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# PRODUCTIVITY



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# The Role of Technology in Productivity Management

S. K. BIJLANI

*Economic development is essentially manmade and the factors affecting Productivity growth have to be consciously managed. Investment of resources to achieve growth rates has been grossly overplayed in our plans and the emphasis needs to shift to the return on the investments and utilisation of the production potential we have already created. For the productivity improvement, the society as a whole, or at least a significant proportion of the population, has to will it, to work for it, and to reward it.*

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It has been said on numerous occasions that production is not productivity, that productivity is the ratio between output and input of resources, that production per se is no measure of the efficiency with which we use our resources. Profitability as a yardstick, too, is not enough, because it may be influenced by the market rather than resources employment efficiencies.

Productivity is no longer an elusive concept; it simply means getting more and better output from a given input. Yet, our economic planning somehow continues to be obsessed with mere investments and growth rates and there is undue emphasis on capital, often to the neglect of other factories.

The message of productivity in India, indeed in all developing countries, has a special meaning, where scarcity of resources is the main hurdle of growth. Low incomes mean low savings potential which lead to low capital formation, holding us back from raising production, in turn, the income levels and we are caught up in this vicious circle. We are ahead in aspiration but behind in resources. The importance and the urgency, therefore, of making best use of what limited resources we have is much greater to us than in a developed economy. In productivity—maximisation alone lies our only hope. India, incidentally, is about the lowest in Asia in labour productivity.



TABLE I

## Labour Productivity Growth in Select Asian Countries

Country	Period	Growth rate in labour Productivity
India	1961-76	0.89
Korea	1960-77	11.20
Philippines	1957-74	3.6
Singapore	1970-77	3.6
Taiwan	1967-77	10.52

It is to our credit that, as a country, we have succeeded in more than doubling our savings rates—from 10% in the early 1950s to nearly 25% in the mid 1980s. This rate of savings is unmatched in a democratic society with such low income levels and is well above the savings rate in many affluent countries.

The increase in savings rate unfortunately has not led to a corresponding increase in the rate of growth, giving rise to massive doses of taxation and deficit financing to sustain the large investments of our Five Year Plans. Indeed, over the years, we have needed more and more capital per unit of output, not less. There has been a decline, quite drastic in fact, in the productivity of capital. Capital-output ratio has gone up from about 3.5 to over 6.0.

Perhaps the figures would drive the point home. Graph 1 shows that, over the 15 year period 1963-64 to 1978-79, while the index of fixed capital rose by 353%, that of value added rose by only 142%.

Thus, whereas an addition of one rupee of fixed capital gave us one rupee increase in output in 1963-64, it brought us only 53p in 1978-79. While a couple of decades ago we needed approximately three units of capital to get one unit of output, today we need nearly six units of input to get one unit of output.

More alarming is the fact that during the decade 1970-71 and 1980-81, our productivity growth is nil.

In terms of labour productivity the figures do not

bring any joy either. Graph 2 shows that whereas the fixed capital per worker increased by nearly 163% over the 15-year period, the value added per worker during this period increased by only 40%. Like Alice in Wonderland, the ground is slipping under our feet and we are not moving fast enough even to keep at the same place.

A comparison with productivity figures of USA is telling :

TABLE II

## Comparative Compound Annual Growth Rates in Productivity\*

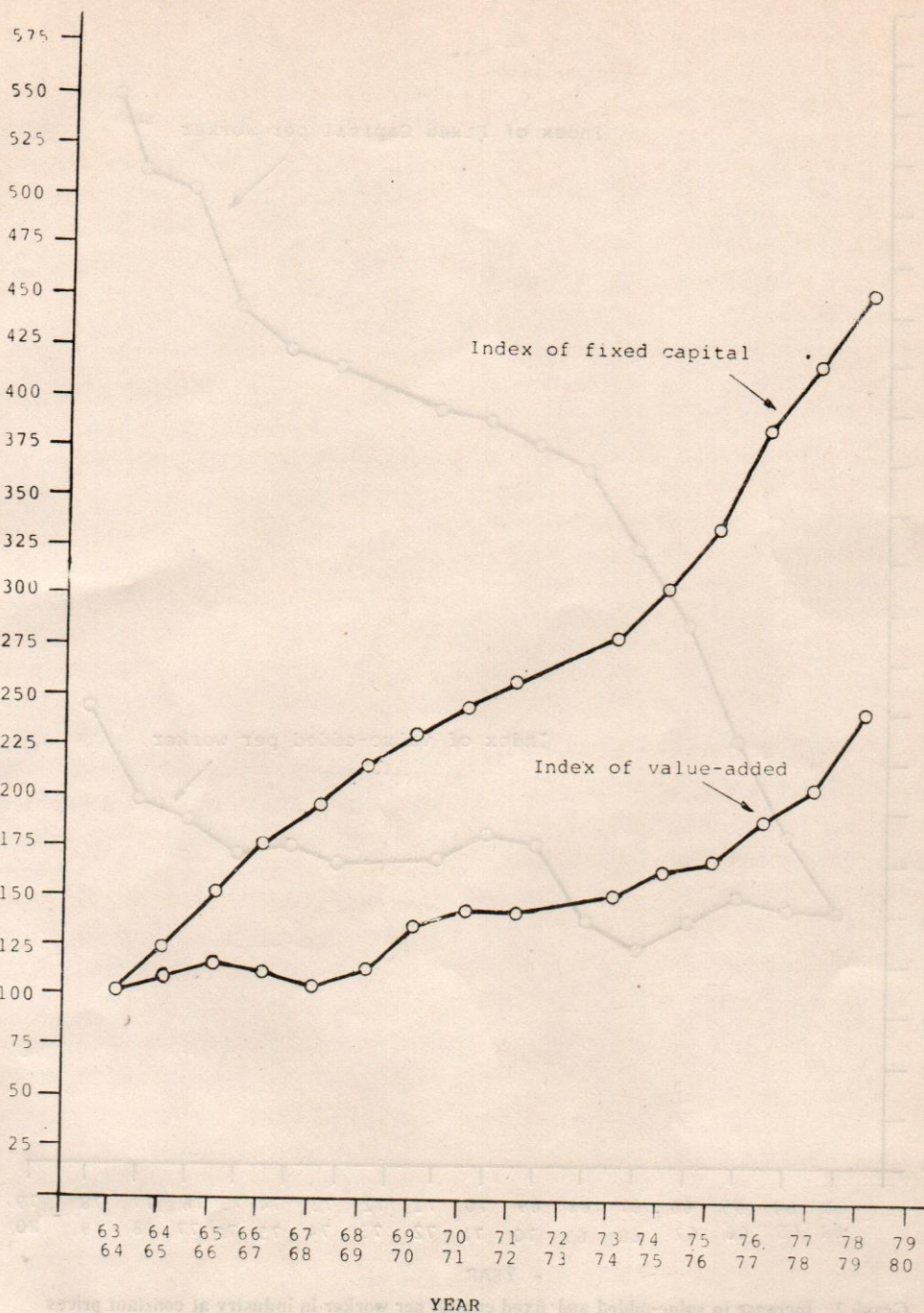
Country	Period	1948-60	1960	1970-78
		USA	To	USA
		1950-60	1970	1970-80
		India		India
USA	Economy	3.0	2.6	0.9
	Mfg Sector	2.5	2.2	1.3
India	Economy	2.0	1.5	-0.02
	Mfg Sector	0.8	0.7	-1.9

\* Total Factor Productivity.

Instead of mounting a national thrust on improving the use of our scarce resources and directing our planning and industrial policy towards better use of the vast production potential we have created, the trend continues to mobilise more resources, a synonym of taxation, and Government helping itself to over 75% of the total bank deposits at subsidised rate—average of about 9% whereas on loans to industry, banks charge 17-18%, and the depositor gets only 7% for a year! It is time we pressed for a plan based not on investment alone, but on return-on-investment

The real reason for the decline in productivity is lack of proper technology—both its choice and its management. In India we made current generation of cars and aeroplanes in the 1950s and 1960s—we are still making them in mid-1980. We have seen the technology gap widen and, today, it is not only in the newer areas of micro-electronics and computer technology, we have





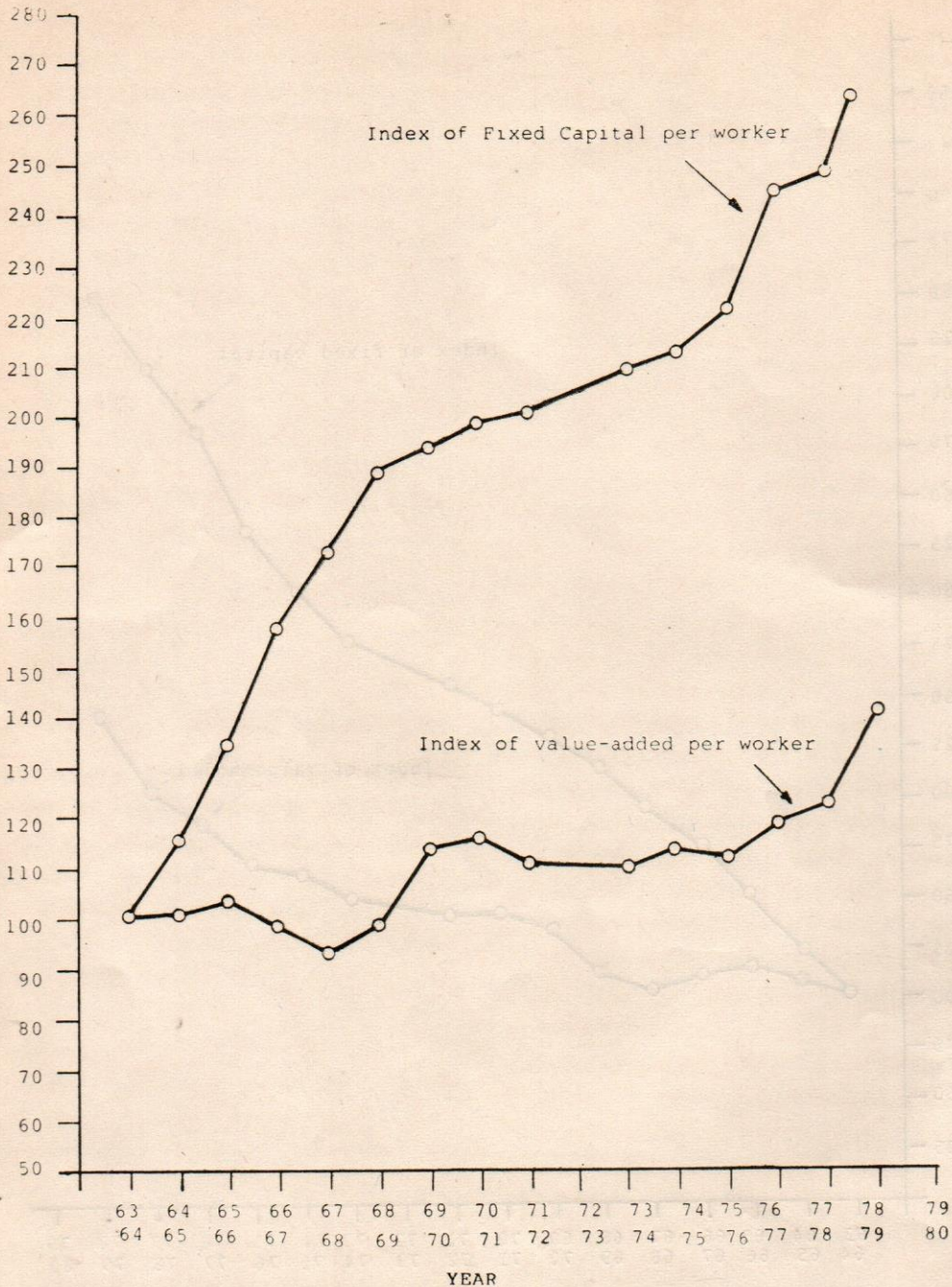
Graph 1 Trends in value added and fixed capital 1963-64 to 1979-80

also lost our edge in world markets in such traditional areas such as textiles and now beginning in even jute and tea.

A notion has developed that the economic development depends on the rate of savings. The historical

evidence is to the contrary. Investment is certainly required. But at the core of economic growth does not lie capital accumulation. In his pioneering work published in 1957, R.M. Solow showed that over 1909-49, the increase in output per man-hour in USA was attributable seven-eighths to technical change and





Graph 2 Increase in value-added and fixed capital per worker in industry at constant prices 1963-64 to 1979-80

only one-eighth to increased use of capital per head. Confirming this analysis, Edward F Dennison in 1974 showed that from 1929-69 only one-ninth of economic growth of per capita income in USA was attributable to increased capital per worker. The figures will be somewhat different today, no doubt, but the point is

that the bulk of the remaining increase was due to other factors such as knowledge and economies of scale :

Nearer home, the green revolution has been nothing more than an attempt to improve the productivity



TABLE III

## Contribution of Individual Factors to the Raising of Living Standards in Use 1929-69

Factor	%
Advances in knowledge	34.9
Increased education per worker	21.9
Economics of scale	17.9
Improved Resource Allocation	14.9
Capital Input	11.3
	100.0

of land by new and better use of resources eg. fertilizers, water and high yielding varieties of seeds. Unfortunately, this has been confined largely to wheat and to certain areas only and has not spread to our agriculture as a whole.

Whereas there are numerous concessions and inducements for savings and investment, for optimum utilisation of resources there seems to be very little. In fact one gets the feeling that there are hurdles placed in the path of productivity. 'Licenses capacity' has been a sacred cow of planners and our administrative ministries have shuddered at the thoughts of 'excess' production. All sorts of fiscal concessions have been available for installing new capacity, but hardly any for making better use of existing plant and machinery. Indeed, it is more paying to spend a few crores of rupees to duplicate obsolete machines than to double production by modernising the existing ones and purchasing balancing equipment at the cost of a few lacs. The recognition of productivity has just begun, but too late, and too grudgingly. Although productivity is the engine of growth, it is not self starting. Factors leading to productivity rise are increasingly dependant on deliberate social action and policy.

There is also historical evidence to believe that improving labour productivity does not aggravate unemployment. It may seem simple to believe that because we have surplus of manpower, we should use more labour in our production processes rather than

reduce the number of man-hours per unit of output. This is simply not so. In India, poor productivity has meant high prices, low demand, poor utilisation of capital and, in the end low employment. Use of less inputs for a given output, be it capital, labour or energy, helps make products more competitive and within the reach of workers wages. It ought to be a matter of serious concern that there are countries which pay their workers more for one hour's work than we pay an Indian worker in a whole day and yet our costs remain higher and we are losing in world markets. Our exports as percentage of world trade have steadily declined over the last 10 years. Indeed over the 45 year period from 1938, it went down from 3.6% to about 0.47%. We did better, exporting commodities than manufactured items.

TABLE IV

## India's Share in World Imports

Year	% Share
1970	0.65
1971	0.66
1972	0.52
1973	0.53
1974	0.59
1975	0.71
1976	0.56
1977	0.57
1978	0.58
1979	0.60
1980	0.69
1981	0.74
1982	0.82
1983	0.77

To be sure, productivity, like all gains in life, has a price tag to it. Improvement in efficiency and in output, with given inputs, does mean new skills and dislocation. It is a price which the society must be willing to pay. To run an industrial enterprise merely to protect jobs is the most costly way of providing unemployment relief.



The great success stories in improvement of productivity in the world, notably in Japan, have been in the area of adopting new technologies to manufacture existing products. There has to be a systematic nurturing of new, sun-rise, methods—even whole industries and phasing out the old, sunset, ones. It is the modern transport and the roadways, let us recall, which have enabled us to provide vast employment opportunities, but it has meant reducing employment for those playing bullock carts. We need industrial euthanasia to conserve resources for productive investments elsewhere. Till recently, when we were asked how many people will we get rid of when we have a computer, the answer was 'three clerks in accounts department'. But of course we added systems people, programmers, computer maintenance staff, all of which require new knowledge and skills. From increased productivity come increased jobs.

The vast production potential we have created since independence lies grossly under-utilised. This is by no means confined to industrial sector alone.

Take agriculture. About half the water carried by existing rivers, for instance, flows to waste in the sea. Low cost investments in field canals can make a dramatic difference. At present the productivity of irrigated farms is no more than 1700 kg of grain per hectare while yields ranging from 400 kgs to 500 kgs have been achieved in demonstration farms. In other words, we can push up grain output from irrigated areas alone to 250-300 million tonnes a year compare with an aggregate production today of about 150 million tonnes from the gross cropped area.

Or, take animal husbandry. We have a cattle population which is the largest in the world, not the second largest as in human population. However the per capita availability of milk is amongst the lowest in the world. The national average yield of our cows is 400 kgs per year as against cows in Britain and Denmark which yield as much as 4000 kgs per year.

Public Sector. In the public sector which has an investment of over Rs. 36,000 crores in manufacturing industries, we find that only 30 per cent of the units have achieved capacity utilisation of over 75 per cent

and the remaining 70 per cent have been working at a lower level of capacity.

Manpower. We possess in this country one of the finest bodies of trained personnel. We produce the largest number of engineers, technologists, scientists, doctors and technicians in the world every year. We also produce the best ones for export. The United Nations has assessed that India has repaid all the aid it has received from the United States by exporting trained man-power.

In industry at least one third of our investment lies unutilised too often the victim of the lack of infra-structural facilities. A mere 10% shortfall in supply of power needed by industry brings down industrial production by Rs. 7000 crores per annum and raises the import needs by over Rs. 1000 crores. In the important areas such as power and transport the demand outstrips supply. In the developed countries these facilities are always ahead of demand but with us, it is the other way round and the dynamism which easy availability of these basic resources could provide to our economy is irretrievably lost. The answer is not still more investment, but better utilisation of the installed capacities, supported by technology.

In the early years of industrial growth, soon after independence, we were restricted by shortages of foreign exchange and the emphasis rightly was on self-reliance through import substitution. Starting as a necessity, it acquired the emotional overtones of economic independence and went beyond what the constraints of foreign exchange strictly dictated. We confused between self-reliance and self-sufficiency. Combined with a protected internal market, large and growing, it has given us an introvert, insular and inward look. In the name of self-reliance, we have talked in the terms of Indian technology, by Indian technology, for Indian conditions! We are now getting out of this phase of technological chauvinism. The thrust is towards the outward and export orientated industry. Our technology inputs are 0.5-0.6% of our total inputs—in West Germany the figure is 6% plus.

We have reached a degree of industrial maturity when we can take infusion of advanced technology



without emotive overtones. Self-reliance reduces imports; but stoppage of imports cannot produce self-reliance, only shortages. There is no industrial country which has banned imports of technology and gained self-reliance. The industrially advanced nations are avid importers of technology and know-how has become one of the fastest growing items: more than 90% of this trade takes place among the developed countries themselves.

Figures of foreign investments in select countries tell the same story :

TABLE V

## Foreign Investment in Select Countries

(US \$ Million)

Year	India	Japan	UK	USA
1975	3.83	150	3866	27662
1976	8.11	180	4089	30770
1977	4.58	210	9078	34595
1978	11.48	220	3789	42471
1979	9.94	510	9252	54462
1980	11.35	280	12190	65483
1981	12.55	420	6818	
1982	66.43	750	6055	
1983	61.27		8665	

The percentage share of foreign investment in India out of total imports is a mere 0.4%. The significant point is that the countries which had a negative trade balance in technology actually fared far better in the export of the products of technology. Competition to use has already emerged from other developing countries who are able to manufacture and market products much superior to ours even though in terms of technological capability, we are far better.

We now badly need to overcome the technological weakness of our industrial base to utilise our vast production potential. Our foreign exchange position, and the spread of manufacturing base, provides us the opportunity to buy current technologies and make up

the leeway in the technology gap between India and the developed countries. Whenever we import a product, we pay not only for the materials but also for the technology which has gone in developing the item. It therefore seems paradoxical that as more and more items are being put on open general licence for imports, the same liberal attitude towards import of technology has yet to be adopted. We could afford to spare say 2% or so for technology imports from our total imports of Rs. 16,000 crores. The multiplier effect would be enormous. It is through encouragement of import of technology in our basic industries, and not merely finished products, that we would be able to reinforce our technological base.

Having said this, selectivity must be exercised in regard to the technology we import. There can be situations in which import of a particular technology would not help us achieve our objectives. It is a paradox of production that many of our best efforts to improve our systems become counter-productive. Under the guise of liberalisation, we have witnessed how, over the last three years, obsolete equipment and technology have found their way into the country, much of it over 10 years old and, ironically, of older generation than that currently made in India. In some cases, the import content of the indigenous equipment is a fraction of the cost of the second-hand, discarded, machines. Short term profits notwithstanding, such imports—and some of these are even in non-priority sectors—reduce productivity, increase costs and further erode our competitive edge in the world markets.

Selectivity also needs to be exercised in technology imports where it may bring a fancy brand name, which has consumer appeal, but no intrinsic superiority over indigenous technology.

It is useful to compare the Indian and Japanese experience in acquisition and application of technology. In India we generally reduced the foreign exchange component, insisting on maximum use of indigenous components. Inclusion of high-cost indigenous components added to the already high product cost resulting from the adoption of a lower technology, supported by contracts to run them for a short time, modified the know-how through its own R & D and



enterprise level.

The will to work however does not suffice. It can make people work harder but not better. Sustained development requires constantly improving productivity, meaning bigger and better outputs from the same inputs. This requires better, more productive work and that requires better knowledge, better know-how, higher technology. We must get away from the so-called 'appropriate technology' which is high cost and low benefit.

This calls for investments and the decision of how much to invest, from which sources and for what purposes. The direction of investments depends on our desired future. In a developing country there ought to be improvement in utilisation of the scarce resources.

It is the technology, its choice and its management, that helps us achieve the productivity growth. Our capability to absorb, adapt and upgrade imported technology leads to innovations in manufacture.

By confirming attention to technology in this paper, one does not wish to minimise the great importance of other factors that contribute towards productivity. We no doubt need a number of structural changes of a durable nature in many areas to achieve our aims.

The technology must ultimately develop our human resources while safe-guarding our traditions and values. It is this development that can enable our country, which has been blessed with great gifts of nature, to use our assets to sustain productivity growth, the lever of development and modernisation.

Performance of ITC at a glance from 1970-80 onwards

Year	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
Production (Lacs)	100	110	120	130	140	150	160	170	180	190
Exports (Lacs)	20	25	30	35	40	45	50	55	60	65
Imports (Lacs)	10	12	14	16	18	20	22	24	26	28
Revenue (Lacs)	150	160	170	180	190	200	210	220	230	240
Operating Expenses (Lacs)	120	130	140	150	160	170	180	190	200	210
Profit (Lacs)	30	35	40	45	50	55	60	65	70	75
Dividend (Lacs)	10	12	14	16	18	20	22	24	26	28
Reserves (Lacs)	20	23	26	29	32	35	38	41	44	47





## Striving for excellence. Round the clock. Round the year.



"I would suggest that our priorities in the Seventh Plan should be **FOOD, WORK and PRODUCTIVITY**. And these considerations should guide alternative growth scenario..." Mrs. Indira Gandhi, June 4, 1984.

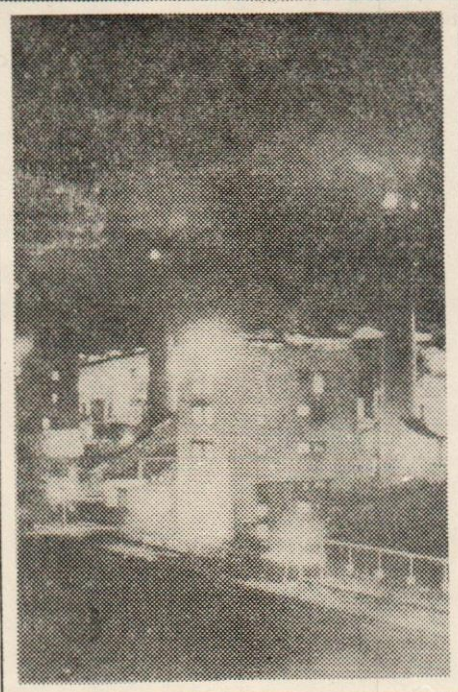
### Here is NLC's growth scenario :

Acclaimed as the 'Energy Cynosure' of Tamil Nadu, Neyveli Lignite Corporation mines lignite, generates power, produces urea, processes lignite coke and extracts costly chemicals. The biggest in Asia, NLC's open-cast lignite mine feeds India's first ever pit-head power house. Incidentally, this is the country's only lignite-fired thermal power station. Performance in both the units, the 6.5 MT per annum Mines and 600 MW Power Station during 1984-85 excelled the rated capacities - Mines 116.76% (total excavation) and Thermal Power Station 118.67%.

The plant load factor of NLC's Thermal Power Station in 84-85 was 77.17% against the country's average PLF of 48.6%. NLC's Fertiliser Plant operated at 99% capacity utilisation.

NLC's prestigious LECO-Lignite Coke - has become a sought after industrial fuel; replacing oil, coal, coke and charcoal in electro-metallurgical, cement, carbide, tea and other industries.

Entering the 29th year of service, NLC is in the galaxy of the top ten public sector enterprises in terms of absolute profit, and has started



improving its ranking - 8th in 1982-83 and 5th in 1983-84.

In recognition of this performance, the National Productivity Council awarded NLC the best performance awards for the mine and the power station and the meritorious functioning award for the fertilizer factory. With all the three operating units winning awards, this is hailed as a unique record. This apart, the mine bagged four Safety Awards, instituted for the first time by the Government of India - Ministry of Labour and Rehabilitation under the National Safety Awards Scheme.

For all-round excellent performance, NLC was also conferred about a dozen awards this including the "Udyog Ratan" award from Institute of Economic Studies, the "Humanitarian Award" by the Lions Club and the "For the Sake of Honour Award" of the Rotary Club. Crowning it all is the best Industrial Relations award from AIOE at the all India level.

Work is afoot in the first stage of the integrated second mine and second thermal power station. In the second stage to follow, the capacity of this mine will be increased from 4.7 m.t. per annum to 10.5 m.t. per annum and that of the power station from 630 MW to 1470 MW. Under active consideration is the opening of a third mine and another power station. Before the turn of the century, NLC will turn out 32 million tonnes of lignite and 3700 MW of power.

To sustain and to improve all-round excellence, the newly incepted training complex imparts and refurbishes skills among all sections of the establishment.

All of which go into the making of a work-oriented Industrial Culture in Neyveli, with NLC setting Man and Machine on the path to "Commanding Heights of Economy" with the motto "Food, Work and Productivity"

### Performance of NLC at a glance from 1979-80 onwards

PRODUCTS	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85
Overburden (LM <sup>3</sup> )	228.43	352.74	323.27	321.74	356.01	387.71
Lignite (LT)	28.97	48.01	58.76	64.01	66.35	71.09
Power Gross (MU)	2370	3175	3391	3833	3909	4056
Power Export (MU)	1768	2454	2686	3073	3027	3087
Urea (Tonnes)	1,04,908	1,34,334	98,640	1,01,211	1,24,447	1,27,960
Coke (Tonnes)	42,948	1,19,411	1,88,419	1,72,111	1,73,603	1,91,190
Capacity Utilisation-Mines I	44.5	73.9	90.4	98.5	102.1	109.4
TPS I (Percentage)	69.34	92.9	99.4	112.2	114.4	118.7
Plant Load Factor-TPS I (Percentage)	45	60.4	64.52	73.0	74.17	77.17



**NEYVELI LIGNITE CORPORATION LTD**  
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Neyveli 607 801, Tamil Nadu



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# Environmental Management in Malaysia

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GURMIT SINGH K. S.

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*Malaysia is a tropical country whose natural frontiers are undergoing tremendous changes in the name of development. But these changes have been associated with disruptions of the complex tropical ecosystem resulting in major environmental impacts. This paper examines critically the impacts on the water regime, air quality, marine and genetic resources, sanitation, agriculture and housing. It also attempts an assessment of the basic causes and indicates possible approaches in management to minimise the adverse impacts within Malaysian socio-politico-economic context.*

Gurmit Singh K. S. is President, EPSM, Malaysia.

## Introduction

Malaysia consists of a peninsula which is the southernmost tip of the Asian landmass and about 1/3 of the island of Borneo. Bounded by latitudes 0° and 7° N, the Peninsula covers 134,680 sq. km while the States of Sabah and Sarawak total 202, 020 sq. km. Some 83% of 15 million population is found in the Peninsula where the bulk of development has also been concentrated.

Almost all development in the country has followed the historical pattern of starting along the coastline and rivers and moving inland and upwards into the hills.

## The Changes in the Tropical Environment

These were rather slow in the pre-colonial period-involving basically shifting cultivation and small pockets of low-land tropical forests being cleared for padi cultivation and tin-mining. However, the pace quickened by the turn of the 20th century as rubber cultivation was introduced by the British. This saw the removal of large tracts of tropical ecosystems and their replacement by a mono species-rubber. The 1960s saw the introduction of yet another single plantation crop-oil palm and further pushing back of the natural tropical frontier. More land was clear felled in ambitious land development schemes while logging intensified as the world-wide demand for tropical hard woods picked up.



Increases in the population and ambitious political economic plans introduced more houses, factories, roads, vehicles, and mangrove reclamation projects.

Consequently, the situation today is such that

- \* Per capita income is US \$2000.
- \* Almost all the low land forests have disappeared in Peninsular Malaysia.
- \* There is a backlog of 600,000 housing units.
- \* Private car ownership is growing at an annual rate of 33% while public transport continues to be inefficient and inadequate.
- \* The majority of the country's rivers are polluted and silted.
- \* Most of the large urban centres are beginning to suffer from air pollution, water supply problems, floods and squatters.
- \* Roads, housing and industrial sites are gobbling up prime agricultural land which in turn is pushing into the forests so much so that virtually all low-land forests have disappeared in the Peninsula.

## The Environmental Impacts on

### *The Water Regime*

Silt levels in virtually all rivers are on the increase, being generated through erosion caused by logging on slopes, inadequate slope protection in highway construction, and virtual absence of silt traps on housing development schemes. Tin Mining discharges also have heavy silt loads. A study conducted by the Environmental Protection Society, Malaysia (EPSM) showed that in the case of the Klang River, the silt load increased by some 300% over a period of 2 years.

Agrobased industries like rubber and palm oil mills contribute high levels of organic pollutants reaching often 30,000 ppm of BOD while much of the domestic sewage ends also in the rivers. Malaysians still cannot stop their habits of discharging all manner of wastes ranging from kitchen waste to the discarded lubrication oil from their cars into drains and rivers. Run offs from agricultural land as well as bleaching of chemical fertilisers and pesticides is a growing problem in

especially the major paddy growing areas. The operation of industrial estates located close to rivers is in many instances contributing towards upsetting the water regime.

Another adverse impact is on the water cycle arising from the removal of sizeable forested areas. Where originally only about 30% of the rain directly reached the ground, the rest trickling down leaves, branches and trunks thus ensuring steady supply to the streams, rainfall in the denuded areas now result in sudden runoffs which combined with silted waterways result in the islands frequent flooding. At the same time the creation of heat by the masses of concrete and tar, cause rain to fall outside catchment areas resulting in frequent shortages of piped water even in the capital of Kuala Lumpur.

### *Air Quality*

The present style of land clearing which involves the clear-felling and open burning of the jungle (except for the most valuable species which are previously extracted) is a major contributor of air quality deterioration in the countryside. Even up to this day wood-based industries, various factories and mills that burn heavy fuel oil, quarries and open burning of rubbish continue to pollute much of the Malaysian air.

Many urban centres are beginning to suffer from haze and smog is in the making in localities like Kuala Lumpur/Petaling Jaya. Their major cause is a 43.5% increase in vehicular traffic. An inefficient and inadequate public transport system coupled with the status associated with car ownership, is seeing an ever-increasing use of private cars despite a 35% increase in petrol prices during the last 3 years. Unleaded petrol is still unavailable in Malaysia. A 1981 study by EPSM revealed a 7 ug/m<sup>3</sup> (24 hour. average) of air-borne lead along a busy street in the heart of the capital city.

Most of the saw mills, quarries, factories burning heavy fuel oil, and chemical manufacturers are contributing towards localised air pollution problems. The problem is compounded by individuals and firms who resort to open burning of rubbish due to breakdowns in the solid waste collection and disposal system. It is also a fairly common sight to see palls of smoke



arising from land development schemes where tree stumps and 'uneconomical' vegetation is set on fire before ploughing or levelling is under taken.

#### *Marine Resources*

Land based effluents like silt, chemicals, oil and waste that move into the waterways have been killing off sizeable amounts of Malaysian marine resources like fish and prawns. This problem is exacerbated by the clear-felling of mangrove swamps for their timber or for land reclamation schemes. About 30% of Malaysian fishes breed in the mangroves. Oil from ship accidents, ballast tanks and off-shore oil rigs is another increasing threat towards our marine resources. This has become especially acute along the Straits of Malacca since the West Coast of Peninsular Malaysia supports about 50% of the Malaysian population. For generations fish has been the staple protein source for average Malaysian. Unfortunately because of diminished catches, fish prices have increased by 50-200% over the last few years.

#### *Genetic Resources*

The accelerated rate of destruction of Malaysian forests has drastically reduce the wildlife population. Many Malaysian scientists have been acutely worried that a large unstudied genetic pool in parts of our undisturbed forest like Endau Rompin will soon be lost.

Not only will this be a blow to scientific knowledge but it will deprive Malaysia and other developing countries opportunities to improve their food and export crop productivity and resistance to pests.

#### *Sanitation*

A 29.6.81 feature article in the New Straits Times reported that even in Kuala Lumpur, the local authority collected 12,000-15000 buckets of nightsoil daily. Only parts of Kuala Lumpur are centrally sewered while most other towns at best have septic tanks (covering about 4 million people) either on an individual house basis or for groups of built units. At other places the bucket system prevails or the open pit latrines. The Ministry of Health is aggressively promoting a scheme for pour flush toilets in the rural areas.

In addition, the conditions of drains, vacant areas, rubbish collection and disposal and sanitary habits of hawkers, shopkeepers and individual Malaysians contribute towards poor sanitation. A month long study by EPSM in 1980 of the city of Petaling Jaya, reportedly the town with the highest per capita income in Malaysia, showed how bad sanitation actually was: clogged drains, overflowing rubbish bins, stinking streams, over grown playing fields and sidetables-to mention only a few items.

#### *Agriculture*

Malaysian agriculture which since the turn of the century has been more export-orientated, has started to process its crops before export. But the agro-based industries have resulted in huge amounts of organic pollutants being discharged into our waterways. In fact their organic pollutants have created greater problems than the discharge of untreated human sewage.

Use of chemical fertilisers and pesticides/herbicides has been increasing so rapidly that their effects on workers and fish life have already started showing. Pesticide resistant mosquitoes and brown hoppers have been on the scene for a couple of years. A recent study showed that the Malaysian population had 14 times more cyclodienes in their blood than their American counterparts.

The introduction of oil-hungry tractors in padi cultivation has displaced labour and coupled with increased frequency of harvesting upset the delicate ecosystem which involved the water buffalo, natural fertilisers, and fish in the fields. Greater mechanisation in the plantations is being advocated by operators who are not keen to improve the working and living conditions of their labourers.

#### *Housing*

25% of the K.L.'s population were recently reported to be squatters and there are varying portions of squatters in almost all the major Malaysian towns. This is a clear indication of the failure to provide adequate low cost housing. The overwhelming speculative



element coupled with bureaucratic bottlenecks in land and housing matters have pushed up prices : 50-100% of over the last 2 years. More than 923,000 new units will be required by 1985 if every family is to be given an opportunity to own a house.

High rise flats are not popular with the poor, especially those who come from the rural areas. But there is just not enough land to provide every one with a single-storey house with a small garden. And supporting infra-structure facilities like water, power and drains are inadequate in many existing areas.

Consequently many of the country's poor live in sub-standard housing or otherwise have to commute over long distances to work and even for recreation. The concrete jungle has become too grim a reality for many of them.

#### Basic Causes of Adverse Impacts

Any careful study of the environmental impacts just outlined would identify the following basic causes :

1. *Exploitative attitudes and practices* that stretch back to the colonial period when Britain exploited the availability of Malaysian natural resources like tin, rubber and later palm oil. The developed countries are currently continuing these exploitative practices through the terms of international trade. Our own business community and leaders abet this process of gobbling up resources at a rate much faster than regeneration can occur. The 'get-rich-quick,' and 'damn-the-future' syndrome is unfortunately deeply entrenched: even at the individual level.
2. *Development policies and practices* which until recently have tried to ape Western industrial development, partly because the ruling elites have believed these to be in their best self-interest and partly because international aid and advisory groups have been obsessed by getting Malaysia to comply with their global strategies. Environmental considerations have only lately received some lip-service.

3. *Inadequate political will sabotaged by bureaucratic and other forms of corruption* has prevented the effective implementation of legislation like the Environment Quality Act and even the acceptance of an EIA procedure. Even simple Anti-Litter regulations have more been ignored than enforced by the local authorities. This has only encouraged polluters of the environment to laugh in the face of public outcries against pollution incidents.
4. *Lack of accountability by both the public and private sectors* has made the citizen, especially the victim of adverse environmental impacts, feel helpless. The curbs on press and individual freedom prevent an improvement in efforts to demand greater public accountability. Recent legislation like Amendments to the Federal Constitution and the Societies Act jeopardise the citizen's ability to check environmental degradation.
5. *Insufficient environmental awareness and concern among planners, politicians, industrialists, developers and ordinary citizens* are obstacles in ensuring that especially long-term adverse effects are avoided. This is compounded by statements and claims by passing foreign "experts" that Malaysia can afford to have more pollution and should not be hesitant to accept industries and exports unacceptable to First World citizens.
6. *Racial, religious and regional Sensitivities and prejudices* which are exploited by vested interests to push through environmentally destructive projects so that a particular group/region may be seen to be benefitting immediately from such projects. With 3 major races, 4 major religions and 13 states (which have jurisdiction over land matters), the stresses are significant.
7. *"Lack of civic Consciousness" and individual greed* contribute in sizeable measure to the problems. Malaysians are not too renowned for their forth-rightness in dealing with bureaucrats and the press. Few write letters to the Editors although many grumble at the coffee-shops. Very, very few refrain from littering



the beaches or the streets, while many are caught up in the materialistic rat-race. The expectations of the majority have been raised by both the government and the media; with few qualifiers.

### Some Possible Solutions

It is obvious that the salvation for our fast changing tropical environment lies in :

- (1) *Diminishing and eliminating, wherever possible, exploitation of natural resources at all levels—international, inter-state and among firms/individuals.* This can be done by adopting the basic needs approach at all levels.
- (2) *Revision of development practices* so that they emphasise environmentally sound management that ensures real development of *people*—not mere expenditure of funds, clearing of huge land tracts, building of dams, etc.
- (3) *Fairer and comprehensive enforcement of environmental legislation* including the greater use of environmental impact assessments for major projects. This should be done in conjunction with the revision of discretionary types of legislation and the scrapping of outdated rules. Polluters must be made to pay.
- (4) *Reversal of the Malaysian trend* to decrease public accountability by improving freedom of the press and the individual. There needs to be national recognition of the role of interest-cum-pressure groups like EPSM.
- (5) *Increased environmental concern* among all sectors of the Malaysian nation with greater dissemination of data and a more open discussion of options and approaches. International co-operation with Third World countries and sincerity from First Worlders is equally essential so that we do not become a dumping ground.
- (6) *Willingness to seek common values and aspirations among Malaysia's various races, religions and states* is vital to prevent exploitation of differences in perception.

- (7) *Improved home and school education* to increase the sense of civic-consciousness among Malaysians. This can be helped by political, business and civic leaders setting personal examples in environmentally sound habits and practices like making greater use of public transports and refraining from littering.

### The Environmental Managers

(A) *Government*—Although the overall responsibility for managing different aspects of the environment is vested in many departments, the prime agent is the Department of Environment (DOE) which is entrusted with implementing the Environmental Quality Act 1974. Being a federal department under the Ministry of Science, Technology & Environment the DOE has to work with State Governments and other Federal Departments—both in terms of monitoring environmental problems as well as enforcing regulations.

The effectiveness of the DOE has, in addition to structural limitations, been hindered by its own philosophy and style of management. There is not much openness and the Director-General exercises strict control even on communications with outside groups/individuals. Despite a number of regional offices, the management of the Department is highly centralised and rigid. Although it has implemented a number of regulations the DOE has only published 1 Annual Report (that for 1979) and has yet to publish any regulations for noise pollution. Even the EIA procedure that it has drafted has still to be approved by the Cabinet.

The Environmental Quality Council established under the Act has no citizen representation (unlike the Sri Lanka provision) but instead has 3 business representatives. Very little is known about how often and effective this Council is but there are public misgivings that its Chairman is also an active businessman.

Only of late have the courts begun meting out realistic penalties to offenders brought to book by the DOE. But these represent only a small fraction of the polluters as the DOE's monitoring and prosecuting



machinery is not comprehensive. Besides limitations of funds, the Department faces, both a high turnover of staff as well as shortage of adequate skills.

The DOE has also to cope with pressures of other departments like that of Trade & Industry who view environmental controls negatively as well as major land development authorities. Co-ordination with other departments like Factories & Machinery, Health, Wildlife & National Parks, Local Government, etc. has not always been satisfactory.

And of course, political interference at various levels has worked to undermine effective environmental management.

(B) *Business*—This sector has been resistant to environmental measures—only responding to government pressures or instructions from their foreign headquarters. As a recent study of Malaysian Institute of management showed, very rarely have they responded to public pressures or out of a desire to demonstrate their corporate responsibility.

In fact, the palm oil industry fought almost tooth and nail against the 1st set of regulations drafted by the DOE claiming that treatment costs were prohibitive. But this has faded as the race period given enabled indigenous technologies to be developed which are both effective and affordable. The only group that has been positive on the issue have been pollution control consultants and equipment suppliers. Inevitably there have been some among them who have made excessive claims which they could not fulfill.

Although the business sector is still negative as a whole towards environmental management there are the beginnings of industry initiatives to convert pollutants into useful by-products. Managers are also beginning to attend environmental management workshops and courses.

It is difficult to say whether multinationals are greater polluters of the Malaysian environment than local business, in the absence of an authoritative study. But my understanding of the situation is that Malaysian businessmen are no better in motivation or

action. It depends on how well protected they feel.

(C) *Citizens*—I would like to offer the Environmental Protection Society Malaysia (EPSM) as illustrative of the role that some Malaysians are playing voluntarily to contribute towards environmental management.

EPSM is registered as a Society under the Societies Act and is nation-wide in the scope of its activities and concerns. Its basic aim is to work for the improvement in the quality of life for the majority of Malaysians. Consequently throughout its representations, studies and projects, the poor Malaysian, whether from the rural or urban areas, remains the prime target, even if he is not specifically mentioned at times. This is inevitable because it is the poor who are the first and most affected victims of any polluting activity.

Organisationally, there are 4 categories of membership: Ordinary—open to adult Malaysian residents; Students; Institutional—open to legally registered bodies (trade unions & schools have so far been prevented by the Registrar from qualifying); and Corporate—open to firms/businesses (again the Registrar has prevented government agencies from qualifying under this category). The bulk of the members are Ordinary—basically Malaysian citizens, who are the only ones allowed to be elected to the 9 person Executive Committee. The current membership stands at 115.

All members of the Executive Committee are volunteers, basically living and working in urban areas, and the Society has no full-time staff although a couple of years ago it did manage to engage part-time staff due to the short-time availability of funds. EPSM has not been very successful in getting financial support from within Malaysia or overseas. Its membership subscriptions are its only reliable funding source but since this has been kept at M\$12/- a year for ordinary members, the financial base is very narrow. Its annual budget has ranged from M\$1,000—M\$13,000 with project-related grants received at various times from the Lee Foundation, Asia Foundation, UNEP, ELC and a couple of Malaysian banks and firms. So far no



money has been received from any Malaysian government agency.

However, this lack of financial resources and limited manpower available from volunteers who have their own callings, has not prevented EPSM from implementing the following strategies/projects :

1. undertaking various studies to ascertain the levels of pollution that Malaysians are being exposed to;
2. disseminating this information through the press, its publication ALAM SEKITAR, and various talks/discussion;
3. reaching out to workers (both in the industrial and agricultural sectors) and alerting them on occupational hazards;
4. making representations to various Government Ministries and enforcement agencies as well as industry groups on issues that have been undermining environmental quality;
5. campaigning together with other NGOs against undemocratic legislation as well as major projects that undermined the viability of the

Malaysian natural resource base;

6. sensitising both the Malaysian public and policy-makers on environmental issues and the urgency for resolving them satisfactorily;
7. acting as a watch-dog on the implementation of legislation like the Environmental Quality Act, Pesticide Act, and the Factories and Machineries Ordinance.

#### Conclusion

In trying to sum up the environmental management situation in Malaysia, I would describe it as one full of challenges to all sectors, right from the national leaders down to village headmen. The current commitment to rapid industrialisation and Look East campaign are already placing new environmental stresses that call for more effective management responses.

If Malaysia fails to benefit from the environmental mistakes of the more 'developed' countries, then major environmental crises will be difficult to avoid. The need for environmentally sensitive managers has never been more acute.

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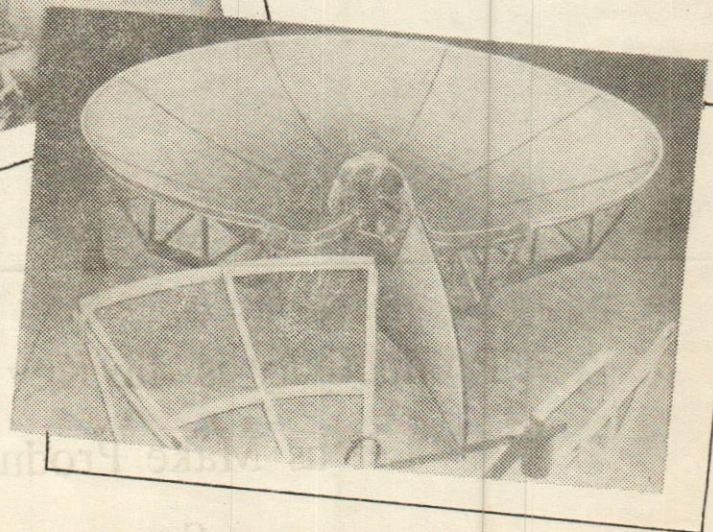
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# Sugar Industry—An Investigation

DR. K. RAJESHWAR RAO  
R. SADANANDAM

*In this paper, the two aspects related to sugar policy and its impact on the industry are examined. First, the applied aspects of controls, decontrols and partial controls imposed by the Government on sugar over the past forty years are analytically studied along with the impact thereof on the various groups involved, viz., the farmers, manufacturers and consumers. Second, an empirical assessment of the managements' attitude towards the impact of Government sugar policy on the industry is made.*

The Indian sugar industry now occupies the first place among the sugar producing countries of the world. Within India sugar industry is the second biggest organised industry in terms of net value added. With more than 50 per cent of its units functioning in rural and industrially backward areas the industry is considered to be making a significant contribution to the socio-economic development of the nation. The market for sugar is a sellers' market unlike that of sugarcane. Sugar can be stored in order to gain from the price fluctuations in the market. This gave scope for the manufacturers and traders to manoeuvre sugar distribution and exploit canegrowers and consumers in order to maximise their profits.

State intervention and control on a wider basis, over the production and marketing of sugarcane and sugar, became necessary from time to time to curb these market imperfections viz., hoarding and black marketing in order to arrest the price rise and ensure equitable distribution of sugar to the consumer apart from ensuring a fair price for the cane grower and sugar manufacturer.

Over a period of forty years from 1942 to 1982, there was control on sugar in some form or other for about 30 years and the remaining ten years was a 'no control' or 'decontrol' period.

The nature, period and duration of controls on sugar were as follows :

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**Nature, Period and Duration of Controls on Sugar in India**

Nature of Control	Period		Duration	
	From	To	Years	Months
Complete Control	April 1942	Dec. 1947	5	8
	Sept. 1949	Sept. 1950	1	0
	July 1958	Sept. 1961	3	2
	April 1963	Aug. 1967	4	4
	Sept. 1979	Dec. 1979	0	3
Partial Control	Oct. 1950	Dec. 1952	2	2
	Aug. 1967	May 1971	3	9
	July 1972	Aug. 1978	6	1
	Dec. 1979	Still in force		
Decontrol	Dec. 1947	Sept. 1949	1	10
	Dec. 1952	July 1958	5	7
	Sept. 1961	April 1963	1	7
	May 1971	July 1972	1	2
	Aug. 1978	Sept. 1979	1	1

The purpose of this paper is two-fold. First, we propose to highlight the applied aspects of Government control on sugar from time to time since the promulgation of the 'Sugar Control Order' in 1942. In each case, the circumstances necessitating the imposition of control, the consequences thereof and the revisions in Government policies from time to time are discussed with a view to analyse the effectiveness of the policies in their application in practical terms. Next, we propose to present the views of the executives of some of the units in the sugar industry about Government Control on sugar and the problems in the implementation thereof. For this purpose, a detailed questionnaire was administered to the Executives at various levels of five sugar factories in Andhra Pradesh including two in the cooperative sector.

#### Applied Aspects of Government Control on Sugar

The sugar industry was granted tariff protection by the Government under the 'Sugar Industry (Protection) Act' of 1932. Within five years of granting such

protection the industry showed a magnificent development<sup>1</sup> and its production reached a stage of surplus and created problems of price decline and marketing. Keeping this in view a voluntary central marketing board called the "Indian Sugar Syndicate Ltd," was established by the sugar mill owners in July 1937 with a membership of 92 sugar factories.<sup>2</sup> The main objectives of the Syndicate were :

- (i) to prevent the demoralisation of market and
- (ii) to bring in a steady effect on the prices.

However, due to failure on the part of its member-factories to adhere to the norms fixed, the Syndicate could not succeed in regulating the prices and marketing of sugar.<sup>3</sup> Government intervention under these circumstances became inevitable to protect the interests of various groups of individuals involved. Thus, the statutory control on price and distribution of sugar was imposed for the first time in the country through the promulgation of the "Sugar Control Order" in 1942 under the Defence of India Rules.<sup>4</sup>

The important provisions of the "Sugar Control Order" were as follows :

- (i) The Government was empowered to appoint a statutory authority viz., "Sugar Controller" to implement the provisions of the Order
- (ii) The Sugar Controller shall prohibit or limit production of special types of sugar products such as gur and khandasari which effect the production of ordinary sugar.
- (iii) He shall notify the price or maximum price at which sugar or sugar products shall be sold or delivered and

1. Adarkar, B.N., 'The History of Indian Tariff 1924-39', New Delhi, Government of India, 1940.
2. Gandhi, M.P., 'Problems of Sugar Industry in India', Gandhi & Co. (Publishers), Bombay, 1945, p. 160.
3. Hirsch, Leon V., 'Marketing in an Under developed Economy: The North Indian Sugar Industry', N.J. : Englewood Cliffs, 1961.
4. This order was later reissued as "Sugar and Sugar Products Control Order 1943".



- (iv) The producers and dealers of sugar were at a statutory obligation to comply with the Controller's directions regarding sales, stocks and distribution of sugar from time to time.

It is worth noting that the control orders created certain favourable conditions to the industry and existed for six years. During the first three years of the imposition of control i.e., from 1941-42 to 1943-44 the area under cultivation increased from 29.44 lakh acres to 35.20 lakh acres, recording 22% increase. Similarly, the sugarcane and sugar output increased from 379 lakh tonnes to 579 lakh tonnes and 7.63 lakh tonnes to 12.2 lakh tonnes recording a growth rate of 37 percent respectively. But during the latter half of the control period i.e., from 1944-45 to 1946-47, there was a slight discouraging trend on account of the inflationary conditions prevailing due to Second World War. The cost of production of sugar shot up and the control price of sugar fixed by the Government based on the cost schedules of 1937<sup>5</sup> was quite inadequate to recover the cost of production. As such the Government decontrolled sugar by rescinding the control order in December, 1947 leaving the pricing and distribution of sugar in the hands of the industry itself. However, in order to avoid misuse of the freedom by the factories, the Indian Sugar Syndicate resumed the responsibility of fixing a reasonable price and proper distribution of sugar. But the member factories appeared to have failed again to implement the norms of the Syndicate. The committed several irregularities such as charging heavy premia over the price fixed by the Syndicate and unwarranted supplies within and among the States.<sup>6</sup> In order to avoid the situation from going out of hand, the Government had to intervene again and reimpose statutory control on sugar in September 1949 through promulgation of Sugar Stock (Control Order' under the Essential Supplies (Temporary Powers) Act, 1946<sup>7</sup>.

At this stage, the gur and khandasari units started creating trouble to the sugar industry. They were free from controls and offered a higher price for the cane than that paid by sugar factories. But this resulted in a large scale diversion of the cane to gur and khandasari producers and affected the cane supply to sugar factories. Consequently, the sugar output declined from 10.06 lakhs tonnes in 1948-49 to 9.76 lakh tonnes in 1949-50. In 1950, the Tariff Board, on request by the Government to examine the sugar issue, suggested for an immediate revision of the sugar price in view of the increased cost of production. Pending revision of sugar prices the Government imposed partial control on sugar in 1950 as a via media between 'full control' and 'decontrol' with a view to provide an immediate benefit to the industry. Under this policy the factories were allowed to sell that part of the sugar output which was in excess of 90 percent of the output in the previous year, directly in the open market. This policy allowed a 'dual price' for sugar for the first time in the country.<sup>7</sup>

The partial control policy showed a remarkable impact on the industry. The sale of sugar in open market brought about handsome profits. This enabled the sugar factories to offer a remunerative price for sugarcane. As a result, there was a noteworthy growth in the area under sugarcane cultivation, cane output and sugar production. The growth rates in 1951-52 in respect of the area under sugarcane cultivation, cane and sugar output were 32, 24 and 56 percent respectively over 1949-50. During 1951-52 the sugar output of 15.2 lakh tonnes outweighed the consumption requirements of 11.8 lakhs tonnes resulting in accumulation of sugar stocks. The disposal of such stocks again created problems to the industry. Under these circumstances, the Government again intervened in 1952-53 and had taken the following steps besides relaxing even the partial control on sugar.

- (i) permission was granted for export of sugar upto 2 lakhs tonnes,
- (ii) a subsidy of Rs. 2 per maund was granted for all sugar exports.

5. R.C. Srivastava, the then Director of the National Sugar Institute formulated a cost schedule for sugar in 1937 based on the data collected in 1935-36 in U.P. and Bihar. (Source: 'Memorandum to the Sugar Industry Enquiry Commission', Indian Sugar Mills Association, 1972, p. 173).

6. Report of the Sugar Enquiry Commission (Chairman, S.R. Sen), Ministry of Food & Agriculture, GOI, 1965, p. 26.

7. 'Report of the Committee on Controls and Subsidies' (Chairman: Vadilal Dagli), Ministry of Finance, 1979, GOI, p. 157.



- (iii) the maximum price of sugarcane was reduced from Rs. 1.75 to Rs. 1.31 per maund in order to discharge excessive cane production.

Though the steps taken were positive from the stand point of the results expected, they proved to be negative on application. The sugar export activities started heading forward at a faster rate because it entailed in a subsidy benefit and greater income from the higher foreign price offers. As a consequence, the sugar releases for the domestic market were reduced sharply followed by creation of scarcity conditions and an upward movement in sugar price. On the other front, the cyclical effect of reduction in cane price was a fall in the area under cane cultivation, cane output and sugar production. By 1953-54, the area under cane and sugar output declined by 27.3, 27.1 and 32.3 percent respectively over 1951-52. In 1953-54, the total sugar production fell down to 10.3 lakh tonnes as against the consumption requirements of 18 lakh tonnes resulting a spurt in prices. This time, instead of reimposing control, the Government banned the export of sugar, regulated the movement of sugar from factories and imported sugar in substantial quantities<sup>8</sup> to meet the domestic demand and to stop rise in prices.

Simultaneously, the Government encouraged domestic production of sugar by increasing the cane price and by leaving the price fixation and distribution of sugar to the industry itself. These steps resulted in an enormous increase in cane and sugar output. In a period of four years from 1954 to 1957 while the cane output increased by 53 percent the sugar output increased by over 100 percent. The multiple growth in sugar output further increased the size of the already existing imported sugar stocks in the country. The supply was greater than demand and therefore, the sugar prices showed a falling trend. In order to ease the situation of surplus, the Government decided to export sugar and announced 1.5 lakh tonnes of sugar for this purpose during 1956-57.

8. During the period from 1953 to 1956, Govt. imported about 14 lakh tonnes of sugar which was about 50 percent of the total production during these years. (Source : Directorate of Sugar and Vanaspati, Ministry of Food and Agriculture, GOI).

Besides the announcement of export quota, rise in excise duty and sales tax have disturbed the decontrol conditions as the producers restricted the release of sugar for domestic consumption. As a natural consequence, there was a sharp rise in sugar prices and the Government found no alternative except to reimpose control on sugar in July 1958, in order to regulate the price and supply of sugar.

During the period of this control, the Government announced an upward revision in the sugar and sugarcane prices, a rebate in excise duty, and a relaxation in margin money requirements on bank advances. All these steps were intended to serve as an incentive for stepping up of the sugar production in the country so that the Government could not only meet the internal demand but also keep up the export commitments. The results were quite encouraging. Within three years by 1960-61, the area under sugarcane cultivation increased by 20 percent, sugarcane and sugar output by 29 and 55 percent respectively. The production of sugar in 1960-61 was 9.3 lakh tonnes (about 45 percent) greater than the domestic consumption of 21 lakh tonnes and left a sufficient margin for exports.

Unfortunately the sugar prices in international market recorded a steep fall during the period resulting in a 60 percent fall in the export of sugar in 1960 as compared with that of 1958. As a result the sugar stocks accumulated to 37.6 lakh tonnes in 1960-61 as against the consumption requirements of 20 lakh tonnes. The incentives provided by the Government, the control on prices; distribution and inter-state movement of sugar became superfluous at this juncture. In September 1961 the Government, therefore withdrew all the incentives and controls on sugar except the regulation of monthly releases. The export of sugar was, however, arranged for in 1961-62 without any considerations for profit and with the sole objective of clearing the accumulated stocks. The loss, on export quotas, if any, was also subsidized by the Government.

In order to avoid further accumulation of stocks, the Government undertook to discourage domestic production of sugar. For this purpose the "Sugar



(Regulation of Production) Ordinance" was promulgated in September 1961 according to which the manufacturers were directed to cut the current production by 10 percent of their output in 1960-61. This may be considered as another negative step taken by the Government as in 1952.

The production of sugar declined by 10 percent in 1961-62 as desired. It further declined by about 30 percent in 1962-63 due to the application of the formula of linking sugarcane price with the recovery rate and the consequent fall in the minimum price of cane from Rs. 1.62 to Rs. 1.50 per maund. In sharp reaction to the fall in sugar output, the prices of sugar started rising.

In order to put down the price rise, the Government was again constrained to move the cycle of controls. Thus the control was reimposed on sugar in April 1963. Simultaneously steps were also taken by the Government to augment sugar production by an upward revision of the minimum price of cane to Rs. 1.75 per maund linked to a reduced recovery rate of 9.4 percent (from 8 percent) and grant of a rebate in excise duty on additional production.

Accordingly the sugar production increased by about 40 percent in 1965-66 over the 1963-64 level. There was also abundant growth of sugarcane and the farmers felt it difficult to dispose it despite best efforts of the industry to absorb maximum quantity. As the supply exceeded the requirements, the prices of sugarcane and sugar declined and this came off as a discouragement to farmers. The area under sugarcane cultivation was, therefore, cut short in 1966-67. The drought conditions prevailing during 1966-67 further aggravated the situation and severely affected the sugarcane crop.

The cane available was to be shared by the sugar factories and the gur and khandasari units. Again as the khandasari units offered a better price, there was a large scale diversion of cane leading to insufficient cane for sugar factories. Therefore, the year 1966-67 was regarded as the 'worst year' in the history of sugar industry in the country. The only way out for the Government to protect the interests of the sugar

producers was to follow a partial control policy, in other words called the dual price policy and announced this policy in August 1967 for the second time in the country. Under this policy, sugar factories were required to supply 60 percent of their output to Government at levy prices and the balance was allowed to be sold in the free market at the prevailing prices. The dual price policy worked well for sometime and the industry regained its strength. There was a substantial increase in the sugarcane and sugar output (45 percent and 50 percent respectively) during 1966-67 to 1968-69.

The surplus sugar stock position again led to the decontrol of sugar in May 1971. The Indo-Pakistan war in December 1971 magnified the already existing inflationary conditions in the country. Sugar prices also hiked significantly. Therefore, the Government was forced to revert to the partial control policy (dual price for sugar) in July 1972. This policy proved to be a successful one and was continuously in operation for six years from July 1972 to August 1980. The three important steps taken by the Government under the present policy were,

- (i) fixing the levy quota at 63.5 percent of which 3.5 percent was meant for meeting export commitments,<sup>9</sup>
- (ii) eliminating the wholesale trade in levy sugar in the private hands by entrusting it to the Food Corporation of India, and
- (iii) announcing a uniform levy price for the sugar throughout the country.

The data showing the trends in cane and sugar output during 1972-78 are presented in the table given below.

The data revealed that the growth rate was about 56 percent in the case of sugarcane and 108 percent in the case of sugar in 1977-78 as compared with that of 1971-72. However, by the end of the sugar year 1977-78, there was a sizeable accumulation of sugar

9. This levy ratio was subsequently raised to 70 percent including a margin for exports.



## Impact of '1972 Partial Control' on Sugar Industry

Year	Sugarcane				Sugar	
	Area (lakh hectares)	Growth rate	Production (lakh tonnes)	Growth rate	Production (lakh tonnes)	Growth rate
1971-72	23.90	100.0	1135.69	100.0	31.08	100.0
1972-73	24.52	102.6	1248.67	100.0	38.72	124.61
1973-74	27.52	115.2	1408.05	124.0	39.49	127.1
1974-75	28.94	121.1	1442.89	127.0	47.94	154.2
1975-76	27.62	115.6	1406.04	124.0	42.62	137.1
1976-77	28.66	120.0	1540.23	136.0	48.40	155.7
1977-78	31.51	132.0	1769.66	156.0	64.72	208.2

(Growth Rate : 1972=100)

stocks in the country due to a decline in exports since 1975-76. Further, the industry suffered a steep fall in open market realisations due to leakage of large quantities of levy sugar into the free market.<sup>10</sup> The fall in open market realisations, rise in production costs and accumulation of larger stocks resulted in sizeable losses to the industry (The loss to the industry during 1977-78 was estimated at over Rs. 250 crores). Consequently the factories could not pay the cane prices regularly to the farmers and the arrears accumulated to about Rs. 100 crores in 1978.<sup>11</sup> Meanwhile there was a change in the Government in the country. The sugar policy of the new Government was aimed at eliminating the rigidities associated with the present control and thus encourage the internal consumption of sugar instead of creating a buffer stock as recommended by Sen Commission in 1965. In August 1978, a complete decontrol with no price fixation and regulation of monthly releases was announced by the Government. But due to absence of regulated releases, the factories released sugar in abundant quantities which exceeded the consumption requirements and consequently there was a 45 percent fall in the sugar prices. This showed an immediate impact on

the cultivator as well. Sugarcane prices also dipped to as low as Rs. 40 to Rs 50 per tonne.

The fall in sugarcane price became a disincentive to farmers and thus the output of sugarcane declined by 28 percent and that of sugar by 41 percent within a period of two years from 1977-78 to 1979-80. At the commencement of the 1979-80 season, the cane available for crushing was quite inadequate. Most of the sugar factories were not in a position to commence the crushing operations at all. Having felt that any more prolonging of these conditions would be harmful to the economy of the sugar industry, the farmer and the consumer, the Government reimposed control on sugar in September, 1979 and promulgated an ordinance in November 1979 to take over the sugar factories which did not start crushing by November 15, 1979 or had arrears in excess of 10 percent of the cane price payable in respect of the 1977-78 season. The Government also felt that there might be a danger of diversion of sugarcane to gur and khandasari units if the sugar producers fail to offer a competitive price. The problem was considered as very grave particularly at the moment when the cane growth was already low. Therefore, in December 1979, i.e., within just three months of imposition of control on sugar prices, the policy was modified in favour of a partial control system. Under this system, 65 percent of the sugar

10. Indian Sugar Year Book, 1979-80, Indian Sugar Mills Association, p. 75.

11. Commerce, July 15, 1978, p. 102.



output was covered by levy and remaining was left for free sale.

By and large, this policy has been working well and the production of cane and sugar has been on the increasing trend. The sugarcane and output have increased by 40 and 119 percent respectively in a period of three years from 1979-80 to 1981-82. The production of sugar during 1981-82 reached an all-time record level of 84.35 lakh tonnes and elevated India to the first position among all the sugar producing countries in the world. The domestic consumption of sugar also reached as high a level as 59.16 lakh tonnes during the year 1981-82, leaving a closing stock of 32.96 lakh tonnes on 30th September, 1982.

Usually 20 percent of the annual consumption would be maintained as closing stock every year. But the stock of 32.96 lakh tonnes on 30th September 1982 amounted to 55.7 percent and it so appeared that it may again result in financial crisis for the industry. In order to avoid this problem the Government increased the size of releases of sugar for domestic consumption. The average monthly release of (levy and free) sugar which was 4.26 lakh tonnes during 1980-81 was increased to 4.80 lakh tonnes during 1981-82 and 6.0 lakh tonnes during 1982-83. Further, the Government also decided to export as much as 7 lakh tonnes of sugar during the year 1982 under the International Sugar Agreement of 1977 and to create an initial buffer stock of 5 lakh tonnes for the first time in the country. But the move to export sugar failed because of the buyers' market abroad. Therefore, the Government decided to increase the sugar buffer stocks to 12 lakh tonnes progressively.<sup>12</sup> Thus, unlike in the past, the Government is taking alternative steps to clear off the surplus stocks instead of disturbing the existing control policy. This may be considered as a good step taken by the Government because on many occasions earlier, the decontrol of sugar in times of surplus stocks had an adverse effect on the welfare of the industry, farmer and consumer.

The controls on sugar were observed rigidly without any relaxation in respect of the losing factories or

unfavourable seasons. The price of levy sugar, the proportion of levy and free sale sugar and monthly releases of sugar were rigidly maintained without any interim alternations or modifications inspite of varying market conditions, sugarcane and sugar prices.

The frequent changes in the sugar policy also affected the interests of farmers. The decontrol policies were announced mostly after the sowing season thus denying an opportunity for the farmers to choose other remunerative crops instead of sugarcane.

#### Views of the Executives about Government Controls on Sugar\*

First, we enquired whether the State Policy of imposing control on sugar industry is necessary or not. A majority of respondents expressed the view that the controls in one form or the other are necessary. In a few cases, it is argued that in view of the present financial difficulties facing the industry, the control on sugar should be withdrawn and an opportunity should be given to the industry to sell sugar at higher prices. They, however, felt that the decontrol should be only for a short period and need not be applied on a permanent basis. Most of the interviewees felt that complete control on sugar is advisable provided the levy price fixed by the Government is remunerative to the manufacturer.

The executives are of the unanimous opinion that the operational flexibility of the industry is largely restricted particularly in regard to recovery of cost of inputs, as the prices of both raw material and finished product are fixed by the Government through control policy. They pleaded for provision of incentives particularly when the costs of production are high and levy price fixed by the Government is not remunerative to the producers. At present, the only incentive provided by the Government to the industry is the rebate in excise duty. They feel this rebate is quite inadequate to cover the losses incurred due to early

\* The view of the executives presented above are the result of analysis and processing of the data collected by us through the questionnaires.

12. Commerce, Nov. 27, 1982, p. 825.



starting and late winding up of cane crushing operations as required by the Government.

The executives are not happy with the frequent changes in the Government sugar policy because such changes are affecting their internal stability and development planning programmes: In some cases it led to withdrawal or postponement of the expansion proposals and in some other cases it resulted in their failure to distribute adequate returns to the shareholders/members. They also reported some problems in the day to day working of their factories due to the controls. Several records, statements and reports are to be prepared for submission to the Government during the periods of control. This involves heavy expenditure to the factories in the form of additional clerical costs and stationery.

They reported that the existence of Khandasari units nearer to sugar factories,<sup>13</sup> is creating problems. In times of rising demand for gur and khandasari, they offer higher price for cane. Under these circumstances the cane agreed for sugar factories is diverted to khandasars. Contrarily, when sugar factories offer a better and high price for cane, they obtain cane supplies over and above the agreed quantity. In order to absorb the entire cane available, the factories continued crushing till late in the summer despite lower recovery entailing in higher cost of production.

The executives also felt that the farmers are not loyal to the factories in respect of cane supply. Their disloyalty is very much regretted particularly by the managements of cooperative factories.<sup>14</sup> According to them the farmer-members are not supplying even the minimum prescribed quantity of 8 tonnes per share in times of higher prices for cane outside. However, when the outside prices for cane are low, the management are obliging its members by purchasing the entire cane supplied even if it is above the agreed quantity.

13. For example, there are two khandasari units within a distance of 5 KM in the case of a cooperative sugar factory.

14. A similar observation was made by Sanjaya Baru, in his article "Sugar Crisis : Who Bears the Burden" Economic and Political Weekly, July 5, 1980, pp. 1152-1156.

The executives are of the opinion that the khandasars, though operating on small-scale basis, are able to compete with the industry as they are offered more incentives and exemptions by the Government than those provided to sugar factories. The benefits extended to gur and khandasari units include power rebate, favourable excise duty, absence of price and distribution control both on the main and by-products etc.

The executives expressed their satisfaction about the present statutory price for cane from the farmers' view point. They feel that there is no need for intervention by the State Government in the matter of cane price as the cane growers have a share of 50 percent in the excess sugar price realisations as per clause 5A of the Sugarcane Control Order.<sup>15</sup>

With regard to the payment of price to the farmers, the cooperative and the public sector factories stated that the sugar units in public and cooperative sectors sincerely pay the State advised prices at all times unlike private sector units who pay lower prices for cane during low recovery periods. The private sector units are thus creating undue competition within the industry with their low cost for cane.

As a reply to a question, they suggested the need for differential rates of recovery being linked to the cane price in high, medium and low recovery areas. They substantiated their proposal by stating that merely due to climatic and geographical advantages a farmer in a high recovery area gets a higher price while a farmer in a low recovery area with same efforts in cane cultivation, is not able to get such a high price.

We enquired about the impact of intervention by the State Governments in the form of cane price fixation on sugar production. The executives are of the view that such intervention with regard to cane-price has an adverse impact on the industry. The following are the causes stated by them in support of their answer.

15. This formula was suggested by V. Bhargava, Chairman, Sugar Industry Enquiry Commission, 1973.



- (1) The State advised prices are not considered for determination of levy sugar price fixation. Though the intention of the dual price policy is to enable the industry to pay a higher price for cane, due to discouraging trends in the prices of free sugar, the factories are not even able to recover the cost of production. Thus the factories are losing on two fronts viz., on purchase of cane by paying higher price and on sale of sugar at lower price.
- (2) The cost of production has further increased due to high purchase tax on cane.
- (3) They believe that the price fixed by the Government of Andhra Pradesh is so high that quite a few other States have fixed the price at such a level.
- (4) Due to better prices for cane, the factories are getting abundant supplies of cane and to crush all the cane available, the factories are forced to continue crushing operations till late in summer in spite of a steep fall in the recovery rate and the consequent high cost of production.

Further, they believe that the Central Government is not totally accepting the cane price suggested by the Agricultural Prices Commission as it leads to an increase in the levy price.

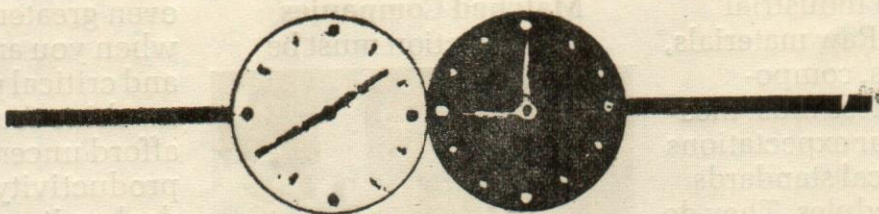
We enquired whether the industry requires differential excise duties for different recovery areas. The opinions of the executives are divided. While a few of them are in favour of differential excise duty, the others are not. Those who opposed the proposal stated that where the production is high on account of high recovery, automatically the burden of excise duty, will be high. Therefore, there is no need for differential duties. The others who endorsed the proposal stated that the present uniform excise duty is a discouraging factor for the factories of low recovery areas. In these areas the cost of production is high as compared to that of a factory in a high recovery area. Therefore, the factories of low recovery areas can not compete with those of high recovery areas in the market. Hence the need for differential duty.

Then we enquired whether the current levy price of sugar is sufficient to recover the cost of production. All the interviewees expressed the view that the current levy price is inadequate to recover the cost of production. Though the levy prices are revised annually the revision is not based on realistic approach. Since 1979-80 neither there is a substantial upward revision of levy price nor the free salesugar realisations are sufficient to make good the loss on levy sugar.

While collecting the data for the study we found that in the case of a cooperative sugar factory, the average cost of manufacture for the year 1981-82 was only Rs. 360.10 per quintal as against a regional average of Rs. 375 to Rs. 385 per quintal. No doubt, it is a sign of its operational efficiency but unfortunately the unit incurred losses during the same period. The data presented in the table given in the next page reveals the fact.

The data revealed that the unit incurred loss in all the months of the year except in October and November 1981 and April 1982. The management of this unit feels that the loss is on account of low levy price. The levy price fixation by the Government is based on estimated costs rather than on actual costs. Therefore there is a need for fixation of levy price realistically, precisely and accurately.

Under the present sugar policy of the Government both levy and free sugar releases into the market are subject to regulation and control. Therefore, we enquired whether such control on releases is necessary. Most of the executives are of the opinion that State intervention in the form of regulation of monthly releases of sugar is necessary in the interests of the industry and consumers. However, they mentioned that there are some problems in this regulation. The release of quotas are more rigid and the policy does not provide flexibility for factories to sell more quota when sugar prices are encouraging. The units are forced to sell the minimum notified quantities even though the market prices are discouraging. The units are not able to explore new markets due to insufficient time for release of sugar. Exploring new markets is also a difficult task in view of the high transportation costs involved.



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had only 24 hours a day!**



Profit or Loss on Realisation  
1981-82

Month	Levy Price (Rs. per quintal)	Free sale price (Rs. per quintal)	Weighted average price realised	Average cost of production	Profit (+) Loss (-) Columns 4-5)
1	2	3	4	5	6
1981					
October	287.63	452.93	376.93	360.10	+16.83
November	287.63	453.18	369.85	360.10	+ 9.75
December	293.36	471.57	354.93	360.10	- 5.17
1982					
January	293.36	498.11	350.87	360.10	- 9.23
February	293.36	458.40	315.76	360.10	-44.34
March	293.36	422.39	315.58	360.10	-44.52
		447.40	361.73	360.10	+ 1.63

# Productivity. It often slips on other companies' banana peels.

It's happening to many companies today. They have the capacity, the technological wherewithal, the professional fibre to produce more. But ...

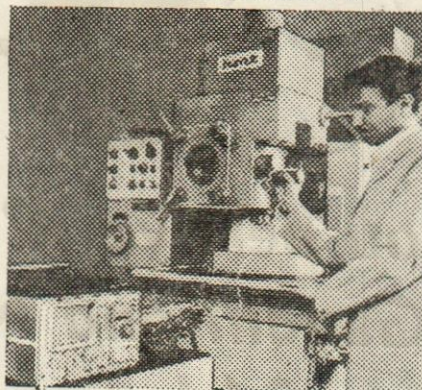
The fact of the matter is that today productivity depends on more than just your company's own in-house strengths. It is becoming increasingly necessary to anticipate the shortfalls of your suppliers and industrial companions. Raw materials, machine tools, components — all these must measure up to your expectations of technological standards and time schedules. They do not always do. These are the industrial banana peels on which good companies can slip and fall.

There is no armour against this fate — except the foresight and caution of care-

ful selection. Your industrial companions must be selected not merely on the basis of specifications of goods needed and on cost considerations, but on more solid criteria. You must examine the companies themselves.

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# Achievement Motivation and Job Satisfaction

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*The present article focussing on achievement motivation points that professional men were found to be significantly higher on Achievement motivation than professional women. Professional men and women and non-professional men selected more motivators than hygienes for both satisfying and dissatisfying job situations thus partially confirming Herzberg's two-factor theory. Different relationships emerged between the level of Achievement motivation and the selection of motivators among the different groups.*

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## Introduction

Society does not encourage expression by women of their talents and potentialities outside the home. Under such circumstances when women feel the need of expressing themselves in the competitive world of professional career, one would guess that they do so owing to an irresistibly strong motivation. Once women work in professional capacities, a relevant question that needs answering is what characteristics of the job give them satisfaction and dissatisfaction.

The purpose of the present study was to test the level of Need for Achievement (N-Ach) and Herzberg's (1969) two factor theory of Job satisfaction-dissatisfaction; how these differ according to sex and job level and to see if there is any relationship between the level of N-Ach and selection of sources of Job satisfaction/dissatisfaction.

## Nature of the Sample

Subjects were 50 professional and 50 non-professional full time working men and 50 professional and 50 non-professional full time working women. These subjects were employed in the public sector.

## Measuring Instruments

Need for Achievement: The Thematic Apperception



Test (TAT) was used to measure the N-Ach and the obtained stories, from each subject, were scored according to the technique given by McClelland et al (1953). A set of six pictures was used. A separate set of pictures, with female characters, was developed for the female sample and the cues were kept same as in the male pictures.

Job Satisfaction : Burke's (1966) Job Description method was used measure the sources of job satisfaction/dissatisfaction. Male and female characters were presented to men and women respectively.

### Testing Procedure

The procedure involved asking individual subject to write brief five minute stories in response to each of the pictures shown for twenty seconds. The standard instructions described by McClelland et al (1953) were used.

After the stories for all the six pictures were written, the subject was given a description of a satisfied worker and a dissatisfied worker. After reading each description, the subject was asked to check five job characteristics out of a list of fourteen which he felt might be the most important contributors to the very high degree of job satisfaction or the job dissatisfaction displayed by the major character in the script. The first seven characteristics on the list constituted the motivators and the rest hygienes (see Table 3).

### Achievement Motivation

A constant of one was added to all N-Ach scores to eliminate zeros.

Means and standard Deviations of N-Ach scores, obtained from TAT, are presented in Table 1. The summary of the  $2 \times 2$  analysis of variance is presented in Table 2.

TABLE 1

Means and Standard Deviation of Achievement Motivation Scores of Professional and Non-Professional Males and Females

Job level	Males			Females			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Professionals	59	2.72	2.17	50	1.64	1.39	100	2.18	1.18
Non-professionals	50	1.54	1.21	50	1.20	0.72	100	1.37	0.33
Total	100	2.13	1.84	100	1.41	1.09			

TABLE 2

A  $2 \text{ (sex)} \times 2 \text{ (job level)}$  Analysis of Variance for Achievement Motivation Scores of Professional and Non-professional Males and Females

Source	Sum of squares	df	Mean $S^2$	F	F
Total	486.87	199	—	—	—
Sex	25.205	1	25.205	11.77	.001
Job-level	32.815	1	32.815	15.33	.001
Sex $\times$ job level	7.835	1	7.835	3.66	NS
Error	421.020	196	2.14		



**Sex**

(a) It was anticipated that professional women will have higher N-Ach than professional men. This hypothesis was not supported. Professional men were found to have higher N-Ach than professional women.

(b) The hypothesis that non-professional men will have higher N-Ach than non-professional women was supported.

(c) The hypothesis that in general men will have higher N-Ach than women was supported.

These results could be explained with the help of socialization and fear of success in women. Though girls are provided with the same education as boys and encouraged to compete with them in the class room, after the education is over, our society expect them to find fulfilment of their life aspirations in taking care of the home. When this is what is expected from them, the question is, why would they want to go in to the professional job ?

**Reasons for low N-Ach in Women**

There are several reasons for which women would want to go into the professional jobs.

A girl is made to go through precisely the same training as boys only because she may need it, if she fails to have a successful marriage (Bettelheim, 1972, p. 106). Even in our country, it may not be the real N.Ach but "just in case" phenomenon which pushes them into higher education and a professional job. Or it may be the easy availability of financial resources which brings them into higher education (Hate, 1969, p. 145).

A professional woman may want an independent social status or better standard of living which she may get by supplementing her husbands salary. This may be one of the reasons behind her entering into a profession.

The most talked about reason for having low N-Ach

in women is "fear of success". For women there are negative consequences associated with success and implications of success in competitive achievement situations (Horner, 1972). In the present sample, when the professional women were divided into two groups on the basis of whether they are in traditional feminine jobs or male dominated careers it was noted that women in atypical careers have N-Ach as high as men in the same careers. It is the group of women which has gone in for traditionally feminine professions that score low on the N-Ach and thereby lower the score of the professional group in general. Though there is not much evidence available to show the presence of fear of success in Indian women, on the basis of studies done in the West, one can say that women who go for traditionally feminine careers have high fear of success and this fear of success is more likely to be associated with low scores on achievement variable (Tangri, 1969).

Another important reason for having low N-Ach in Indian women is the conflict or the difficulty in managing both the home and the job experienced by married women and anticipated by singles. Approximately 63% of the stories written by the women contained such a conflict, none of the male stories did. The conflict is rather severe in Indian women than it is in western women. This is because, men in the west make greater adjustments with the working wives, than Indian men (Kazi, 1978, p. 86; Fogarty, et al., 1971, p. 240).

This may dampen her need for accomplishments at the job. For the same reason non professional women were found lower on N-Ach than non-professional men. The only way to bring out achievement striving in working women would be for men to take the full share in household responsibilities, to minimize her worry and fatigue. Considering the fact that women go for professional jobs are virtually pursuing who have two careers, where as men have just one career to pursue, one can say, that whatever women achieve, in such cases, in their career cannot really be considered low as compared to men.

**Job level**

(d) As hypothesised, professionals were found significantly higher on N-Ach than non-professionals.



Prestige of an occupation reflects its level of difficulty and demands for individual decision making. Individuals with high N-Ach are attracted towards such jobs because they are more challenging and require more planning. It is not always the lack of proper education, opportunities or the family circumstances but the lack of planning in selecting the job can also force an individual to take routine jobs (Veroff and Field, 1970).

### Job Satisfaction/Dissatisfaction

The sample was further tested for Herzberg's (1959)

two-factor theory of motivation. Herzberg states that factors involved in producing job satisfaction are separate and distinct from the factors that led to job dissatisfaction. According to Herzberg, motivator events lead to job satisfaction because of a need for growth or self-actualization.

The number of times a job characteristic was chosen by professional men and women in the satisfying and dissatisfying job situations and the rank order of these choices are presented in Table 3. The same aspects for non-professional men and women are presented in Table 4.

TABLE 3  
Frequencies and Rank Order of Job Characteristics Choices of Professional Males and Females for Satisfying and Dissatisfying Job Situations

	Professional Males (PM) N=50				Professional Females (PF) N=50			
	Satisfying job Situation		Dissatisfying job Situation		Satisfying job Situation		Dissatisfying job Situation	
	Times Chosen	Rank Order	Times Chosen	Rank Order	Times Chosen	Rank Order	Times Chosen	Rank Order
1. Voice in decision	36	2	20	5	34	2	31	2
2. Opportunities for advancement	20	5	30	1	22	5	29	3
3. Challenges ability	39	1	13	11.5	36	1	27	5
4. Importance of job	12	7.5	18	7	19	7	13	9
5. High responsibility	30	4	14	9.5	24	4	15	7.5
6. Recognition for achievement	31	3	25	3	20	3	35	1
7. Growth in skill	15	6	10	13	16	8	7	13
8. Fringe benefits	0	14	9	14	1	14	3	14
9. Job security	8	12	16	8	4	13	10	11
10. Physical working conditions	9	11	14	9.5	9	11	15	7.5
11. Good boss	11	9	19	6	15	9	16	6
12. Good Salary	10	10	22	4	13	10	12	10
13. Inter-personal relationship	12	7.5	27	2	22	6	28	4
14. Company polity	7	13	13	11.5	5	12	9	12

PM = 20.0 P .01  
PF = 8.0 P .01  
PM × PF = 24.0 P .01



TABLE 4

Frequencies and Rank Order of Job Characteristic Choices of Non-Professional Males and Females for Satisfying and Dissatisfying Job Situations

	Non-professional Males (NPM) N = 50				Non-professional Females (NPF) N = 50			
	Satisfying job situation		Dissatisfying job situation		Satisfying job situation		Dissatisfying job situation	
	Times chosen	Rank order	Times chosen	Rank order	Times chosen	Rank order	Times chosen	Rank order
1. Voice in decision	17	10	17	7.5	16	7	30	2
2. Opportunities for advancement	24	2	25	2	30	2	22	6
3. Challenges ability	27	1	22	3.5	12	10.5	17	7
4. Importance of job	22	3	16	9	10	12	34	1
5. High responsibility	21	4	18	6	12	10.5	11	10
6. Recognition for achievement	19	8	14	12.5	22	5	15	8
7. Growth in skill	19	8	22	3.5	6	14	10	11.5
8. Fringe benefits	4	14	15	10.5	15	8	8	13
9. Job security	19	8	14	12.5	7	13	14	9
10. Physical working conditions	12	12	19	5	20	6	10	11.5
11. Good boss	14	11	8	14	26	3.5	23	5
12. Good salary	20	5.5	26	1	35	1	26	3
13. Inter-personal relationship	20	5.5	17	7.5	26	3.5	24	4
14. Company policy	11	13	15	0.5	13	9	6	14

NPM = 8.85 P. .01

NPF = 0.36 P. .05

NPM × NPF = 4.00 P. .05

### Job Satisfaction

(e) It was hypothesized that for satisfying job situation, professionals as well as now professionals will select motivators more often than hygienes.

In the present study professional men, professional women and non-professional men selected more motivators than hygienes for satisfying job situation thus supporting Herzberg's theory. While explaining his theory, Herzberg says that a man or woman, be in any occupation, tends to actualize himself/herself in every area of life and the job is one of the most

important areas.

Non-professional women, however, selected more hygienes than motivators for satisfying job situation. This may be because most of them work strictly for economic reasons, to supplement their husband's salary or to pass time (Rapoport, et. al. 1971).

### Job Dissatisfaction

(f) It was hypothesised that professionals as well as non-professionals will select hygienes more often than motivators, for dissatisfying job situation.

In the present study, the findings for dissatisfying



job situation did not support Herzberg's theory. Both motivators and hygiesnes were found contributing to it in more or less equal proportions. Professional men, professional women and non-professional men marked three motivators and two hygiesnes for dissatisfying job situation, showing that in their case, motivators are responsible not only for giving satisfaction but also for avoiding unpleasant situation. This finding tends to support the findings of some studies done before in India as well as in America (Ghadijally and Dhawale, 1975; Choudhari et. al., 1968; Burke, 1966). Non-professional women marked more hygiesnes than motivators, showing more extrinsic orientation supporting Herzberg's theory.

Thus it is personality in the case of men and job level in the case of women that play important roles in the selection of motivators and hygiesnes. At higher job levels, sex is not the factor that determines the selection of job characteristics.

#### Relationship between level of N-Ach and Selection of Motivators

The intrinsically oriented emphasize the task itself and the challenge it offers to test skill and abilities more than the extrinsically oriented. Therefore, in a working situation the former group is expected to have high N-Ach than the latter group.

(g) Therefore, it was hypothesised that people with high N-Ach will be more intrinsically oriented i.e. they will select more motivators than hygiesnes for satisfying as well as dissatisfying job situation.

Regardless of N-Ach most of the professional men and professional women were found intrinsically oriented, disconfirming the hypothesis (Table 5.) It is possible that since higher level job offer more stimulation for intrinsic satisfaction, regardless of level of N-Ach, most of the professionals select more motivators.

In the case of non-professional men, data showed a negative relationship between the N-Ach and the number of motivators selected. Among non-professional men those who had a high N-Ach, seven out of nine marked Good Salary and Good Boss as the

TABLE 5

Pearson Product Moment Correlation Between Level of Achievement Motivation and Selection of Motivators in Professional and Non-Professional Males and Females.

Subjects	r	z	p
Professional males	.12	0.84	.05
Professional females	.06	0.42	.05
Non-professional males	-.33	-2.31	.05
Non-professional females	.49	3.43	.01

hygiene factors responsible for giving satisfaction. It is possible that they took salary as a symbol of their achievement and good Boss as a source of recognition, in that case hygiesnes were infact perceived as motivators.

The results with non-professional women supported the hypothesis. This shows that non-professional women with high N-Ach value motivators, but because of the lack of proper training and opportunities they are doing such jobs where intrinsic gratification is not possible. These women may have a strong desire to improve themselves and the selection of motivators could be a reflection of their "ideal-self."

Thus the study shows though it is true that unless one values a particular goal one will not be motivated to achieve it, it is also possible that one who values a particular goal will not necessarily achieve it. Moreover, the orientation depends more upon whether the character is an end in itself or is a means to achieve some goal.

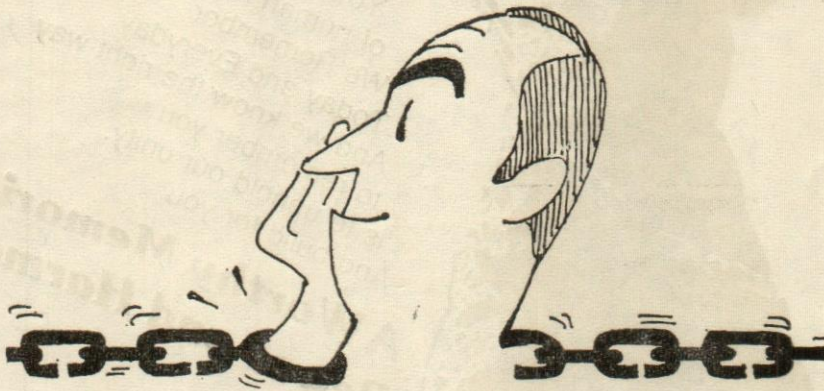
Thus, it is concluded that the sex and the occupational level of the individual has an impact on the level of N-Ach. Because of socialization pattern women even professional women develop low N-Ach as compared to men. The findings on job satisfaction and dissatisfaction give partial support to Herzberg's two-factor theory. A particular job characteristic can be a satisfier or a dissatisfier depending upon individual



and situational determinants and the way an individual perceives a particular job characteristic.

## REFERENCES

1. Bettelheim, B 'Growing up Female' in 'Great Argument: the rights of women' (eds) Bosmajian, H & Bosmajian, H. Addison-Wesley, London, 1972.
2. Borke R.J. 'Relative Contributions of Motivators and Hygienes to Satisfying and Dissatisfying Job Situations', *Journal of Industrial Psychology*, 1966,4, 1-6.
3. Choudhari, P.K. and Lahiri, D.K. 'Perceived Job Characteristics as Satisfiers and Dissatisfiers by Manual Workers', *Indian Journal of Psychology*, 1968, 43, 41-62.
4. Fogarty, M.P.; Rapoport, R. and Rapoport, R.N. 'Sex, Career and Family', John Allen & Unwin Ltd., N.Y. 1971.
5. Ghadially, R and Dhawale, A.K. 'Relative Contribution of Motivators and Hygienes to Satisfying and Dissatisfying Job Situation',; *The Asian Journal of Psychology*, 1976, 1, 17-20.
6. Hate, C.A. 'Changing States of Women in India', Allied Publishers, Bombay, 1969.
7. Herzberg, F., Mausner, B. and Snyderman, B.B. 'The Motivation to Work', New York, Wiley, 1959.
8. Horner, M.S. 'Towards an Understanding of Achievement Related Conflict in Women' *Journal of Social Issues*, 1972, 28, 157-175.
9. Kazi, K.A. 'Statistical Package for Social Sciences and Its Utilization', B. Tech. Project submitted to the Indian Institute of Technology, 1978.
10. McClelland, D.C.; Atkinson, J.W.; Clark, R.A. and Lowell, E.J. 'The Achievement Motive', Appleton-Century-Crofts, New York, 1953.
11. Rapoport, R. and Rapoport, R. 'Dual-Career Families', Penguin Book Publishers, 1971.
12. Saleh, S.D. 'A Study of Attitude Change in the Pre-retirement Period', *Journal of Applied Psychology*, 1964, 48, 310-312.
13. Tangri, S. 'Role-Innovation in Occupational Choice among College Women', Doctoral Dissertation submitted to the University of Michigan in 1959. Published by University Microfilms, Inc., Ann Arbor, Michigan, 1969.
14. Veroff, J. and Field. S. 'Marriage and Work in America', Van Nostrand-Reinhold, New York, 1970.



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# EOQ with Multi Items

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RAKESH GUPTA  
DR. J. D. AGARWAL

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*The paper develops Economic Order Quantity model with multi items under different constraints and varying costs. It considers the problem under space constraints, financial constraints and upper limit on the number of orders.*

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## Introduction

The classical Economic Order Quantity (EOQ) formula is based upon a set of assumptions such as constant price, deterministic lead time, known demand, single item, no shortage etc. Most of these assumptions at time do not hold valid in real world. Yet the theoretical model of EOQ with regards to material management science is very advantageous. However, a detailed study and analysis of EOQ formula, its assumptions both implicit, explicit and real life materials management problems motivates one, to probe and carry out an extension and further study of EOQ formula.

In our present paper we have been motivated to probe into some of the assumptions of EOQ dealing with (i) a single item and (ii) constant unit cost in the given period. It has been observed that business houses in a modern complex world face situations where inventory policy is to be applied to the management of its materials which constitute of multi items with variable unit cost over a period. Inventories is an industrial undertaking may be classified as composed of raw materials work in progress, finished goods, goods in transit and spares. In some or all of these components generally there exists a fairly large number of items. Premier automobile Limited Bombay—A private sector enterprise producing cars only, manufacturing a single item it requires its materials composed of various parts as stated above and also requires a large number of items to complete the



production process. Similarly a business house dealing in manufacturing and/or trading multiple items simultaneously would require its inventories composed of (a) different components such as raw material, work in progress, finished goods etc. (b) varying type of items required for production of each single item and also may requires both of these (a) and (b) as specified here for each one of the multiple items simultaneously. The example of such business houses are Bharat Heavy Electrical Limited (BHEL) producing switch gear, pumps, motors, boilers, turbine set, generators etc. with varying production life cycle ranging from 2 to 50 months.

Under the situation as stated here above where single item is a rare phenomenon it will be desirable to modify the classical EOQ formula for the multi items inventory with variable unit costs. It has been observed that there are different type of interaction among these multiple items. Some of these interactions among these items may be stated as follows :

- (i) Limited warehouse capacity.
- (ii) Upper limit on the number of orders.
- (iii) Upper limit on the maximum amount of investment in different components and different items of inventory.

Amongst these interaction there is a constant problem of alternative choice for the decision maker with regard to the competing nature of these items for each one of the above interactions i.e. competition for warehouse space, purchase orders and the amount of the investment irrespective of nature of items with regard to their being substitutable and or complementary.

Moreover it may also be observed that it is not always true for a unit cost of an item to be independent of quantity procured, keeping in view of the above we are making an attempt to devise a method to determine the EOQ in some particular cases. For the purpose of this paper, keeping in view of the observation made above that a unit cost of an item is dependent of quantity procured. The cost  $C_j$  of the  $j$ th item where  $j = 1, 2, \dots, n$  has been considered as

$$C_j = h_j + \frac{k_j}{n_j} \text{ where } h_j \text{ and } k_j \text{ are constants} \\ Q_j \quad (j = 1, 2, \dots, n)$$

**Problem**

We considered the situation where  $n$  items are stocked. We are interested in finding  $Q_j$ 's ( $j=1, 2, \dots, n$ ) order quantities which will minimize the total cost over a period towards inventory under one or more constraints i.e. (i) floor constraint (ii) order constraint (iii) financial constraint, with varying unit cost as :

$$C_j = h_j + \frac{k_j}{n_j} \dots\dots\dots(1) \quad j = 1, 2, \dots, n$$

The following notations are employed :

$\lambda_j$  is the total yearly demand rate,  $A_j$  is the ordering cost per order,  $I_j$  is the inventory carrying charge, and  $C_j$  is the unit cost of  $j$ th item. ( $j = 1, 2, \dots, n$ ). Thus the average annual variable cost for all the item is

$$K = \sum_{j=1}^n \left[ \lambda_j C_j + \frac{\lambda_j A_j}{Q_j} + \frac{I_j C_j Q_j}{2} \right] \dots\dots(2)$$

Where  $\lambda_j C_j$  is the purchasing cost,  $\frac{\lambda_j A_j}{Q_j}$  is the ordering cost and  $\frac{I_j C_j Q_j}{2}$  is the inventory carrying cost of the  $j$ th item.

Putting the value of  $C_j$  from (1) into (2) Then equation (2) becomes

$$K = \sum_{j=1}^n \left[ \lambda_j \left( h_j + \frac{k_j}{n_j} \right) + \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{n_j} \right) \right] \dots(3)$$

(For  $n_j = 0$  equation (3) is with constant cost for every item such a case is considered in [2]).

Now problem is to find values of  $Q$ 's which minimises(3) under constraints.



**Analysis***Case 1 : Floor space constraints*

Let  $f_j$  ( $j = 1, 2, \dots, n$ ) be the floor space required by one unit of  $j$ th item and  $f$  be the upper limit on the floor space. If the floor space constraint is not to be violated by order quantity  $Q_j$  of  $j$ th item ( $j=1, 2, \dots, n$ ) at any time then

$$\sum_{j=1}^n f_j Q_j \leq f \quad \dots (4)$$

To find the optimal values of  $Q_j$ 's consider the lagrangian function  $L$

$$L = \sum_{j=1}^n \left[ \lambda_j \left[ h_j + \frac{k_j}{n_j} \right] + \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{n_j} \right) + \phi \left( \sum_{j=1}^n f_j Q_j - f \right) \right] \quad (A)$$

where  $\phi$  is lagrange multiplier

For optimal values of  $Q_j$ 's, we have

$$\frac{\partial L}{\partial Q_j} = 0 \text{ for } j = 1, 2, \dots, n$$

$$\text{i.e. } \frac{-\lambda_j k_j n_j}{n_j + 1} - \frac{\lambda_j A_j}{Q_j^2} + \frac{I_j h_j}{2} - \frac{I_j k_j (n_j - 1)}{2Q_j} + \phi f_j = 0 \quad j=1, 2, \dots, n \dots (B)$$

$$\frac{\partial L}{\partial \phi} = 0 \text{ i.e. } \sum_{j=1}^n f_j Q_j - f = 0 \quad \dots (C)$$

(B) and (C) are  $(n+1)$  equations in  $(n+1)$  variables i.e.  $Q_j$ 's ( $j=1, 2, \dots, n$ ) and which will provide solution. However, for general values of  $n_j$  solution for  $Q_j$ 's become difficult to obtain. Thus we consider this problem for particular values of  $n_j$

*Particular case for  $n_j = 1$  for all  $j$*

equation (3) becomes

$$K = \sum_{j=1}^n \left[ \lambda_j \left( h_j + \frac{k_j}{Q_j} \right) + \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{Q_j} \right) \right] \quad \dots (5)$$

If there is no floor constrain then

$$Q_j = \sqrt{\frac{2\lambda_j (A_j + k_j)}{I_j h_j}} \quad j=1, 2, \dots, n \quad \dots (6)$$

If the  $Q_j$ 's of (6) satisfy (4) then the  $Q_j$ 's are optimal. In such a case the constraint is not active i.e. sufficient floor space is available so that average yearly costs could not be reduced by increasing the amount of floor space available. On the other hand, if the  $Q_j$ 's of (6) do not satisfy (4) then the constrain is active and the  $Q_j$ 's of (6) are not optimal.

To find the optimal  $Q_j$ 's for  $n_j = 1$  equation (A) becomes

$$L = \sum_{j=1}^n \left[ \lambda_j \left( h_j + \frac{k_j}{Q_j} \right) + \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{Q_j} \right) + \phi \left( \sum_{j=1}^n f_j Q_j - f \right) \right] \quad \dots (7)$$

$$\text{We have } \frac{\partial L}{\partial Q_j} = 0 - \frac{\lambda_j (k_j + A_j)}{Q_j^2} + \frac{I_j h_j}{2} + \phi f_j = 0 \quad j = 1, 2 \quad \dots (8)$$

$$\frac{\partial L}{\partial \phi} = 0 = \sum_{j=1}^n f_j Q_j - f \quad \dots (9)$$

Equation (8) gives

$$Q_j^* = \sqrt{\frac{2\lambda_j (A_j + k_j)}{I_j h_j + 2\phi^* f_j}} \quad j = 1, 2, \dots, n \quad \dots (10)$$

Where  $\phi^*$  is the value of such that  $Q_j^*$ 's of (10) satisfy (9).

The function  $\sum_{j=1}^n f_j [2\lambda_j A_j (I_j C_j + 2f_j)^{-1/2} - f]$  is a montone decreasing function of; consequently, there is a unique  $\phi^* > 0$  such that (9) is satisfied.



**Case II Constraint on the total number of orders during the period and  $n_j = 1$  for all  $j$ .**

Let  $h$  be the maximum orders that can be placed for year. This requires that

$$\sum_{j=1}^n \frac{\lambda_j}{Q_j} \leq h \quad \dots (11)$$

We assume that there is no fixed cost per order. The only costs are then the inventory carrying charges and cost of purchases. Thus the annual variable cost is :

$$K = \sum_{j=1}^n \frac{I_j C_j Q_j}{2} + \lambda_j C_j \quad \dots (12)$$

It is desired to find minimum of  $K$  subject to (11). To determine the optimal  $Q_j$ 's, we form the lagrangian function

$$J = \sum_{j=1}^n \left( \frac{I_j C_j Q_j}{2} + \lambda_j C_j \right) + \eta \left( \sum_{j=1}^n \frac{\lambda_j}{Q_j} - h \right)$$

Where  $\eta$  is the lagrange multiplier

$$J = \sum_{j=1}^n \left[ \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{Q_j} \right) + \lambda_j \left( h_j + \frac{k_j}{Q_j} - h \right) \right] + \eta \left( \sum_{j=1}^n \frac{\lambda_j}{Q_j} - h \right) \quad \dots (13)$$

To determine optimal values of  $Q$ 's differentiate (13) w.r.t.  $Q_j$  and  $\eta$

We have

$$\frac{\partial J}{\partial Q_j} = 0 = \frac{I_j h_j}{2} - \frac{\lambda_j K_j}{Q_j^2} - \frac{\eta \lambda_j}{Q_j^2} \quad j=1, 2, \dots, n \quad \dots (14)$$

$$\frac{\partial J}{\partial \eta} = 0 = \sum_{j=1}^n \left( \frac{\lambda_j}{Q_j} \right) - h \quad \dots (15)$$

The unique optimal solution is

$$Q_j^* = \sqrt{\frac{2\lambda_j (k_j + \eta^*)}{I_j h_j}} \quad \dots (16)$$

Where  $\eta^*$  is obtained by substituting  $Q_j$ 's into (15)

$$\text{i.e. } \sum_{j=1}^n \lambda_j \sqrt{\frac{I_j h_j}{2\lambda_j (k_j + \eta^*)}} - h = 0 \quad \dots (17)$$

In particular if  $k_j = k$  for all  $j$  then from (17)

$$\eta^* = \left[ \frac{1}{h/2} \sum_{j=1}^n I_j h_j \lambda_j \right] - k \quad \dots (18)$$

**Case III Upper limits on the investment in inventory**

$n_j = 1$  for all  $j$  in  $C_j$

There is an upper limit  $D$  to the Re investment in inventory at any one time. This constraint requires that

$$\sum_{j=1}^n C_j Q_j \leq D \quad \dots (19)$$

By putting value of  $C_j$  in (19) and after simplification we get

$$\sum_{j=1}^n h_j Q_j \leq D - \sum_{j=1}^n k_j = D' \quad \dots (20)$$

Thus we minimize cost function

$$N = \sum_{j=1}^n \left[ \lambda_j \left( h_j + \frac{k_j}{Q_j} \right) + \frac{\lambda_j A_j}{Q_j} + \frac{I_j Q_j}{2} \left( h_j + \frac{k_j}{Q_j} \right) \right]$$

subject to (19). The constraints (19) is similar to the floor space constraint(2). Hence the analysis will be similar.

$$\text{Thus } Q_j^* = \sqrt{\frac{2_j (A_j + k_j)}{I_j h_j + 2\theta^* C_j}} \quad \dots (21)$$

Where  $\theta^*$  is the value of lagrange multiplier

**Remarks**

1. Problem can easily be handled for  $n_j = 0$ , or 1 for every  $j$



II.  $n_j = 2$  for every  $j$

Equation of the type (A) reduces to

$$\frac{-\lambda_j k_j n_j}{Q_j^3} - \frac{\lambda_j A_j}{Q_j^2} + \frac{L_j h_j}{2} - \frac{I_j k_j}{2Q_j^2} + \phi f_j = 0 \quad j = 1, 2, \dots, n$$

which can be solved using methods for solving third degree equations.

III. It is also possible to have two or more of the constraints imposed simultaneously for example there is a constraint on the floor space and a constraint on the maximum rupees investment in inventory at any time. Thus we have to minimise (3) subject (4) and (19). In this case to find optimal values for  $Q_j$ 's we consider langrangian function  $\bar{L}$  with two language multipliers one with each constraint (say  $\phi$  and  $\theta$ ). We obtain

$$\frac{\partial \bar{L}}{\partial Q_j} = 0; \quad \frac{\partial \bar{L}}{\partial \phi} = 0; \quad \frac{\partial \bar{L}}{\partial \theta} = 0$$

**Numerical Example**

Consider a shop which produces sand stocks three items. The management desires never to have an investment in inventory of more than Rs. 14,075. The items are produced in lots. The demand rate for each item is constant and can be assumed to be deterministic. No backorders are to be allowed. The pertinent data for the items are given in table. The carrying charge on each item is  $I = 0.20$ . Determine the lot size for each item.

DATA TABLE

Item	1	2	3
Demand rate (Unit per year) $\lambda_j$	1000	500	2000
Set up cost per lot (Rs) $A_j$	30	50	70
Fixed cost (Rs per unit) $h_j$	20	100	50
(Rs. per unit) $k_j$	20	25	30

The optimal lot sizes in the absence of the constraint are

$$Q_1 = \sqrt{\frac{2(1000)(30+20)}{4}} = 158;$$

$$Q_2 = \sqrt{\frac{2(500)(50+25)}{20}} = 61;$$

$$Q_3 = \sqrt{\frac{2(2000)(100)}{10}} = 200$$

If these  $Q_j$ 's were used, the maximum investment in inventory would be

$$D' = 20(158) + 100(61) + 200(50) = \text{Rs. } 19,260;$$

$$D = 19,335$$

This is greater than the maximum allowable investment in inventory. Hence the constraint is active, and on introduction of a lagrange multiplier  $\phi$ , then optimal  $Q_j$ 's are given by

$$Q_j^* = \sqrt{\frac{2\lambda_j (A_j + k_j)}{h_j [1 + 2\phi^*]}} \quad j=1, 2, 3; \quad I_1 = I_2 = I_3 = I$$

where  $\phi^*$  is the solution of the equation

$$\sum_{j=1}^3 \sqrt{\frac{2\lambda_j h_j (A_j + k_j)}{(I + 2\phi^*)}} = D' = 14,000$$

$$= \sqrt{\frac{I \times 10^6}{0.10 + \phi^*}} + \sqrt{\frac{3.75 \times 10^6}{0.10 + \phi^*}} + \sqrt{\frac{10 \times 16^6}{0.10 + \phi^*}}$$

Thus

$$\sqrt{0.10 + \phi^*} = \frac{1}{14} [1 + 1.935 + 3.16] = 0.436$$

$$\text{or } \phi^* = 0.091$$

Consequently the optimal  $Q_j$ 's are

$$Q_1^* = \sqrt{\frac{2(1000)(30+20)}{20(0.382)}} = 114;$$

$$Q_2^* = \sqrt{\frac{2(500)(50+25)}{100(0.382)}} = 44;$$

$$Q_3^* = \sqrt{\frac{2(2000)(70+30)}{50(0.382)}} = 145$$



Substitution of these  $Q_j^{*s}$  values into the constraint shows that it hold as a strict equality

$$D = 20 \times 114 + 100 \times 44 + 145 \times 50 = \text{Rs. } 13,930$$

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#### REFERENCES

1. E. Sankara Subramanyam and S. Kumaraswamy—EOQ formula under varying Marketing policies and conditions in AIIE Transactions, Vol. 13 No. 4, December 1981.
2. G. Hadley and T.M. Whitin—Analysis of Inventory System, Prentice—Hall, Inc., Englewood Cliffs, N.J. 1963.

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# Need for Technology Upgradation in the Informal Sector

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C. S. RAO

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*This paper emphasises the existence of a wide spectrum of technologies in any industry in any country, more particularly in the developing countries, is inevitable as long as there is a market for the products of such differential technologies. This situation calls for a vigorous policy support to the artisans and entrepreneurs to move up in the "technology ladder" to a point which determines the techno-economic viability on the basis of free play of economic and market forces.*

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According to the International Labour Organisation (ILO), informal sector is understood as that part of the economic activity which is characterised by certain features like ease of entry, reliance on indigenous resources, family ownership, small scale operation, labour intensive and adopted technology, skills acquired outside the formal school system, unregulated and competitive markets. In the Indian context, a wide range of activities which fall within the domain of industries, transport and even agriculture can be included in this sector. The distinction of their location in rural and urban areas becomes irrelevant because even though by their very nature, they are rural oriented and traditional, a significant part of the informal sector is also urban specific. While the exact contribution of this sector to the national economy is anybody's guess, the village and small industries sub-sector has acquired a distinct place in our national development plans and its contribution to the GNP is being measured more systematically and regularly on the basis of available data. The scope of the present article is, therefore, restricted to the village and small industries sector which constitutes a separate entity in our five year development plans. (See status table at the end).

## Village & Small Industries Sector

The village and small industries sector comprises modern small scale industries and mechanised power-



loom on the one hand and traditional industries such as the handlooms, khadi and village industries, handicrafts, sericulture and coir. The industries together account for 49% of the total value of industrial production in the country, 59% of the value added by manufacture and 33% of the total value of exports of the industrial products. The total employment including full time and part time employment generated by the sector is over 28 million persons as against 4.50 million persons employed on full time basis in the entire organised sector of Indian industries. Both the rural and urban oriented industries in this sector have accounted for nearly 50% of the GDP of the manufacturing sector. It is because of their singular contribution and several advantages in a developed country like ours where unemployed and under employed labour is plenty and capital is scarce and the available skills are primitive and technology is traditional, a great deal of emphasis has been placed on their role in achieving a number of socio-economic objectives. Accordingly, a number of policy and other measures have been designed from time to time to support this sector not only to compete successfully with its counterparts in the medium and large industries sector but also products of other countries and also to ensure their orderly growth. However, some of the major objectives such as integration of the promotional programmes for the sector with the large scale industrial sector under a "common production programme" and also with other area development programmes, equitable distribution of national income, removal of regional imbalances, technology upgradation to make it self-supporting, to check migration of rural people to urban areas, etc., using this as a policy instrument are still to be achieved. One of the major failures in designing and implementing the development schemes for the sector was lack of sufficient awareness of upgrading technology and skills and product development. Therefore, there is no wonder, if the Planning Commission's Sixth Plan document expressed its concern for the persistent low levels of technology resulting in low-productivity and low earnings to the artisans. Therefore, a continuous appraisal of the technological gaps is necessary because technology is a dynamic concept and there is bound to be a wide range of technologies co-existing at one and the same time in many industries resulting in cost

differentials in ex-factory price of ultimate products. For example, in the cotton textile industry itself there are several technologies from hand spinning and waste loom weaving to highly mechanised technology in organised sector. Even within the handloom industry itself there are several types of looms and equipments for weaving. Cottage powerloom is in the middle position of the range of technologies.

Several technologies can and do exist in any country as long as there is a product differentiation and a market for each product. More often technology upgradation and modernisation takes place by commercial compulsions in a free market economy. In developing countries, however, as our own experience shows, socio-economic compulsions influence political decisions not only to continue with traditional skills and technologies, but also to protect them from competition from organised sector of Industries. Technological transformation has to take place gradually to allow sufficient time to the traditional artisans to adjust themselves to the changing scenario. A "bottom up" approach is called for bringing about technological transformation in the village and small industries sector and to bridge the technology gaps between this sector and organised sector.

### Low Productivity

Modernisation of medium and large industries sector like textiles, cement, jute, automobiles, rubber, engineering industries, etc. involves huge capital and import of modern foreign technology. Even though demands for capital outlay for technology upgradation are relatively small and manageable, a large segment of industries which comes within the scope of the village and small industries continues to suffer from technological obsolescence, inefficiency and low productivity. Thus a large number of rural traditional artisans continue to live below the poverty line and are exposed to various hardships due to lack of regular work, fluctuating fortunes of their production, exploitation of middle-men, etc. For example, khadi and village industries sector has 26 industries including khadi under the Khadi & Village Industries Commission (KVIC) and it is not known how many artisans working in the sector on whole-time basis, can be



placed above poverty line. The performance of selected scheduled industries in the khadi and village industries sector in 1982-83 in terms of production, employment and net value of production, etc. has been presented in the Annexure. It will be seen that khadi occupies a prominent place among these industries, may be due to some historical reasons. Although KVIC has over the years introduced a number of progressive measures such as the use of electric power, production of blended fabrics with man made fibre by the name 'Poly Vastra', production of 'Lok Vastra' with cotton yarn spun by power run spinning equipment, institutionalisation of credit, better production and marketing of techniques, etc, low levels of productivity and earnings continue to be the characteristic of these industries and employment is mostly part-time. In khadi, for instance, as per the available data for 1982-83, average per capital earnings on estimated full time employment basis, work out to Rs. 755 per annum; the corresponding figure for village industries is Rs. 1093. It is, however, not known whether this per capita income represents the family income. The point to be noted is that poverty among the khadi and village industries workers is self-evident. This is mainly due to the low productivity of workers as can be seen from col. 9 & 10 of Annexure because the technology employed in the khadi and village industries sector in general is mostly manual and inferior.

In the case of coir, sericulture and handicrafts also the same observations may be nearly true. It is, however, heartening to note that several innovations both in the techniques of production, designs, colour schemings, product diversification and finally, processing of finished fabrics have been introduced in the decentralised handloom industry. Even then the problem of low productivity and low earnings continues in many areas in the handloom sector largely due to certain other reasons such as irregular supply of yarn competition from unauthorised powerlooms, marketing problems etc.

### Need for Technology Upgradation

It is in this context that a radical and unorthodox approach is called for in the matter of technology upgradation in the VSI sector, with adequate

safeguards against technological unemployment and shrinkage of markets, built into the policy frame. The country is today in a more favourable position with a host of R & D and promotional institutions and agencies including voluntary agencies existing and more progressive outlook being displayed by the government. The question, therefore, before us is how to go about with selection of appropriate technology, designing of a package of other support measures, indentifying an effective delivery system, monitoring and evaluation, etc.

### Appropriate Technology-A Concept

The word appropriate technology leaves much to be interpreted and mis-interpreted by those who use it as a tool of economic analysis. Several attempts have been made in the past to define precisely and conceptualise appropriate technology both in the context of developing and developed countries. However, such attempts have failed because the concept is far too wide and comprehensive to include many relevant criterion. Appropriate technology has become a part of the international language of development economists, planners, administrators, scientists, etc. and has generated copious literature and terminologies like alternative technology, adoptive technology, intermediate technology, human scale/face technology, innovative technology etc.

According to the Ministry of Overseas Development Government of U.K., one workable definition of appropriate technology is 'technology appropriate to a country's factors of production in that it maximises the use of factors which are locally scarce' (Appropriate Technology, Overseas Development Paper 8 HMSO, London, 1977, Ministry of Overseas Development). Jequier defines appropriate technology as that which "represents what one might call the social and cultural dimensions of innovation. The idea here is that the value of a new technology lies not only in its economic viability and technical soundness but in its adaptation to the local, social and cultural environment. Assessing the appropriateness of a technology necessarily implies some sort of value judgement both on the part of those who developed it and those who will be using it" (Appropriate Technology : Problems



and promises, Paris, OECD, 1976). Eugene Staley defines appropriate technology as the "technology which is best for a given society, taking into account the society's particular stage of economic-social development, its development goals and problems, and its resource endowment. He further adds that usually the technologies which are appropriate for less developed countries (LDCs) will be technologies which use relatively less capital and more labour than technologies which are appropriate for highly developed countries (HDCs). This is because LDCs characteristically have relative scarcity of capital and abundance of labour power, the latter often manifests in severe unemployment, under-employment and male employment. LDCs need capital-stretching technologies which spread capital more thinly and employ more labour". There can be as many definitions as there are economists but the fact remains that the objectives and circumstances vary between and within the economies over time. The concept of appropriate technology has necessarily to be dynamic rather than static. It is not possible to consider any one definition of appropriate technology as being universally acceptable and perhaps because of this conceptual problem faced, it is best termed as appropriate technology which satisfied all.

Although there is no conceptual limitation to apply the definition to large and medium industries, however, in common parlance appropriate technology is construed as low cost and inferior technology suitable for small scale industrial sector, rural industrialisation and so on. Based on such an interpretation, the choice of low cost technologies in the developing countries is extremely important as an effective tool for achieving certain immediate socio-economic objectives as also for harmonizing the conflicting situations and an orderly growth of developing economies.

### Strategy

Technology is a critical input having two dimensions, i.e., software and hardware. It is actually important to recognise the fact that technology by itself cannot achieve the results. It is, therefore, considered necessary that a total approach should be adopted in the matter of choice of technology and its diffusion.

The broad strategy includes : —

- (i) Identification of the priority areas, i.e., industries which require technological upgradation consistent with our socio-economic objectives;
- (ii) Selection of appropriate technology which has already been tested either within the country or outside and can be adopted with minimum modifications.
- (iii) Identification of critical technological problems which require intensive R & D work;
- (iv) Identification of an effective delivery system for demonstration in life situation and dissemination;
- (v) Effective monitoring and evaluation; and
- (vi) Linking of various promotional measures and supply lines for raw-materials, credit and marketing.

### Integrated Model

As stated above, technology promotion should go hand in hand with other associated inputs. In other words, it should be delivered in a package with focus on technology. In this Integrated Technology Promotion Model there may be three stages of implementation. In the first stage, a diagnostic or pre-project study has to be carried out to identify the exact gaps in the technology if it has to satisfy certain given socio-economic objectives. This includes development of project ideas and formulation of an action plan. In the second stage, the action project will have to be implemented to demonstrate convincingly under actual live situations the proven technology. A more pragmatic approach will be to select a technology already available and modify a little to suit the local conditions. If a ready-made solution is not available, recourse has to be taken to R & D which may involve both time and larger resources. As stated earlier, during this stage all beneficiaries, extension and other functionaries such as artisans/entrepreneurs, buyers and sellers of the products, publicity media men, planners and administrators, credit and supply institutions should be closely involved so as to enable each group to play its assigned role. In the third stage, the new



technology should be handed over to a local promotional agency for dissemination. Needless to say that a close monitoring and evaluation of the project at every stage will determine its success.

### **Trial of the Model**

The year 1982 in a way was the beginning of an era of technology. The year was declared as the "PRODUCTIVITY YEAR". The revised New 20-Point Programme which laid stress on technology upgradation in the rural industries sector was launched in the same year. In pursuance of the objectives of these two important national decisions, a modest attempt was made by the Appropriate Technology Unit in the Department of Industrial Development to launch two pilot action projects for productivity improvement and technology upgradation to test the integrated technology delivery model referred to above in two well known traditional crafts/industries, viz. blue art potteries of Jaipur (Rajasthan) and lock making industry of Aligarh (Uttar Pradesh). At the same time two more such projects for popularisation of cultivation of Java Citronella grasses and extraction of essential oil and demonstration project for manufacture of light roofing sheets from cellulosic wastes were also completed. Encouraged by the results, similar action project for productivity improvement and technology upgradation in wooden lacquerware toy making industry at Chennapatna (Karnataka) was initiated. Currently two appropriate technology extension projects for the development of decentralised lock making industry at Aligarh and blue potteries craft at Jaipur and a preliminary study for development of appropriate technology in hand stone polishing industry at Tandur (Andhra Pradesh) are in progress.

### **Achievement in Brief**

A brief account of the action projects launched by the appropriate Technology unit including major achievements is given below :—

**Blue Potteries of Jaipur :** The blue pottery product of Jaipur is a unique handicraft speciality of Rajasthan (India). Over 150 traditional artisan families are engaged in this 600 year old craft of Persian origin.

For historical reasons, Jaipur has the biggest cluster of these artisans. A few more units are located in the surrounding villages of Jaipur. The original designs, exotic colour combinations and stony character of the blue potteries distinguish them from the glazed ceramic potteries in many ways. The product range includes artistic colourful flower-vases, ash trays, beer mugs, dinner sets, etc. Annual production is estimated at Rs. 3 million. A significant quantity is also exported to Japan, West Germany, USA, etc.

In the action project certain basic and chronic defects in the processing of materials and burning such as porosity caused by lack of compactness in the body, lead poisoning due to the use of lead oxide (Sindhur) for glaze, smoke effect and heavy breakage due to uncontrolled firing were removed. Besides, a number of cheap synthetic colours in different shades were developed to substitute conventional colours used to be prepared by the artisans themselves involving considerable drudgery. A fuel efficient kiln for controlled firing was also developed. As a result of these improvements, the breakage rate has come down from 50% of one furnace load to 50%; productivity and wages have gone up by 50% and the product is acceptable to all types of consumers. The new colour stains offered a wide choice to the artisans to attract new customers. After satisfactorily demonstrating the improved technology, efforts are now being made to disseminate the same and provide an economically viable kiln as a common facility centre to the small cottage units. The project was designed and implemented by the National Productivity Council in collaboration with the Rajasthan State Small Industries Corporation.

**Lock Industry of Aligarh :** About 20,000 cottage and other type of production units providing whole time employment of about one lakh people are producing a wide variety of locks worth Rs 300 million every year at Aligarh and villages within a radius of 20 kms. from it. The export market of Aligarh locks to USA, West Germany, Nigeria, Kuwait, etc. has dwindled during the recent years mainly because of the fast deteriorating quality, out-moded designs and cut-throat competition among the local units which are not able to compete with Taiwan, China, West Germany,



etc. The lock industry of Aligarh has reached almost dead-end and fallen into a deep crisis. In the action project, small attempt was made to upgrade the technology and productivity of hand-made G.I. Pad locks which have even today good domestic market. A few improved tools like drills, gigs, guages and templates which can be conveniently handled by the house-hold units to produce accurate, uniform and standard parts and components such as body, shackle and key for hand made G.I. Pad Locks were designed and tested. Currently 65 artisans are under training at Aligarh on these new tools. The major achievements of the new technology include increase in productivity of body making by 20%, shackle making by 75% and key making by 25%, elimination of drudgery and fatigue, minimisation of wastage of raw materials and use of fuel, etc. Certain proposals for establishment of common facility centre to provide a wide range to technical, marketing and other services at Aligarh and also to extend the technology to Dindigal (Tamil Nadu) which also accounts for 20% of the cottage lock making industry are under consideration. The NPC and the NSIC have been involved in the implementation of the project.

**Citronella Oil :** The Regional Research Laboratory (RRL), Jorhat, Assam has acclimatised an exotic variety of Java Citronella grass in the north-eastern region and designed an economical distillation plant for extraction of essential oil. This aromatic oil has wide application in a number of pharmaceuticals and cosmetic industries. Appropriate Technology Unit has sponsored a scheme for establishment of a few demonstration centres for motivating the local farmers and extraction of citronella oil on commercial basis. As a result of the successful demonstration, citronella cultivation has become very popular in the north-eastern region which is now producing the entire quantity of 400 to 500 tonnes of oil which was being imported earlier. The farmers are also able to earn Rs. 8000 per hectare/per annum and have been able to improve their economic conditions. This is a fine example of an integrated agro-industrial technology that has been popularised in the country. These demonstration projects are still in progress in Manipur, and Arunachal Pradesh.

**Light Roofing Sheets :** RRL, Jorhat has developed

a process for producing good quality light roofing sheets from cellulosic wastes on a pilot plant scale and ATU has sponsored a demonstration project of one tonne/day capacity plant for manufacture of these sheets on commercial scale. The project has convincingly demonstrated that it will be possible to produce these sheets of one sq. mtr. with comparable features, for example, fire and water resistant at one fourth of the cost of similar asbestos sheets. The durability of these sheets is estimated at 12 to 14 years. This will be a welcome development for low cost housing projects.

**Lacquered Wooden Toys :** Chennapatna, a small town in Karnataka is well-known for lacquered wooden toys. About 1500 to 1600 small units employing 3000 artisans are producing toys worth Rs. 25 million and also exporting a significant part of it. An action project is in progress to develop more efficient manually operated lathes for producing new varieties of toys and fancy articles which are likely to boost up our exports. The project also envisages afforestation to ensure regular supply of soft wood, use of substitute for lac which is becoming scarce, new designs and colour combinations, diversification of production to meet the requirements of educational institutions, middle class consumers, etc. The craft is wide-spread all over the country and in particular in Andhra Pradesh, Rajasthan, Gujarat; etc. Therefore this new technology can be spread in these states also.

**Stone Polishing Industry :** Polished stones are widely used as flooring tiles in various parts of the country. These are available in abundance in the quarries in Andhra Pradesh where a large number of tribal women have been engaged in hand polishing. This type of work involves considerable drudgery, fatigue and even causes physical disability to workers over the years. A preliminary study is being launched to identify the technological and other problems and develop simple hand operated tools to substitute the present inefficient and hazardous technology and to ensure reasonably higher wages to the tribal people. After carrying out the preliminary investigation and experiments, it is proposed to perfect the technology and cover the clusters of artisans in Tamil Nadu, Kerala, Orissa etc.



### Policy Issues

Experience in the past tells us that the products of the VSI sector have to face unequal competition from similar products of their counterparts in the medium and large industry sector which enjoys the benefits of the scale of operations in the domestic markets and equally stiff if not more competition in the foreign markets. For instance, in spite of reservation and other support measures, the products of handlooms face competition with the products of power-looms and even organised textile industry. Similarly, washing soap, leather products, matches, etc. industries in the VSI sector experience uncertain markets due to differences in the ultimate price charged to the consumers, quality and finish. These problems are bound to persist as long as scale of operations and technologies differ widely. It is, therefore, time that we clarify our stand with regard to policy support in the context of a host of disadvantages suffered by the VSI sector due to location, scale of operations, inferior technology, product selection, absence of inner strength among these artisans and entrepreneurs and strong association and half hearted implementation of support measures by the promotional agencies at the field level. If employment and poverty alleviation are our deep concern, can we feel satisfied with our present policies programmes and support systems to accelerate the growth of the VSI sector which can serve as an effective instrument of economic change in the circumstances? If we reject our present policy in favour of a sophisticated technology, can we offer alternative employment to nearly 20 million persons who are dependent on these traditional industries for their livelihood and have we prepared them to face the changed circumstances and new environment? If active official support to this sector is required to be continued, does it not call for a spirit of tolerance and sacrifice on the part of us as consumers of their product and services? If the dichotomy between inferior and superior technology cannot be broken down, how can we harmonise the conflicting interests of both producers and consumers? Can we find answers to these questions before we launch our science and technology oriented Seventh Plan?

### Lessons of Experience

Action projects of the type described above have

been successful mainly due to the fact that adequate care has been taken in the selection of the industry or craft, identification of the critical areas and adoption of an integrated approach by which keeping in view the technology in focus, necessary support services, viz, demonstration, training buyer-seller meet to promote marketing, suggestions on packaging, commercial publicity, etc., were provided. Besides, continuous follow-up and monitoring of the progress of implementation at every stage has also greatly contributed to their success. The involvement of local development agencies has made the task of implementation easy. In the end, the model, methodology and strategy as outlined in paras 10 to 12 which was fully tested is now available for replication elsewhere.

### Village and Small Industries : Present Status

	Production & : in Rupees export Crores
	Employment : in lakh persons
<b>I. Small Scale Industries</b>	1982-83
Production	27,700.00
Employment	79.00
Exports	2,095.00
<b>II. Coir</b>	
Production	85.82
Employment	8.17
Exports	28.60
<b>III. Khadi &amp; Village Industries</b>	
Production	764.00
Employment	34.34
Exports	Nil
<b>IV. Handloom</b>	
Production	1,980.00
Employment	61.50
Exports	414.00



## V. Handicrafts

Production	2,880.00
Employment	20.30
Exports	1,210.00

## VI. Sericulture

Production	182.70
Employment	16.00
Exports	85.00

## ANNEXURE

## Khadi &amp; Village Industries Performance of Selected Scheduled Industries : 1982-83

S.No.	Industry	Net disbursements (Rs. Crores)	Production (Rs. Crores)	Employment No. of Persons in lakhs			Net value of Production (Rs. Crores)
				F.T	P.T	Total	
1	2	3	4	5	6	7	8
1.	Khadi	224.61	143.40	4.40	9.11	13.61	87.59
2.	Processing of Cereals, pulses & Masalas	9.33	44.18	0.34	0.21	0.55	6.63
3.	Ghani Oil	26.09	134.63	0.29	0.31	0.60	16.15
4.	Village Leather	19.93	80.86	0.84	0.54	1.38	35.58
5.	Cottage Match	8.64	18.09	0.32	—	0.32	13.57
6.	Cane Gur & Khandsari	6.43	84.91	1.34	—	1.34	21.23
7.	Palm Gur & Palm Products	5.06	26.92	—	4.87	4.87	18.04
8.	N.E. Oils & Soaps	13.69	23.44	0.04	1.05	0.09	2.34
9.	Handmade Paper	3.67	4.00	4.05	0.01	0.06	2.60
10.	Bee-Keeping	1.73	9.79	—	1.93	1.93	7.83
11.	Village Pottery	15.16	41.64	0.95	1.27	2.22	24.98
12.	Fibre	3.34	17.87	1.12	0.70	1.82	11.97
13.	Carpentary & Black-Smithy	19.09	72.05	1.00	0.40	1.40	28.82
14.	Lime Manufactue	5.40	18.26	0.17	0.19	0.30	9.93
15.	Gobar Gas	3.30	27.02	0.14	—	0.14	21.62
16.	Gum & Resine	0.89	2.27	—	1.46	1.46	NA
17.	Bamboo & Cane	1.63	8.13	0.29	0.16	0.45	NA

Source : KVIC's Report 1982-1983.

- Note : 1. Col. 1—Industries whose annual production is worth Rs. 2.00 crores or more only have been selected.  
 2. Col. 2—Net grants disbursed during the year plus loans outstanding at the end of the year only.  
 3. Col. 4—PCP industries includes non-commercial production; NEO & Soaps includes value of soap only; 3. and lime industry includes collection of lime stone.  
 4. Col. 8—Gross value minus value of raw-materials, etc. Consumed NEO & Soap industry net value is for soap only.  
 5. Col. 10 & 14—Half of part-time employment is treated as full-time employment.  
 6. F.T. Full-time employment & P.T.—Part-time employment.



## ANNEXURE (Contd.)

S.No.	Industry	Per Capita Net-Value of Production (Rupees)		Production per Rupee of net disbursement (Rupees)	Per capita annual earnings of workers working on		
		On the basis of FT+PT employment	On the basis of total estimated FT employment		F.T.	P.T.	Estimated total F.T.
1	2	9	10	11	12	13	14
1.	Khadi	644	968	0.64	1257	130	755
2.	Processing of Cereals, Pulses & Masalas	1205	1507	4.73	1679	543	1557
3.	Ghani Oil	2692	3670	5.16	3307	1319	3109
4.	Village Leather	2578	3205	4.06	NA	NA	1757
5.	Cottage Match	4241	4241	2.09	1166	Nil	1166
6.	Cane Gur & Khandsari	1584	1584	13.21	940	Nil	940
7.	Palm Gur & Palm	370	739	5.32	Nil	400	400
8.	N.E. Oils & Soaps	215	418	1.71	3250	213	632
9.	Handmade Paper	4333	5200	1.09	NA	NA	1817
10.	Bee-Keeping	406	816	5.66	—	406	406
11.	Village Pottery	1125	1581	2.75	1408	526	1270
12.	Fibre	658	814	5.35	682	357	690
13.	Carpentry & Black-Smithy	2069	2402	3.77	1714	1290	1858
14.	Lime Manufacture	2536	3652	3.38	2047	837	2028
15.	Gobar Gas	NA	15443	8.19	—	—	—
16.	Gum & Resine	NA	NA	NA	Nil	35	70
17.	Bamboo & Cane	NA	NA	NA	Nil	1313	568



## PROGRESS IN POWER SECTOR

# Andhra Pradesh State Electricity Board

### POWER

IN PLENTY  
FOR PROGRESS  
FOR PROSPERITY

### Power of Power in the Service of the State

Installed Capacity	MW	668	3156	372
Demand	MW	652	2158	231
Villages Electrified		10,262	22,854	122
Agricultural Connections		2,61,989	6,42,758	145
Industrial Connections		29,600	80,013	170
Consumers in Lakhs		14	36	157
Per Capita Consumption	Kwh	60	163	172

By 1990 the installed capacity would be about 4,883 MW through ongoing projects and including the share of 680 MW from the Central Sector Projects to meet an anticipated demand of 3,800 MW.

Power for Bountiful Food Production

Through 6.42 Lakh Pumpsets in 22,854 Villages and 9,681 Hemlets

Rapid Economic Growth in Industrial Sector

Through 80,013 Industrial Connections

Bringing Light into the Lives of Weaker Sections

Through 'One Bulb for one House Scheme' in 48 Thousand Houses, Harijanwada Electrification in 96% of Electrified Villages and 2,125 Tribal Villages

In the Service of

36 Lakh Consumers



# Application of Science and Technology in Rural Leather Sector

DR. J. C. SRIVASTAVA

*Technology generation, its transfer and utilisation from an important segment of production and productivity. These are, therefore, of significance to an informal sector, be it handloom, handicrafts or leathercrafts, etc. The application of science and technology (S & T) to the rural informal sector is however, more challenging. This paper discusses briefly the principles and thoughts regarding the application of S & T in rural leather sector.*

India is basically an agricultural country with a rural set up of economy. According to 1981 census, more than 76 per cent of the total population (658 million) is classified as 'rural' residing in more than 0.5 million villages. Nearly 70 per cent of this rural population derive their livelihood from agriculture directly or indirectly. While 91.4 million of the main work-force of the country are cultivators (farmers), around 55.4 million are the farm labourers, artisans like blacksmiths, potters, carpenters, leather tanners, etc., and those engaged in village (cottage/household) industries like cotton, wool and silk spinning and weaving (handlooms), handicrafts, metalcrafts, leathercrafts, etc.

All artisan or craft based cottage/household economic activities undertaken in rural areas are generally named as village industries (such activities are however, also undertaken in semi-urban and urban areas). Many names have been used for this sector such as unorganized, decentralised or in formal sector. *For this study, these rural economic activities have been termed as Rural Informal Sector (RIS).*\*

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\* Informal Sector (IS) as outlined by the International Labour Organisation (ILO) is characterised by attributes like ease of entry; reliance on indigenous resources family ownership; small scale/tiny/cottage/household scale operation; labour intensive and adopted technology; skills acquired outside the formal school system, unregulated and competitive markets.



Because of low return for time and energy spent (want of economic returns) and full employment, fatigue and drudgery, social stigma (as in leather tanning and processing), competition with products made in urban areas/mass production, lack of access to support services and trade, *this informal sector in rural areas is declining fast* and losing its attraction for not only the present generation of rural society, but also preventing the new generation from seeking a livelihood from these activities. Similarly, lack of resources to make optimum use of local raw material, production and manufacture; value-adding to primary produce; and uncertain returns are some other reasons of the decline of this sector (there are of course, policy, planning, administrative, fiscal and management ills also). Majority of the people engaged in the RIS subsist below the poverty lines.\* In spite of these constraints, this sector plays an important role both in terms of its capacity to serve a large portion of rural population including people of lower income and to produce goods, services and raw materials for a definite segment of urban population. This sector has got another distinction of being one where significant portion of women and children are directly involved.

#### Application of Science & Technology (S & T)

It has been experienced that the application of science and technology (S & T) which covers the entire process from technology generation (appropriate to needs) to its adoption and assimilation has made significant contribution in improving the productivity and quality of produce thereby a marked socio-economic development of the rural artisans and craftsmen and women.

The application of S & T helped in building bridges between primary processing at rural level, secondary processing at intermediate level and sophisticated processing at urban level. This also opened new vistas for service industries. To illustrate one such significant contribution is the case of Rural Leather Industry

\* The poverty line is defined as the level corresponding to a consumer expenditure of Rs. 76 per capita per month in rural areas. People below poverty line were 259.5 million (50.7 per cent) in 1981.

which not only sustains a large proportion of local demand, but also the foreign exchange earning export.

The Technology Policy Statement (1983) can be interpreted as an eloquent pronouncement of support to this. The policy inter alia states (through application of S & T) to :

- (i) provide maximum employment to women and weaker sections;
- (ii) use traditional skills and capabilities making them commercially competitive;
- (iii) ensure the correct mix between mass production and production by masses.

This draws our attention towards providing protection to the RIS through the interaction of science and technology. This study, therefore, presents the case of application of S & T in rural leather sector efforts made by the Central Leather Research Institute (CLRI), Madras, a constituent laboratory of the Council of Scientific and Industrial Research (CSIR).

#### Rural Leather Sector

The cattle population in India is largest in the world. For example in 1977, this position has been as follows :

(Number in thousands)

1. Cows and bullocks	18,00,04
2. Buffaloes	61,960
3. Sheep	40,873
4. Goat	75,361
	-----
Total :	35,81,98

The cattle are the source of milk, draught power and transport requirements (Sheep is reared for wool and goat for meat). Due to religious beliefs and food habits (vegetarian), a large section of population maintain these cattle till they meet their natural death (about 7-8 per cent every year). The dead cattle



(except the goat which is slaughtered) are to a section of rural society called 'chamars' (one of the scheduled castes).

The carcass utilisation is one of the ancient artisans occupations where traditional techniques have been transferred from father to son. The dead animal is flayed and its hide is processed into what is called leather. The rural flayers follow traditional methods in taking off the hide. They normally leave the rest of the body products at the outskirts of the village which are eaten away by vultures; crows and dogs. The bones are later collected and sold. There is much potential of full utilisation of body parts like meat, tallow, blood, horns, hoof, etc. which can be judged from the following data :—

TABLE 1  
Estimated recoverable products and their market value

(average weight of carcass : 250 kgs.)

	Average weight of carcass (kgs.)	Percentage to weight	Marketable product per kg.	Market value (Rs.)
1. Raw hide	20	8	Rs. 1.75—2.50	35.50
2. Bone, flesh etc.	170	68	converted into meal (45 kg) Rs. 3—3.50	135.16
3. Stomach, intestine, etc.	20	8	Fat (6 Kg) Rs. 4.5	25.30
4. undigested dung	25	10	—	—
5. Wastage	15	6	—	—
<b>Total</b>	<b>250</b>	<b>100</b>		<b>195.96</b>

From the above, the extent of losses due to non-recovery and utilisation of various byproducts of carcass can be noted. The losses are also due to traditional methods adopted in carcass handling, flaying, preservation of hides and skins which ultimately have an impact on quality of leather. Due to decomposition of

leftover, abnoxious odour spreads over the area and often poses occupational health hazard to carcass, handlers and workers.

### Rural Leather Workers

According to the report of Working Group on the Development of Scheduled Castes (September, 1980), the position of leather workers engaged in different sectors are as follows :

TABLE 2

(Rs. in lakhs)

Sector	Flaying	Tanning	Footwear finishing	Other leather products	Total
1. Cottage	5.00	2.28	3.40	0.09	10.77
2. Small Scale	—	0.33	0.64	0.20	1.17
3. Large Scale	—	0.05	0.06	—	0.11
<b>Total</b>	<b>5.00</b>	<b>2.66</b>	<b>4.10</b>	<b>0.29</b>	<b>12.05</b>

A study by Sanjay Sinha (IDS, 1984) on the status of rural leather workers and bone collectors in Gorakhpur District (Eastern Uttar Pradesh) gave the following picture of their economic status :

TABLE 3

Category of rural workers	Families surveyed (number)	Income from (average in Rs. per annum)	Other sources	Per capita income
1. Village flayer	16	251	2761	434
2. Flayer cum hide trader	11	1463	2537	550
3. Tanner	4	3400	1425	419
4. Leather workers	4	4325	4937	1158
5. Cobbler (charmkar)	3	831	2239	919
<b>Total/Average</b>	<b>28</b>	<b>1408</b>	<b>2743</b>	<b>593</b>



The economic status of these leather workers thus shows that this informal sector has an average income of about Rs. 600/- as against the national average of Rs.1350 per annum for organised leather workers. It is unfortunate to add that all leather workers belong to the lowest ladder of society and even untouchables in some parts of the country. With the social stigma to this work, a sort of hatred developed among new generation and they are not willing to adopt this work.

Another study conducted by the Centre for Studies in Decentralised Industries, Bombay (1983) also gave some idea about the average monthly incomes of flayers households from different sources (see table 4). From this one can note that income from such RIS as well as income from all sources are quite low. The flayers are thus compelled to supplement income from other sources and even then find it difficult to come out of poverty.

#### Interaction of Science and Technology (S & T)

The planners and policy makers realised the need and urgency of introducing improved and new method of carcass processing; preservation and utilisation. A

strong need was also felt for value addition to byproducts. All this aimed at production of quality hides and leather both for domestic consumption and export. These expectations were based on improvements in traditional techniques, development of new and appropriate technologies, tools, equipment, chemicals and many other products used by the industry and ultimately on the interaction of S & T. Technology was also expected to mitigate human drudgery, poverty, and exploitation of rural leather workers.

Socio-economic advancement of the workers of the RIS thus drew our attention towards the following issues :

- (1) organisation of collection of carcass;
- (2) scientific handling, flaying, curing and storing;
- (3) total utilisation of carcass including primary processing of byproducts and deciding the scale of technology involved;
- (4) improving working conditions and hygiene and eliminating human drudgery;
- (5) working out desirable level of integration of various operations from the point of view of

TABLE 4

Percentage share of average monthly income from different sources per household of flayer

State	Number of simple household	Average number of members	Flaying and recover of hides and skins		Percentage of income			From other sources including services	Total	Total monthly income (Rs.)	Average per capita monthly income (Rs.)
			Average number of carcass per month	Average income (Rs.)	Flaying	Cultivation	Agri labour				
1. Maharashtra	31	5.9	4.0	233(a)	83(a)	3	5	9	100	280.7	47.6
2. Karnataka	10	5.0	6.5	143	60.6	—	16	23.3	100	236.0	47.2
3. Andhra Pradesh	11	5.8	3.5	104(b)	27.4(b)	8.4	22.1	42.1	100	379.6	65.4
4. Uttar Pradesh	29	6.1	3.0	39	30	—	35(c)	35.0	100	134.0	22.0

(a) Income from flaying, tanning and footwear making since the scheduled castes undertake all these activities in a composite fashion.

(b) Includes two per cent income from sale of beef.

(c) Includes income from cultivation and agricultural labour from which equal income are derived.



- sustained viability gainful employment, and energy efficient;
- (6) development of appropriate equipment and machinery for adoption at rural level;
- (7) availability of required chemicals and dyes;
- (8) decentralisation and bifurcation of various operations which could be adopted at various levels though manual, animal, mechanical, or non-conventional sources of energy;
- (9) product diversification and design development;
- (10) effluent disposal;
- (11) providing technical guidance and technology delivery at the door-steps of the artisans; and
- (12) demonstration and training.

### Research and Development (R & D)

Scientists of the Central Leather Research Institute (CLRI) realised these needs, problems and drudgery of rural leather workers and the expectations of policy makers and planners in boosting the leather export trade. The scientist took the challenge and made a landmark in research and development (R & D) in various facets of carcass utilisation. This also involved survey of traditional techniques and tools used by rural leather workers.

Raw hide produced at rural level are of very poor quality because of the traditional method of processing and also the cattle salvaged are mostly old age, diseased, decrepit and fallen ones. Processing of these hides yields a large portion of low and inferior grade leathers. A number of technologies have thus been developed to upgrade the traditional techniques at rural level. By application of a special chemical formulation prepared with readily available chemicals developed by CLRI scientists even inferior variety of leather could be converted into high value-added products.

CLRI's R & D achievements of direct relevance to rural flayers and tanners are :

- (1) curing and preservation of hides and skins,
- (2) simple preservation methods with plant products,

- (3) unhairing practices using improved 'jawasee' process,
- (4) improved tanning methods especially suited for easy adoption by bag-tanners with locally available.
- (5) E.I. (vegetable tanning of cow and buffalo hides and goat and sheep skins, tanning materials,
- (6) techniques of manufacturing leather using heavy cattle skins,
- (7) finishing of leather with simple formulations, and
- (8) improved sole leather production.

The techniques and technologies (thus developed by CLRI) matching to the needs, resources and skills of leather workers is presented here in a tabulated form. This chart projects the traditional practices followed and corresponding improved and new technologies developed by CLRI (see annexure 1).

### Byproduct Utilisation

This relates to various body parts available from cattle by flaying of fallen cattle or from slaughter houses (refer table 1). Although a good deal of pioneering R & D work has been done in this area, more remains to be done. There is even a vast scope of alternate uses of these byproducts. Keeping this important aspect of utilisation of byproducts, CLRI has set up a pilot plant for batch dry rendering of a variety of animal offals including fallen animals and for developing simpler technologies for processing animal byproducts viz.

- \* processing carcass by rendering into meat meal\* (protein meal) for meat cum bonemeal and tallow;
- \* preparing sterilised bone and bone-meal; and
- \* processing small intestines.

\* Gram Pratisthan, Bardoli (Gujarat) has developed a solar dryer for drying the meat meal,



### Technology Transfer

CLRI efforts towards transfer of technology did meet with success. The Institute adopted following approaches in raising the productivity and product quality of rural leather workers.

- (1) practical demonstration of improved and new technologies in tanning, curing and preservation of hides;
- (2) imparting training in improved techniques of carcass handling and utilisation of byproducts;
- (3) collaboration with rural development agencies, voluntary organisations, KVIC/KVIB, SISI, DIC, etc. for development of rural artisans;
- (4) demonstration and training in leather goods manufacture;
- (5) project formulation and layouts like housing/colony, tanning platform and shed, common facility centres) for rehabilitation of rural tanners in some states;
- (6) assessment of status of rural artisans and suggesting improvement; and
- (7) free technical guidance and services on priority basis. A few success cases are given here as illustration (see annexure 2).

In order to provide service to rural leather workers in various parts of the country, CLRI has set up Regional Extension Centres at Bombay, Calcutta, Madras, Jalandhar (Punjab), Kanpur (UP) and Rajkot (Gujarat).

### Organisation

There is, however, the constraint of benefiting individual leather artisan family all over the country working in isolated manner. It is, therefore, felt that definite advantage of fruits of R & D could be employed if these artisans join hands to work in clusters (viable for efficient interaction of S & T and management) at rural levels. Since the scale factor is a crucial determinant in the application of certain technologies, it is further felt that there is need for building technological bridges between rural primary processors, suburban and sophisticated levels in urban areas. This

would require establishing and strengthening linkages between various practices as shown in the following flow-diagram (see figure).

There is also the need for improvements between timely collection and processing of carcasses, filling technological gaps, distribution of the products and byproducts for further processing and value-adding and ploughing back the benefits of S&T to rural leather artisans.

The models provide scope for setting up 'Technology Centre' for training, production, common facility and services to allow rural leather artisans the facility of adopting improved and new technologies to sell their raw hides to the centre or to get it processed there on the job work basis. The leather workers could thus obtain the processed leather for making leather goods at cottage scale. Such a centre could also take the responsibility of quality control, standardisation (as far as possible), product design and development and marketing functions of raw hides and or/finished leather products. Such 'Technology Centre' could be successful in places where raw material availability through organised collection meets the minimum economic viability. One such glowing example is the Vajinath Leather Complex (Gujarat) set up by local voluntary group.

### Summing up

CLRI has regarded both social economic and technology factor of rural leather workers as a basis for research and development. It is believed that it is the technology per se which can help in improving quality, work, opportunity, productivity and the quality of life and in removing their social and economic stigma in the society. By upgrading the technology and possible product diversification with the aid of modern technologies, one can hope to attract the younger generation within the rural artisans households and raise their socio-economic status in the society. The impact of application of S&T by the humble efforts of scientists in rural tannig sector can be measured in terms of overall prosperity of such an informal sector in certain pockets with which CLRI was associated. The input of technology improved the traditional techniques, skills and tools. It reduced the processing time,



## Interaction of technology in leather processing at various functional levels

Primary level (3-4 Km radius in rural areas)	Secondary/Medium level 7-8 Km radius (villages/semi-urban)	Sophisticated level (urban)
One flaying unit   Carcass collection   Flaying/salting-curing   Collection of vegetative (plant) materials or cultivation of such plants used for vegetable tanning and supply to tanning unit.	One tanning unit Unhairing vegetable tanning & Preparation of crude hide   Footwear making for local market and cobbling; sale of leather products	Finished leather Unit Utilisation of byproducts/wastes for value added level Wet blue chrome tanning   Leather products making and sale Chrome uppers, readymade soles, etc.
Carcass component separation   Blood/meat meal for farm-manure (sale locally)   Tallow, horn, hoof and hair   Bone	Byproduct utilisation Hooves-glue leather siril hair & bristle Tallow Bone crushing for fertilizer	For industrial use

improved product quality and yield, utilized local resources, introduced newer techniques and technologies, reduced the drudgery. By generating a sense of self-confidence and successfulness among rural leather workers, technology also brought home the

rural craftsmen.

Please let us know what more one scientist can do for this rural informal sector. It may, however, be noted that CLRI is a scientific research laboratory and not an extension institute.

## ANNEXURE-1

## Leather Processing/Technologies

Process (Laboratory)	Traditional Process	Improved Process at Rural Level
1	2	3
Carcass-Processing (CLRI, Madras) (i) Carcass Collection and transport to processing centre	Carcasses are dragged, or transported by a hand-cart, to the village outskirts for flaying. A drawback is that hides in many cases get damaged because of dragging as well as because of delays in flaying. When animals die of natural causes and in places where carts cannot ply, the carcasses have to be removed manually.	A carcass-collection cart with a hoist is recommended. Improvement in design with standard components like wheels, beams, pulleys and rollers for easy transportation of carcasses. For urban use, a jeep with trailer is suggested.

(Contd.)



## ANNEXURE 1 (Contd.)

1	2	3
(ii) Flaying and curing	<p>Done by an ordinary knife, this is an improper method. The drawbacks are that hides get cuts, and more flesh is left in some parts, such flesh putrefying and damaging the hides.</p> <p>The hides are not cured immediately and are mostly dried in the sun. Sometimes, the salt applied is inadequate, or contaminated, or used salt is re-utilised.</p>	<p>(i) Two types of flaying knives should be used : (i) round-edged, and (ii) sharp and pointed. A flaying platform may be provided.</p> <p>(ii) To remove blood and dirt, use of 30% NaCl by weight of hides, or a mixture of salt and preservatives is recommended. This mixture should be applied in 3 parts on the flesh side of hides. There should be washing pits and a good supply of water.</p> <p>(iii) A weighing machine should also be provided.</p>
(iii) Carcass disintegration pre-processing/composting	<p>Flayed carcass is left as such to vultures and dogs and the bones are collected afterwards.</p>	<p>(i) Carcass parts should be separated into tallow, bones and flesh for animal feed, manure, horns and hoofs.</p> <p>(ii) Where there is no arrangement for carcass cooking, the meat and bone should be buried and the bones recovered later for being sold to bone mills or to those who utilize bones.</p> <p>(iii) Pre-processing of bone flesh for bone flesh meal plant.</p> <p>(iv) Composting of waste for manure.</p> <p>(v) Recovery of tallow by scrapping and melting in pan.</p> <p>(vi) Preservation of tallow before supply to processing units.</p> <p>(vii) Recovery of guts for rackets; hair for brushes; hide trimmings, ear, and tails for glue-making; and horns/bones for curios.</p>
Tanning (CLRI, Madras)		
(i) Jawasee/awk/lime process (unhairing)	<p>(i) Fallen flint hides in mixed lot are used with no proper soaking. Old jawasee/awk bath are used for years and these emanate a very strong foul smell, with the resultant stigma and social problems. It takes 20-90 days for unhairing. Similarly, jawasee treatment is done in two baths, and without being washed it is taken to old (Malni) oza bath.</p>	<p>(i) The hides are soaked well in a preservative. A fresh jawasee bath is prepared and hides are treated for 5-6 days. The treated hides are unhired, fleshed, washed and lightly pickled and taken for tanning. The processing period is considerably shortened and the foul smell is eliminated.</p>

(Contd.)



## ANNEXURE 1 (Contd.)

1	2	3
(ii) Tanning	<p>(ii) Lime process ; Hides are partially soaked and immersed in an old-lime liquor with fresh lime for 15-20 days, unhaired fleshed and washed.</p> <p>Tanning is done by the pit-or bag-tanning method, by using aal or babul bark or any other locally available bark. The drawbacks are that the quantity of bark used is often insufficient, and the leathers are unevenly tanned. As a result, the final products are disfigured with dark patchy colours, while some are hard leathers, with a foul smell.</p>	<p>(ii) Lime proces—The hides are well soaked. Liming is done in two stages, spanning a period of 6-8 days. These are unhaired, fleshed, washed, delimed by using <math>(\text{NH}_4)_2\text{SO}_4</math> and lightly pickled with salt and sulphuric acid. The drudgery of the beam-house operation is thus eliminated. Use of water is minimised by using chemicals for deliming.</p> <p>Tanning is done by the following methods using locally available barks :</p> <ul style="list-style-type: none"> <li>(i) E.I. tanning</li> <li>(ii) Improved bag-tanning</li> <li>(iii) Wet-blue chrome</li> <li>(iv) Rural chrome process for sole/lace</li> <li>(v) 'Novotone, finishing.</li> </ul>
(iii) Post-tanning	<p>Salt dissolved in old tan liquor is sprinkled on the flesh side of pit or bag-tanned leather and dried as such on ground. These are then processed, dried, beaten and stored. The leathers are creasy and uneven in colour, emit a foul smell, and are mostly used for rural footwear, Charas (water-lifting leather bag) and mashk (water container for sprinkling), buckets, and agricultural accessories.</p>	<p>The tanned hides are treated with myrab and oil, using locally available oil, epsom salt, and jaggery. These are hooked for semi-drying, followed by setting by slickers, and are dried. The finished leathers are of uniform light colour, smooth, soft and plain and are free from foul smell. Thus, this leather can be used for shoes and other footwear and leather products to meet the demand from rural and urban markets.</p>
<b>Leather Products (CLRI, Madras)</b>		
<b>Footwears and leather goods manufacturing</b>	<p>Desi juti (native shoe), irrigation leather (charas), leather bucket, agricultural accessories, etc. are made to meet the local village demand. For this, old traditional tools are used.</p>	<p>With the improved technology, shoes, chappals, sandals, school bags, shoulder bags for upper-class men and women, pouches, waist belts, sport goods like football and volleyball, industrial leather goods, etc. could be produced to meet the demand of rural as well as urban markets. Use of improved tools and improved designs is recommended.</p>

(Contd.)



## ANNEXURE 1 (Contd.)

1	2	3
Leather-processing management (CLRI, Madras)	<p>Hardly any concept about management except where there is some organised structure. Because of constraints in the availability of sufficient quantities of carcasses within easily transportable reach processing becomes uneconomical and unproductive.</p> <p>Rural artisans are also exploited by the urban-based industries and their agents.</p>	<p>Improved management considerations</p> <ol style="list-style-type: none"> <li>(1) After the death of the animal, its immediate removal from rural homes, farms and other places in the village is absolutely necessary. Hence, appropriate transportation from the place of death to the disposal ground is a must. The expenses in this regard have to be incurred by the owner of carcass, the flayer, the tanner or any agency. Expenditure cannot be avoided even if the carcass is to be buried, and hence need not be brought into the economics of utilisation.</li> <li>(2) The development of growth centres with common facility/service centres by location depends on :       <ol style="list-style-type: none"> <li>(a) size of procurement of dead animals</li> <li>(b) availability of hereditary flayer/leather artisans.</li> <li>(c) Promotional objectives and policies and the current consumption pattern of leather goods for local consumption and for catering to urban demand.</li> <li>(d) Scope of subsidiary occupation : o the rural poor.</li> </ol> </li> <li>(3) Given necessary training, supply of required materials, services, facilities and supervisions and R&amp;D support, it is possible to establish a technology appropriate to rural areas.</li> <li>(4) By-product utilization should also be organised simultaneously.</li> <li>(5) Production and fabrication depend on local demands, nearness to market, ancillary contacts, etc.       <ol style="list-style-type: none"> <li>(a) Introduction of improved tools and equipment;</li> <li>(b) Utilization of locally available resources and technologies; and</li> <li>(c) Introduction of improved and newer designs in combination with traditional crafts/skills would be necessary to help the villager to earn a higher income, which in turn would improve the socio economic conditions of the rural leather artisans.</li> </ol> </li> </ol>



## A Few Success Cases

## 1. Gujarat

Gujarat is known for rural leather industry. The CLRI Extension Centre, Rajkot in association with institution like Indian Institute of Management, Bank of Baroda and Central Institute of Design, Ahmedabad conducted technical training programme for rural leather artisans (in their localities/colonies) in Sargam, Malkot, Kabra, Kotra, Jawaja for the manufacture of improved, vegetable tanned leathers and conversion of such leathers into leather goods like shoulder bags, pochos, woven belts, portfolios, etc. All those who received training have adopted the improved/ new technology. Even those who had earlier left the profession took up the new technology because they saw economic gains in it.

2. Narottam Lalbhai Rural Development Fund (NLDRF), Ahmedabad has adopted a few villages in Degham taluk for integrated rural development. CLRI collaborated with them to improve the leather industry in the villages. Rural tanners were following traditional methods of tanning by awk process which besides foul smell, used to take 4-6 months for processing. With the added constraint of marketing, these tanners stopped their tanning work. A training camp was organised by CLRI in village Chakhlapagi where NLDRF constructed pits for tanning. With the improved technology, the artisans today not only produce a better quality leather within 20-25 day, but also selling the same with more profit

## REFERENCES

1. Leather Industry—a village level approach, changing villages, Consortium on Rural Technology, New Delhi, 1984.
2. Dewan, M.L. and Kala, L.D., Unorganised leather industry workers in India, Consortium of Rural Technology, New Delhi 1984 (unpublished).

## 3. Rajasthan

CLRI organised a demonstration camp in village Harmara (Tilonia), Rajasthan in association with Social Work and Research Centre, Tilonia a voluntary agency working for rural development. Thirty rural tanners who received training obtained bank loan and started production of improved leathers. The voluntary agency came to the rescue of rural leather goods manufacture for the sale of their products. The working and living conditions of such rural families have improved considerably.

## 4. Punjab

In Jullundur several sports good units in small/cottage sector have been assisted in the manufacture of better leather sports goods like foot-ball, volley-ball, cricket ball, hockey ball, gloves, etc. Similarly, traditional tanners in Ambala and Jullunder processing sheep skins were given the technology for making value added garment and glove leathers: They have now gone ahead in making readymade leather garments and gloves.

## 5. Himachal Pradesh

As a result of transfer of technology from CLRI many rural tanners in Himachal Pradesh and Haryana have started producing modified rapid bag tanned leather for value added items like manufacturing football which was never conceived and feasible earlier.

These are just the few examples of application of S&T for socio-economic development of rural leather artisans.

3. Discussions held between the author, the Director (Leather) Khadi and Village Industries Commission, Bombay and the scientists of the Central Leather Research Institute, Madras, 1984.
4. Technology for rural development, Vol. I, Council of Scientific and Industrial Research, New Delhi, October 1983.



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# Rural Marketing Services

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A. RAMA RAO

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*The paper focusses on the marketing services to the cottage and small scale industries and emphasises the need for fortifying the same through various suggestions with a view to bring out the best of cottage and small scale industries.*

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The industrial Policy Resolution (6th April, 1948) emphasized the "cottage and small scale industries have a very important role in the national economy, offering as they do scope for individual, village or cooperative enterprises. These industries are particularly suited for better utilisation of local resources and for the achievement of local self-sufficiency in respect of certain types of essential consumer goods like food, clothing and agricultural implements. The healthy expansion of these industries depends upon a number of factors like the provision of raw materials, cheap power, technical guidance, marketing of their produce, and safeguards against intensive competition from the large scale manufacture as well as the education of the workers in the use of best available techniques". They also provide immediate large scale employment, ensure a more equitable distribution of national income and facilitate an effective mobilisation of resources of capital and skills and prevent the unplanned urbanisation and its consequences. The state has been following a policy of supporting cottage, village and small scale industries by restricting the volume of production in the large scale sector, by differential taxation or by direct subsidies. However, the aim of the said policy was to ensure that the decentralised sector acquires sufficient vitality to be self-supporting and its development is integrated with that of large scale industry. Therefore, the State will concentrate on measures, designed to improve the competitive strength of village and small scale sector.

In consonance with the Industrial Policy Resolution



of 1948, All India Handloom Board, All India Khadi & Village Industries Board, Coir Board, Central Silk Board, All India Handicrafts Board were set-up/reconstituted by the Government of India for giving required assistance and support for the promotion and development of the industries according to their respective charters. These Boards organised the infrastructure for marketing the goods produced in their spheres.

### **KVIC's Marketing Network**

Khadi and Village Industries Commission created a marketing network for selling the products of khadi and village industries, in addition to supply of raw materials. KVIC gives credit, equipment, technical guidance, raw materials and help in marketing the products. The Commission also helps in setting up Khadi Bhavans, Khadi Bhandars, Gramodyog Bhavans which undertake whole-sale and retail sale of khadi and village industries products. The marketing network evolved by the KVIC at present comprises of six departmental Bhavan, 4,000 Khadi Bhandars and 11,000 production-cum-sales centres. There are Khadi Bhandars and production-cum-sales centres of village industries in all the 400 districts of the country. No other governmental organisation has established such a vast network ranging from the metropolitan areas to the districts and blocks.

### **Handloom Emporia**

The marketing infrastructure of handlooms consists of the apex level cooperative societies in the states and the handloom development corporations which deal with handloom products in the non-cooperative sector. Over the years, the apex cooperative societies developed about 1,600 sales outlets in metropolitan and urban areas. The more dynamic of the apex societies market on a national scale whereas others concentrate their sales in their respective states. The apex societies are now handling a volume of business of about Rs.150 crores, whereas the handloom development corporations are having a sales of about Rs.100 crores. There are 1600 sales outlets under handloom cooperative societies, and 200 sales outlets under handloom development corporations. Major Expos were organised in

metropolitan cities and cities and mini expos were arranged in towns and urban areas. The scheme of 20 percent special rebate on the sale of Handloom cloth was continued.

The marketing support given by the apex societies to the primary societies is of the order of 50 per cent in Tamil Nadu and Andhra Pradesh. In other states, marketing support is comparatively less. The larger primary cooperative societies of Tamil Nadu and Andhra Pradesh have their own retail sales outlets. Modernisation programme is being drawn up for implementation by various agencies involved in handloom marketing. The NCDC gives assistance for construction/renovation of show rooms. The office of Development Commissioner (Handlooms) provides share capital assistance to handloom apex societies and state handloom corporations. Some portion of this money can be utilised for improving the marketing infrastructure.

### **Marketing Structure of Handicrafts**

So far, thirty nine marketing and service extension centres were set-up with the object of providing package of services to artisans in their production & marketing efforts and to improve marketability of the products. These centres have organised several market meets at important commercial centres. Initially, about Rs. 2 crores were contributed towards the share capital of 12 State Handicrafts Corporations and Apex cooperative Societies so as to help them to buy handicraft products directly from the artisans and provide services to the craftsmen. In the field of exports, registration of exporters, issue of G.S.P. certificates/visas etc. were given. A carpet export promotion council was set up in 1982 and another exports promotion council is being set-up for other handicrafts. The exports of handicrafts recorded a phenomenal increase from the level of Rs. 80.30 crores during 1970-71 to over Rs. 1,000 crores during 1980-81.

In spite of the efforts of KVIC, Development Commissioner (Handlooms) and Development Commissioner (Handicrafts) in the critical area of supplying raw materials and marketing the products, much more needs to be planned for achievement. Developing marketing infrastructure at the block level in the shape



of rural marketing centres, district supply and marketing societies at district level and state rural industries marketing corporations at the state level need to be considered in detail.

### Rural Marketing and Service Centres

The proposal for setting up rural marketing centres (RMCs) to provide integrated services to the rural artisans in respect of raw materials, technology, credit and marketing support was first made in a meeting between the Ministers of Agriculture and Industries, Government of India in the year 1978 and agreed to in principle. It was thought that financial provision under the integrated rural development programme would also be utilised for setting up rural marketing centres which were meant to provide focal points for procuring and supplying raw materials to the rural artisans, market their products, explore new markets and render consultancy services to the rural artisans. The All India Board like the Handloom Board, the Handicrafts Board, the Coir Board the Khadi and Village Industries Commission etc. were expected to take the responsibility of linking the rural marketing centres with their own marketing organisations and ensuring marketing channels for the products of rural artisans.

With the concurrence of the Ministry of Industry and Planning Commission, the RMCs scheme was launched by the All India Handicrafts Board on a pilot basis in ten selected community development blocks on the basis of surveys conducted by the National Productivity Council during 1978-79. During 1978-79, 120 RMCs were sanctioned and it was proposed to set-up additional 200 RMCs in 1979-80.

In January 1980, at the meeting of Inter-Agency Co-ordination Committee, following consensus emerged:

Financial assistance for a RMC unit would be about Rs. 80,000 to Rs. 85,000 including the seed capital grant of Rs. 50,000. This seed capital could be utilised as working capital or may be treated as margin money to raise working capital loans from the banks. There is also a provision of Rs. 30,000 per RMC unit towards rent up to Rs. 500 per month for three years, towards purchase of samples upto Rs. 5,000 and for

purchase of fixtures etc. upto Rs. 10,000. The per cent managerial subsidy will be provided in the first year, in second year upto 66 per cent, in third year upto 33 per cent and in fourth year Nil. However, a RMC unit should have a turnover of Rs. 2 lakhs per year as soon as possible to achieve economic viability.

The surveys of rural marketing centres that were taken up, threw up enough data regarding artisans clusters, markets and potential for development. The RMCs should concentrate on these areas before widening their coverage.

The RMCs would arrange institutional support to extend the composite loan schemes to rural artisans. The All India Handicrafts Board would continue to act as the nodal agency in identification of RMCs and would sanction funds to them. The All India Boards and the Khadi and Village Industries Commission were requested to recommend suitable and willing institutions and areas to be covered by RMCs. General Managers of District Industries Centres (DICs) were also requested to recommend the institutions for taking up RMCs.

The RMCs should concentrate on the supply of inputs required by the artisans and sale of their products. They should prepare bankable projects covering either supply of raw materials or marketing support or both to the identified institutions and artisans.

Marketing support by the RMCs would be successful only if they are linked with marketing/purchase organisations in the State/Central Government, NSIC, Small Scale Industries Development Corporations, State Leather Development Corporations and any other public corporation or organisation having a network of sales outlets willing to market the products.

### Performance of RMCs

Although the All India Boards and the KVIC agreed in principle to finance and implement the scheme, it was the All India Handicrafts Board that financed the scheme by sanctioning funds to about 200 RMCs.



According to an Expert Committee out of 130 RMCs were set-up, 95 RMCs could be considered operational by December 1981. The committee suggested that a RMC should seek to achieve a minimum turnover of Rs. 10 lakhs to Rs. 15 lakhs per year, comprising about Rs. 5 lakhs of raw materials supply and Rs. 10 lakhs of finished goods sale. About 45 per cent of the Rural Marketing Centres were working well and another 45 per cent were working with average efficiency. It was opined that it would be appropriate to take a stock of the performance and consolidate the work.

#### **National Committee on Development of Backward Areas**

In its report on village and cottage industries, the National Committee on Development of Backward Areas dealt in detail about the pressing need for the supply of raw materials to the rural artisans and marketing their goods and suggested to build the marketing structures viz. District Marketing Supply and Marketing Society at the district level and state Rural Industries Marketing Corporation at the State level, in addition to RMCs at the block level. The following functions were recommended by the National Committee to be discharged by the RMCs :

1. The RMCs should maintain a suitable display and marketing centre at the urban centres for all types of rural industries products;
2. New RMCs are to be developed as multi-commodity display and sales centres;
3. They should lift fifty per cent of the products from the artisans and the balance may be left to them to meet the demands of their local clients and markets;
4. The RMCs must have holding capacity and storage facilities for keeping the goods in proper condition for distribution during the season;
5. Suitable linkages with the Central and State Governments purchasing organisations are necessary for selling the products of rural artisans. However, the products should be as per the specifications and of good quality;
6. The existing private retail shops should also be brought into the distribution channel.

#### **District Supply and Marketing Society**

The National Committee on Development of Backward Areas suggested the setting up of District Supply and Marketing Society at the district level with the following functions :

- (a) Identification of outside markets other than the local markets;
- (b) Ensuring quality of goods, studying the consumer market and introducing the right type of goods at appropriate places;
- (c) Developing RMCs as multi-commodity display and sales centres;
- (d) Studying the market trends and the changing consumer tastes and laying down the specifications and standards for producing the goods by artisans on the assessment of markets;
- (e) Arranging the procurement of raw materials in adequate quantity and proper quality during the season, storing them at suitable places near the growth centres or clusters of rural artisans and supplying them in time to artisans at reasonable prices;
- (f) Conducting surveys in collaboration with the District Industries Centres in order to obtain data regarding the problems of raw materials and marketing of finished products by the rural artisans;
- (g) Giving institutional support to the units for obtaining composite loans on soft terms from banks and other financial institutions ;
- (h) Obtaining credit from financial institutions at concessional rate on the lines of handloom cooperatives for its own operations;
- (i) Guiding and coordinating the activities of marketing outlets such as Khadi Bhandars and Handloom and Handicrafts Emporia etc. in the district, and selling the goods of rural artisans not covered by them; and
- (j) Providing cover to the organisations at the block levels whether they be artisans co-operatives, registered societies or other types of organisations.



The recommendations of the Sivaraman Committee and the recommendations of various seminars and workshops paved the way for finalising the scheme on District Supply and Marketing Societies. The Ministry of Rural Development invited the views of the Secretaries of Rural Development, Secretaries of Cottage Industries of various state governments on the need for setting up of DSMS for serving the rural artisans. The most important factor to be considered is whether it would be necessary to set-up DSMS in each and every district or whether it is practical to strengthen the existing organisations so that they were able to provide the services. For example, in sectors like handloom, khadi and handicrafts, there are some arrangements, for supply of raw materials and marketing. It would be necessary to identify the marketing infrastructure in a district and consider the extent to which it needs to be strengthened further so as to cater to the needs of rural artisans.

It is worth considering to make DSMS a part or subsidiary of a state level organisation with which it should be linked. The state level body could be the Rural Industries Marketing Corporation or similar organisation.

Since the DSMS serve the entire sector of cottage and village industries and the beneficiaries under IRDP would form a portion of the activities, it may not be feasible to meet the full cost out of IRDP funds. It

would, therefore, be necessary to identify the other sources of funding for providing necessary capital for DSMS. Funds earmarked for infrastructural support under IRDP can also be considered.

As yet, there is no finality about future of the scheme of District Supply and Marketing Society. However, in Orissa a similar organisation was established at the district level to help the rural artisans in supply of raw materials and marketing their goods.

#### **State Rural Industries Marketing Corporation**

To give necessary support and guidance to DSMS, the National Committee on Development of Backward Areas recommended the setting up of State Rural Industries Marketing Corporation. Such an agency was already set-up by Government of Gujarat.

The SRIMC should establish suitable linkages with the purchase organisations of the State and Central Governments and explore the markets at the State and national levels. It should also lay down the standards and specifications for purchase of goods from the artisans and assessing the demands of the state, national and international markets. The state governments may consider to establish the above organisations in their respective states in order to provide marketing intelligence, design development, identification of market and supply of raw materials.



लम्बी भाँजल तय करने के लिए ऊर्जा बचाइए  
WE HAVE MILES TO GO...  
CONSERVE ENERGY





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# Role of Women and Children in the Informal Sector

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JAYA ARUNACHALAM  
NANDINI AZAD

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*This paper brings out the current status of the women and children in the informal sector and presents the strategies for the improvement of the same.*

The concept of the informal sector evolved in the 1970's as a remedy to solve the problem of the increasing under-employed in the cities of the developing countries. Since then though information has been collected on the nature, work and living conditions in this sector-strategies for alleviating conditions have been minimal. The issue assumes alarming proportions when we realize that 89% of India's Working Women belong to the informal labour sector. The term informal sector according to this paper denotes the marginal labour force that provide (a) vital goods and services to a large majority of the urban population (b) play a major but invisible role in the agrarian economy, fish marketing, live stock rearing, handicrafts, export economy etc. (c) are unorganized piece-rate workers (beedi, agarbathi, lace).

## Conditions of work and life

A common feature of both urban and rural informal sector workers are (a) long hours of work (b) low wages (c) invisible contribution (d) arduous labour (e) poor living conditions (f) social oppressions. It is these women workers that are disadvantaged and caught between the pincers of poor work and living conditions that are the members of the Working Women's Forum. The organization has been able to increase their productivity by providing credit, (Rs. 80,00,000) health services, covering (1,00,000) people training, credit co-operative and more importantly organization and solidarity.

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Policy options have overlooked the existence of this sector for a long period of time. The informal sector has considered this sector merely as a reservoir of cheap labour that is constantly available for exploitation. The majority of these workers are unskilled and non-technical and therefore cannot be absorbed in the formal sector. The fact however remains that the growing needs of an increasing low-income population can be met only by informal sector workers. Further, an increase in the earning opportunity of low-income households in the slums and villages is possible merely by sustaining informal sector work and by providing support services as against creation of new skills and employment.

In the urban/rural areas, these workers experience great many difficulties in their daily struggle for survival. They are mostly categorised as hawkers and vendors, piece rate workers, petty producers, and those that provide consumers services among the class of people who will not be able to pay high service charges for the same.

In the urban centres, the Forum's members are street vendors, pavement hawkers, face daily struggle to ply trades be it procuring goods from wholesale market, or in transportation. Besides poor storage facilities, lack of permanent structure and training, long and arduous working hours, sexual harassment, harassment from police and municipal authorities, as well as lack of access to credit are example of their unfavourable working conditions. The wholesaler, money-lender and middleman provide raw materials on credit - leading to low profits and marginal subsistence for women vendors.

Particularly when we talk about rural women workers we are rarely aware that they constitute 50% of the agricultural labour force in India and that they play a major role in the agrarian economy and participate in all stages of crop production. In fact they have been invisible contributors to the productive process. But lack of organization among the peasantry and the landless, forced them to the status of low productivity.

Women's Forum (India) and the WWF's strategies to improve working/living conditions of urban/rural women workers.

In 1978, the WWF-a women intensive organization of women workers in the unorganized sector was initiated in Madras city and grew from 800 members in 1978 to 36,000 in 1984. Initiated as an credit and income generating project the Forum now encompasses varied support services such as health, day-care-centres, night schools, craft centres, credit society, co-operative child labour centres, technology upgrading, leadership and technical training etc. Expanding from urban to rural and from individual workers to piece rate workers and from a collective groups of women to a registered union. The forum has replicated its original urban model (with modification) to give different cultural contexts separated variedly by cultural and geographical boundaries. Access to credit has helped strengthen micro-business and increase its productivity, access to consciousness helped women control their earnings/spending patterns as well as limit their family size.

The Forums decentralised/participatory organizational structure has been an important variable in facilitating the growth of women's consciousness and grass roots leaders plus the group systems.

The Forum rural branches in Dindigul Taluk of Madurai district (initiated in 1979 among Harijan landless women) has created an alternative employment option to wage labour through cattle loans (income has increased over 300% according to a ILO study). A scarcity in the labour market has been created, pressurizing landlords to increase wages.

In 1980 the Forum's branches at Adiramapattinam village (Tanjore district) organized fish marketing women for credit. Access to credit options has minimized the role of the middleman in the fishing hamlets. Members (1400) attribute to a better quality of life (ILO study).

In Narasapur (Andhra Pradesh) credit for self-employment and a producers co-operative have helped women lace artisans (numbering 300) weaken the hold



of exporters and increase their wages from Rs. 4 per reel of thread to Rs. 10/- per reel of thread. In 1983, 2100 agarbathi or incense stick workers from Bangalore city (Karnataka) have been organized in to loan groups and have been utilized as a unit of wholesale raw materials procurement. Access to credit and cooperative action have strengthened workers solidarity.

In 1984 beedi workers from Vellore town (1500) have been unionised for collective action, leading to higher wages, implementation of labour legislations and credit.

Increased income and consciousness led to the need for limiting the family size and improved health care. In 1980, the organization initiated an experiment in leadership training for health leaders. 60 semi-literate slum women were trained for 6 weeks in Mother and Child health, Family Planning Methods, Nutrition, Sanitation etc. and provided with the responsibility of 120 families in their neighbourhood. Hailing from the same locality and belonging to the same class as their clients, the health leaders have been also to provide 94.5% coverage in family planning services to 30,000 people within a time-span of the targetted three years. Immunization goals have been achieved within half the targetted time 1½ years. Further the organization has been able to generate employment through provision of basic services.

Now the Forum has initiated a larger health project for a target population of 1,00,000 training 200 health workers (both urban and rural. This project is funded by the Ministry of Health, Government of India.

### Structures of the Organization

The organizational structure ie. creation of neighbourhood credit groups and application of the concept of peer pressure" point out its beneficiary or target group oriented approach. 99% of its staff are illiterate and yet participate in project design identification, implementation evaluation etc. Target group leaders identify the loan groups from the basic unit of the Forum's organization. Similarly, the health leader from the slum/village form the first unit of its family

planning programme. In contrast to the trickle down approach, the forum represents a big push upward's from the grass-roots. Leadership roles of members of WWF(I)—A key to success :

An analysis of the experiments of the WWF(I) reveal that the extra-ordinary leadership roles played by urban poor/illiterate landless women have to a large extent contributed to the success of the organization in achieving the desired results. Local group leaders had been instrumental in the initiation of members to a great in some areas. In some other places the majority of members themselves were responsible for initiating the organization.

The group leader, herself is always a target group beneficiary in the forum. Members of her group have found in her to possess certain pre-requisites of leadership required to suit the immediate environment. The group leaders both in urban and rural areas are responsible for day-to-day implementation of projects such as collecting subscription from members in the slums and villages and paying it at the headquarters, calling members to group meetings, linking to business/credit loan accounts with banks, monitor and check repayment, keep together the group and solve local problems, spread the message of the forum to other slums/villages ie. mobilize members. Apart from this, she guarantees and obtains loans and helps members. In rural areas she helps procure subsidy and other benefits for members from Government etc. Members of one group can go to another group and be easily elected to the position or as group leaders (expansion of leadership).

### Strategies

The women workers are victims of harsh working conditions, unemployment and lack of legal protection because of ineffective laws and male alcoholism leading to family neglect and oppression.

The WWF(I)'s experience indicate that women workers are disadvantaged both ways. Some are over employed but for low returns, others are underemployed at discriminatory wages. Lack of mobility in some areas imposed by caste taboos (as in the case of Narasapur lace makers) is another problem, resulting



in lack of options, or bargaining power for the women workers.

"Women intensive" strategies were evolved by WWF(I) taking into consideration factors that come in the way of their development like class, caste and gender situations. Women workers were organized into unions by the WWF, to facilitate them to fight against discrimination in equal/minimum wages, for better credit and marketing organizations.

WWF(I) believes as long as the inequality between men and women remains, separate women's organizations, particularly for the most disadvantaged group of women workers would be necessary.

Taking in to account the productive roles of women workers, her economic contribution to family and community, and the health hazards they face in their work, there is a need to provide a package deal of health services to improve her living and working conditions. Effective family planning service should be extended to relieve them from the frequent reproductive roles (debility caused by frequent pregnancies) and the responsibility of looking after number of children (a responsibility which men always refuse to share) in addition to her work load.

Thus all attempts are made to eliminate sex-linked in injustice as well as discriminatory biologically determined female inferiority that hinder womens roles as social producers by the organization.

### Issues and Strategies

The Forums experience suggests an alternative model of development in the informal sector. Integrating the sector in to the national economy by linking up with nationalised banks, local bureacracy, municipalities, agricultural universities, research institutions, as well as linked up with international agencies such as the ILO the FAO and other bilateral agencies such as

SIDA, NORAD are part of the organizations efforts at linking up to the national and international mainstream.

By conscientizing women to confront exploitative local elements such as the moneylender, middlemen, exporter and providing greater income, improved housing, clothes, food, nutrition and health-workers have been able to improve trade and living conditions. Benefits have been distributed to a higher to neglected population as also access to information.

Planned health services has led to identification of a low cost/effective delivery system, that can bring down family size and improve workers health. Further consciousness and training have improved self-perceptions and helped in creating of new values regarding female status.

The following statistics indicate that in India 12% of Working Women work in the organized sector while 94% of women work in the unorganized sector. Further, it is a reality that the women workers in the organized sector herself is underprivileged and invisible, within their organized process. What then will be the fate of the female workers in the unorganized sector if she is lumped together with female workers in the organised sector except 'total invisibility'.

International organizations such as the ILO, FAO, and other bilateral agencies such as SIDA, NORAD should now consider the "Unorganized sector" as a sphere of priority. More so, with reference to the doubly disadvantaged female worker in the unorganized sector.

Reorient the media, literacy and education programs to be instruments of social action and social change. They should deal with issues of women's employment and social awareness to help women to obtain the such needed economic and political power in the democraric system to bargain for themselves.



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# An Apology for Handlooms

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V. K. AGNIHOTRI

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*The author in this paper discusses the role of handloom industry, presents the problems therein and gives suggestions for their remedy. He suggests policy guidelines, to make the industry a more viable proposition.*

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## Introduction

Handloom Industry in India today is the largest unorganised economic activity after agriculture and constitutes an integral part of the rural life of the country. There are roughly 3.8 million Handlooms in India, the largest number in the world, engaged in the production of both natural fibre fabrics like cotton, silk and woollens etc. and man-made fibre fabrics and mixed fabrics. About 10 million people depend either fully or partly on these looms for their livelihood.

## The Handloom Tradition

Handloom Industry in India has a long tradition of excellent craftsmanship. The exquisite Muslins made of the finest yarn, could pass through a ring and the silks of Kanchipuram and Varanasi were the delight of discerning buyers all over the country in ancient times. The modernisation of organised textile industry posed a grave threat to the handlooms and during the British rule they had to face the danger of extinction on account of the discriminatory and exploitative policies adopted by the then rulers. The fact that the handloom industry in India has survived various onslaughts of fiercely competitive modernised technology based industrial production and urbanisation for such a long time, does establish its native resilience.

Handlooms have survived many fluctuations of fortunes because to most of the Handloom Weavers,



weaving is a way of life rather than a profession which they have chosen in preference to others. Their work combines "creative endeavour with livelihood."

The Handloom Industry of India is part of its ancient cultural heritage. The fabric of India's civilisation displays the unique mingling of old and new, ancient and modern, traditional and progressive, in all walks of life. Handlooms thus are intimately associated with the richness and variety of Indian culture. Handweaving is perceived as "a pulse beat of Indian cltural life". The weavers are the "link in an unbroken tradition which embraces both producer and consumer within a socio-religious community.<sup>1</sup> Today when we are talking of preserving our ancient cultural heritage, it would be ironic if the handlooms are regarded as a drag on Indian economy and allowed to survive only by default like poor relations whom one would much rather not like to have, but at the same time cannot wish to die. "The fine texttile craftsmen of this country are national treasures, and should be so recognised."<sup>2</sup>

### Handloom and Rural Economy

In India, since time immemorial, agriculture and handlooms have existed side by side in every nook and corner of the country. They form an integral part of India's agrarian economy. Their preservation, therefore, is not only necessary but also vital for maintaining the crucial agrarian balance in the economic life of the country. After hundreds of years of indiscriminate exploitation of natural wealth of the world, man has today come to realise the importance of natural vegetation for maintaining the ecological balance in nature. It would similarly be wise for us to appreciate the importance of Handlooms for maintaining the critical balance in India's agrarian economy before it is too late. Unlike the natural wealth however, which could be regenerated, it would not be possible for us to bring back handlooms, if due to lack of proper appreciation of their crucial role, policy formulations are made on the basis of postulates which would directly or indirectly affect their healthy survival.

Self-sufficiency has been one of the goals of India's planned economy since independence. Self-sustenance and self sufficiency of the national economy can, however, be built only on the edifice of the self-sufficiency of the rural units, namely, the villages which constitute India. The Community Development and area development programmes and, lately, the 'cluster approach' adopted by the Government for accelerating rural development aim at creating self sufficiency among the rural population of the country.

Looked at from this point of view also handlooms have a crucial role to play in supporting and strengthening the self sufficiency of the rural economy. India with its extensive land mass and paucity of resources, cannot hope to build in the near future a network of communication and distribution systems comparable to the one available in advanced countries, wherein centralised production will be able to meet the basic requirements of all the people living across the length and breadth of the country, some of which are located in considerably difficult and even hostile terrain and natural climates. For a long time to come, therefore, we will have to ensure that the basic minimum clothing requirements of the rural population, as far as possible, are met by the cloth produced on handlooms which along with agriculture constitute the core of the self-sustaining rural economy of India.

### Handloom and Employment

Indian economy continues to be dogged by considerable amount of chronic unemployment and underemployment. Of late several rural development programmes have been initiated to generate additional employment in the rural areas. While steps are thus being taken to tackle the problem of unemployment in rural areas, it is obvious that persons already engaged in rural occupations have to be sustained in their employment. "The handloom craft today is a small industry in terms of tools and technology but a vast industry in terms of its employment potential."<sup>3</sup> It is, therefore, imperative that systematic and adequate steps are taken to ensure that the persons employed in

1. Pupul Jaykar : Handloom Pilgrimage, The India Magazine, December, 1984.

2. Ibid.

3. Ibid.



the handloom industry continue to derive their sustenance from it. Quite apart from the fact that it is unthinkable to provide alternative employment to the large work force of about 10 million persons currently engaged in the handloom sector, socio-economic costs of providing them with alternative avenues of employment will be too great to the nation. As the agricultural sector is already over-burdened, the unemployed handloom weavers may tend to gravitate towards urban centres or swell the ranks of the unemployed rural labour force. In either case, the effect of their displacement will create socio-economic strains on a massive scale. Just as it is absurd to contemplate an alternative to agriculture in India in the foreseeable future, it is equally unrealistic to start a search for an alternative to handlooms.

Thus so long as the general problem of unemployment and under employment in the country has not been effectively tackled, the question of providing alternative avenues of employment to the handloom weavers does not arise. It would also be ironic if the professionally skilled handloom weavers are allowed to languish, while efforts are being made, on the other hand, to train the rural youth for other professions under various rural development programmes.

#### **Exquisite and Exclusive Handloom**

Another reason why the handloom industry of India needs to be preserved and protected is that they have over a period of time come to produce some of the most exquisitely beautiful textiles which are appreciated all over the world. The major strength of the handloom industry is "the unique skill of the weaver, his comprehension of colour, texture and function, the weaver's capacity for rapid adaptation and for production of small yardage in a variety of designs".<sup>4</sup> Handloom has, therefore, become an important foreign exchange earner on account of its ability to clear to the needs of the fashion markets. Handlooms are capable of producing even a hundred metres of fabrics in particular design or colour combination to meet the individual taste of the consumer which is very much in the forefront in the developed countries. It is this

'exclusiveness' of handloom that gives it a certain edge over other sectors of the textile industry generally, because when it comes to the production of run of the mill textiles what powerlooms and mills can do in our country perhaps the textile mills in other countries can do better.

However, here it is to be borne in mind that all handlooms cannot be engaged in this type of production. Firstly because the demand for such articles cannot increase dramatically over a short period of time. Secondly, these exclusive products, in the nature of things, are churned out from the large base of the handloom industry, like cream from milk, and unless, therefore, the base is sustained and strengthened its quintessential products cannot be augmented or even be sustained.

It is no doubt true that efforts have to be made to increase the manufacture of such fabrics on handlooms which have unique characteristics. Innovation and improvisation should be the objective of handloom development for this purpose. Novelty fabrics using different materials or different types of yarn have to be produced on handlooms. There is need, therefore, to constitute Technical Cells in all States to ensure proper transfer of technology and its implementation. It is also essential that equipment suitable for giving sophisticated finish to handloom products should be designed and developed.<sup>5</sup>

In order to improve the quality and productivity of handlooms, modernisation is of the essence. Studies by SITRA have shown that productivity of handloom weavers can be increased by as much as 50 per cent through minor modifications in machine and processes. However, the industry is highly tradition bound and to introduce changes is not so much a matter of imparting skills as of changing attitudes which have been in existence for many generations. Many of the schemes started with great enthusiasm and excellent intentions, have not yielded the result expected of them mainly because of the weavers' resistance to change. "This fundamental fact must be given due recognition and there should be at least one sociologist attached to

4. Ibid.

5. K. Srinivasan : India's Textile Industry (1984)



every scheme who will help to bring about changes smoothly and quickly.”<sup>6</sup> The effort in the direction of modernising the handloom industry has to be similar to the one undertaken in the past to introduce hybrid and high yielding varieties of seeds, use of fertilisers, pesticides etc. in agriculture, leading to the Green Revolution.

### The Hidden Persuaders

A view is sometimes expressed that in the interest of standardisation and economy of production, handlooms should be gradually replaced by powerlooms or automatic looms. It is suggested that conversion of handlooms—particularly those that are producing fabrics which can be better made on powerlooms—should be introduced. In this connection, it is to be seen that quite sometime ago the Kanungo Committee appointed by the Government to make a detailed inquiry into the various sectors of cotton textile industry with a view to determining the place of each in the national economy recommended the gradual conversion of handlooms into powerlooms. However, efforts made to provide powerlooms to handloom weavers have not succeeded and most of the new powerlooms have not been set up in the handloom sector. Sri K. Srinivasan in his book “India’s Textile Industry” while advocating conversion of handlooms into powerlooms has categorically stated that it also means that any unauthorised powerlooms coming into existence should be ruthlessly eliminated. However, for various reasons, especially the connivance of the State Government authorities, the growth of unauthorised powerlooms has continued unabated, thereby derailing the strategy of graduating the handloom weavers to the higher technology of powerlooms. A situation has thus been reached where the powerlooms have mushroomed to such an extent that except ensuring a total curb on their further growth by fiscal and other measures, there is no scope for reverting to the strategy of conversion in the near future, in view of the comparative inelasticity of demand for textiles.

As pointed out in a World Bank Study, contrary to the intended policy of protecting the handloom

sector, the bundle of policies has encouraged a spectacular growth rate of the powerlooms industry. This has been largely due to the fact that the market wage in the powerloom sector is far below that in the mill sector and not so different from that in the handloom sector. The World Bank Study further points out that the choice facing the Indian authorities has been one of large increase in employment at a low wage as against smaller addition to employment at a higher wage. There is therefore, case for encouraging the small sector in order to change the pattern of earnings in favour of low wage workers. This argument would, of course, apply even more strongly in favour of encouraging the handlooms.<sup>7</sup>

As regards the argument that the handlooms should be confined to the production of high cost fabrics in sophisticated designs where uniqueness of design is more important than the cost of production and leaving the run of the mill production to powerlooms, it is to be remembered that actually only a small percentage of handlooms are engaged in the production of such artistic fabrics. Most of the weavers in fact produce mass consumption items such as Dhoties, Sarees, Towels etc. There is no way in which all these handlooms could be switched on to production of artistic fabrics in the foreseeable future. The handlooms engaged in production of mass consumption items have suffered the worst on account of the growing competition from the powerlooms. Each powerloom replaces six handloom workers leading to under-employment and unemployment of handloom weavers.

As a measure of protecting the handlooms, Government of India reserved certain items for exclusive production in the handloom sector. Currently these orders are issued under the Essential Commodities Act. It has since been decided to undertake a separate legislation for the purpose, A Bill has been introduced in Parliament. However, here it is to be seen that certain categories of items are only partly reserved for the handloom sector with certain specifications. This

6. Ibid,

7. Dipak Mazumdar : World Bank Staff Working Papers, No. 645; The Issue of Small Versus Large in the Indian Textile Industry (An Analytical and Historical Survey): 1984.



has led to violation of the reservation orders by the powerlooms, by exploiting their loop-holes. It is, therefore, felt that certain areas of production such as Dhoties and Sarees should be reserved totally and completely for the handloom sector so that they do not face any competition in those areas, and also in order to ensure more effective implementation of the reservation orders.

### Policies and Programmes

The importance of and the vital role played by the handloom sector in the nation's economy had been recognised quite early at the policy planning level of the Government. Since independence, through successive five year plans, a host of programmes and schemes along with various kinds of organisational and financial interventions have been made in order to encourage and support the Handloom Industry. In terms of outlays in the various five year plans, the allocation has gone up from a level of Rs. 11.10 crores during the first plan to Rs. 120 crores during the 6th Plan in the Central Sector. This has been further augmented by the allocations in the plans of individual State Governments totalling around Rs. 190 crores during the 6th Plan Period.

As a result of these measures, the number of Handlooms in the country has gradually gone up from about 28 lakhs in 1951 to about 38 lakhs at present. The production output from handlooms has increased from a level of about 500 million metres in the early fifties to over 3200 million metres in 1982-83, which represents over five-fold increase in three decades. The handloom sector today accounts for nearly 30% of the total textile production in the country.

### The Textile Policy of 1981

In the Textile Policy announced on 9th March, 1981 the following prescriptions were made in respect of the handloom sector :—

(i) Maximum possible growth of handlooms in the decentralised sector to generate more employment and raise the standard of living of small weavers and others employed in this sector.

- (ii) While fixing the sectoral targets for production of textiles, the first priority has to be given to the handloom sector which will be called upon to achieve the maximum quantum it can produce in a realistic manner. For maximising production in the handloom sector the strategy suggested involved revival of dormant looms and sustained modernisation of looms.
- (iii) Special efforts to be made to ensure availability of adequate yarn so that the handloom sector is enabled to achieve the production target allotted to it. The National Handloom Development Corporation will be assigned the main role for procurement and distribution of yarn for the handloom sector at reasonable prices. The National Textile Corporation/ State Textile Corporations will be fully utilised for making available adequate quantities of yarn at reasonable prices to the handloom sector.
- (iv) Government would encourage formation of a network of cooperatives for effective integration of spinning, weaving and processing activities for the growth and development of handlooms.
- (v) The existing infrastructure of the Indian Institutes of Handloom Technology and Weavers Service Centres will be strengthened to provide necessary technical support to the handloom sector. A new Institute of Handloom Technology will be set up in the North East for bringing about greater commercialisation of the handlooms situated in that area.
- (vi) Production of Polyester and other non-cotton and reservation of certain articles exclusively for handlooms will be continued and special steps will be taken for its effective enforcement.
- (vii) Consistent with the objective of providing adequate protection to the handloom sector, the growth of the powerloom sector should be regulated and monitored. With this end in view, a limited extension of the powerlooms will be promoted in respect of handloom cooperative societies only.



- (viii) Suitable steps will be undertaken to determine the Cost Handicap of the handloom sector vis-a-vis powerlooms. Suitable fiscal adjustment would be considered for removing the Cost Handicap, if any, of the handloom sector.
- (ix) In the production of controlled cloth, it was proposed to give the handloom sector progressively increasing share.

### The Textile Policy Implementation

In the context on the Textile Policy enunciated above it is to be seen that whereas in some cases the specific objectives set forth have been achieved or concrete steps have been taken to achieve them, in some other cases, achievements have not been up to the mark either for reasons of lack of resources or on account of certain inherent difficulties. The National Handloom Development Corporation has been set up and is taking steps to play a catalytic role in procurement and distribution of yarn. It is procuring the yarn from National Textile Corporation, Cooperative and State Textile Corporation Mills. The National Textile Corporation has been asked to supply yarn at mill gate prices. A new Institute of Handloom Technology has been set up at Gauhati. The production of polyester and polyester blended fabrics has been encouraged with the active association of Petrofils. A new legislation has been introduced in Parliament for reservation of certain articles for exclusive production on handlooms. The share of janata cloth produced on handlooms under the controlled cloth scheme has gradually gone up from about 50% to 55%.

However, on the other hand, the strategy of organising weavers into cooperative, revival of dormant looms and modernisation of handlooms has not met with unqualified success. Inadequacy of funds, specially in the State Sector, has been one of the factors reasonable for inadequate growth in these area, in so far as the funds for these schemes are made available by the Office of the Development Commissioner for Handlooms on a matching basis with the State Governments. There are also certain inherent difficulties in the nature of lack of response to co-operativisation in certain States, non-availability of adequate working capital for revival of dormant looms

and resistance to modernisation in the tradition bound handloom industry. The response from the State Governments to the scheme of providing powerlooms to handloom cooperative societies has also not been encouraging. There is resistance from the States and the Cooperative Societies to the scheme in so far as the marketing network under which the cooperative societies work does not provide for marketing of powerloom goods by the Apex/Regional Cooperative Marketing Societies and there is also an apprehension that if the same society produces both handloom and powerloom goods the chances of misutilisation of rebate facilities etc. will be there.

The Office of the Development Commissioner for Handlooms had set up a Study Group on Cost Handicap of the Handloom Sector vis-a-vis powerloom sector. Recommendations of the Study Group were forwarded to the Textile Department and are under consideration in the context of the proposals being formulated for reorganising the duty structure on textiles.

One of the basic reasons why the Government have found it difficult to intervene effectively on behalf of handlooms has been the absence of accurate and adequate data regarding handlooms. Some States have no doubt, from time to time, conducted censuses of handlooms and some sample surveys have been sponsored by the Central Government; but there are no baseline statistics available to give a total picture of the industry covering its employment and wage levels, infrastructure, production, marketing, etc.

On the whole, on account of the various constraints mentioned above, the handloom sector has not been able to realise its optimum potential in meeting the overall requirements of cloth in the country. Against this background the Sub-Group on Handlooms for the 7th Plan addressed itself to basic problems of the handloom industry and suggested several schemes to strengthen and invigorate handloom industry.

### The Strategy of the Seventh Plan

The strategy of the Seventh Plan suggested by the Sub-group envisages putting the Handloom Development Corporations more or less on the same footing



as the Handloom Cooperatives in the light of the experience of the earlier Plans which have shown that cooperativisation has not been an unqualified success in all parts of the country. It suggests revival of the Intensive Handloom Development Projects so that a package of inputs could be provided to clusters of weavers to bring them under an organised frame work. It envisages creation of more spinning facilities in the Weavers' Cooperative Spinning Mills' Sector in order to provide a captive source for supply of yarn to the weavers. It also envisages provision of subsidy in order to ensure availability of yarn to the weavers at reasonable prices.

In the scheme of modernisation of looms, certain modifications have been proposed in order to make it a complete package so that the benefits percolate to the weavers more effectively. For promoting the production of polyester and polyester blended fabrics on the hand looms, the Office of the Development Commissioner for Handlooms has proposed exemption of excise duty on polyester and polyester blended yarn used by the Cooperatives and Corporations and on processing of fabrics produced with such yarn.

The Sub-group has also recommended a more vigorous approach towards marketing of handlooms in the country by setting up handloom complexes in important cities and towns while at the same time assisting State level agencies in improving their local marketing network. In order to make the handloom goods more competitive and improve their marketability, creation of processing facilities exclusively for the handloom sector has been taken up and is proposed to be continued. Decentralized training of weavers and special thrust on design development is also proposed in order to upgrade the skills of the weavers. A greater thrust on publicity and exhibitions is also envisaged to support the marketing activity. In order to give greater fillip to export of handlooms, organising Buyer Seller Meets and Market Orientation Tours has been suggested. For gearing up garment export, including handloom garments, an Institute of Fashion Technology is being set up.

For improving the data base with a view to put the

planning activity on sound lines periodic censuses of handlooms supplemented by Sample Surveys and Research Studies have also been marked out for special attention.

Last but not the least, in order to improve the working conditions of the weavers and increase their commitment to the organisational framework of Cooperative and Corporations, certain welfare schemes like Workshed-cum-Housing Scheme, Thrift Fund Scheme, Medical Scheme, etc., are proposed to be implemented during the Seventh Plan.

#### An Outline for Future Policy

To sum up, in the context of the foregoing discussion, the following framework of policy guidelines is suggested for the development of the Handloom Industry in future :

- (1) The Textile Policy of giving pride of place and protection to the handloom sector for its maximum possible growth in order to generate more employment and raise the standard of living of small weavers should be continued.
- (2) In order to ensure adequate availability of yarn at reasonable prices to the weavers, the hank yarn obligation on the mills should be made foolproof and strictly enforced. Secondly, setting up of weavers Cooperative Spinning Mills should be given the highest priority in all programmes of expanding spinning capacity in the country. Finally, Government assistance should be extended to the buffer stocking operations in yarn, dyes and chemicals of the National Handloom Development Corporation.
- (3) The Ban on additions to the weaving capacity in the mills and the powerloom sectors should be continued. The unauthorised powerlooms should be ruthlessly eliminated. A clear understanding should be reached with the State Governments in order to put a stop to their indirect support to the growth of unauthorised powerlooms.
- (4) The loopholes in the orders reserving certain articles for production exclusively in the hand-



loom sector should be plugged and adequate machinery should be provided for their strict enforcements;

- (5) In the light of the experience of the past, the policy of considering cooperativisation as the only way of organising the weavers should be replaced by a two-pronged strategy of cooperativisation and intensive development of handlooms through corporations. For this purpose, the state handloom development corporation should be provided adequate financial, institutional, and programme support, more or less on the lines of the cooperatives.
- (6) Modernisation of Handlooms and training of weavers should be given special attention, and research and development activities to increase productivity of looms and to develop equipment and techniques for sophisticated finish to handloom products should be accelerated in order to gear the industry to meet the challenges of the future. Special efforts should be made to increase acceptability among the weavers of new skills, techniques and equipments.
- (7) Pre-loom and Post-loom processing facilities for handloom products should be strengthened in a big way in order to improve their quality especially for the export markets.
- (8) Marketing infrastructure for marketing support to handloom should be given a new thrust by setting up marketing complexes and launching extensive publicity through frequent exhibitions etc. Within the country and abroad.
- (9) In order to encourage production of mixed fabrics on handlooms, with a view to improve the wage level of the weavers, to reduce the cost handicap of the products as well as to cater to the changes in consumer preferences, excise duty exemption should be given to Polyester and Polyester blended yarn, used by the handloom and channelised through co-operatives and corporations. Similarly, excise duty exemption should also be given to processing of such fabrics produced on handlooms in order to further increase the competitive edge by reducing their cost handicap.
- (10) Institutional arrangements for providing working capital and investment credit to the handloom sector should be strengthened in order to enable them to achieve their optimum capacity utilisation, to activate the dormant looms and to increase the pace of modernisation and marketing activities.
- (11) The entire production programme of controlled cloth should be transferred to the handloom sector under the Janata Cloth Scheme in order to ensure minimum subsistence level of employment to the weavers and at the same time to provide cheaper cloth to the poorer sections of the society.
- (12) In order to improve the working conditions of the weavers as well as to increase their commitment to the institutions created for their organised development, welfare and security schemes like Work shed-cum-Housing Scheme, Thrift Fund Scheme, Insurance Scheme etc. should be taken up on a larger scale.
- (13) The data base of the handloom industry should be strengthened by conducting periodic censuses and sample surveys in order to help evolve proper and adequate strategies for the growth and development of the handloom industry.
- (14) For adequate monitoring, supervision and evaluation of various handloom development programmes, proper management information systems should be evolved with necessary machinery to implement them.
- (15) For taking up all these activities a much higher level of investment than in the past will have to be provided in the Central as well as State budgets.



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# Marketing Support to Informal Sector

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J. D. KALE

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*Marketing of rural products needs special efforts since rural industries are mainly in unorganised sector. Marketing support to this sector involves supply of necessary inputs such as raw materials, training and guidance, designing, etc. While there are various organisations looking after development of Informal Sector, very little work so far has been done in extending market support to this sector according to the author.*

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According to Mr. Peter Drucker, in the developing economy, marketing is the least developed and therefore the most backward part of the economic system. Shri K. Rustomji has emphasised that marketing is the key to economic development and a country can be industrialised not only by building factories but by building markets. As the country develops, its market grows thereby providing employment to large number of persons.

The economic development of a country at times adversely affects the decentralised sector since this sector faces direct competition from organised sector which is well supported by modern infrastructure of transport, power, communications, etc. In order to avoid such a situation Governments in developing countries formulate such policies which help in strengthening the decentralised sector, especially in rural areas, where majority of vulnerable sections of the society live. In our country, with the launching of massive self employment programmes production in the decentralised sector is growing. The produce of this sector must however find market, else it will slowly perish, leaving large number of persons jobless. The organised sector has already entered the markets of rural areas which can be noted in 'haats' (weekly bazaars) where traditional items of daily utilities of rural population are rapidly replaced by products of organised sector.

Marketing aspects of rural industrial products can



be considered under the following three broad groups; viz. (i) Artisan group (ii) Traditional Tiny Industries Group and (iii) Non traditional industries Group. Marketing aspects of these groups can not, further, be studied in isolation. It is necessary to go in further depth in the production function of these industries which involve selection of product, supply of raw material, imparting guidance and training, provision of tool, equipment, tie-up for finance, etc. etc.

### Present Status

The informal sector of industries is presently getting assistance under various schemes through agencies like Khadi and Village Industries Commission, Handicraft and Handloom Boards, State Industries Department and Development Corporations etc. The assistance is mainly in the form of subsidies and loans. Efforts are also made in supply of raw-materials, improved tools and equipments, imparting of training, etc. To help these industries in marketing assistance, measures such as rebate on rural industries products, opening of retail outlets and emporia for marketing of products produced by rural artisans are taken both at national and State levels.

It is, however, observed that these efforts are not adequate and sufficient. Further, the objective of percolating real benefits of such schemes to rural artisans is rarely achieved since several times the advantage is actually taken by the middleman who operates as a link between the artisan and institution implementing the incentive/development schemes. Thus, the very purpose of these efforts is defeated.

Analysing reasons for the present status of rural artisans/industries one finds the following deficiencies :

1. Ignorance of market.
2. Lack of management skill.
3. Paucity of funds.

These factors are further explained below :

### Ignorance of Market

Artisans in rural areas and in cottage industries are

mainly engaged in manufacturing traditional items. These cover leather, textiles, carpentry, smithy, carpet weaving, embroidery; carving, pottery and other trades and crafts. Many of these items are based on local skills and craftsmanship while others are trades providing items of daily utilities.

With the advent of industrialisation, the products of modern industries have been making inroads to rural areas leaving the rural artisans without business. Example can be cited of handloom weaver who is facing keen competition from powerlooms and textiles. Similar is the case of cobbler who is losing his business because of p.v.c. chappals and other items which has replaced leather. Even potter's business is taken away by plastic utensils.

The rural artisans are losing traditional business in their areas, they are not aware either of market for their items/skills elsewhere or are not able to reach these raw markets of their own.

### Lack of Managerial Skills

Rural artisans is mainly illiterate. He only knows his craft but does not know how to carry on the same profitably. When he has any order, he is not in a position to fulfil the same because of lack of raw material. He is not able to cost his product properly taking into consideration all the facts direct and indirect involved in his final products. Further because of his weak financial position-primarily due to lack of proper management of his affairs-private traders exploit him and purchase his products at astonishingly low price. At times, he is under certain obligation to these middlemen which compels him to sell his product to them in order to pay the debt and advances received earlier.

### Paucity of Funds

This is not rather a cause but an effect of bad management of his affairs as explained above. Money can buy for him necessary raw materials and other inputs to produce his product. Various Central and State Governments and institutions are giving liberal financial assistance. The nationalised banks have also



now started giving emphasis for financing the tiny sector which is covered under 20-point programme. Even with these efforts there appears to be two reasons which are coming in the way of effective results. Firstly, the finances available are not received timely and in sufficient quantity. Still, the rules and procedures become obstacles in sanction and disbursement of financial aid to the artisans. Secondly and more important, there are several cases of misuse of the assistance given to the artisans. The money instead of being used in his business, is used in meeting incidental family expenditures on marriages, sickness and other occasions.

### Approach

From the foregoing analysis of problems encountered by artisans in efficiently working in their professions, it is felt that an integrated approach should be followed to deal with these problems. It is necessary to bring artisans spread over thousands of villages and hundreds of towns together. It is likely that all artisans may not agree to combine. But efforts should be made to bring together those artisans who are willing to work collectively.

There can be many ways of bringing them together. One can have a cooperative structure with apex body at the top. Alternatively, there can be regional set-ups if the coverage is large enough. It is also possible to form trust and societies instead of co-operatives. The structure-cooperative society or a trust may cover all the arts and crafts in the region or may limit itself to development of one trade only.

In many States apart from State Development Corporations such as Handloom Corporation, Handicraft Corporation, Leather Corporation and Khadi and village Industries Board several organisations are working either as cooperative societies or as trusts. There are various Industry Houses and charitable organisations providing work to artisans. The present structure however is not adequate and effective to give full time employment and reasonable income to the artisans/workers in the informal sector. These artisans have not still come out from the clutches of middlemen. The obvious reasons for this situation is (i) the high prices of items (ii) the high overheads (iii) low degree

of commitment (iv) less accessibility to artisans. As a result most of these organisations have to depend upon Govt/institutional assistance in the form of subsidies and loans. The middleman, on the other hand, is in a position to cut away these factors and able to compete with these organisations in the open market.

In order to overcome these limitations it will be necessary to provide certain financial assistance to these organisations. The usual form of assistance generally extended covers (1) Subsidy of sale of these products (2) reservations in respect of purchase of these products (3) exemption in taxes such as sales-tax, octroi etc. There is now growing opposition towards such concessions. The purchasing departments feel that because of monopoly of the organisations connected with informal sector, they are forced to pay higher prices to the products otherwise available at cheaper price from private trader/middleman. The organisations and Government Departments dealing with informal sector must therefore find out ways and means of reducing the cost of their final products so that these organisations can compete with private sector in open market. These organisations should compare their costing with the corresponding costing of a private trader and asks such assistance headwise to the extent to meet the difference. Such inputs can be in the form of raw material assistance, wage assistance, transport assistance etc.

### Experience of Gujarat Rural Industries Marketing Corporation Limited (GRIMCO)

In Gujarat the informal sector is mainly attended by the Directorate of Cottage Industries, Khadi and Village Industries Board, State Handloom Development Corporation, State Handicraft Corporation and other institutions involved in the development of cottage industries and industrial cooperatives. These organisations, however, cover specific industries. There was further no organisation in existence looking to the specialised area of marketing of products of rural industries. In May, 1979, the State Government, therefore, established Gujarat Rural Industries Marketing Corporation Ltd. (GRIMCO). The aims and objectives of the corporation are broadly as under:

1. Generate employment to rural artisans.



2. Raise economic level of rural poor.
3. Impart training to artisans to make quality products.
4. Make available technical, financial and other assistance.
5. Check inflow of rural population to urban areas.
6. Organise production through cooperatives, individual artisans and production centres.

The corporation is primarily supplying raw materials to artisans and getting the products manufactured from them, on piece rate basis. The Corporation has set-up production-cum-sales centres in leather footwear, readymade garments, carpentry, etc. The Corporation is also trading in salt and beedi. In salt trade, the Corporation purchases salt from individual agarias (Small salt pans holders) and salt cooperatives. In beedi, the Corporation supplies raw materials to beedi workers cooperatives and obtains rolled beedies under one brand name.

The Corporation has also embarked on training programme. It is running training centre for heavy leather footwear and another centre for readymade garment. The Corporation proposes to intensify its training activities since it is felt that unless artisans are given specific training in the field, it will be difficult to obtain specialised type of work from them for which there is a market. The Corporation is coordinating these activities with integrated Rural Development Agencies and District Industries Centres.

The Corporation's coverage of institutional marketing includes supply of leather footwear, readymade garments (uniforms), transport equipments like camel-carts, hand-carts, hand lorries, furniture etc. etc; Though the Corporation is included under the State Government resolution whereby purchases from the Corporation are permitted without inviting tenders, most of the purchasing departments do not follow the Government directive. As a result, the Corporation has to participate in the tender enquiries floted by various Government/public sector organisations. Even in such

enquiries the usual price preference is also not made applicable in several cases and as a result because Corporation not being lowest in the quotation is a loser of big business. The Corporation's prices as compared to private sector are little higher for reasons mentioned earlier. The price structure worked out by the Corporation in respect of its products marketed by the Corporation is appreciated by these Departments. But because of the above explained situation they show their helplessness to place orders. After detailed consultation with State Industries Department on the costing of GRIMCO's products, input assistance of various nature is being worked out. If this materialises the Corporation will be in a position to compete in tender enquiries.

In spite of these difficulties and limitations the Corporation has achieved a total turn-over of Rs. 2.22 crores, during the first 4 years of VIth Five Year Plan. It is presently providing employment to around 300 rural artisans all over the State through its 26 Production Centres. The Corporation intends to cover another 1500 workers by the end of VIIth Five Year Plan.

### Conclusion

Marketing of any product is hard work. Marketing of rural products is more difficult because of several problems and limitations involved therein. The informal sector suffers from several lacunae and unless concerted efforts are made it will be very difficult to improve the economic situation of those artisans covered under informal sector. While several organisations are engaged in providing different inputs-both financial and material to this sector, it is felt that the efforts are not closely linked. An integrated programme of giving assistance to this sector therefore appears to be one solution. Such a programme should not isolate marketing aspect from other related aspects connected in production of articles in the informal sector. This integrated programme aims to provide single window service to artisans. Though, single window service concept was, the basis in setting-up the District Industries Centres in the country, this very concept is not visible today. GRIMCO-Gujarat Rural Industries Marketing Corporation Ltd. (State

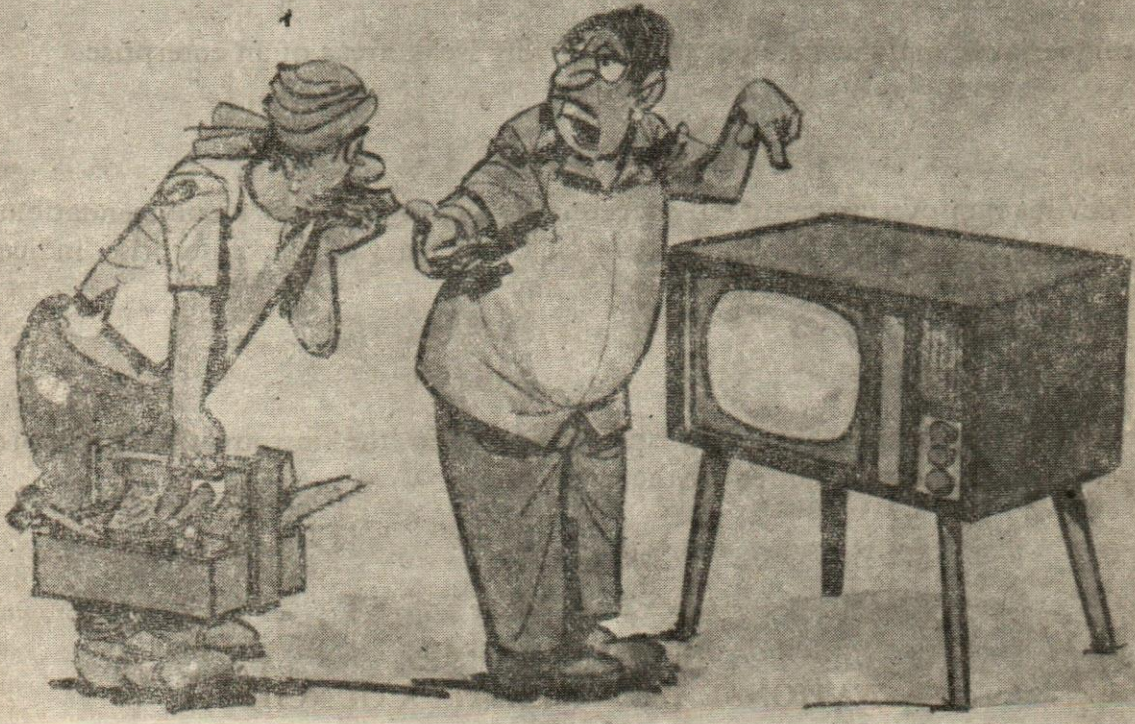


Government Undertaking)-in Gujarat is attempting to provide such a service to Rural Artisans and Industries in the State. Today's GRIMCO activities are modest and the Corporation is facing numerous problems in discharging its aims and objectives. Nevertheless with

increasing support in general and from State and public sector undertakings in particular, there is no doubt a bright future for the Corporation which naturally will help in bettering economic conditions of rural artisans.

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New Delhi-110 003**

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## EXECUTIVE READINGS

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### **The Control of Resources** **Prof. Partha Dasgupta**

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Published by :  
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Rs. 85/-  
PP 215

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Reviewed by :  
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Deputy Director, Air Transport,  
Office of the Director General of Civil  
Aviation, New Delhi

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This book deals with environmental economics and development planning. The author is the Professor of Economics in the London School of Economics who has prepared this manuscript as Ford Visiting Professor at the Institute of Economic Growth, New Delhi. It is a contribution to this field of literature at a time when there is a debate all over between economists and environmental experts on the management of natural resources and maintaining ecological balance.

The chapters comprise of following: common property, externalities and distribution; goals, constraints and accounting prices; environmental control under uncertainty; dimension of welfare; the stationery case and the transient phase; the economics of pollution control; forests and trees; uncertainty, irreversibility and option values; and the conclusions.

The author says that he is analysing conceptual issues in relation to economics of environmental resources. He points out the regenerative capacity of such resources. He refers to the dialogue on environmental pollution and resources management like fisheries etc.

Environmental resources are often common property resources, says the author, and most of the problems created are because of exhaustion of resources and their misuse. He is in favour of welfare economics and states that pollution has impact on welfare as well.

Professor Dasgupta feels that environmental problems are difficult to analyse, let alone solve (p. 10).

Nevertheless, he advocates a social cost-benefit analysis on environmental economics. Further, there must be environmental standards in law for preventing pollution damage. The cost-benefit analysis is carried into resources of forests, trees, fisheries and land-use planning.

The author concludes that economics ought to find out the unifying characteristics in natural resources management p. 202. There from we should then derive general prescriptions for their exploitation. One is not sure how far has the author succeeded in creating a unifying approach on the subject. He has obviously left out the contribution of ecologists to this understanding of ecological problems in resource management. An eco-system approach to environmental economics seems pragmatic in this regard. From an eco-management of a certain geographical area, we can extend this ecological relationship of natural resources management to the whole of geography and the world order as a whole. In this process we can



find better solutions to management of vast global resources of climates, forests, airspace, land areas, oceans and inland waters and rivers. Indeed, the global economics is now part of ecological economics.

The author has advocated a steady state which according to him does not necessarily mean curbing growth rate, but adjustments in the segments of economy so as to avoid unstable situation for world economy. The steady state is also being recommended by scientists to maintain global ecological balance. One does not agree with the author when he says that scientists foresee the end of world anyway. What the scientists say is that economic planning should have relation with the laws of nature so as to protect global ecology and heritage. The danger to world order is much more from nuclear weapons and militarisation, not because of ecological economics. On similar reasons, ecologists plan for future, because future planning will yield a steady state and a better quality of life. As Professor John Galbraith has said in his book *The New Industrial State* (London 1967, p. 7), what matters is not the quantity of goods but the quality of life.

The global thinking is moving towards harmony with the natural order which is not attained by mass production and consumption, but by sound and ecological use of global resources, especially the non-renewable resources. Futurology is therefore an important developing science and economics both. We cannot possibly ignore future life on this planet.

This book makes inroads into various problems of environment degradation and resources exploitation. It has created a sound awareness for unifying certain relationships involved in environmental resources use, misuse and overall management. It is a good contribution to the field of environmental economics and should be of interest to planners, students and scientists.

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#### **Quantitative Techniques for Managerial Decisions**

L.C. Jhamb

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Aditya Publishing House, Pune-411030

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Since the advent of the industrial revolution, the world has seen a remarkable growth in the size and complexity of organizations. The artisans' small shops of an earlier era have evolved into large corporation of today. An integral part of this evolutionary change has been a tremendous increase in the division of labour and segmentation of management responsibilities, in these organisations. The results have been spectacular. However, alongwith its blessings, this increasing specialisation also has created new problems. One of these is a tendency for the many components

of an organisation to grow into relatively autonomous empires with their own goals and value systems, thereby losing sight of how their activities and objectives mesh with those of the over-all organisation. What is best for one component frequently is detrimental to another, so they may end up working at cross purposes. A related problem is that, as the complexity and specialization in an organization increases, it becomes more and more difficult to allocate its available resources to its various activities in a way that is most effective for the organisation as a whole. These were the kinds of problems, and the need to find a better way to resolve them, that provided the environment for the developments of various quantitative techniques. These techniques help managements in arriving at decisions which are best in the overall interest of the organisations.

Today, the impact of these techniques can be felt in many areas. This is indicated by the number of academic institutions offering courses in this subject area at all degree levels. Many business consulting firms are currently engaged using most of these techniques in analysing various management activities. These activities have gone beyond business applications to include hospitals, financial institutions, city planning, transportation systems etc. Of late there has been an inflow of books on quantitative techniques and it is a good augury that many are involved in the study of quantitative techniques and their applications to numerous intricate business problems.



This book under review has been divided into 17 chapters. Chapters 1 to 17 deal with linear programming, transportation models, assignment models, inventory control and critical path analysis. Line of balance, investment theory, replacement theory, break even analysis and work sampling are discussed in chapters 8 to 12. Chapters 13 to 17 contain queuing theory, simulation, sequencing, sales forecasting and statistical quality control. The book is not overburdened with mathematics and can easily be followed those who have an elementary mathematics background and as such may prove useful to students doing very basic courses on quantitative techniques. However, the book is not complete in its coverage and may only wet the appetite of the reader rather than satisfying it. Surprisingly, some of the important techniques like integer linear programming, dynamic programming, markov chains, game-theory and goal programming have not been included. Author may consider the suggestion of incorporating these techniques in the next edition. It is also recommended that topics like quality and post optimality analysis, transshipment model and travelling salesman problem are included in chapters on linear programming, transportation models and assignment models respectively. To make the subject area more meaningful to the readers it may be advisable to include a few real-life case studies also.

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**Integrated Technology Transfer**  
**Jacques Richardson**

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**Reviewed by**  
**V. Raghuraman, Director, NPC**  
**New Delhi**

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Virtually the North-South dialogue for a New International Economic Order centres around technology transfer from the "haves" to the "have nots". The post-war scene presents several lessons for the developing nations to reduce dependence and create their own national capacity to import, negotiate, adapt, diffuse, innovate and invent technologies.

Technology is the result of cumulative search by restless minds, over the centuries and spread over the continents, for doing things better or making different things. Yet technology is leased under conditions much harsher than that of feudal agrarian societies, just as the over-haul of feudal agrarian relationship, transformation in the technology transfer areas is inevitable. The integrated Technology Transfer, as attempted by the Editor connotes that transfer of basic scientific knowledge and technical know-how involves the combination of learning to know process with that of learning to-do. These thoughts crystallised in the volume through a collection of articles in the year (1979) of U.N. Conference on Science and Technology for Development make an

incisive introspection of development and technology transfer of developing countries.

The developing nations present a fragile and loose knit framework with respect to defining priorities, organising technology transfer arrangements-including augmenting skills and management coordination. The developing countries depend largely on Government policies and Government initiative on R & D. The multinational technology transfer arrangements have practically no back-up of stimulating local research for adaptation or for innovation. The local talent and financial resource base though widened considerably since the 1950s, are yet to assume a credible force to break-away and be self-reliant. Isolated success stories such as water supply, live-stock disease and rural electrification of Pakistan's mountain communities are there. But there is need to understand the traditional value systems to blend technological progress synergistically. The Ghanaian fisher folk managing their entire business, the distribution network of palm toddy which cannot keep for more than a day, show local skills, which a modern management expert cannot comprehend.

Knowledge, especially scientific knowledge, is the product to varied internal and outside pressures having relationship with the level of a country's development; it may even influence or estinguish an entire culture. That the level of education obtaining in a particular society is indicative of this is brought out by Nagarja Rao and Henri Claude :



That the ethnic minorities like Scots in Britain and Parsees in India are instrumental in quicker assimilation of technology is an interesting conclusion.

The transformation of technologically advanced societies ushered in by the industrial revolution in Britain cannot be duplicated now due to changed balance of industrial and finance power-base. The Meiji restoration of Japan pertends the foundation of indigenous industrial and financial infrastructure. This seems still logical—the basic six steps viz. freeing agriculture from feudalistic restrictions; the Government initiative in setting up model factories eventually sold to zealous entrepreneurs; Government subsidies for heavy industry, railways and shipyard to wean away investment from land and commerce; official patronage of local manufacturers; formation of national banking networks and lastly by setting up exclusive modernisation funds. This coupled with the developments in communication is the key success to the Japanese miracle. The discerning capacity of the Japanese in selective imports of technology, the reverse engineering capability and innovative capacity to re-export improved technology is the type of linkage which needs evaluation to local adaptation in the developing world. The Japanese developments have been aided by the separation of planning and implementation of Japan's science and technology policy system.

These aspects along with thrust areas of electronics, bio technology, small scale industries, energy conservation, solar energy have also

been dealt with in the concise coverage of 162 pages. A reproduction of the articles in the UNESCO's Journal, *Impact of Science on Society*, this is a valuable addition to the selective, constructive and adaptive application of technology to the benefits of all world societies. It is recommended for planners, economists, financiers, technologists and management experts who are ever puzzled and baffled by the technology transfer propositions.

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### **Industrial Productivity and Motivation**

**H.C. Ganguli**

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Reviewed by  
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In every country, whether developed or developing, industrial productivity has become a matter of great concern. That there is a link between productivity and worker motivation has long been established. With the help of the findings of empirical studies and sound scientific inquiries the present book attempts to explain this relationship.

The book discusses a model of

human behaviour: Human needs, hierarchy, multiplicity of motivation, need for homeostatis resistance to change in a concise manner.

The author refutes the contention, money is not any more a motivator for Indian worker. He sounds logical, when he says that, in this context there are other intervening variables. The issues like workers income—how far it is adequate, how the cultural conditioning has affected his needs and what is the accepted index of status for the worker, to a great extent decide whether money will motivate the worker. In addition to this, the author rightly points out that the climate in the set up also influences productivity. A supervisor, who takes a broad interest in work is better than the one who directs the worker in all the details, for productivity. "Group participation is an effective technique to reduce industrial tension and improve worker productivity and morale". An incentive system, in the design of which the workers have participated, is more likely to succeed than the one in the which they have not been involved.

The book is simple and useful.

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### **Fourth Eye : Excellence Through Creativity**

**Prof. Pradip N. Khandwalla**

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For the layman, the term "creativity" has an aura of mystique. It is looked upon as some inexplicable and rare gift bestowed upon the chosen few of the human race, such as Newton, Leonardo da Vinci, Beethoven, Tagore, etc. The value of Prof. Khandwalla's book *Fourth Eye* lies in dispelling this very misconception about the creative process and establishing it as a phenomenon, which though complex, is well within the reach of the reader to master and nurture within himself. As Prof. Khandwalla himself comments in the preface, this book is "a book of ideas, techniques, and procedures to help the ordinary strive to become extraordinary."

One of the striking features of *Fourth Eye* is its comprehensiveness. While the trend of research, training and publication on creativity is more than three decades old, it is still rare to find a book of such diverse range. In the nine chapters

and one appendix constituting the book, the author does not limit himself to the issues of individual creativity, as is common among most such books. The book starts by dealing with the mental abilities and personality factors associated with creativity, then goes on to the techniques and processes of producing useful and original ideas and objects, and finally attempts to explore the applications of creativity in interpersonal interactions, management of organisations and societal functioning. In this way, the author succeeds in conveying the complexity and diversity of application of creativity.

Another remarkable feature of the book is its emphasis on "experiencing" the creative act. The reader does not merely read through the book, he also "works-through" it. Each chapter is accompanied by a number of exercises which are aimed at providing an experiential understanding of the creative act. These exercises also help in bringing down the theoretical concepts to applicable and practical day-to-day reality. The attitude-to-apply is also facilitated by the simple language and examples used by the author which

make the reading a smooth and enjoyable exercise.

Two aspects of the book, however, have some scope for improvement. One, which is concerned with the contents, is regarding the coverage of creativity techniques. The author deals with four techniques, viz., brainstorming, synectics, attribute listing, and checklists. If other techniques, e.g., input-output technique, inversion, forced relationship, lateral thinking techniques, etc., were also covered, the usefulness of the book for creative professions would have increased.

The other aspect is the poor quality of printing of the book. The crowded pages, as well as poor printing, could have been improved to facilitate easier reading.

In all, *Fourth Eye* is an extremely useful book for professional managers, administrators, consultants and other professionals. It can also be utilised effectively as training manual by professional trainers. Professionals involved in creative activities, e.g., advertising, value-engineering product-designing, etc., will find the first five chapters useful and applicable.



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# A Select Bibliography

## on

### Informal Sector

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(Period Covered : 1980 to 1984)

#### A GENERAL

- Abraham, RT : Small firm sector: dearth of management talent in third world. *Economic Times*, Feb. 2, 1984, p7.
- Ahmed, S : Modernisation at grass root levels. *Economic Times (Suppl)*, Feb. 7, 1981, pIII.
- Bangasser, Paul : Appropriate technology and small enterprise promotion. *Productivity* 25(1), April-June 1984, 55-65pp.
- Bhise, UG : Future needs of mass communication for decentralised sector Khadi Gramodyog, 28(7), April 1982, 368-70pp.
- Desai, MV : Modern technology for small units. *Commerce*, 149(3823), Sept 8, 1984, 385-386pp.
- Deolankar, Vivek : Marketing problems of small-scale industries in India. *Indian Journal of Marketing*, 13(11&12), July-August 1983, 23-26pp.
- Dhesi, Autar S & Wadhwa, V : Productivity, earning and employment potential of informal sector a case study of Nangal (Punjab). *Indian Journal of Industrial Relations*, 20(1), July 1984, 1-16pp.
- Elango, R & Bhaskaradoss, K : Decentralisation and development, Khadi Gramodyog, 27(6), March '81 309-313pp.
- Goyal, SK : Small scale sector and big business. New Delhi, IIPA, 1984.
- Jain, LC : Decentralised industries. *Voluntary Action*, 25(1), July-Aug '82, 4-6pp.
- Jain, LC : Development of decentralised industries : A review and some suggestions. *Economic & political Weekly (Special No.)*, 15(41-43), October 1980, 1747-1754.
- Karan, AK : Decentralisation. *Khadi Gramodyog*. 28(2), Nov. 1981, 115-118pp.
- Khushu, MN : Institutional framework and industrial policy with special reference to tiny and medium industry and concessions for them. *Vikas Banking*, 3(182). Jan-June 1983, 43-63pp.
- Korba, Arvind I : Marketing concept and the small scale sector. *Indian Journal of Marketing*, 13(4), 1982-83, 19-22pp.
- Korba, Arvind I : Small scale industries and marketing. *Laghu Udyog Samachar*, 7(8), March 1983, 2-4pp.
- Ojha, PD : Finance for small scale enterprises in



- India. Reserve Bank of India Bulletin, 36(11), Nov. 1982, 934-951pp.
- Raju, R Satya : Informal sector will continue to dominate labour market in India. Southern Economist, 22(20) Feb. 15, 1984, 17-18pp.
- Raman, CS : Small industry prospects in India. Laghu Udyog Samachar, 7(2), Sept. 1982, 11-12pp.
- Rao, KGK Subea : Size profitability with reference to small scale industrial units in the assisted sector. Reserve Bank of India Occasional Papers, 3(1), June 1982, 44-47pp.
- Rao, S Vanaja : Dispersal of tiny units. Khadi Gramodyog, 28(5), Feb. 1982, 265-268pp.
- Reddy, T Subbi & Reddy, N Sobha : Motivating factors in starting a small unit. Indian Management, 23(8), August 1984, 13-21pp.
- Saxena, AP : Administrative reforms for decentralised development. Kula Lampur, Asian & Pacific Administration Centre, 1980, 302pp.
- Sen, Mankumar : How vital is the small-scale sector. Capital (Annual), 1983, 89-93pp.
- Shashi Bala : Management of small-scale industries : problems, government policy and assistance, finance, production, marketing, labour and management. New Delhi, Deep & Deep, 1984.
- Srivastava, Madan Kumar : Development of small scale industries in Uttar Pradesh. Indian Journal of Marketing. 14(7), March 1984, 29-30 Opp.
- Stegail, Donald P : Managing the small business. Bombay, D.E. Taraporevale, 1982.
- Varma, S S : Export performance of small industries. Laghu Udyog Samachar, 7(2), Sept. 1982, 2-8pp.
- Vepa, Ram K : How to succeed in small industry. New Delhi, Vikas, 1984.
- : Development and transfer of technology. Commerce (Suppl), 142(3641), March 28, 1981, 30-31pp.
- : Need for responsive marketing strategy. Commerce(Suppl), 142(3641), March 28, 1981, 28-29pp.
- : Need for strong institutional infrastructure. Commerce (Suppl). 142(3641), March 28, 1981, 20-22pp.
- B ARTISANS**
- Chauhan, JB Singh : Credit needs of rural artisans : A case study. Khadi Gramodyog, 29(5), Feb 1983, 204-208pp.
- Mandal, SK & Sunil Kumar : Regional rural banks and rural artisans. Khadi Gramodyog, 29(7), April 1983, 263-268pp.
- Nagaiya, D : Development strategy for rural artisans. Kurukshetra, 28(23), Sept 1, 1980, 20-23pp.
- Nambiar, KKG : Artisans of India. Economic Times, Jan 30, 1983, p. 4.
- Narayan, KV : Plight of rural artisans. Khadi Gramodyog, 27(11), Aug 1981, 541-543pp.
- Pandit Rad, YA : Poverty and rural artisan. Commerce (Suppl), 142(3641), March 28, 1981, 10-11pp.
- Ramkumar, JB : Artisan enterprise : Problem of revitalising them. Economic Times, July, 1983, p. 5.
- Reddy, V Venugopal : Institutional finance for village artisans. Khadi Gramodyog, 28(12), Sept 1982, 548-552.
- Sharma, Harish Chander : Artisans in the Punjab (1849—1947) : Occupational change and new social relations. Journal of Regional History, 1, 1980, 107-119.
- Swami, NR Krishna : Development of rural artisans— An enigma. Economic Times (Suppl), Oct. 10, 1981, p. I.
- : Organising village artisans. Commerce (Suppl), 142(3641), March 28, 1981, 23-27pp.
- C COIR INDUSTRY**
- Garg, RBL : Crisis in coir industry. Eastern Economist, 77(23), December 4, 1981, 1087-1089pp.
- Janardhan, EP : New approach to structure and state policies necessary. Economic Times, Jan. 30, 1984, p4.
- Mondal, Sekh Rahim : Cottage industry of the rural poor : A case of coir work. Indian Museum Bulletin, 15(1-2) Jan-July 1980, 65-68pp.



- Raina, LN : Coir has its place in the economy. *Eastern Economist*, 76(26), June 26, 1981, 1517-1519pp.
- Thomas, TM : Class struggle and transition to specifically capitalist form of production ; Some conclusions of a study of coir industry in Kerala. *Social Scientist*, 11(12), Dec. 1983, 35-46pp.
- Coir exports : Unwarranted optimism, *Economic & Political Weekly*, 15(48), November 29, 1980, 1997p.
- Coir industry in India-Progress in retrospect. *Economic Times*, (Suppl), Dec. 31, 1981, pl.

### D COTTAGE INDUSTRY

- Allal, M & Chute, E : Cottage industries and handicrafts : Some guide lines for employment promotion. Geneva, ILO, 1982, 202pp.
- Charles, KJ : Are cottage industries efficient ? *Khadi Gramodyog*, 27(5), Feb. 1981, 259-266pp.
- Gupta, Arun : Cottage industries and rural poor in Punjab. *Khadi Gramodyog*, 28(3), Dec. 1981, 174-183pp.
- Gupta, DE : Employment implications of cottage industries. *Anvesak*, 11(1-2), June-Dec. 1981, 427-438pp.
- Mehta, JK : Does the economic valuation of India depend on the development of cottage industries. *Varta*, 1(1), April, 1980, 17-38pp.
- Panditrao, YA : Institutional finance for artisans. *Khadi Gramodyog*, 27(5), Feb. 1981, 267-274pp.
- Rao, Guk & Krishna, PV : Cottage and village industries in Nalanda : A case study. *Khadi Gramodyog*, 29(5), Feb 1983, 215-217pp.
- Sharma, SS : Cottage industries : A source of income to landless agricultural labourers. *Khadi Gramodyog*, 29(8) May 1983, 292-295pp.
- Sivaraman, B : Rural village and cottage industries : The economics. *Management and Development*, 2(3), Sept 1980, 21-30pp.
- Extract from report on village and cottage industries : National Committee on the development backward areas SEDME, 8(3), Sept 1981, 321-334pp.

### E HANDI-CRAFT

- Aryan, Subhashini : Handicrafts of India. *Indian and Foreign Review*, 19(19), July 1982 14-18pp.
- Babani, Anoop : The struggle of memory. *Economic Times*, March 4, 1984, p5.
- Banerjee, Arany : Our dying handicrafts. *Economic Times*, Dec 27, 1981, p3.
- Basil, S Joseph : Industries and handicrafts. *Kurukshetra*, 26(8), Jan 6, 1980, 20-23pp.
- Dubey, Manjulika : Crafts and cant. *Mainstream*, 20(33), April 17, 1982, 5p.
- Ford, Colin : The living crafts. *Marg*, 35(4), Sept. 1982, 85-86pp.
- Ghose, Benoy : Traditional arts and crafts of West Bengal. *Calcutta, Paprus*, 1981, 108p. Rs. 35.
- Gopinath, Vilasini : Handicrafts of Gujarat. *Economic Times (Suppl)*, Oct 10, 1981, 11p.
- Gupta, Arun Kumar & Harnek Singh : Cottage industries and rural poor in Punjab. *Khadi Gramodyog*, 28(3), Dec 1981, 174-183pp.
- Hanumanthrao, V : Arts and crafts of Andhra Pradesh. *Economic Times (Suppl)* Oct 10, 1981 11p.
- John, Usha : New trends in Exports. *Economic Times (Suppl)* October 10, 1981, p III.
- Kagal, Carmen : *Shilpakar*. CCWI, 1982, 150p, Rs. 200.
- Mehta, Vadilal Lalubhai : Give back to the villages- their crafts and industries. *Indian Worker* 30(23), March 8, 1982, 6-8pp.
- Mozumdar, Riten : Comment : The craftsman and his craft. *Indian Magazine* 3(7), June 1983, 26-27pp.
- Nelson, John ; Handicrafts : Marketing in the 80's. *Capital*, 188(4709), June 7, 1982, 20-23pp.
- Ninan, Sevanti : Marketing of handicrafts. *Voluntary Action* 25(1), July-August 1982, 18-20pp.
- : Technology in crafts neglected. *Voluntary Action*, 25(1), July-August, 1982, 11-13pp.
- Noi, Num : Living crafts : Handicrafts of North East reflect the life style of its people. *India Magazine*, 2(12), November 1982, 18-23pp.



- Pal, MK :** Crafts and craftsmen in traditional India. New Delhi, Kanak Publishers, 348p.
- Patnaik, NC :** Handicrafts : Campaign for wider exposure. *Economic Times (Suppl)*, July 20, 1981, p. IV.
- Perzade, San :** Progress of handicraft industry. *Economic Times (Suppl)*, October 10, 1981, p I.
- Prakash, Swatantrata :** The living art of India : Crafts men at work. *Marg*, 35(4), September 1982, 79-84.
- Prasad, Rajiv Ranjan :** Tribal handicrafts of Uttarakhand. *Yojana*, 25(4), March 1, 1981, 30-31pp.
- Rajajee, MS :** Handicrafts of Tamil Nadu. *Economic Times (Suppl)*, October 10, 1981, p II.
- Rac, Akurathi Venkateswara :** Financing the shuttlecraft industry—A case or reappraisal. *Cooperative Perspective*, 17(4), January-March 1983, 21-27.
- Roy, Aruna :** The handicrafts dilemma. *Voluntary Action*, 25(1), July-August 1982, 38-40pp.
- Sahai, Yaduendra :** Minakaris of Jaipur. *Economic Times*, March 8, 1981, p 9.
- Saraf, DN :** Indian crafts : Development and potential. New Delhi, Vikas Publishers, 1982, 278p, Rs. 295.
- Seetharam, Mukkavilli :** Crafts for women : The Sriniketan experiment. *Voluntary Action*, 25(1), July-August 1982, 21-22pp.
- Sreedevi, PL :** Crafts-men training aims at imparting new skills. *Southern Economist*, 19(20), Feb. 15, 1981, 31-32pp.
- Subramaiyan, B :** Handicaps of Indian handicrafts. *Kurukshetra*, 30(7), Jan. 1, 1982, 17-18pp.
- Taimni, KK :** Cooperativisation of handicrafts. *Commerce*, 143(3673), November 7, 1981, 872p.
- Taimni, KK :** Development of handicrafts during the sixth plan. *Maharashtra Cooperative Quarterly*, 64(4), April 1981, 219-222pp.
- Varma, DN :** The role of museums in perpetuation of handicrafts. *Journal of Indian Museum*, 37, 1981, 25-28pp.
- Varshney, PL :** Export marketing of handicrafts including rural industries products. *SEDME*, 8(3), September 1981, 298-306pp.
- Viegas, Savia :** Handicrafts-Historical perspective. *Economic Times (Suppl)*, October 10, 1981, p I.
- : Developing handicrafts. *Economic Times*, November 27, 1983, p 4.
- : Export potential of handicrafts products. *Mysore Economic Review*, 68(4), April 1983, 8-11pp.
- : Goa handicrafts corporation. *Commerce (Suppl)*, 145(3712), July 31, 1982, 23p.
- : Handicrafts export. *Economic Times* Aug. 7, 1981, p 5.
- : Indian handicrafts abroad. *Economic Times (Suppl)*, Oct. 10, 1981, p II.
- : Punjab scheme to boost handicraft. *Economic Times*, December 3, 1981, p 4.
- : The living arts of India-Craftsmen at work. London, Arts Council of Great Britain.

## F HANDLOOM

- Arasaratnam, S :** Weavers, merchants and company : The handloom industry in Southeastern India. *Indian Economic & Social History*, 17(3), July-Sept. 1981, 257-281pp.
- Batra, JD :** Petrolits to the aid of handloom cooperatives. *Kurukshetra*, 17(1), June 16, 1979, 24-27pp.
- Bijli, MFR :** Increasing exports of handloom goods. *Commerce (Suppl)*, 143(3633), January 31, 1981, 51 p.
- Boothalingam, M :** A note on the problem faced by primary handlooms. *Cooperative Perspective*, 16(1), April-June 1981, 66-68pp.
- Chandrasekhar, CP :** Textile industry : Growth of decentralised sector. *Economic Times*, August 9, 1982, p 5.
- Devi AK Rajula :** Plight of handlooms : A study. *Kurukshetra*, 31(7), January 1, 1983, 17-22pp.
- Hadimani, RN :** Social and personality factors in entrepreneurship. *Journal of the Institute of Economic Research*, 18(2), July 1983, 29-35pp.
- Jain, LC :** Handlooms face liquidation : Powerlooms mock at Yojana Bhawan, *Economic & Political*



- Weekly, 18(35), August 27, 1983, 15-17-26pp.
- Janardhan, EP: Popularising Kerala handlooms. *Economic Times*, June 1, 1981, p 4.
- Jayakar, Papvl : The design of history. *Times of India (Sunday Review)*, November 20, 1983, p IV.
- Khai Roowala, Zia Uddin : Handloom Industry in Tamil Nadu : Performance and prospects. *Southern Economists*, 21 (24), April 15, 1983, 27-29pp.
- Khosla, Kukesh : Untapped treasure. *Economic Times*, April 19, 1981, p4.
- Khurana, Rakesh : Management of decentralised sector : case of handlooms, New Delhi, Oxford-IBH, 525 pp.
- Kundy, Abanti : Pattern of organisation of the handloom industry in West Bengal. *Social Scientist* 9(1) Aug 1980, 18-32 pp. 9(2-3), Sept-Oct 1980, 41-52pp.
- Narang, AS and Pandit, Ajay : Optimal assignment of looms in a textile unit-An application of queuing theory. *Productivity*, 21(3), Dec 1980, 415-423pp.
- Naresh Kumar : Export promotion of handloom goods. *Indian Journal of Marketing*, 13(11 and 12), July-Aug 1983, 9-10pp.
- Pande, KR : Handloom industry : Strategies for marketing. *Economic Times*, May 20, 1981, p5.
- Patel KC : Role of handloom industry. *Economic Times (Suppl)*, July 20, 1981, pIV.
- Puranik, VG : Management spinning cooperatives. *Economic Times (Suppl)* Nov 13, 1982, p11.
- Rao, Gangeswara : Additional impetus. *Andhra Pradesh*, 26 (2), Dec 1981, 16-17pp.
- Rayuder, CS : Handloom textile in Andhra Pradesh. *SEDME*, 9(4), Dec 1982, 233-242pp.
- Rayuder, CS : Marketing aspects of handloom cooperatives. *Cooperative Perspective*, 17(2) July-Sept 1982, 5-8pp.
- Razdan, Anil : The house of handloom, *Social Welfare*, 27(11) Feb 1981, 43-44pp.
- Sarangadharan, M : Obstacles to growth of handlooms in Kerala. *Southern Economist*, 22 (7) Aug 1, 1983, 20-21pp.
- Seshadri, NP : Handlooms for all seasons. *Financial Express*, Aug 15, 1982, p6.
- Singh, BN : Handloom industry in Ghazipur Tehsil., *National Geographical Journal of India*, 27(3-4), Sept-Dec 1981, 162-165pp.
- Vishwanathan, S : Handlooms : Tamil Nadu maintains its lead. *Eastern Economist*, 78(20), May 21, 1982, 1189-93 pp.
- : And now legislation for handloom protection. *Economic and Political Weekly*, 19(14), April 7, 1984, 583-584pp.
- : Deprivation and destitution. *Link*, 26 (41), May 20, 1984 25-26pp.
- : Eliminating middleman in handlooms. *Commerce*, 144 (3706), June 19, 1982, 1058-1059pp.
- : Handloom exports. *Economic Times*, June 10, 1982, p5.
- : Handlooms exports : PM call to maintain quality. *Economic Times*, June 9, 1982, pl.
- : Handloom industry. *Mysore Economic Review*, 65(12), Dec 1980, 15-16pp.
- : Handloom industry. *Mysore Economic Review*, 67(1), Jan 1982, 19p.
- : Handlooms : Need for modern technology. *Eastern Economist*, (Suppl), 77(15), Oct 9, 1981, 55-59pp.
- : Review of handloom industry. *Textile Industry & Trade Journal*, 21(11&12), November-December 1983, 17-20pp.
- : S-5 handloom industry-quality control and standardization. *ISI Bulletin*, 34(4), April 1982, 156-160pp.

## G KHADI & VILLAGE INDUSTRIES

- Bhatt, Pitamber : Relevance of industrial potential surveys for KVI. *Khadi Gramodyog*, 27 (10), July 1981, 482-488pp.
- Chaturvedi, YN : Progress of Khadi and village Industries. *Commerce (Suppl)*, 142(3654), June 27, 1981, 43-45pp.



- Chaudhari, JL : Generation and transfer of appropriate technology. *Commerce (Suppl)*, 146(3760), June 25, 1983, 24-30pp.
- Choudhary, JM & Rao, PB Mohan : Appropriate technology by KVI cooperatives. *Cooperative Perspective*, 17(2), July-September 1982, 1-4pp.
- Deshpande, YB : KVI cooperatives in 2001 AD. *Khadi Gramodyog*, 28(7), April 1982, 359-367pp.
- Devendra Kumar : New horizons for KVI. *Khadi Gramodyog*, 28(7), April 1982, 315-318pp.
- D'Souza, I : Financing of Khadi and village industries by cooperative banks. *Khadi Gramodyog*, 28(4), January 1982, 220-224pp.
- Ganguli, RK : Khadi : Need, nature and extent of financial support. *Khadi Gramodyog*, 30(1), Oct. 1983 15-17pp.
- George, MA : The nature of management in industries. *Khadi Gramodyog*, 29(8), May 1983, 285-288pp.
- Gupta, Ram Gopal ; Remuneration of Khadi workers. *Rural India*, 46(9), Sept. 1983, 159-160pp.
- Guru, HN : Manpower utilisation and Khadi and village industries. *Rural India*, 46(5), May 1983, 89-92pp.
- Gurusamy, MP : Role of Khadi and Village industries in the removal of poverty. *Khadi Gramodyog*, 29(9), June 83, 338-342pp.
- Harichandran, C : Role of Khadi and village industries in rural development, *Khadi Gramodyog*, 27(4), January 1981, 241-244pp.
- Jain, LC : Mass awakening must precede mass spinning. *Khadi Gramodyog*, 30(1), October 1983, 10-14pp.
- Jayalakshmi, L : Adoption of appropriate technology. A key to prosperity. *Khadi Gramodyog*, 28(6), March, 1982, 283-286pp.
- Mehta, JD : Expanding markets for Khadi. *Khadi Gramodyog*, 30(1), Oct 1983, 32-57pp.
- Nag, TK : : Problems in marketing of Khadi and village industries products. *Commerce (Suppl)*, 144(3692), March 13, 1982, 32-34pp.
- Naidu, Venkataramana : KVI Kurnool : A critical appraisal. *Khadi Gramodyog*, 27(10), July 1981, 493-498.
- Pandey, BP : Social movement through dissemination of appropriate technology. *Khadi Gramodyog*, 28(4), January 1982, 193-197pp.
- Panditrao, YA : Cost of job creation in KVI and large industry. *Commerce (Suppl)*, 144(3692), March 13, 1982, 5-11pp
- Panditrao, YA : Economic of Khadi : Social costs and benefits. *Khadi Gramodyog*, 30(1), October 1983, 52-64pp.
- Panditrao, YA : Eradication of poverty through technological and managerial innovations in KVI. *Khadi Gramodyog*, 29(1), October 1982, 54-59pp.
- Pandit Rao, YA : Policy support for KVI. *Commerce (Suppl)*, 146(3760), June 25, 1983, 9-16pp.
- Panditrao, YA : Subsidy on Khadi and village industry. *Economic Times (Suppl)*, April 20, 1983, p. II.
- Pantulu, N Kamaraju & Damodara, Naidu : Role of KVI in solving employment problem. *Khadi Gramodyog*, 27(8), May 1981, 391-396pp.
- Patel, AR : Role, nature and extent of financial assistance. *Khadi Gramodyog*, 30(1), October 1983, 71-82pp.
- Patel, Manubhai T : Women's cooperatives in KVI sector. *Khadi Gramodyog* 29(12), September 1983, 436-441pp.
- Perzade, SAN : Solving unemployment through KVI in sixth plan. *Khadi Gramodyog* 28(9), June 1982, 423-428pp.
- Prasad, Bhagwan : Marketing KVI products : Some issues. *SEDME*, 8(3), September 1981, 291-294pp.
- Raghavan, PV : A mass programme of future. *Khadi Gramodyog*, 30(1), October 1983, 65-70pp.
- Raghavulv, Cov : Marketing of Khadi and village industries products. *SEDME*, 8(3), September 1981, 313-320pp.
- Ranga Rao, SP & Aleem, S : Management of Khadi and village industries in India-some issues. *Administrator*, 28(2&4), 1983, 379-388pp.
- Rao, MV Raghava : Field agencies for development.



- of Khadi and village industries. *Khadi Gramodyog*, 3(2), November 1983, 97-100pp.
- Rao, YA : KVI ; An appraisal and their prospects. *Khadi Gramodyog*, 28(7), April 1982, 328-340pp.
- Sablok, PL & Sablok, Asha : Gainful utilisation of manpower in Khadi Gramodyog. *Rural India*, 46(6), June 1983, 116-118pp.
- Sharma, CL : Marketing strategy for KVI products under IRDP. *Khadi Gramodyog*, 28(1), October 1981, 84-91.
- Sharma, SS : Relevance of management practices for Khadi and village industries. *Khadi Gramodyog*, 27(6), March 1981, 327-329pp.
- Sharma, YC : Organisational and managerial aspects of Khadi. *Khadi Gramodyog*, 30(1), October 1983, 18-25pp.
- Sharma, Yogesh Chandra : Technology directions in Khadi development. *Commerce (Suppl)*, 146(3760), June 25, 1983, 52-55pp.
- Singh, PN : Financial problems of Khadi and village industries with special reference to Bihar State Khadi and Village Industries Board. *Economic Studies*, 20(11-12), May-June 1980, 533-538pp.
- Singh, Radha Raman : Role of KVI in rural development : A case study of Bihar. *Khadi Gramodyog*, 27(6), March 1981, 300-308pp.
- Subramanian, TR : The fine Andhra Khadi. *Khadi Gramodyog*, 29(11), August 1983, 419-422pp.
- Thomas, AM : Relevance of Khadi. *Khadi Gramodyog*, 30(1), October 1983, 71-72pp.
- Thomas, AM : Role of Khadi and village industries in 20 point programme. *Commerce (Suppl)*, 146(3760), June 25, 1983, 3-4pp.
- Umarji, NH : KVI in Gujarat : Bright future ahead. *Commerce (Suppl)*, 146(3760), June 25, 1983, 49-51pp.
- : A critical appraisal of KVI's recent performance. *Commerce (Suppl)*, 142(3641), March 28, 1981, 12-19pp.
- : Khadi and village industries-A long term perspective. *Khadi Gramodyog*, 28(7), April 1982, 319-322pp.
- : Khadi and village industries in Indian economy. *Commerce (Suppl)*, 144(3692), March 13, 1982, 4p.
- : Marketing of KVI products. *SEDME*, 8(3), September 1981, 276-282pp.
- : Proceedings of national seminar on marketing of Khadi and village industries products. *SEDME*, 8(3), September 1981, 226-267pp.

## H RURAL INDUSTRIES

- Agrawal, BL : Rural industrialisation in India, *Indian Journal of Agriculture Economics*, 38(3), 1982, 342-354pp.
- Agnihotri, SB : Rural development and choice of technology : Some issues. *Administrator*, 26(3), 1981, 458-481pp.
- Arasan, M Thirumalai : Rural industrialisation-Need for managers. *Khadi Gramodyog*, 30(5), February 1984, 206-209pp.
- Banerjee, Sailesh Kumar : Need for exploring alternative modes of providing employment in rural areas. *Commerce (Suppl)*, 144(3692), March 13, 1982 16-17pp.
- Basanta Kumar : Rural industrialisation in Orissa : A case study. *Khadi Gramodyog*, 30(2), November 1983, 101-107pp.
- Batra, VP : Employment generation in rural areas. *Kurukshetra*, 31(17), June 1, 1983, 20-22pp.
- Behari, Bepin : Unemployment, technology and rural poverty. *New Delhi, Vikas*, 1980, 453p.
- Bhajan Lal : Focus on rural industries : Faster economic development through rapid industrialisation. *Haryana Review*, 15(16), November-December 1981, 45-46pp.
- Bhardwaj, Kusom & Vaul, KN : Selected underutilised plants for rural industries. *Khadi Gramodyog*, 29(2), November 1982, 114-120pp.
- Bhargava, Gopal : Rural development and employment prospects. *Khadi Gramodyog*, 29(6), March 1983, 225-228pp.
- : Rural employment plan in twenty point programmes. *Khadi Gramodyog*, 30(3), December 1983, 156-158pp.



- Bhattacharyya, Harishikes : Entrepreneur, banker and small scale industry. New Delhi, Deep & Deep, 1984.
- Bhatia, BM : Modernise agriculture : have more rural industries. Kurukshetra (Annual Number), 30(1), October 1, 1981, 53-57pp.
- Bhaumik, Alok K : Mobilising local-level resources for rural prosperity : Some lessons of experience. Capital (Special No.), 1982, 21-25pp.
- Chaturvedi, Pradeep : Modernisation of rural industries Southern Economist (Annual Number), 21(1), May 1, 1982, 16pp.
- Cherunilam, Francis : Role of VSI in India's exports. Khadi Gramodyog, 28(5), February 1982, 247-251pp.
- Choudary, KVR & Reddy, BUK : Success in rural small entrepreneurship. Indian Management, (20)2, February 1981, 34-42pp.
- Datt, Ruddar : Village and small industries and the sixth plan, 1980-85 Indian Economic Almanac, 1(2), July-September 1981, 54-56pp.
- Deolankar, Vivek S : Industrialisation in rural areas. Yojana, 27(22), December 1, 1983, 14pp.
- Doshi, Abhijit : Complex dimensions of rural marketing. Commerce 147(3763), July 16, 1983, 92-93pp.
- Doshi, RR : Rapporteur's report on rural industries : Their potential and constraints. Indian Journal of Agriculture Economics, 38(3), July-September 1983, 383-390pp.
- Doshi, RR : Rural industries, their potential and constraints. Indian Journal of Agricultural Economics, 39(1), January-March 1984, 24-26pp.
- Durgaprasad, P : Rural industrialisation : Objects and paradigm-to-action process. Economic Times, June 1, 1984, 5p.
- Dutta, AK : Industrial potential in Cachar rural industrialisation-A souvenir. Cachar, Ramakrishna College, 1982, 49p.
- Dutt, Mahavir : Technology for farmers : Biases in rural development. Economic Times, January 16, 1982, 7p.
- Fahamvddin : Approach to rural industrialisation. Kurukshetra, 32(7), April 1984, 8-10pp.
- Ganguly, AK : Rural marketing strategy attempts to explore new areas. SEDME, 8(2), June 1981, 103-113pp.
- George, MA : Application of costs and decision making techniques in village industries. Khadi Gramodyog, 28(8), May 1982, 393-397pp.
- George, MA : The nature of management in industries. Khadi Gramodyog, 29(8), May 1983, 285-288pp.
- Ghosh, Roma : Rural unemployment and dualism : A note. Gandhi Marg, 5(3), June 1983, 171-172pp.
- Goyal HD : Rural industrialisation in India. Yojana, 27(11), 1983, 11-15pp.
- Grover, RP : Socio-economic determinants of rural industrialisation : An outlook for survival/expansion of rural industries in Haryana. Indian Journal of Agricultural Economics, July-September 1983, 367-371pp.
- Gupta, DE : Employment implications of cottage industries. Anvesak, 11(1-2), June-December 1981, 427-438pp.
- Guruswamy, MP : Appropriate technology for full employment. Khadi Gramodyog, 30(5), February 1984, 201-205.
- Harriss, Bareara : Inaction, interaction and action : Regulated agricultural markets in Tamil Nadu. Social Scientist, 9(4), November 1980 93-137pp.
- Hasan, SN : Industrialising Medak-before and after MP's adoption. Business Standard, December 9, 1982, 5p.
- Ho, SPS : Economic development and rural industry in South Korea and Taiwan. World Development, 10(11), 1982, 973-990pp.
- Hoda, MM : Lopsided industrial development. Voluntary Action, 25(1), July-August 1982, 7-10pp.
- Hooja, R : Project formulation for rural development. Vikalpa, 8(3), 1983, 189-197pp.
- India, Planning Commission, Development of Backward Areas : Report on village and cottage industries. New Delhi, Controller of Publications, 1982.
- Jaiswal, NP : Image of village industry. Commerce (Suppl), 144(3692), March 13, 1982, 21-26pp.



- Joshi, Navin Chandra : Industrialising backward rural areas : Some constraints. *Kurukshetra*, 31(17), June 1, 1983, 10-11pp.
- Kochar, Anil : Constraints on the development of consumer demand based rural household manufacturing units in arid regions-Kutch District, Gujarat. *Indian Journal of Agricultural Economics*, 38(3), July-September, 1983, 347-354pp.
- Mahajan, VS : Rural industrialisation and unemployment. *Economic Studies*, 22(1), July 1981, 81-85pp.
- Mathew, MO & Sudalaimuthu, S : Essentials of marketing strategy for rural areas. *Southern Economist*, 22(12), October 15, 1983, 17-18pp.
- Mathew, MO & Sudalaimuthu, S : Marketing of village industries products : Problems and Solutions. *Khadi Gramodyog*, 27(4), January 1981, 238-240pp.
- Mathur, K : Improved accountability through rural development Information system. *Indian Journal of Public Administration*, 29(3), 1983, 623-629pp.
- Minocha, AC : Rural employment in household industries in Madhya Pradesh. *Margin*, 15(3), April 1983, 79-90pp.
- Mishra, SN & Sharma, Kushal : Trysem and rural employment. *Gandhi Marg*, 4(12), March 1983, 965-975pp.
- Mohanty, Nilamadhab : Rural industrialisation : The Indian experience. *Kurukshetra*, 29(3), November 1, 1980, 14-22pp.
- Mukherjee, Dhurijati : Rural industrialisation : Planning perspectives and future challenges. *Khadi Gramodyog*, 30(1), October 1983, 44-51pp.
- Naidu, KK : Giving villages the industries they need. *Kurukshetra*, 30(22), August 16, 1982, 19p.
- Papola, TS : Economics of rural industries : Some evidence from Eastern Uttar Pradesh. *Arthniti Sameeksha*, 1(1), January 1982, 43-58pp.
- Papola, TS : Modernisation as preservation : A critique of current policies on rural industrialization. *Management & Development*, 3(3), September 1981, 17-28pp.
- Papola, TS : Rural industrialisation : Approaches and potential. *Bombay, Himalaya Publishing House*, 1982, 100p, Rs. 60/-
- Papola, TS & Misra, VN : Some aspects of rural industrialisation. *Economic & Political Weekly (Special Number)*, 15(41-43), October 1980, 1733-1746pp.
- Parikh, Mohan : Why appropriate technology ? *Voluntary Action*, 25(1), July-August, 1982, 43pp.
- Parthasarathy, G & Pothana, V : Rural development : Critical issues in formulating 7th plan. *Economic Times*, February 8, 1984, p11.
- Parthasarathy, G & Pothana, V : Rural development : Structural constraints on executing programmes. *Economic Times*, February 11, 1984, p5.
- Patarpeaker, SA : Modern technological applications to Indian village economy. *Janata*, 36(43), December 27, 1981, 13-15pp.
- Patel, AR : Adoption and transfer of technology in village industries; Financial aspects. *Khadi Gramodyog*, 29(1), October 1982, 60-70pp.
- Patel, AR : Monitoring and evaluation studies of rural industries : Need, concept and approach. *Khadi Gramodyog*, 28(10), July 1982, 449-454pp.
- Pathak, CR : Rural industrialisation for rural area development. *Indian Journal of Regional Science*, 14(1), 1982, 81-90pp.
- Patra, GC : Some aspects of constraints of working capital for rural industrialisation. *Vision*, 2(2), October-December 1982, 1-8pp.
- Prasad, Bhagwan : The strategy of rural industrialisation. *Kurukshetra*, 29(2), October 16, 1980, 11-14pp.
- Prasad, Jagdish & Prasad, Rajendra : Rural industrialisation in Bihar : An analysis of employment-Productivity relationship between inter-industry units. *Indian Journal of Agricultural Economics*, 38(3), July-September 1983, 361-367pp.
- Qazi, Moin : From laboratory to mud hut. *Times of India (Sunday Review)*, October 10, 1982, pIV.
- Rai, B Chalva : Developing rural industries. *Productivity*, 25(1), April-June 1984, 49-54pp.
- Raghuvanshi, Kalpana : Appropriate technology to help rural women. *Kurukshetra*, 30(19), July 1, 1982, 18-21pp.



- Rajgopal** : Rural marketing : Giving tribals their due. Kurukshetra, 30(22), August 16, 1982, 13-15pp.
- Rajuladevi, AK** : Women in rural industries. Kurukshetra, 30(23), September 1, 1982, 13-16pp.
- Rangachar, SS** : Employment generation and income distribution through village and small industry in India : An analytical study. SEDME, 10(2), June 1983, 1-31pp.
- Rao, A Rama** : Coordination efforts to promote self employment in rural areas. Khadi Gramodyog, 29(7), April 1983, 259-262pp.
- Rao, A Rama** : Need for appropriate technology in rural industries. Khadi Gramodyog, 29(1), October 1982, 49-53pp.
- Rao, A Rama** : Rural marketing service. Khadi Gramodyog, 30(1), October 1983, 38-43pp.
- Rao, A Rama** : Village and small industries in the Five Year Plans. Khadi Gramodyog, 30(3), December 1983, 131-135pp.
- Rao, BSS** : Broadcasting support for village and small industry development. SEDME, 9(1), March 1982, 35-44pp.
- Rao, DVLNV Prasada** : Rural employment programmes : Some observations. Rural India, 45 (9-10), September-October 1982, 168-170pp.
- Rao, D Vasudeva** : Weekly markets half village economy. Kurukshetra, 29(11), March 1981, 20-22pp.
- Rao, KV Narayana & Srivastava, KE** : Rural industries : A study of panchayat udyog in Uttar Pradesh. Rural Development Digest, 4(3), July 1981, 221-260.
- Rao, S Vanja** : Rural industries products : Bottleneck in marketing. Economic Times, Dec 24, 1981, p5.
- Rayappa, P Hanumantha** : Employment planning for the rural poor. Delhi, Sterling, 1980.
- Reddy, T Subbi & Reddy, M Bhaskar** : Institutional finance and rural industrialisation. Khadi Gramodyog, 27(4), January 1981, 245-254pp.
- Reddy, T Subbi & Reddy, PN** : Rural industrialisation of Anantpur District. Yojana, 25(21), November 16, 1981; 19pp.
- Roy, Amal Sankar** : Non-traditional uses of jute in rural industries. Khadi Gramodyog, 29(9), June 1983, 346-348pp.
- Sarkar, Subhash Chandra** : On instilling skill and technology in rural areas. Commerce (Suppl), 142(3641), March, 28, 1981, 6-9pp.
- : Real bottleneck to the development of village industries. Commerce (Suppl) 144(3692), March 13, 1982, 36-39pp.
- Sastry, C Mani** : Industrialisation and rural development. Southern Economist, 21(8), August 15, 1982, 29-32pp.
- Satyapriya, VS** : Rural industries in Karnataka-Trend in employment, Indian Journal of Agricultura Economics, 38(3), July-September 1983, 354-360pp.
- Sethi, JD** : Rural industrialisation and political power structure. Janata, 38(22) August 1983, 1-3pp.
- Sharma, YC** : Bank finance for rural industries. Commerce (Suppl), 143(3658), July 25, 1981, 15-19pp.
- Shelat, KN** : Appropriate technology for rural development. Kurukshetra, 32(7), April 1984, 4-7pp.
- Shukla, LP** : Rural industries and development. Kurukshetra, 30(5), December 1, 1981, 15-17pp.
- Sibal, VK** : Rural industrialisation programme in Haryana. Haryana Review, 15(16), November-December 1981, 51-52pp.
- Singh, Nagendra P** : Perception of opportunities, profitability and outlook of rural enterprises. Vikas Banking, 3(1&2), January-June 1983, 73-88pp.
- Sinha, Surendra Prasad** : Technology : Key to success. Voluntary Action, 25(1), July-August, 1982, 36-37pp.
- Sinha, VC** : A case for rural industrialisation. Kurukshetra, 30(9), February 1, 1982, 17-18pp.
- : Towards rural industrialisation on Gandhian lines. Khadi Gramodyog, 27(11), August 1981, 507-515pp.
- Sivarama Kurthy, A** : Human factors in rural industrialisation : Some case studies. Voluntary Action, 25(1), July-August 1982, 41-42pp.



- Sivaraman, B : Rural, village and cottage industries : The economics. Management and Development, 2(3), September 1980, 21-30pp.
- Srinarain Singh : Rural factory workers : An attitudinal study. Social change, 13(3), September 1983, 31-33pp.
- Srivastava, Hari OM & Srivastava, VK : The hierarchy of rural market centres. Deccan Geographer, 18(2), July-September 1980, 815-821pp.
- Srivastava, JC : Technology for development of rural women. Khadi Gramodyog, 28(4), January 1982, 198-204pp.
- Srivastava, VD : Rural marketing in India. Productivity, 22(3), October-December 1981, 81-83pp.
- : Rural marketing in India. Economic Times, November 10, 1982, 8p.
- : Rural marketing in India. Economic Times (Suppl), November 10, 1982, p. IV.
- Swami, MRK & Rao, S Vanaja : Rural marketing service centre : Jangaon, SEDME, 9(4), December 1982, 253-263pp.
- Swaminathan : Technology for rural development. Eastern Economist, 77(26), December 25, 1222-1224pp.
- Swartzberg, Leon : The North Indian peasant goes to market. Delhi, Motilal Banarsidass, 1980, 166pp.
- Tewari, Amitab : Towards rural industrialisation. Kurukshetra, 32(5), February 1984, 13-15pp.
- Tewari, MC : Forests and rural industries. Khadi Gramodyog, 29(1), October 1982, 79-82pp.
- Thapar, SD : Parameters of success of rural industrial. Voluntary Action, 25(1), July-August 1982, 29-32pp.
- Thomas, AM : Sixth plan : Some important issues. Commerce (Suppl), 142(3641), March 28, 1981, 4-5pp.
- Tiwari, RS : Village industries-Vital link in IRDP. Khadi Gramodyog, 28(11), August 1982, 477-482pp.
- Tyabji, Nasir : Small scale, cottage and village industries in Tamil Nadu, Madras Institute of Development Studies Bulletin, 14(5,6), May-June 1984, 49-76pp.
- Varma, SC : Developing rural markets for small farmers. Kurukshetra, 28(9), February 1, 1980, 14-18pp.
- Venkaiah, V : Rural industrialisation will go to a long way. Kurukshetra (Annual Number), 32(1), Oct. 1983, 51-56pp.
- Verma, Neelmani & Sharma, Kushal : Accelerating rural employment through TRYSEM. Kurukshetra, 31(5), December 1, 1982, 12-14pp.
- : Extract from report on village and cottage industries. National committee on the development of backward areas. SEDME, 8(3), September 1981, 321-34pp.
- : Proceedings of national seminar on TRYSEM and rural industries : Main recommendations on marketing. SEDME, 8(3), September 1981 307-312pp.
- : Rural marketing : A pilot study. SEDME, 8(3), September 1981, 295-297pp.
- : 25 years of Khadi and village Industries Commission-selected statistics. Commerce (Suppl), 144(3692), March 13, 1982.

## I SERICULTURE

- Ahmed, KI : India's growing "silk power". Economic Times (Suppl), January 12, 1983, p. III.
- Arterborn, YJ : The loom of interdependence : Silk-wearing cooperatives in Kanchipuram. Delhi, Hindustan Publishing Corpn., 1982, 205p.
- Bhat, IK : A new chapter in silk industry. Khadi Gramodyog, 30(6), March 1984, 258-261pp.
- Charsley, SR : A silk market in Karnataka. Economic & Political Weekly (Special Number), 14(41-43), October 1980, 1755-1764pp.
- Das, SK : Silk reeling : Process, equipment and output. Khadi Gramodyog, 3(4), January 1984, 186-189pp.
- Ebenezer, TP : Action of processing chemicals on silk. Khadi Gramodyog, 28(4), January 1982, 225-228pp.
- Ghodke, Manju : China dominates world scheme. Economic Times, January 12, 1983, p. 1.



- Gupta, Ranjan Kumar : Birbhum silk industry : A study of its growth to decline. *Indian Economic Social History Review*, 17(2), April-June 1980, 211-226pp.
- Heggade, Odeyar D : Developing sericulture in tribal areas. *Khadi Gramodyog*, 28(10), July 1982, 466-469pp.
- Heggade, Odeyar D : Silk spins wealth among tribals. *Yojana*, 26(10), November 1, 1982, 7-9pp.
- Iqbal, Badar Alam : Performance and prospects. *Yojana*, 24(20), November 1, 1980, 15-16pp.
- : Performance and prospects, *Khadi Gramodyog*, 27(11), August 1981, 526-533pp.
- Jolly, Manjeet S : Contribution of Central Sericulture Research and Training Institute, Mysore in the field of tropical sericulture and its impact. *Mysore Economic Review*, 67(10), October 1982, 41-45pp.
- Kasturi Bai : Research and development programmes on sericulture in Karnataka. *Mysore Economic Review*, 67(10), October, 38-39pp.
- Khairoowala, Zia Uddin : Sericulture industry in Karnataka : Some recent developments. *Southern Economist*, 22(13), November 1, 1983, 23-24pp.
- Koul, ON : Sericulture in J&K. *Economic Times (Suppl)*, May, 26, 1892, p. III.
- Koul, ON : Stagnation in J&K sericulture industry. *Economic Times*, January 31, 1983, p. 5.
- Krishna Swamy, KA : Small industry and sericulture development. *Capital*, 189(4726), October 4, 1982, 21-23pp.
- Moulik, TK & Purushotham, P : What ails silk industry. *Commerce*, 148(3798), March 10, 1984, 412-418pp.
- Murthy, Srs & Ramanna, R : Employment opportunities created on farms through silk cocoon production in Devanabhaili Taluk Bangalore District. *Manpower Journal*, 17(1), April-June 1981, 15-24pp.
- Pillai, PK : Production base in poor shape. *Economic Times (Suppl)*, March 21, 1984, Ip.
- Raju, NS Kuppuppu : Silken chiltoor. *Yojana*, 25(11), June 16, 1981, 25p.
- Rao, Rajitanjini : Silk export promotion council or call of two cities ? *Janata*, 38(9), April 10, 1983, 9-10pp.
- Rao, RV : Sericulture and rural development in Andhra Pradesh. *Khadi Gramodyog*, 27(6), March, 1981, 322-326pp.
- Rao, Sri : Progress of sericulture industry from storage. *Mysore Economic Review*, 67(10), October 1982, 3-6pp.
- : UZI fly menace to silk industry in Karnataka. *Mysore Economic Review*, 66(7), July 1981, 2-3pp.
- Roy, BB : A new approach to reeling and preparatory process for Tassar. *Khadi Gramodyog*, 29(3), December 1982, 139-141pp.
- Sabarathnam, VE : Impact of sericulture on the social system of a Bangalore village. *Khadi Gramodyog*, 28(9), June 1982, 437-442pp.
- Sarma, Avk : Sericulture industry in India. *SEDME*, 10(1), March 1983, 39-55pp.
- Shanthudu, D : Employment through sericulture : An Andhra Pradesh study. *Kurukshetra*, 32(6), March 1984, 21-24pp.
- Sharoff, DN : Need for improving quality of silk fabrics. *Commerce (Suppl.)* 143(3770), October 17, 1981, 8-9pp.
- Subhan, Malcolm : Indian silk : Competition from China. *Commerce*, 144(3704), June 5, 1982, 978-979pp.
- Sule, Surekha : Good show by Indian sericulture. *Economic Times (Suppl)*. January 12, 1983, p1.
- Thakur, SN : A micro approach to wage determination in a developing economy. *Indian Journal of Labour Economics*, 23(4), January 1981, 283-289pp.
- Vijayakumar, MN : Role of sericulture in the economy of Karnataka. *Southern Economist*, 21(13), November 1, 1982, 29-32pp.
- Yeshwanth, Indra : Sericulture as a subsidiary avocation. *Kurukshetra*, 31(14), April 16, 1983, 17-19pp.
- , Contribution of cultural silk Board to sericulture industry. *Mysore Economic Review*, 67(10), October 1982, 17-19pp.



- , Contribution of Regional Tassar Research Station Imphal in the Development of Oak Tassar in the North Eastern Region (1972 to 1980-81). *Mysore Economic Review*, 67(10), October 1982, 51-59pp.
- , For immediate support. *Economic & Political Weekly*, 15(47), November 22, 1980, 1957-1958pp.
- , India's growing exports of silk goods. *Capital*, 189(4713), July 5, 1982, 40p.
- , India's position in world sericulture industry. *Mysore Economic Review*, 67(10), October 1982, 3-6pp.
- , Indian silk in west europe. *Economic Times (Suppl)*, March 21, 1984, 11p.
- , Karnataka sericulture developments in 1980's. *Mysore Economic Review*, 67(10), October 1982, 23-27pp.
- , Promoting silk goods exports. *Commerce*, 142(3636), February 21, 1981, 416-417pp.
- , Reorientation of sericulture in Assam. *Assam Information*, 32, January-March 1981, 22-31pp.
- , Silk—The queen of fabrics. *Haryana Review*, 17(12), December 1983, 11-14pp.
- , Tassar culture in India and its role of Central Tassar Research and Training Institute, Ranchi. *Mysore Economic Review*, 67(10), October 1982, 46-50pp.
- , The golden thread. *Mysore Economic Review*, 67(10), October 1982, 7p.
- , Threat from import replenishment. *Economic & Political Weekly*, 17(22), May 29, 1982, 890p.
- , Tradition modernised. *Capital*, 188(4712), June 28, 1982, 17p.

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## Letter From the Editor-in-Chief

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The construction sector plays an important role in the socio-economic development and in generating employment in the country. In the developing countries, intensity of construction activity is considered a sensitive indicator of the economic growth.

The Seventh Five Year Plan envisages an outlay of Rs. 322,000 crores. About 40% of this investment will be spent on construction activity alone, and for this reason it becomes an affective vehicle for generating substantial employment. Along with it, emphasis on investment in housing activity for the low income group further helps in improving the quality of life of the poor masses. Needless to mention that construction activity, besides being a sensitive indicator of the economic growth, significantly contributes to the fulfilment of plan objectives of generating employment and alleviation of poverty.

Generation of large scale employment is one of the most significant aspects of the construction sector. The employment in the organised construction sector rose from 8.43 lakhs in 1961 to 11.83 lakhs in 1984. The employment of women in this sector also increased from 56,000 in 1971 to 59,000 in 1984, but it cannot be reckoned as appreciable. It is, however, estimated that every one lakh rupees worth of construction generates employment equivalent to 3,000 man days of skilled and semi-skilled employees and 1300 man days in managerial and technical category.

Despite its importance, the construction sector in India is, by and large, operating with low technological base and consequently suffers from high cost, poor quality and low productivity. Labour and capital productivity has been practically stagnant over the three decades in the Indian construction industry contrary to the remarkable growth witnessed by most of the countries in the Asian region. Low level of technology coupled with lack of application of well-established and proven management techniques are the major factors responsible for the present unsatisfactory state of affairs in the construction sector.

Use of simple equipment and tools and adoption of well-tested concepts such as modular designs, pre-fabricated components and high "utility-value materials" will go a long way in improving productivity of this vital sector, provided of course these efforts are supported by sound management practices which ensure optimum utilisation of the resources, fulfilment of desired objectives, timely completion of projects so as to minimize time and cost over-runs. We should not forget that undue delay in timely completion of projects with substantial cost over-runs has adverse impact on the economy—making it a high cost economy because of the fact that construction activity also constitutes about 40% of the total plan investment.

There is a need to give serious thought to treat construction as a 'Industry'. This recognition itself



will provide a great filip for the growth of this sector which, of course, has to stand on the four pillars of upgraded technology, ease in availability of finances, trained manpower, and efficiency and productivity. While each pillar is important for sustaining the structure, training of manpower, which has not received adequate attention in the past, needs to be geared up by upgrading technical skills of the semi-skilled and skilled employees, technical and managerial skills of the overseers, engineers and managers.

In conclusion, I would like to refer to the extremely valuable and useful recommendations made by the National Seminar on 'Productivity in Construction Sector' held in May 2-3, 1985. If the Government, industry, educational and research institutions make a serious attempt to implement some of the most important ones, I am confident that construction sector has a bright future in the years to come.

R.S. Gupta

(R. S. GUPTA)