDREAS & SEBLOCK, ROBERT, L: Supported employment—Equal opportunities for severely disabled men and women. *International Labour Review*, 130(1), 1991.
- KOTHARI, DEVENDRA & ANUJA GULATI: Family Welfare programme in India: a proposal for structural change. *Administration Change*, 18(1 & 2), July 1990, June 1991.
- KRISHNA KUMARI: Population Introgenity and internal migration. *Demography India*, 9(1 & 2), 1980 p 82-94.
- KRISHNAN, TN: Population, poverty and employment. *Economic and Political Weekly*, Nov. 14, 1992, p 2479-2498.
- KRISHNAJI, N & SATYA SHEKHAR P: Population and agricultural growth—a study in inter regional variations. *Economic and Political Weekly*, 26(26), June 29, 1991 p A63 A68.
- KRISHNARAJ, MAITHREYI: Women's work in Indian Census: Beginnings of change. *Economic and Political Weekly*, 25(48 & 49), Dec (1 & 8), 1990, p 2663-2672.
- KULKARNI, SUMATI & SANTOSH KUMAR B: Socio-Economic development and population growth of various states in India: The experience of two decades. *Journal of Family Welfare*, 37(3), Sep 1991, p 44-51.
- KUNDU, AMITABH: Growth of non-agricultural employment: A hypothesis on rural urban Linkages. *IASSI Quarterly*, 10(2), Oct-Dec 1991, p 1-20.
- KUNDU, AMITABH: Sectoral diversification—special deminsions. *Productivity*, 32(1), April-June 1991, p 48-57.
- KURIAN, NJ: Employment potential in rural India. An analysis, *Economic and Political Weekly*, 25(52), Dec 29, 1990, p A177-A178.
- KUTTY, AI: Population and population. *Sarvodaya*, 30(3 & 4), Sept-Oct 1982, p 129-134.
- LINGA MURTHY, & VIJAYA KUMAR S: Demographic trends and the impact of family welfare programmes in India. *Asian Economic Review*, 32(1), April, 1990, p 45-76.
- LOUTFI, MARTHA F: Self employment patterns and policy issues in Europe. *International Labour Review*, 130(1), 1991, p 1-19.
- MALATHY, R: Estimating substitution and income effects of female labour supply. *Journal of Quantitative Economics*, 7(1), Jan, 1991, p 43-63.
- MATHUR, HS: Planning for population change in arid Rajasthan. *IASSI Quarterly*, 9(1 & 2), July-Dec 1990, p 163-175.
- MATHUR, VIJAY K & STEIN SHELDON H: A dynamic inter regional theory of migration and population growth. *Land Economics*, 67(3), Aug 1991, p 291-298.
- MAULDIN, W PARKER: Population trends and prospects. *Development Digest*, 19(4), Oct 1981, p 23-24.
- MAYUR, JEAN: The Employment Policy Convention: Scope, assessment and prospects. *International Labour Review*, 130(3), 1991, p 339-358.
- MCALLEER, MICHAEL & MCKENZIE, CR: Keynesian and new classical models of unemployment revisited. *Economic Journal*, 101(406), May 1991, p 359-81.
- MEHTA, GS: Effect of Education in occupational structure of employment. *Manpower Journal*, XXVII (4), Jan-Mar 1992, p 23-31.



- MILLS, EDWIN S & JEE PENG TAN: A comparison of Urban population density functions in developed countries. *Urban Studies*, 17(3), Oct 1980, p 313-321.
- MISHRA, RK: Population campaign: The otherwise. *Link*, 24(23), Jan 19, 1982, p 8.
- MITRA, ASOK: Population and environmental degradation in India. *IASSI Quarterly Newsletter*, 3(3 & 4), Dec 1984, p 12-18.
- MITRA, S: Effect of emigration on other demographic measures. *Demography India*. 17(2), July-Dec 1988, p 278-88.
- MUNDLE, SUDIPTO: The employment effects of stabilization and related policy changes in India: 1991-92 to 1993-94. *Indian Workers*, 11(17 & 19) 27 Jan 10.-Feb, 1992, p 27-37.
- MUNDLE, SUDIPTO: Unemployment and financing of relief employment in a period of stabilisation—India, 1992-94. *Economic and Political Weekly Welfare*, Jan 30, 1993, p 173-181.
- MURTHY N LINGA & S VIJAYA KUMAR: Demographic trends and the impact of family welfare programmes in India. *Asian Economic Review* 32(1), April 1990, p 45-76.
- NAGCHAUDHURI, BD: Population, environment and world order. *India Quarterly*, 40(2), April-June 1984, p 212-17.
- NAIDU, K LAKSHMAIAH: Indian labour migration to Gulf Countries. *Economic and Political Weekly*, 26(7), Feb 16, 1991, p 349-350.
- NARAYANA, MR: Optimum population size for a regional economy—Analytical approach. *Indian Journal of Quantitative Economics*, 4(2), 1988, p 77-83.
- NATH, V: 1991 Population census some facts and policy issues. *Economic and Political Weekly* 26(51), Dec 21, 1991, p 2937-42.
- NELSON, JOAN M: Organized labour politics and labour market flexibility in developing countries. *World Bank Research Observer*, 6(1), Jan 1991, p 37-56.
- PARASURAMAN, SULABHA & ROY, TK: Some observations on the 1991 census population of India. *Journal of Family Welfare*, 37(3), Sep 1991, p 62-68.
- PARTHASRATHY, G: Agricultural labourers and rural wages: National Policy for agricultural labourers. *IASSI Quarterly*, 9(3), Jan-Mar 1991, p 12-56.
- PATHAK, KB & RAM F: Dynamics of population changes in India: Lessons from the 1991 census. *Journal of Family Welfare*, 37(3), Sep 1991, p 52-61.
- PATHAK, KB & RAM F: Dynamics of population change in India: Lessons from the 1991 change. *Journal of Family Welfare*, 37(3), Sept 1991, p 52-61.
- PATHAK, TC: Industrial employment in Rajasthan, *Manpower Journal*, XXVI (1), April-June, 1990, p 51-64.
- PATHE, VASANT P: Beyond demography towards interdisciplinary exploration. *Economic and Political Weekly*, 25 (1), Jan 6, 1990, p 57-60.
- Planning Commission: Employment past trends and prospects for 1990's Working Paper, Government of India, May 1990.
- PRASAD, KAMTA: Right to employment—strategic and Operational aspects. *IASSI Quarterly*, 9(1 & 2), July-Dec 1990, p 20-25.
- PRAKASH, BA: Growing unemployment in Kerala. Study of nature and magnitude. *Manpower Journal*, 26(3), Oct-Dec 1990, p 67-78.
- PREMI, MAHENDRA K: India's population—Heading towards a billion. Delhi, B.R. Publishing Corporation, 1991, p 157.
- PUROHIT, YS & BHARDWAJ, VP: Determinants of Labour mobility in a backward area: A study of Bharuch-Ankleshwar region. *Anvesak*, 19 (1 & 2), June-Dec 1989, p 65-76.
- RADHAKRISHNA RD & OTHERS: Rural labour markets in irrigated and dry zones of Andhra Pradesh. *IASSI Quarterly*, 9(3) Jan-March 1991, p 131-144.
- RAINA, BL: Development of Population Policy in India. *Journal of Indian School of Political Economy*, 1(1), Jan-June 1989, p 29-63.
- RAINA, BL: Population Policy. Delhi, B.R. Publishing Corporation, 1988, p 231.
- RAMAIAH, P & RAO, A MURALIDHAR: Impact of special employment generation programmes in rural areas: A case study. *Southern Economist*, 3(5), July 1, 1991, p 13-16.
- RAMAMURTHI, TV: Suggested strategy for increasing heavy investment growth and minimising employment generation during 1990-2000. *Manpower Journal*, XXVI (1), April-June 1990, p 1-31.



- RAMASWAMY, C & SELVARAJ, KN: Agricultural labour market under difference production environments. *Productivity*, 32 (4), Jan-March 1992, p 693-697.
- RAMASWAMY, C & SELVARAJ, KN: Dimensions of agricultural labour markets. *IASSI Quarterly*, 9(3), Jan-March 1991, p 145-151.
- RAMESH CHANDRA: Jawahar Rozgar Yojana: Some issues. *Administrator*, XXXVI (1) Jan-March, 1991, p 133-141.
- RAO, A MURALIDHAR REDDY, SEKHAR, B & RAO, N. NARASIMHA: TRYSEM needs collective approach to success. *Kurukshetra*, 39 (10), July 1991, p 29-31.
- RAO, B KRISHNA: Planning ane employment growth. *Southern Economist*, 29(19), Feb 1, 1991 p 7-10.
- RAO, B SUDHAKAR: Employment and productivity in Agro Industries. *Productivity*, 32(1), April-June 1991, p 38-47.
- RAVALLION, M: Reaching the rural poor through public employment—Arguments, evidence and lessons from South Asia. *World Bank Research Observer*, 6(2), July 1991.
- RAVI, K: Demographic trends, a study of southern states. *Southern Economist*, 30(1), May 1991, p 41-42.
- RAY, S.N. & JACOB, PANL: Employment, unemployment and underemployment current dimensions and conceptual issues: A study based on the NSS 43rd round results. *IASSI Quarterly*, 9(1 & 2), July-Dec 1990, p 111-128.
- REDDY, C NARAYANA: Organising agricultural Labour: A review. *Social Changes*, 21(3), Sep 1991, p 16-23.
- REDDY, G YALLAWANDA: Right to land, new technology and employment generation. *Kurukshetra*, 39(5), Feb 1991, p 4-14.
- REDDY, PH: Population front of India's economic development, *Economic and Political Weekly*, 23 (35) August 27, 1988, p 1809-1812.
- REDDY, V. RATNA: Some estimates of labour demand of riq cultivation. *Indian Journal of Economics LXXI* (283), April 1991, p 523-540.
- RIVEROS, LUIS A: Labour costs and manufactural exports in developing countries: An econometric analysis. *World Development*, 20((7), July 1992, p 991-1008.
- RODGERS, GERRY: Population growth and poverty in rural south Asia, New Delhi, Sage Publications, 1989, p 249.
- ROSENZWERG, MARK R: Population growth and human capital investments: Theory and evidence. *Journal of Political Economy*, 98(5), Oct 1991, p 38-70.
- ROY, ANUBHA: Employment planning and policy in India. *Journal of Social and Economic Studies*, (2), 1989, p 281-296.
- ROY, BADAL: Inflation, wages and the future of employment in India. *Indian Journal of Industrial Relations*, 25(3), Jan 1990, p 243-253.
- SAAZ, JL: Interplay of population and development. *Yojana*, 27(1) Jan 26, 1983, p 33-35.
- SAIGHAL, VINOD: Population problem in India, anticipating pressures during decades ahead. *Mainstream*, 23 (30), 1985, p 11-14, 23 (31), March 30, 1985, p 25-26.
- SANGAL, PS: Population and Law. *India International Centre, Quarterly*, 8(3), 1981, p 311-316.
- SANGITA, SN: Infrastructure for selfemployment programme: A focus on TRYSEM. *Sedme*, 17(1), Jan 1990, p 49-76.
- SARKAR, SB: Unemployment in West Bengal: Left's policy failed to create jobs. *Business Standard*, Sept 13, 1991, p 7.
- SATYA, SUNDARAM: TRYSEM-Progress and problems. *Kurukshetra*, 39(5), Feb 1991, p 35-37.
- SEAL, KC: Data requirements for planning work opportunities for all. *IASSI Quarterly*, 9(1 & 2) July-Dec 1990, p 26-35.
- SEN, A: Employment, technology, and development. Delhi, Oxford University Press, 1975.
- SESHADRI, C & PANDEY, JL: Population education: A national source book. New Delhi, National Council of Educational Research and Training, 1991, p 404.
- SETHI, VIJAY K & SETHI, ASHOK K: Demand for labour in Indian manufacturing industry 1960-64. *Journal of Indian School of Political Economy*, 3(3), July-Sept 1991, p 521-533.
- SHARMA, AVK: Self-employment programmes: Resprospect and prospect, *Sedme*, 17(2), June 1990, p 1-14.
- SHARMA, JP: Problems relating to labour and employment sports goods industry in India. *Manpower Journal*, 27(1), April-June 1992, p 1-16.
- SHARMA, LC: Population, census count from 1872-1991. *Facts for you*, 13(2), Aug 1991, p 35-42.



- SHARMA, NARAYAN PRASAD: Migratory behaviour of agricultural labourers. *Manpower Journal*, 26(3), Oct-Dec 1990, p 89-94.
- SHUKLA, VIBHOOTI: Rural non-form employment in India – Issues and Policy. *Economic and Political Weekly*, July 11, 1992, p 1477-1488.
- SINGH, AK & OTHERS: Problems and prospects of family workers employment in various farming systems. *Manpower Journal*, 27(1), April-June 1991, p 17-26.
- SINGH, LR & DUBEY, RN: Impact of population growth on agricultural and use in Rohilkhand, UP. *National Geographer*, 25(1), June 1990, p 45-54.
- SINGH, RAJENDRA & SINGH, SRIKRISHNA PRASAD: Pattern of employment and male-female wage differential among landless agricultural workers in Eastern U.P. *Manpower Journal*, 24(4), Jan-March 1989, p 59-70.
- SINGH, SURJEET: Non-form employment in Punjab: A perspective. *Indian Journal of Labor Economics*, 34(1), Jan-March 1991, p 41-53.
- SINGH, SURJEET & SHARMA, MAHENDRA K: Employment and rural non-farm activities in Rajasthan. *Rajasthan Economic Journal* 19(1), Jan 1990, p 41-61.
- SIWAL, BR: Population education in rural development. *Kurukshetra*, 30(14), April 16, 1982, p 13-15.
- SREENIVASAN, K: The demographics scenario revealed by the 1991 census figures. *Journal of Family Welfare*, 37(3), Sept 1991, p 3-9.
- SRINIVASAN, K & OTHERS: Impact of population on selected social and economic sectors. *Economic and Political Weekly*, 23(37), Sept, 10, 1988, p 1913-17. 23(38), Sept 17, 1988 p 1965-75.
- SRINIVASAN, K: The demographic Scenario revealed by the 1991 census figures. *Journal of Family Welfare*, 37(3), Sept 1991, p 3-9.
- SHRIVASTAVA, ASEEM: Overpopulation the great red herring? *Economic and Political Weekly*, 27(38), Sept 19, 1992, p 2032-2038.
- TISDELL, CLEM: Rural-Urban Migration, population and labour allocation: Labour surplus models and alternatives. *Indian Journal of Quantitative Economics*, 4(2), 1988, p 15-27.
- United Nations: Concise report on the world population situation in 1989 with a special report on population trends in the less developed countries. New York, 1991, p 29.
- United Nations: Long range population projections: Two Centuries of population growth 1950-2150. New York, UN, 1922, p 35.
- United Nations: Trends in population policy. New York, UN, 1990, p 387.
- UNNI, JEEMOL: Regional variations in rural non-agricultural employment: An exploratory analysis. *Economic and Political Weekly*, 26(3), Jan 19, 1991, p 109-122.
- UPADHYAY, SASHI BHUSHAN: Cotton Mills workers in Bombay, 1875-1918: Conditions of work and life. *Economic and Political Weekly*, 25(30), July 28, 1990, p PE 87-PE 89.
- VERMA, NEELMANI, P: Female labour and work participation validity of the existing hypotheses. *Manpower Journal*, 26(3), Oct-Dec 1990, p 95-101.
- VISARIA, PRAVIN: Concepts and measurement of unemployment and underemployment in Asian Countries: A comparative Study. New Delhi: ILO-ARTEP, 1990, p 93.
- VISARIA, PRAVIN & MINHAS, BS: Evolving an employment policy for the 1990s: What do the data tell us? *Economic and Political Weekly*, XXVI (15), April, 13, 1991, p 969-97.
- WAQUIF, ARIF A: Manpower planning approaches for employment generation. *IASSI Quarterly*, 9 (1 & 2), p 51-55.
- WILKINSON, FRANK: The structuring of economic and social deprivation and the working of the Labour markets in Industrial countries. *Labour Society*, 16 (2), 1991, p 119-38.

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# Manufacturing Strategy: A Potent Source of Competitive Advantage

S.N. Nandi

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*Manufacturing Strategy can be considered as a pattern of choices made in order to achieve the full competitive capability of a business unit. These strategies are either explicitly drawn up or implicitly realised as manifested in a stream of real time decisions made at different points of time. The author attempts to explain the important characteristics of a manufacturing strategy from a conceptual angle and then outlines the pattern of strategic decisions that emerge from the kind of structures and infrastructures that exist in Indian organisations.*

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The term 'strategy', has its origin in a military context to mean 'Generalship or manoeuvrability in a war'. The term signifies, in a business, an integrated pattern of decisions made and subsequent actions taken to reach specified goals. It is expressed in terms of both the intent (i.e. goals or objectives) and means i.e. actions to be undertaken (Greenwood & Thomas, 1981). It is thus a plan, a position, a ploy, or a mental image (Mintzberg & Quinn, 1991). It governs important decisions having long term organization wide implications. It is "the match an organization makes between its internal resources and skill and the opportunities and risks created by its external environment". (Hofer & Schendel, 1978). It is also recognised as the means of developing competitive advantage with a particular business unit related to a specific product/market segment (Porter, 1985). It is the means by which some of the chosen value adding activities are carried out in such a way as to provide distinctive benefits to a customer. Though marketing is a function interfacing with customers, distinctive advantages could not be delivered by marketing and sales unless the same is executed by the manufacturing function. It is, now recognized that a business unit should be concerned about strategic perspective of the manufacturing function. And thus, a manufacturing strategy could be considered as a pattern of choices made in order to realize competitive capability of a business unit. Till now, manufacturing function, spanning from receipt of raw materials through delivery of finished goods to customers, has not been given due recognition in strategic management literature.

## Strategic Role of Manufacturing

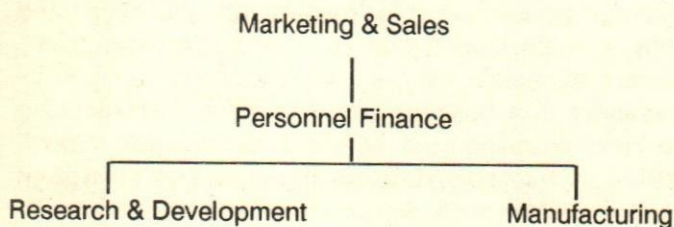
Theoretically, a strategy could exist at any level of disaggregation of an organisation system. However, three levels – corporate, business and functional – are often discussed and made use of in a practical situation. Corporate strategy is concerned with what types of busi-



nesses the company, as a whole, should be in and how changes to be made in those types. These issues constitute corporate planning. Financial return, growth and fulfillment of other powerful stakeholders' interests are the objectives which are pursued in deciding such issues. Business strategy is concerned with how to compete in a specific product-market situation. Such a strategy is also known as a competitive strategy. Porter (1980) argues that a business unit or firm, through competitive strategy, seeks to define and establish an approach to competing in the concerned industry. Such a competitive strategy could be effective if it offers a sustainable competitive advantage over existing and potential competitors (Porter, 1985). There are broadly three generic competitive strategies - low cost leadership, product differentiation and segmentation or focused approach with potentiality of providing such competitive advantages.

Lower cost is the ability of a firm to design, produce and market a comparable product more efficiently than the competitors. Korean steel and semiconductor producers, for example have penetrated against foreign competitors using this strategy. Differentiation is the ability to provide unique and superior value to the buyer in terms of product quality, special features or after-sales service. German machine differentiation strategies involve high product performance, reliability and responsive services. Focused approach is visible in many industries. In automobiles, leading American and Japanese companies have wide product lines, while BMW and Daimler-Benz (Germany) emphasize high performance cars and Hyundai and Daewoo (Korea) focus on compacts and sub-compacts.

With the boundaries of the business and the desired competitive advantages identified, each functional area (typically, marketing and sales, manufacturing and R & D) develop strategies that support that business focus.



Each of the functional strategies will have interactive relationships with business strategy and among one another. Relationships are proactively decided. Among all the other functions, manufacturing is the most misunderstood function from a strategic point of view.

Increasing level of competition and rapid evolution of production technology have, of late, drawn attention of

policy makers to look at the manufacturing function from a strategic perspective. Skinner (1969) pointed out that 'a lack of awareness among top executives that a production system inevitably involves trade offs and compromises and so must be designed to perform a limited task well, with that defined by the corporate strategy'. Skinner (1985) subsequently clarified that (1) there are many ways to compete besides producing at low cost; (2) a factory can not perform well on every yardstick and (3) simplicity and repetition breed competition. He further mentioned that the traditional model seems to be that corporate strategy is often set with little reference to the existing manufacturing structure. While the overall strategy is carefully translated into product strategy and marketing mix, the manufacturing function is simply expected to cope with the outcome.

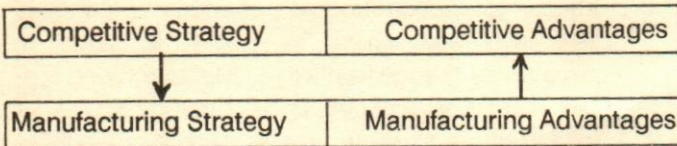
**Manufacturing is the most misunderstood function from a strategic point of view.**

Western countries have now realised the strategic role of manufacturing function. For example, Abernathy (1978) says, "the primary sources of this advantage are found, instead, in the Japanese-execution of a well designed strategy based on the shrewd use of manufacturing excellence. The Japanese cost and quality advantages originate in painstaking strategic management of people, materials, and equipment that is, in superior manufacturing performance". The concept of manufacturing strategy has now been formalised as the means by which the capabilities of the manufacturing function are developed to support the desired competitive advantage of the business units, and to complement the efforts of the other functions. Operationally, such capability and support are determined by the pattern of decisions that are made in manufacturing.

An appropriately built up manufacturing function only could make a business unit realise a competitive performance by producing error free products, getting goods to the customer quickly, invariably keeping delivery promises, being able to introduce innovative new products on a timely basis, providing a range of products wide enough to satisfy the customer requirements, being able to change volumes or delivery dates to customer demands and, always important, it determines the company's ability to offer products at a price which either undercuts the competitor or gives a high margin or both (Slack, 1991). Thus, the manufacturing function is going



to be the key focus for formulation and execution of a competitive strategy. A proactive manufacturing strategy will provide the needed strength and linkages as shown below:



**The Japanese cost and quality advantages originate in painstaking strategic management of people, materials, and equipment that is, in superior manufacturing performance.**

### Manufacturing Strategy Defined

Although there is no generally accepted definition of a manufacturing strategy, several explanations have appeared which specify what it does or what it addresses. There seems to be an agreement that manufacturing strategy should act to support corporate objectives (Skinner, 1978; Wheelwright, 1984), provide manufacturing objectives which offer the firm a competitive advantage (Hayes & Wheelwright, 1979) and focus on a consistent pattern of decision making within key manufacturing resource categories (Hayes & Wheelwright, 1984; Edmondson and Wheelwright, 1989; Hil, 1989).

A manufacturing strategy could be defined as "a collective pattern of coordinated decisions that act upon the formulation, reformulation and deployment of manufacturing resources and provide a competitive advantage in support of the overall strategic initiative of the firm or the SBU" (Maruchek, Pannesi & Anderson, 1990). Slack (1991) defines manufacturing strategy as "the set of coordinated tasks and decisions which need to be taken in order to achieve the company's required competitive performance objectives". Slack's definition relates manufacturing strategy with manufacturing objectives whereas the former definition links it with the business objectives. Another school of thought relates it to world class manufacturing. Richard Schonberger (1986) who led this school, defines world class manufacturing as "Today there is wide agreement that continual improvement in quality, cost, lead time, and customer service is possible, realistic, and necessary", and that one more primary goal, improved flexibility, is also part of the package". According to Schonberger "with agreement on the goals, the management challenge is reduced to speeding up the

pace of improvement". A manufacturing strategy could thus be thought as "a blueprint for action towards world class manufacturing: a pattern of decision to be executed in line with overall business goals or objectives mostly through a gradual process" (Roth, Giffi & Seal, 1992). This definition stresses that a manufacturing strategy ensures a business to move towards a direction with a view to attain the manufacturing excellence. Manufacturing excellence is broadly defined as a dynamic process that provides unique value, competitive advantage and delight to customers and suppliers through the development of internal operations capabilities that foster continuous improvements in human assets, technology, materials and information flows, that are synergistic with the total business, and that provide a sustainable competitive position in the firm's target markets" (Roth et. al, 1992). Since there exists many constraints towards achieving the above mentioned goals, a manufacturing strategy could also be probed into from a perspective of constraints. The essence of strategic planning in manufacturing should therefore be a dynamic process of identification and removal of internal and external constraints towards achieving higher level of performance in terms of short term and long term corporate profitability (Weston, 1992). All these definitions point out that there is a set of performance objectives based on which future competition battle will be fought. Manufacturing process has to equip itself with the right capability so that the concerned business could keep on winning the battle at any point of time. These performance objectives have been termed differently by various authors. Manufacturing mission, competitive priority, manufacturing advantages, manufacturing objectives, etc. are some of the examples.

**Manufacturing excellence is broadly defined as a dynamic process that provides unique value, competitive advantage and delight to customers and suppliers.**

### Manufacturing Objectives

There has been surprising amount of unanimity in defining manufacturing objectives or criteria. These criteria are :

- i. Cost: Low cost having direct and easily understood effect on price has been the dominating performance objective for the manufacturing func-



tion in many countries. Factors related to location, volume of production, resource utilization etc. contribute to lowering the cost. Long term manufacturing decisions are often made to ensure higher resource productivity. Lower volume, higher variety and frequent variations are the three principal market related factors that often contribute to higher costs. Importance of low cost as an objective rises with the price-sensitivity of the market.

- ii. *Product quality conformance*: This refers to conformance to product specifications. It is equivalent to doing right thing or doing error free. Product specifications may refer to those attributes which relate to not only functionality but also other dimensions of quality like reliability, durability, economy in use, etc. This objective has now been a matter of essential requirements in many markets. Such an objective is sometimes divided into two: conformance of design with market requirements and conformance of production with designs. Process certification through ISO 9000 ensures continuous adherence to such a conformance especially when market requirements are specified.
- iii. *High performance product*: To win customers over competitors, certain additional features are added in order to enhance the value of a product. This additional feature differentiates the product from other competing products so as to carry premium with the customers.
- iv. *Dependability*: It means keeping delivery promises – honoring the delivery contract with the customer. It is sometimes called 'on-time delivery' or 'timeliness'. The scheduling and coordination of all elements of a manufacturing system determine its ability to produce on time.
- v. *Customer service*: A Hardware product alone seldom sells. It is often accompanied with certain kinds of services provided to the customer. These services relate to those provided during pre-transaction, transaction and post-transaction periods. Post-transaction or 'After-sales services' as it is commonly known, becomes sometimes an important criterion in some market places.
- vi. *Speed*: This refers to 'Delivery Time'. Shorter delivery time is always an advantage with a customer. Process technology deployed, relationship built up with vendors, co-ordination between different workplaces, etc. contribute to shorter delivery time. It has become an important issue in

many industries where the competition is getting intensified.

- vii. *Flexibility*: It refers to two kinds of characteristics: ability to accommodate changes ('response flexibility') and ability to exhibit a range of capabilities ('range flexibility'). Manufacturing system should have necessary technology and other infrastructure to show greater degree of flexibility as customers are perceived to require varieties of products or services. Lack of knowledge and uncertainty regarding future state of affairs are also responsible for needing greater flexibility.
- viii. *Innovativeness*: It is an ability by which a manufacturing system could bring out a new process or a product in order to meet market demands. Co-ordination of technologies and creation of supportive environments are often pre-requisites for stimulation of greater innovativeness.

It may be mentioned here that the term 'Total Quality' as used sometimes in 'Total Quality Management' embraces all the above mentioned criteria other than the 'cost/price'.

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Any of the manufacturing systems is a collection of different working elements, each one of them could be thought of mini-manufacturing systems. Any one of them acts both as a supplier to the next element and as a customer to the previous one. It is, therefore, argued that the above mentioned criteria are to be pursued not only with respect to external customers which is definitely vital but also with internal customers (Slack, 1991). Further, externally important criteria are comparatively easier to discern but internal ones are very difficult. Internally, individual performance objectives influence and are influenced by each other. Any major improvement in manufacturing performance requires one to gain insights into both internal and external performance criteria. Manufacturing strategy should therefore look at both internal and external capabilities. According to Porter (1985) 'how to compete' is a deliberate choice of the management to decide which one to emphasize. But there are experts who argue that criteria have a time phase for development. A manufacturing firm could not



compete effectively for a long time on 'speed' unless the concerned firm and its manufacturing process are working with high degree of efficiency (resource productivity), dependability and quality. Growth of the performance criteria over time as visualized by Bolwijn et al (1990) is shown in Fig. 1. But the criterion based on which a firm is competing must be significantly distinguishable before the customers. Such appreciable differences on some criteria are only recognised as 'Strategic breakpoints' (Haas, 1987).

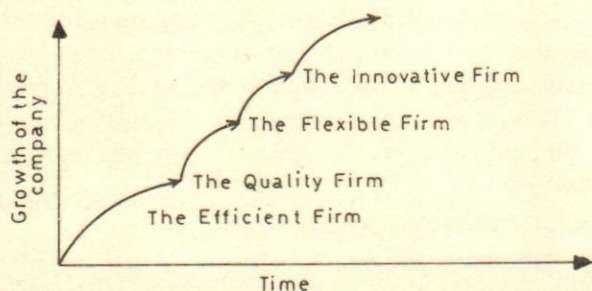


Fig. 1: The evolution of a manufacturing firm

Finally it is to be mentioned that all the criteria other than those differentiating a firm from others are also important as performance of the firm on each of those criteria has to be at least comparable with others. Thus, there are both 'Winning Criteria' and 'Qualifying Criteria' as Hill (1989) postulated. All the firms in an industry are to be equally good in all the qualifying criteria, though a specific firm may perform much better in one or two chosen winning criteria. Over time, therefore, all the firms will show progression in performance in respect of each of the manufacturing objectives or criteria as discussed above. And, that's why Schonberger emphasizes 'speeding up the pace of improvement.....' as the only fundamental task of the management.

### Elements of Manufacturing Strategy

There are several areas of manufacturing in which choices are required to be made. Since manufacturing is a part of the total value adding process which is further a small part of several cycles of production and consumption in our modern industrial society, its important decisions, as derived from the arguments of Mansfield (1986), will relate to (i) inputs and their suppliers (ii) outputs and their users (iii) transformation activities along with their physical and communication configuration and (iv) overall orientation of the organisation towards the manufacturing process. However, many of the early proponents of the concept of manufacturing strategy, like

Skinner (1974), Hayes & Wheelwright (1984), etc. mentioned about decision areas related to the first three. Writers of the Total Quality Management and world class manufacturing have emphasised the need for continuous improvement to be an overall orientation of the management in coming years. Considering observations made by all of them and the existing pattern of influencing powers by different functional groups in Indian organisations, the following decision category areas needed to be studied in the formulation and/or evaluation of a manufacturing strategy.

- Physical Structural Configuration
- Facilitating systems and procedures
- Interface with other key functions
- Relationship with external agencies
- Continuous improvement dynamics

The first category includes decisions related to facilities, technology, capacity, locations and vertical integration. Some further details are given in table 1.

Table 1: Physical Structural Configurations

Process Hardware	
●	Technology and Equipments for production
●	Types of production/or layout
●	Materials movement
●	Job design
●	Focus or specialisation
●	Trends in changes
Capacity	
●	Initial and subsequent changes
●	Single or multiple streams/plants
Location	
●	Availability of resources to be converted
●	Availability of skill, suppliers and other economic and social infrastructure
●	Special advantages
Vertical Integration	
●	Span of the process
●	Criticality of in-house/supplied components/operations

In case manufacturing strategy is not explicitly formulated, analysis of the existing structure and the ways they are undergoing changes could throw considerable light on the manufacturing strategy being implicitly followed by the concerned business unit.

There are several kinds of enabling services required for smooth manufacturing to happen. Each of these services is normally provided through well laid down systems and procedures. How effectively each of them contributes to required competitive performance is a matter of primary concern.



These services normally relate to following areas:

- Product design
- Production control
- Materials procurement
- Quality Control and assurance
- Organisation structure
- Human resource development (skill, deployment pattern, rewards, morale)
- IT application

A manufacturing strategy is one of the functional strategies laid down to achieve competitiveness at a business unit level. A functional strategy indicates how the function will support the desired competitive advantage (the business strategy) and how it will complement and interact with the other functional strategies. A business unit, for its success, requires effective and coherent working of all the important functions - Marketing, Personnel, Finance and Research & Development besides manufacturing. This interpretation of the role of manufacturing strategy in a context of functional network is very important in many countries where existing organisations are highly functionwise differentiated.

A consistent pattern of decisions in manufacturing could therefore be ensured if interfaces of manufacturing functions with key functions like marketing, personnel, finance and research & development are effectively managed. It is, therefore, visualized that such interface management should be strategically viewed to evolve a proper manufacturing strategy.

Following interfaces are important:

- Interfaces with personnel for HRD
- Interfaces with Finance for investment
- Interfaces with R & D for new product development
- Interfaces with manufacturing for product identification and design

In the last category, decision elements relate to the relationship with an external agency. A manufacturing strategy is, after all, one of the means to ensure a fit with the external environment. There are several stakeholders like investors, end users, distributors, suppliers, Government owned regulatory bodies, etc. A manufacturing strategy could only be acted upon when interests of these stakeholders are also considered. It is, therefore, emphasized that manufacturing strategy should also be concerned with the relationship build up with these stakeholders. Following relationships are important from strategic point of view.

- Relationship with suppliers
- Relationship with chain of customers

- Relationship with other stake holders

Management scientists of post 80's, specially those working in areas of TQM and world class manufacturing are convinced that a manufacturing process should have to be improved on a continuous basis in order to ensure that the process remains competitive. Such improvements could be incremental or substantial at times. Culture, creativity and technology are some of the enablers for such improvements. Innovative designs for global markets, global sourcing, etc. are also visualized as sources for competitive advantage to be achieved through manufacturing in coming years. Manufacturing strategy should therefore be concerned about the directions of such improvements. Approach to and kinds of improvement determine future competitive capabilities of the manufacturing function. The relevant elements under this category are:

- Organisational Culture
- Performance measurement and control systems
- Approach for continuous improvement
- Incremental improvement
- Radical improvement
- Globalisation

**Table 2:** Decision Areas

Decision Category Areas	Now	Future
Hardware Config. (physical structure)	Process Focus	Flexible as well as focussed.
Infrastructure (Co-ordination)	Differentiated, considerable non-value adding activities.	Slow, Integrated, Responsive, with least non-value adding activities.
Interface with other functions	Multi-directional	Uni-directional
Performance measurement & Control	Cost, Short-term & inward	Multiple dimensions, Short-term, & long-term, inward & outward both.
Organisational culture	Hierarchical, Authoritarian	Group oriented, egalitarian and congruence
Improvement mechanics	Different loci, Big investment oriented	Uni-directional, Both small and big investment oriented
Globalisation	Global consideration for marketing alone	Global consideration for all activities.

As mentioned earlier, the manufacturing function is to be fully taken into consideration in future in order to achieve competitive performance goals. Improvement directions, as argued earlier, are more or less universal. Therefore decisions in these areas are to be moving the



same direction as postulated in table 2. Such directional forecasts are in conformity with various stage theories (Doll & Vonderembse, 1992).

### Indian Scenerio of Manufacturing Strategy

India has a fairly large base of manufacturing industries. Though Indian industries are familiar with the techniques of corporate planning and strategic planning concepts of competitive strategy and competitive advantages at a specific product market level have not been much popular mostly on account of lack of competition in most of the manufacturing industries. Consumer goods industry, mostly dominated by private sector units alongwith some multi-national firms, of course, have been following some of the related principles. Marketing of brands, evolving new brands, market segmentation etc. are some of the market related strategic approaches followed by Indian Organisations. Manufacturing which is normally visualized as a supporting function to these marketing oriented strategies never have received explicit recognition of its contributions to the development of competitive advantage. Manufacturing function in most of the industries including consumer goods has been found always in a state of fire fighting towards fulfilling targets of time, cost and quality. As a result, labour productivity level and productivity growth rate in Indian

manufacturing sector as a whole has been low compared to those in many other Asian countries as seen in Figs. 2A and 2B. Many of the firms may loose even in the domestic market unless manufacturing function as "equivalent to doing" is considered while planning for a product market strategy. After all, it is the execution i.e. production and delivery which ultimately provides satisfaction to customers and thereby the competitive advantages of the firm get manifested in terms of higher sales and lower costs.

**Manufacturing function in most of the industries including consumer goods has been found always in a state of fire fighting towards fulfilling targets of time, cost and quality. As a result, labour productivity level and productivity growth rate in Indian manufacturing sector as a whole has been low compared to those in many other Asian countries.**

Export markets especially, in developed countries could offer a competitive advantage if manufacturing function is strategically reorganised. There is a segment

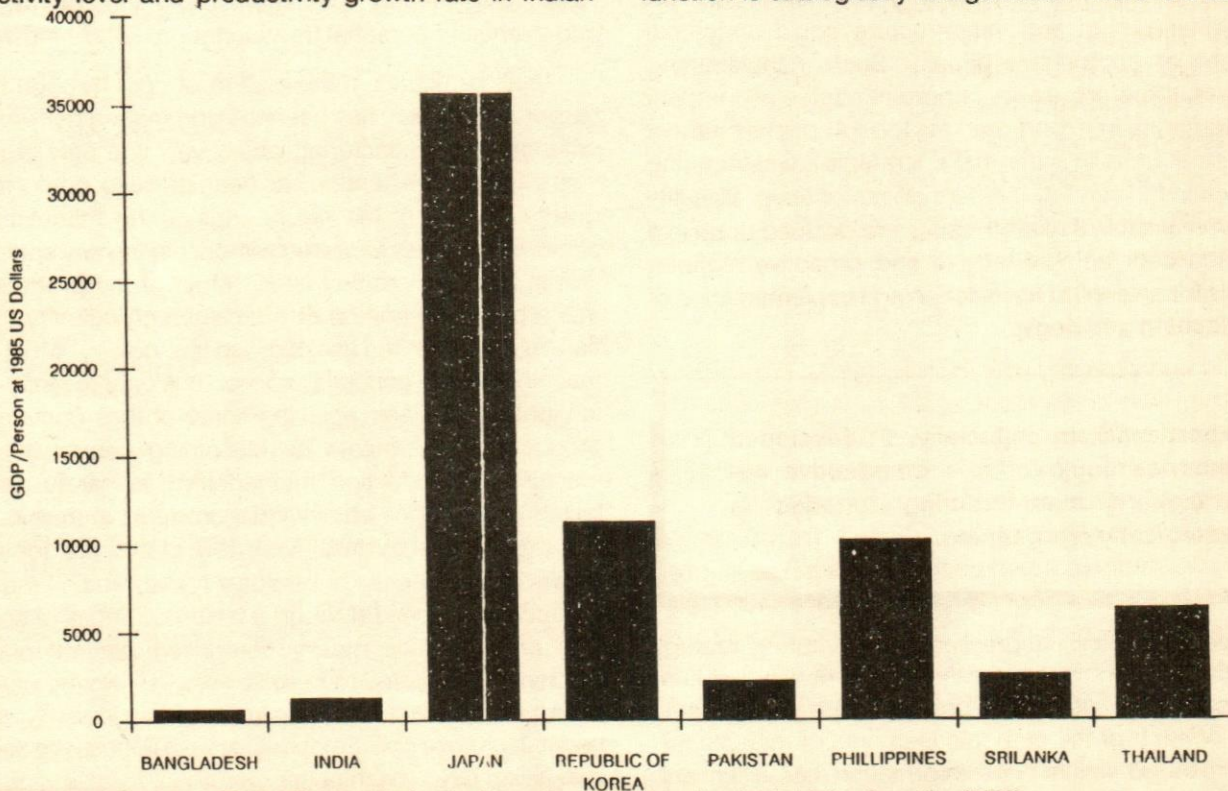


Fig. 2A Productivity levels of manufacturing sector in selected Asian Countries (1990)



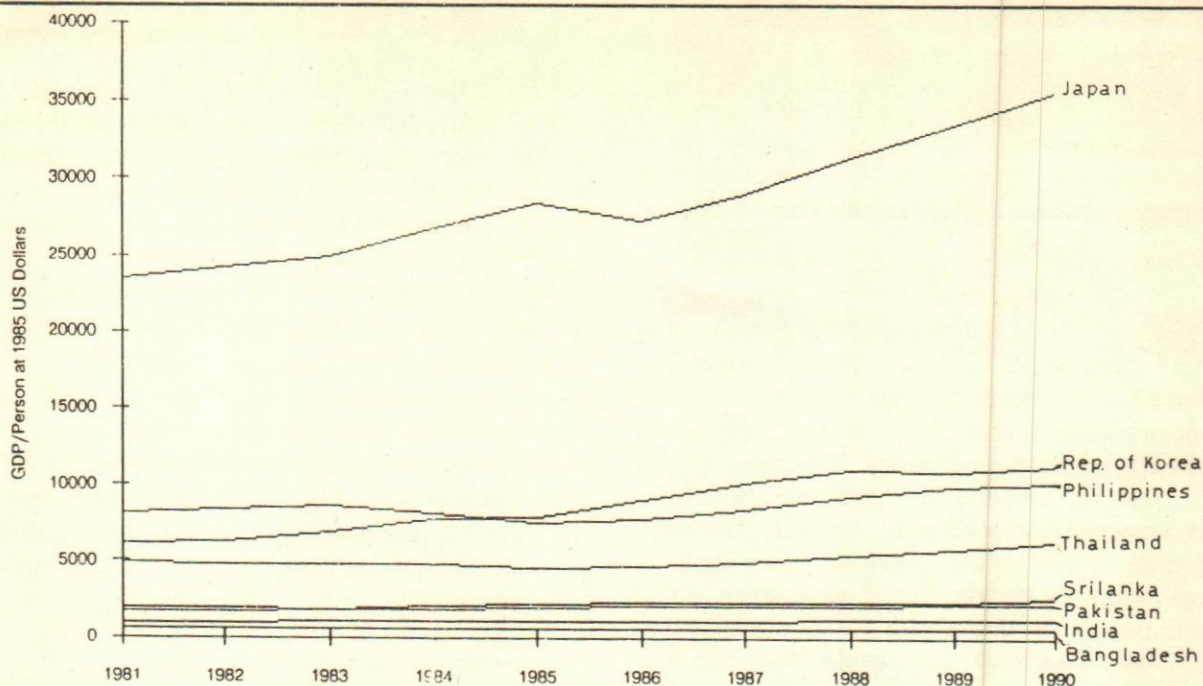


Fig. 2B Productivity growth of manufacturing sector in selected Asian Countries (Source: NPC Research Division, 1993)

in developed countries where a customer decides to buy based on customer service, tail-end customisation and flexibility besides a reasonable level of cost and quality. Flexibility in such kinds of cases could be provided through highly skilled technical labour/knowledge workers. Indian manufacturing units with proper organisational set up and infrastructure could undertake such jobs at competitive prices. Such manufacturing strategy is, therefore, a very important source of competitive advantages in export markets too. At present almost all industrial units in India make strategic manufacturing decisions in isolation at different points of time. Benefits could be realisable if related issues are decided upon in a more focussed, comprehensive and proactive manner. This calls for an explicit formulation and implementation of a manufacturing strategy.

**Export markets especially, in developed countries could offer a competitive advantage if manufacturing function is strategically reorganised.**

Since no explicitly expressed manufacturing strategy exist today, the author has attempted to profile a pattern based on observations on present state of affairs in respect of each of the strategic elements of manufacturing enumerated earlier. As information has been col-

lected mainly from secondary sources like annual reports, business magazines and limited on-the-spot observations made incidentally to the author's consultancy work, observations herein have been made in broad terms. Further, observations are comparatively biased towards Heavy Engineering, Machine tools manufacturing units and 2-wheeler personal transportation vehicle industries.

In all industries, minimisation of cost through higher resource efficiency has been the dominating performance criterion or manufacturing objective. It is only in recent years that some attention has been given to 'conformance quality'. Many of the heavy engineering manufacturing plants are process focussed without having any specialization in terms of product lines. Most of the products are made based on one-off or a small batch quantity. There has been very limited use of group technology. Most of the machineries are general purpose. It is only recently that a few of the firms are replacing some of their conventional production equipments by Machining centres or CNC machines. Production methodology is hardly decided based on positions of individual products in their respective product life cycles. Very few plants are focussed. However, in the case of personal transportation industry, production proceed through a limited number of specialized product lines mostly comprised general purpose machinery dedicated to specific lines. However, only one or two recent plants in a transport vehicle industry, set up under Japanese collaborations, are equipped with specialized NC or CNC machineries.



Indian manufacturers, more or less, have much higher diversity in products being produced from the same production plant. This shows impreciseness in identification of market requirements which, in turn, poses a problem in coordination. One of the successful strategies followed by a Japanese collaborating firm has been its effective product design for a specific Indian market segment. An innovative product design in conformity with the emerging requirements of customers can have significant impacts in the Indian market as in western markets.

Availability of raw materials, and skilled engineering personnel alongwith government incentives have been the basis for location of manufacturing plants. The total investment on the plant rises on account of having provided many social infrastructural facilities to the employed personnel. Most of the Indian manufacturers have much longer span of process than their counterparts in western countries. Lack of outside facility or lack of confidence with outside suppliers is responsible for getting most of the important components and sub-assemblies made in-house in addition to assembly.

Indian manufacturing system is characterised by a high degree of functional specialisation with a large percentage of white colour jobs compared to shopfloor jobs. Each of the manufacturing service departments like production planning, progress, inspections, design, methods engineering, exists, most often, to exercise control rather than providing support to shopfloor manufacturing personnel. 7 to 8 hierarchical levels exist in the different groups related to manufacturing function—the commitment on the part of the direct manufacturing employee is much less in such a hierarchical manufacturing set up.

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Quality control is usually inspection oriented. Production linked incentive schemes only act as an effective motivator for the direct manufacturing personnel to comply with a given production plan. Production planning is done at a centralised level by production planning department. Day to day scheduling is done by shopfloor supervisors. Computerized production planning and control system is yet to start in a big way. Raw material and in-progress inventory is comparatively higher. For example, even in the personal transportation industry, the average inventory of raw materials and in-progress

materials is about twice that maintained by a firm having Japanese collaboration in the same industry.

Manufacturing units in India still follow an adversarial relationships with suppliers, though an air of change is blowing in this direction — a few firms have built up a very good relationships with suppliers, dealers and distributors. In most of the manufacturing units, financial and personnel policies have often been offering conflicting demands on the manufacturing function. Though marketing function is gradually gaining recognition, better management of interfaces between the marketing and design departments has not got under way. Research and development departments in many of the Indian organizations are yet to provide valuable contribution in new product development.

Though quality and timeliness are measured at the operational level, cost is the only important performance parameter which draws the attention of higher management. Control has been the dominating management style in all the functional segments of an organization. Improvement is made at the tactical level mostly on the initiative of the functional specialists. Industrial engineering department, if existing, is busy in operationalisation of incentive schemes. Quality improvement efforts are limited to process certification. Globalization is thought in terms of import of technology and export to price sensitive segments of world market.

**Though quality and timeliness are measured at the operational level, cost is the only important performance parameter which draws the attention of higher management.**

## Conclusions

Manufacturing management in India, is to-day seen only in an operational framework, consisting of tools and techniques. Technology alone is regarded as the deciding factor for organising manufacturing function. Therefore the only manufacturing policy embedded in the concept of Indian management is the maximisation of utilization of manufacturing facilities and set-up. As a result, various important strategic decisions regarding manufacturing facilities like technology, layout, work organisation, etc. and other kinds of manufacturing infrastructures are taken on an ad-hoc basis. This state of affairs prevents the function from playing an active role in



developing competitive advantages. At present, the Indian firm does not possess a focussed operational policy with regard to manufacturing. There is a need, for the Indian management to be made aware of the strategic management framework of manufacturing.

### References

- Abernathy, W.J.** — The productivity Dilemma, John Hopkins University Press, Baltimore, 1978.
- Bolwijn, P.T. & Kumpe, T.** — Manufacturing in the 1990's: Productivity, Flexibility and Innovation, Long Range Planning, 23(4), 1990.
- Doll, W.J. & Vonderembse, M.A.** — The evolution of manufacturing systems: towards the post-industrial enterprise, in Manufacturing strategy: Process and content, by C.A. Voss (Ed), Chapman & Hall, 1992.
- Edmondson, H.E. & Wheelwright, S.C.** — outstanding manufacturing in the coming decade, California Management Review, Summer, 1989.
- Greenwood, P & Thomas, H** — A review of analytical models in strategic planning, Omega, 9(4), 1981.
- Haas, E.A.** — Breakthrough manufacturing, Harvard Business Review, March-April, 1987,.
- Hayes, R.H. & Wheelwright, S.C.** — The dynamics of proces-product life cycles, Harvard Business Review, March-April, 1979.
- Hayes, R.H. & Wheelwright, S.C.** — Restoring our competitive edge, Wiley, N.Y., 1984.
- Hill, T** — Manufacturing strategy: Text and cases, R.D. Irwin, Homewood, I.L., 1989.
- Hofer, C.W. & Schendel, D** — Strategy Formulation: Analytic concepts, St. Paul, MN: West, 1978.
- Mansfield, R** — Company strategy and organisational design, Croom Helm, London, 1986.
- Maruchek, A, Pennesi, R & Anderson, C** — An exploratory study of the manufacturing strategy process in practice, in C.A. Voss (ed), Manufacturing strategy: Process and content, Chapman & Hall (1992).
- Mintzberg, H & Quinn, I.B.** — The strategy process: Concepts, contexts, cases (2nd Edition), Prentice-Hall, Englewood cliffs, New Jersey (U.S.A), 1991.
- NPC Research Division**, Labour Productivity in Asian Countries, Productivity, 33(4), 1993.
- Portner, M.E.** — Competitive strategy, Free Press, 1980.
- Porter, M.E.** — Competitive Advantage, Free Press, 1985.
- Roth, A.V., Craig, A.V. & Gregory, M.S.** — Operating strategies for the 1990's: elements comprising world class manufacturing in C.A. Voss (ed) Manufacturing Strategy: Process and content, Chapman & Hall (1992)
- Schonberger, R.I.** — World class manufacturing: The lessons of simplicity applied, The Free Press, N.Y., 1986.
- Skinner, W** — Manufacturing: Missing Link in corporate strategy, Harvard Business Review, May-June, 1969.
- Skinner, W** — Manufacturing in the corporate strategy, John Wiley, N.Y. 1978.
- Skinner, W** — Manufacturing: The formidable competitive weapon. John Wiley, N.Y., 1985.
- Slack, N** — The manufacturing advantage, Mercury Books, London, 1991.
- Weston, F.C.T.** — Manufacturing strategy and the theory of constraints, in C.A. Voss (ed), Manufacturing strategy: Process and content, Chapman & Hall (1992)
- Wheelwright, S.C.** — Manufacturing strategy: Defining the missing link, Strategic management Journal, 5(1), 1984. □