

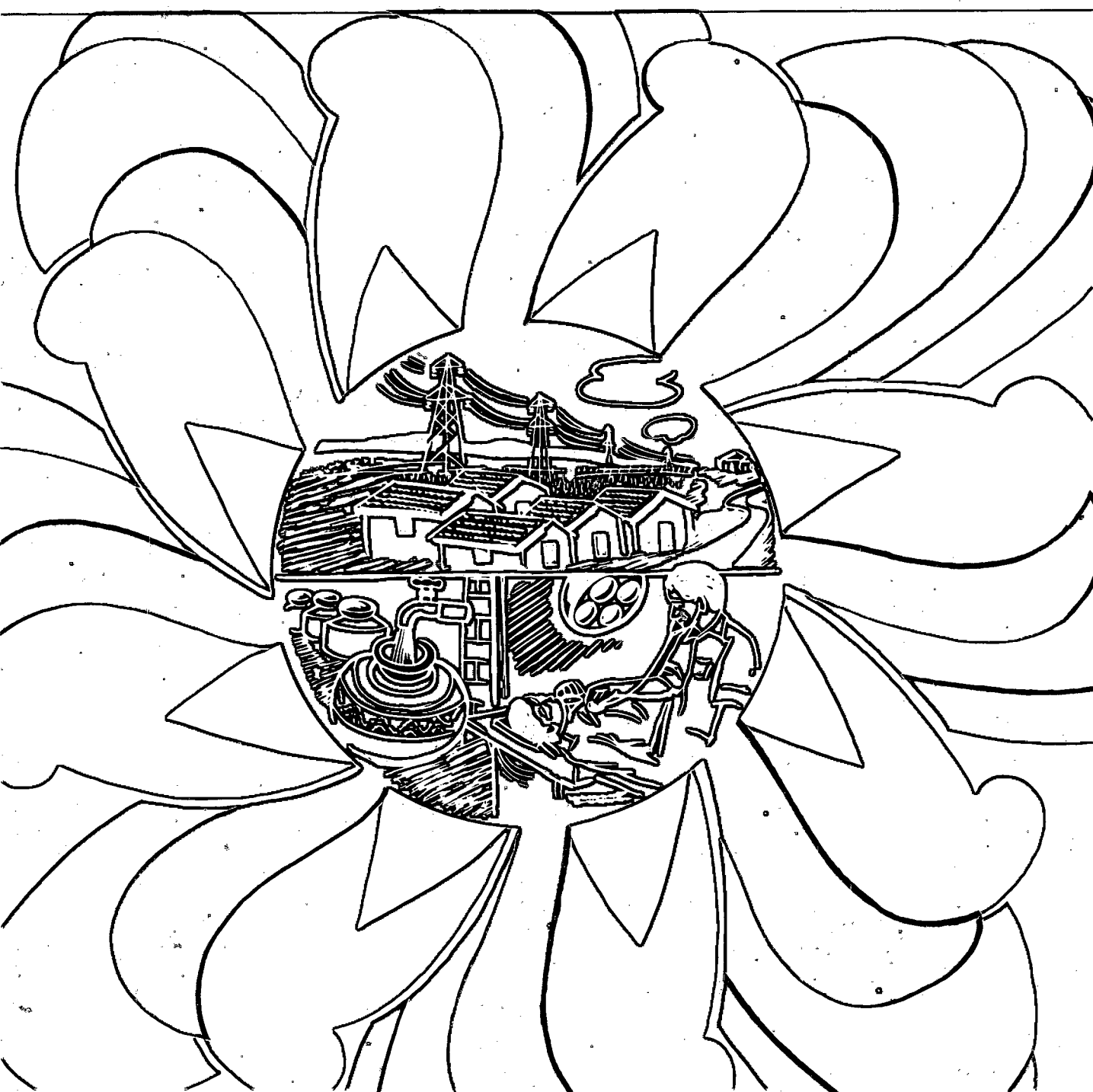


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Development Diary

A New Chapter In Health Care

THE Hindustan Latex Limited, a Government of India undertaking located at Akkulam in Kerala, will be commencing commercial production of Ceredrain Hydrocephalus Shunt, a very important health care aid in neuro-surgery and paediatrics by 1994. These shunts were designed and developed by the Sree Chitra Thirunal Institute for Medical Sciences and Technology, an autonomous institution in Thiruvananthapuram.

The human brain is suspended inside the skull in a fluid known as Cerebro Spinal Fluid (C.S.F.). This fluid, besides many other functions supports and protects the delicate structure of the brain and spinal cord, maintains a uniform pressure and acts as a cushion and shock absorber. Sometimes an imbalance may occur in children due to birth defects and in adults due to tumours in the fluid pathways.

Implantation of Hydrocephalus Shunt in the brain is the widely and most accepted treatment for this imbalance. At present shunts are being imported which are quite costly (about Rs. 4000).

The indigenously manufactured ones which are made of materials like silicon rubber polypropylene and polyacetal are very good implantable biomaterials, will be available at an affordable subsidised price of Rs. 600 only. It is estimated that the annual requirement of Shunts is around 15,000 and the product has an export potential of 50,000 pieces annually, especially to the third world countries. ☐

S. Hariharan



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Editorial office: Yojana Bhavan, Sansad Marg, New Delhi-110001.
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The Macro Economic Scenario And Credit Policy

C. Rangarajan

1991-92 was a landmark year in many ways. It was a year of crisis, but it was also a year which saw far reaching changes in India's economic policy. The crisis the economy had to face in mid-1991 was a grim one. The balance of payments situation had deteriorated sharply and the foreign exchange reserves had fallen so low that the possibility of default in payment was imminent. Orthodox and unorthodox measures had to be taken urgently to restore our credibility in the international markets. On the domestic side while the economy had done extremely well in terms of real growth between 1985 and 1990, the fiscal situation had also deteriorated sharply. The fiscal deficit of the Centre alone had touched 8.5 per cent of GDP.

The policy changes that were brought into force since July 1991 fall broadly into two categories. The first set of measures is part of what is normally known as stabilisation policy. The second set of measures comes under the category of structural reforms. While the stabilisation policies are intended to correct the lapses and put the house in order in the short run, the structural reform policies were intended to accelerate economic growth over the medium term. Structural reform policies cannot succeed unless a degree of stabilisation has been brought about. But stabilisation by itself will not be adequate unless structural reforms

are undertaken to avoid recurrence of the problems faced in recent years.

The new economic policy comprises the various policy measures and changes that were introduced since July 1991. There is a common thrust running through all of these measures. The objective is to improve the efficiency of the system. The regulatory mechanism involving multitude of controls has fragmented capacity and reduced competition even in the private sector. The thrust of the new economic policy is towards creating a more competitive environment in the economy as a means to improving the productivity and efficiency of the system. This is to be achieved by removing the barriers to entry and the restrictions on the growth of firms. While industrial policy seeks to bring about greater competitive environment domestically, the trade policy seeks to improve the international competitiveness subject to the protection offered by the tariffs, both in the public and private sectors. The challenge can be met only if business organisations equip themselves adequately to work in a competitive environment.

It is sometimes argued that the low rate of economic growth in 1991-92 was due to the implementation of the new economic policy. Nothing can be farther from truth than this. The low rate of growth was contri-

buted by a poor performance in agriculture and it is well known that the performance of agriculture from year to year is more a function of weather. The collapse of industrial production in 1991-92 can be attributed to a large measure to the high degree of import compression that was brought about which would have been inevitable in any case.

The economic prospects for 1992-93 appear to be distinctly better. The real GDP growth in 1992-93 may be around 4 per cent, thus taking the economy closer to the Eighth Plan target growth rate of 5.6 per cent. The higher growth rate in the current year will be largely attributed to a substantially improved performance in agriculture. The anticipated growth rate in agricultural production is around 5 per cent. This is in contrast to the decline of 2 per cent last year. The overall food grain production is likely to be 180 million tonnes—a substantial improvement from the level of 167 million tonnes last year. As regards cash crops, oilseeds, cotton and sugarcane are likely to record an impressive performance.

The trends in industrial production are, however, not that encouraging. The index of industrial production during the first four months of 1992-93 rose by 2.1 per cent. There was a distinct improvement in the performance of industrial production in August and September

so that the index of industrial production during the first six months shows a rise of 3.9 per cent. This is in contrast to a decline of 1.2 per cent during the comparable period last year. The growth rate of around 4 per cent is still a far cry from the average annual rate of growth of 8 per cent achieved in the '80s. Several factors have contributed to the slackening of industrial growth. To some extent, attempts to reduce the fiscal deficit, which once again has a bearing on government expenditures, must have affected the demand for certain goods. The demand for industrial consumption goods must have been affected by the rising trend in prices. However, there are some encouraging factors in the overall economic scenario with respect to industrial production. With the improvement in production of cash crops, agro-based industries which still have a weight of 30 per cent in the index of industrial production may not face any supply constraints. With larger imports, the availability of foreign components and raw materials must also ease. With the improvement in agricultural production, rural incomes will pick up which can again create more demand for industrial consumption goods.

There is as yet no indication of private investment going down. A study done by Reserve Bank of India on the forecast of corporate investment indicates that in 1992-93 corporate investment might be higher than in the previous year by 15.9 per cent. In fact, the primary capital market has been characterised by significant buoyancy, both in terms of number and amount of new capital issues by non-Government public limited companies. During the first eight months of the current financial year, the number of new issues more than doubled—increasing from 259 to 596 and the average amount per issue also increased substantially, as a result of which, the

total amount of issues increased more than five-fold—from Rs. 2,020 crore to Rs. 13,723 crore; nearly two-thirds of the total new issues were on rights basis. Public investment, however, could have suffered to some extent as a consequence of the overall attempts to contain fiscal deficit. The Annual Plan outlays of State governments may show a shortfall of 10 per cent as compared with the original estimates because of the inability of States to raise adequate resources.

There are signs of revival in the external sector although there is a need for continuous monitoring of trends in order to take pre-emptive action to prevent any pressure on the reserves. During April-November 1992 the value of exports in US dollar terms recorded a growth of 5.9 per cent over the corresponding months of the previous year. What is encouraging is that exports to the General Currency Area, which are important from the point of view of accretion to reserves, grew by 13.4 per cent. On the other hand, imports too recorded a substantial increase of 18.7 per cent during the period as compared with the corresponding months of 1991. This was the result of release of the pent-up demand consequent to the relaxation of the import controls by both the Government and the Reserve Bank of India. As a consequence, trade deficit rose to \$3,097 million from 1,431 million in the corresponding months of 1991. However, it was still lower than the deficit of \$4,079 million observed in April-November 1990. The analysis of trade balance shows that while there was a deficit of \$3,468 million in April-November 1992 on account of oil, the non-oil balance showed a surplus of \$371 million. Our success on the external front will to a large extent be determined by our ability to manage the oil sector.

As of January 15, 1993, foreign exchange reserves amounted to \$5.3 billion. Although this indicates a fall

of \$300 million compared with the position at the beginning of the year, that we have been able to maintain more or less the level of foreign exchange reserves does indicate that on a current basis our inflows and outflows are matched. Our inflows do of course include exceptional financing.

There has been a distinct change in the climate for foreign investment. The approvals by the Reserve Bank of India and the Government do show a sharp rise. During the period from August 1991 through October 1992 foreign collaboration approvals were granted to 1,876 proposals (of which 740 were for equity participation), amounting to US\$1,224 million. Of these, 808 proposals were approved by the Reserve Bank and the remaining by the Secretariat for Industrial Approvals and the Foreign Investment Promotion Board. The approvals given by RBI include 38 proposals from existing companies for enhancing foreign equity up to 51 per cent. Most of the proposals approved both by the Government and the RBI have yet to result in the actual flow at investment. This does indicate that much more work needs to be done to translate the approvals into actuals.

Monetary & Credit Policy

Containment of inflationary pressures and supporting productive activities with adequate credit have remained the cornerstone of Reserve Bank's monetary and credit policies. The Reserve Bank came to bear more than its normal share of responsibility in mid-1990-91 when the balance of payments situation acquired crisis dimension. It had to respond swiftly through monetary and credit policy measures aimed at import compression and demand containment. While these strong measures helped to alleviate the balance of payments problem they inevitably had an adverse impact on the general level of economic activity which in the circumstances could not be avoided.

In formulating the monetary and credit policies in 1992-93, while keeping in mind the primacy of the objective of inflation control, measures have been introduced to revive industrial and agricultural production.

There has been a distinct improvement in the price situation during the current financial year so far. The inflation rate as measured by the Wholesale Price Index on a point-to-point basis in the current financial year up to January 2, 1993 was 5.7 per cent as compared with 12.0 per cent recorded during the corresponding period of the previous year. Even after allowing for the difference between the provisional and final price index, which is about one to one and a half percentage points, there has been a distinct moderation in the price increase in the current year. For the year as whole, the Wholesale Price Index may record an increase between 8 and 9 per cent.

The pace of monetary expansion during the year up to December 11, 1992 has been 11.2 per cent as compared with a 14.2 per cent increase in the corresponding period of last year. Though there has been a moderation in the money supply growth, it has already exceeded the target set for the full financial year. There is a continuing need to keep a watch on money supply growth. The slower rate of growth in broad money during 1992-92 as compared with 1991-92 has been made possible mainly on account of two factors. First, the foreign exchange assets adjusted for net drawals from the IMF declined in '92-93 as compared with a large increase in '91-92. Second, there was a lower expansion of net RBI credit to the Central Government; during last year (up to December 25, 1992) the fortnightly average level of net RBI credit to Central Government was Rs. 6,592 crore as compared with the average level of Rs. 9,425 crore during the corresponding period of last year.

For the first time, the net RBI credit to Central Government is running at a level lower than the budgetary deficit. The reduction in the net RBI credit to the Centre this year has been in tandem with the Government's declared objective of reducing the gross fiscal deficit from 6.5 per cent of GDP during 1991-92 to 5 per cent of GDP in 1992-93.

If the reduction in fiscal deficit and more particularly the budget deficit is enduring, it provides greater manoeuvrability to monetary and credit policy, by enabling a reduction in pre-emptions under the cash reserve ratio and the statutory liquidity ratio. In relation to both these ratios, there have been substantial changes during 1992-93. Because of the modifications introduced in these two ratios, the pre-emption of incremental deposits which stood at 63.5 per cent in 1991-92 came down to 45 per cent in the first half of 1992-93 and further to 25 per cent in the second half of the year. This implies that in the second half of the year, almost 75 per cent of incremental deposits are available for expanding credit. In fact, there has been a sharp increase in non-food credit made available during 1992-93. During the previous financial year (up to December 25, 1992) credit extended by scheduled commercial banks rose by 16,405 crore or 13.6 per cent as compared with the rise of Rs. 3,450 crore or 3.1 per cent during the comparable period of last year. To some extent the increase in net bank credit in the current year is also due to the adjustments which became necessary because of the changes introduced with respect to the bill discounting and rediscounting operations as well as higher receivable finance to be provided to some industries, such as fertilisers. Nevertheless, there has been a significant increase in the provision of bank credit which has been facilitated by significant reductions in reserve requirements.

In fact, recognising the need to provide additional stimulus to industry and agriculture certain measures were introduced on January 18, 1993. The Reserve Bank has enhanced the general line of credit for short-term agricultural operations to National Bank for Agriculture and Rural Development (NABARD), by Rs. 400 crore from Rs. 2,700 crore to Rs. 3,100 crore. This will enable NABARD to provide larger credit to finance short-term agricultural operations during the Rabi season.

To stimulate output of capital and intermediate goods industries, the RBI will provide accommodation to Industrial Development Bank of India (IDBI) to the tune of Rs. 400 crore by way of refinance limits. Another Rs. 200 crore will be made available out of IDBI's own resources. This additional financial assistance through bill discounting and other schemes will be available to manufacturers of commercial vehicles, machinery manufacturers, hire purchase and leasing companies and Road Transport Corporations.

Simultaneously, the RBI has also relaxed the norms for calculating maximum permissible bank finance. Banks have been advised to treat only two-thirds of the term loan instalments falling due for repayment during the next 12 months as current liabilities and to keep the remaining one-third outside the current liabilities for the purpose of calculating maximum permissible bank finance. This move will enhance the borrowers' eligibility for maximum permissible bank finance which would alleviate to some extent the liquidity problems faced by some borrowers because of changes relating to bill discounting/rediscounting.

Besides we have also announced relaxation of selective credit control measures by reducing the minimum margins on bank advances against oilseeds and vegetable oils (including vanaspati) and also against cotton

and *kapas* across-the-board by 15 percentage points in view of the improved price-output situation. Thus, on the whole, despite compelling needs to moderate monetary growth to contain inflationary pressures, attempts have been made to ensure that the availability of credit to the productive sectors of the economy is adequate.

Finally, I come to the issue of interest rates. I can understand your concern about the high level of interest rates. A central feature of the Indian monetary and credit system is that the interest rates are administered. In the case of commercial banks, both the deposit rates and lending rates are regulated. Until recently the rate at which corporate entities can borrow in the form of debentures was also regulated. The rate of interest on the government securities can be maintained at lower levels because commercial banks and certain other institutions are required to invest a certain proportion of their liabilities in government securities. The purpose behind an administered structure of interest rates is to enable certain preferred or priority sectors to obtain funds at concessional rates of interest. An element of cross-subsidisation gets automatically built into the system if the concessional rates provided to some sectors are to be compensated by higher rates charged on other non-concessional borrowers. Regulation of lending rates leads to

the regulation of the deposit rates. If the average lending rate is to be maintained at a certain level, the deposit rate has to be accordingly adjusted. Over the years, the system of administered interest rate structure became complex as the number of sectors and segments to which concessional credit is to be provided proliferated.

The last few years have seen some important reforms in relation to administered structure of interest rates. These are: (a) considerable rationalisation has been effected in banks' lending rates with reduction in the number of concessional slabs and enhancement in some of the rates, thereby reducing the element of cross-subsidisation; (b) the regulated deposit rate structure has been replaced by a single prescription setting a maximum rate for maturities of 46 days and above; (c) rates of interest on government securities have been raised; and (d) for several instruments, such as Certificates of Deposits the interest rates are freely determined by individual banks. On the deposit side, there is need to give depositors positive real rate of interest; otherwise funds may move out of the organised financial system into the unorganised system. There is considerable controversy whether rate of interest is an important variable in determining the overall savings. Notwithstanding this dispute, there is no doubt that transferable

savings are influenced by interest rates. It is relevant to note that the rate of return earned by banks on their entire portfolio of lending including those to government is no higher than 13 per cent. It is the element of cross-subsidisation, which becomes essential to some extent, that keeps the rates of interest for the large borrowers at a relatively higher level. Moreover, these high interest rates were a part of crucial policy measures undertaken to achieve a turnaround of the balance of payment position. However, from the high level of 20 per cent which was prescribed as the minimum lending rate in October 1991, it has been brought down in two stages to 18 per cent. In fact, on the last occasion when the lending rate was lowered, the maximum deposit rate was also lowered. Any downward adjustment in the lending rate is possible only if the deposit rate is also lowered. Otherwise the viability of the banking system will be severely affected. In determining the deposit rate, one has to take into account the perceptions of depositors as well as the returns available on alternative financial assets. All that I can say, at this juncture, is that we will keep interest rates under continuous review. It is not the intention of policy to keep the real lending rate at a very high level over a long period. □

(Courtesy: RBI)

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Corporate Planning In Banks

Dr. Ashok Vasant Bhuleshkar

IN a dynamic economic environment today, the banking industry is faced with the challenges to cope with the two main objectives in the context of corporate planning. The first and the foremost is the attainment of social objectives via their targeted lendings. This responsibility presupposes on the part of banks that they conduct their business in accordance with the national goals and priorities, yet they have to function as a corporate body, commercial in nature, as an individual bank. For this purpose the banks are expected to develop social consciousness and plan their business conduct in such a manner that it eventually will lead to surplus generation. The second objective is the optimisation of their profits through profit planning strategy in their business conduct by enhancing their operational efficiency and by bringing about cost effectiveness all around. The time-bound Action Plan proposed for banks by the Reserve Bank of India in recent years has given the necessary direction and guidance. It may be mentioned that the Action Plan emphasises that the banks should critically analyse their income and expenditure with a view to finding ways and means of improving profitability. The traditional role of the banks as a commercial entity solely concerned with the business conduct devoted to operate on commercial lines, so as to generate the profits through increasing operational efficiency has been given due weightage in the Action

Plan contemplated by the Reserve Bank of India set out for the period 1990-92. Accordingly the banks are required to project their profits for each of the next two years in order to make available surpluses for augmenting and strengthening the financial base. It is felt that this action will ensure better management of funds and help effecting quicker recoveries of banks' dues. Before we analyse the present state of planning methods obtaining in Indian banks, let us have a quick look at the theoretical foundations of the planning system.

Why Planning

In the context of RBI's action plan fulfilment, each bank is required on its part to develop effective short and long-term planning systems and is also required to establish and develop corporate strategic planning capabilities. The basic concept of planning in banks should thus be concerned with the channelising resources to the desired objectives. At times the objectives may be clear but the availability of resources may be constrained by the stipulations of maintenance of CRR (Cash Reserve Ratio) and SLR (Statutory Reserve Ratio) requirements; while at other times, it may be the reverse. Therefore, the absence of planning, achievements of objectives may not be realised due to mis-match between resources and objectives. Hence, for effective planning, the primary need is for clarity and specificity of objectives. In short, to be effective a management by objectives system must at least avoid

unnecessary delays, improve communications, coordinate activities, ensure individual and group commitment, discard too much paper work and pin down the responsibility through delegation of power and authority at appropriate levels, spell out the quantitative parameters, and finally, inculcate in the planning process and techniques qualitative measures so that the corporate planning concept can be translated into action to attain its success in a realistic manner. The degree of planning involved depends, however, upon number of complex factors. The complexity of planning in the banks will vary directly with the size of the organisation, the range and the complexity of its activities. But, the essence of planning process does not alone lie in the formal process but is concerned with providing better basis for decisions taken by management throughout the organisation on a continuing basis.

Main Tasks

Planning envisages four main tasks which should not be seen in isolation but viewed as a whole. These four tasks can be:

- (i) Establishing strategic objectives in various sectors of its activities over the plan period;
- (ii) Establishing operational plans—clarifying means of achieving strategic objectives in terms of operational and technical objectives and relating priorities, action plans and resources required;

- (iii) Defining the plan and clarifying through individual/group analysis, issues requiring further analysis; and
- (iv) Periodic review of the plan and updating of reviewing techniques in the light of such review.

Some of the key areas to be considered over the plan period are:

- (i) Financial and other resources;
- (ii) Human resource—types of skills likely to be required/types of skills likely to be redundant;
- (iii) Effective utilization of human resource/upgrading of existing skills.
- (iv) Improvement in Customer Services;
Customer Services—Depositors/borrowers—scope and means of improvement;
- (v) Improvement in overall profitability—effective deployment of all resources—areas of cost control, areas of increased expense leading to proportionately much larger benefits.
- (vi) Innovations—new services/cutting out or modifying existing services.
- (vii) Important ratios—credit/deposit ratio, district-wise and bank-branch-wise return from exchange transactions—yield on securities, etc.

Corporate planning is not merely forecasting. Corporate planning should be concerned with existing information to take decision on what needs to be done in future. What can be realistically achieved in a given time scale and motivating staff for improving performance. Corporate planning requires to concentrate on key areas and need not be too much comprehensive.

Critical Areas

Broadly speaking, the optimisation of profits require planning in many different ways. As a corporate body, planning on the part of banks involves review of many critical areas

such as management of their funds judiciously; credit deployment/management with a mix of allocational efficiency; developing manpower management techniques in a cost effective manner, evolving techniques and processes of planning prudently and thus ultimately, evolving strategies for profit planning in a realistic manner that their weakness in the ultimate analysis become strength for growth and expansion which would enable them to subserve the social objectives and goals pronounced in the national economic development plans. One important factor which the banks should keep in mind while adopting the planning and techniques at the Head Office level, at the Zonal/Regional/Divisional level and even at the bank branch level, is that they are operating in an environment of rapid technological changes and therefore, they have to suitably modify process and techniques to achieve the goals.

Like any large organisation the banks in India have been involved in performance budgeting and planning over a number of years. With growing complexity and ever increasing number of transactions, it is all the more necessary for banks to have efficient planning to cope with the challenges, existing and emerging. Now the pertinent issue in this context is how far has planning succeeded in banks? Profitability is one of the most important criterion for judging the performance of any commercial organisation including banks. Looking at the profitability of banks, the performance over the last few years is not impressive. Even with the existing variations in accounting procedures adopted by banks, declared profits are extremely meagre. The planning process should in fact ascertain the adequacy and cost effectiveness of various control

and monitoring systems to ensure efficient development of all resources. The planning process should also evaluate the effectiveness of internal systems to cope with the increased complexity and over increasing volume of transactions as lack of effective control over inter branch transactions, clearing house account, suspense accounts not only lead to distortions in Balance Sheet and profit and Loss Account but also result in colossal loss through frauds.

Human resource is most important factor for any bank and also one of the most expensive. How far does the planning process evolved any plan to motivate the staff and upgrade its skills in line with the rapid technological changes? How far does the planning process help in maintaining and improving the quality of advances which are of critical importance to the banks?

In sum, corporate planning as a concept is relatively new to commercial banks in India. The expertise will have to be developed to formulate operational plans. In the beginning efforts should be made to prepare operational plans at the highest level. Thereafter, the next step would be to do the similar exercises at the regional/divisional levels. It is necessary to develop the process of involvement and consultation. The operational plans at the branch level can only be undertaken when the process of corporate planning gets the momentum and forms the part of the culture and thinking process at every stage of planning. This would ultimately help to reconcile the various operational plans and would enable to integrate them to evolve an integrated corporate plan for the bank as a whole. □

The author is ex-Adviser, RBI.

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INSAT In India's Development

Biman Basu

THE second Indian-built multi-purpose geostationary satellite, INSAT-2B is being put in orbit shortly. It will be launched by the European Space Agency from Kourou in French Guyana. When operational, in a few weeks, it will not only increase the countrywide telecom capacity but will also substantially augment regional television services in the country besides providing additional channels of data transfer. In a way, INSAT-2B will ensure the continuation of the revolution started by INSAT-1B ten years ago. Over the year, the INSATs have not only helped link the remotest corners of the country with reliable telecom lines, bringing them into the national mainstream, but it has also enlarged the reach of Doordarshan and All India Radio substantially. Besides, they have also brought a sea change in the quality and extent of meteorological services in the country, by providing round-the-clock cloud cover imagery and hydrological and oceanographic data for meteorological forecasting.

As far as satellites go, the INSAT is a unique concept. A brainchild of Indian space scientists, who wanted to make the most of the available resources and technology, each satellite was conceived as a three-in-one package capable of providing simultaneously reliable long distance telecom services, round-the-clock earth observation and data relay facility, and countrywide networking of All India Radio and Doordarshan centres. Besides being a major technical innovation in satellite design, the operationalization of the INSATs also represents a major organizational innovation which cuts across the traditional boundaries of the government departments and agencies. Besides the Department of Space, which is the main partner in

the joint venture and is responsible for the procurement, launch and operation of the satellites, various other user agencies such as the Department of Telecommunications, India Meteorological Department, All India Radio and Doordarshan are actively associated with the project. However in order to get the INSAT system in operation before the 1982 Asiad in New Delhi, and to gain time for the indigenous fabrication of satellites for the system, contract for the fabrication of all the satellites of the first generation, namely INSAT-1B, INSAT-1C and INSAT-1D, were awarded to the US firm Ford Aerospace. Only two of them—INSAT-1B and INSAT-1D functioned well, the other two had to be abandoned in space due to a series of technical glitches soon after launch. The first of the indigenously-built satellites of second generation INSATs, INSAT-2A, was launched in July last year and has been performing flawlessly ever since. This has given new confidence to Indian space scientists in satellite building. This is important, as all the future INSATs including the INSAT-2B, are to be indigenously built.

The INSAT system today comprises two satellites, INSAT-1D and INSAT-2A in orbit and about 700 ground terminals of various sizes, with the Master Control Facility at Hassan in Karnataka. Of the ground terminals, about 150 are used for telecom services. Together they provide over 4500 two-day speech circuits over 140 routes, connecting for the first time even the far off rural areas and off-shore islands with the main land through reliable STD lines. The nationwide geographic reach of the INSATs makes it possible to use the system for a variety of applications ranging from administrative and business transac-

tions to library networking and computer communications. Already these facilities are being made use by several government and private agencies using small terminals. To facilitate faster transmission of telegraphic messages to remote rural areas which at present takes several days, more than 50 additional earth stations are being set up in the northeast with the hub station at Shillong. The INSAT is also helping in linking up all the district headquarters in the country through the National Informatics Centre Network (NICNET). Another network, called the Remote Area Business and Message Network, is coming up which will provide reliable data communication facility between widely dispersed locations in remote areas.

As a weather satellite, the INSAT performs several tasks. Each satellite is equipped with a device called Very High Resolution Radiometer (VHRR) which records the cloud cover image both in the visible and infra-red wavelength, every half an hour round-the-clock. Cloud pictures taken by INSAT are regularly used on Doordarshan's night news bulletins and are also published in newspapers.

In addition to providing cloud cover imagery the INSATs are also equipped to receive meteorological data from one hundred unmanned Data Collection Platforms (DCPs), including one set up at the Indian base in Antarctica. The DCPs provide valuable inputs for more accurate weather forecasts.

Life Saver

The INSATs are also helping save lives. A unique service rendered by these satellites is that of providing advance warning about cyclones through a locale-specific Disaster Warning System. The system is made

up of over 100 specially designed disaster warning receivers (DWRs) installed in selected cyclone-prone area of the east coast. Whenever a cyclone is seen moving towards the coast, the receiver in the specific area is automatically activated by the Cyclone Warning Centre located at Madras via INSAT, which alerts the people in the threatened area well in time to move away to safer places. One of the most dramatic demonstrations of the life-saving capability of this unique system was seen during the cyclone that hit the Andhra Pradesh coast on 9 May, 1990. Timely warning enabled the local authorities to evacuate more than 1,70,000 people from the threatened area, thus saving thousands of human lives and livestock. With INSAT-2B in orbit the Meteorological Department is planning deployment of additional DWR units in other cyclone-prone coastal areas of the country.

The most dramatic impact of INSAT has been in the spread of Doordarshan coverage in the country. Today there are 537 TV transmitters which carry Doordarshan programmes to the remotest parts of the country. Even if there is no local transmitter around, one can still receive Doordarshan programmes on a direct reception set.

After the coming of the INSAT, the quality of radio broadcasts, especially of those programmes which are put out on the national network, has improved dramatically. Gone are the days of noisy interference that invariably accompanied relay of programmes. Networking through the RN channels of INSAT now brings the programmes loud and clear.

An additional feature of INSAT-2A and INSAT-2B is the provision of a special transponder for satellite aided search and rescue operation. Besides the United States, India is the only country in the world to

incorporate this facility in a geostationary satellite, which will be invaluable in search and rescue in the sea.

Although the first indigenously built INSAT was put into orbit only in 1992, India's experience in using satellite for telecommunication and TV broadcasting goes back to mid-1975 when the Satellite Instructional Television Experiment, or SITE, was launched. Under this project, educational TV programmes were broadcast directly to augmented community TV sets in more than 2000 villages from the "ATS-6" satellite leased from the United States. SITE was a one-year experiment which laid the foundation of satellite broadcasting in India. It was followed by a two-year Satellite Telecommunication Experimental Project, or STEP, in 1977. The Franco-German satellite "Symphonie" was used in STEP.

By the time the first of the INSATs was put into orbit in April 1982, the infrastructure of ground stations was ready. But the first satellite INSAT-1A failed within a few months after launch. INSAT-1B did better. Launched in August 1983 it continued to be in service well beyond its rated working life till INSAT-1D was commissioned in June 1990. The third satellite, INSAT-1C also failed to make the grade and was abandoned within weeks of the placement in orbit in August 1988.

The second generation of INSATs were designed to be bigger and with higher functional capability than their first generation predecessors. Both INSAT-2A and INSAT-2B carry 18 transponders each compared to only 12 of the INSAT-1 series. Besides both have on board indigenously designed and built subsystems such as communication and VHRP payloads, reaction control thrusters, telemetry, tracking, command, and power systems, and the solar array. As the experience with INSAT-2A

shows, these have all performed extremely well.

Even as INSAT-2B awaits lift-off on the launch pad at Kourou, work on the fabrication of three more of its siblings is already under way. Ultimately, the INSAT-2 space segment will comprise four satellites, with two of them located very close to each other at 74°E longitude and operating as a single large capacity satellite.

The experience with SITE and the INSATs, have clearly demonstrated not only the tremendous uniting power of the satellite but also its potential role in the eradication of illiteracy in the rural areas. Keeping this in mind, and as an offshoot of the INSAT programme, the Indian Space Research Organization has drawn up a plan for a satellite exclusively for rural broadcasts. Called GRAMSAT, it will be tailored to meet the basic requirements of rural areas to disseminate culture and region specific knowledge on health, hygiene, environment, family planning, and agricultural practices. The GRAMSAT could also incorporate features for providing continuing education for specific groups.

Looking at the tremendous progress in the spread of countrywide telecom network which in turn has led to a visible spurt in economic activity the kind of which was unthinkable before the coming of the INSAT, one is reminded of what Dr. Vikram Sarabhai, the father of Indian space research had said many years ago: "...we are convinced that if we are to play a meaningful role nationally, and in the comity of nations, we must be second to none in the application of advanced technologies to the real problems of man and society which we find in our country." The INSATs have shown what modern technology can do for the all round development of even a developing country like India. □

The author is Editor, Science Reporter.

Prospects Of Factoring Services

V.H. Koppar

ONE of the main headaches of small and medium industrialists and traders is the timely collection of debts. As the debts are not collected in time they are handicapped by lack of sufficient working capital. This affects their production and expansion of business. If the debts are collected in time, they can pay their suppliers in time and earn cash discounts. The working Group on Money Market, that is, Vaghul Committee, recommended introduction of factoring services in India to solve the financial problems of the small scale suppliers. Reserve Bank of India then appointed a committee under the Chairmanship of C.S. Kalyanasundaram, former Managing Director of the State Bank of India, to examine the need and scope for factoring organisation in India. The committee submitted its report in December 1988 recommending introduction of factoring services in India. The R.B.I. accepted the recommendations of the committee. The Government of India has now declared factoring as an activity which could be undertaken by Banking companies under the Banking Regulations Act 1949. The R.B.I. then directed the banks to take up factoring activity through a subsidiary. The State Bank of India was the first

bank to come forward and in collaboration with the Small Industries Development Bank of India, Union Bank of India, State Bank of Saurashtra and State Bank of Indore, set up a new subsidiary called SBI Factors and Commercial Services Private Ltd. (SBI Factors) to serve industrial and commercial units in western India covering Maharashtra, Madhya Pradesh, Gujarat, Goa, Dadra Nagar Haveli, Diu and Daman. The company commenced its operations on 18 April 1991 but was formally inaugurated by Shri S. Venkitaramanan, Governor of Reserve Bank of India on 30 July 1991.

Factoring is a continuing arrangement between a financial institution (the factor) and a business concern (the client) selling goods or services to trade customers, whereby the factor purchases the clients accounts—receivables/book debts, controls, the credit extended to the customers and administers the sales ledger.

The main function of the factor is to purchase account receivables or book debts. However, he also renders other ancillary services like administering the seller's sales ledger, provision of prepayment of funds against the debts he agrees to buy,

collection of the debts and also covering the credit risk. Factors also provide certain advisory services by virtue of their experience in credit and financial dealings and excess to extensive credit information.

All the above services provided by a factor can be obtained individually from other sources. For example, commercial Banks provide finance against receivables by discounting bills or granting cash credit or overdraft. Collection of book debts is performed by specialised collection agencies in advanced countries who also underwrite credit risk. Computer agencies can provide Sales Ledger accounting facilities. But what is unique about factoring is that a factor brings all these services together in one package. The actual purchase of trade debts as opposed to granting finance against them is unique to factoring. Thus factoring offers a solution to the problems posed by working capital tied up in trade debts.

The seller will prepare his invoice in a usual manner on sale of goods only adding the notification that the debt on the invoice is assigned to a factor and it should be paid to the factor. Then a copy of the invoice

along with a receipted delivery challan is forwarded to the factor. The factor will then immediately provide up to 80% of the invoice value. The factor then undertakes the responsibility of collection of debts. The customer will receive official notification and statements of accounts. When the customer settles his account the factor will pay the balance of 20%. The factor will send monthly statements of accounts and inform the client about the progress of collection of debts from time to time.

Thus a trader or a manufacturer can convert his invoices into instant cash upto 80% of their value without waiting for the usual 30 or more credit days. The factor takes up the follow up action to collect the debts. So, the manufacturer is relieved of this onerous task. The factor also maintains the sales ledger of the client. An on line computerised system informs him about the debts collected and overdue accounts. This helps the client to increase his sales with the availability of finance.

Cost

The cost of factoring is not very heavy. The client will be charged only for the amount actually used and thus it is a cheap source of finance. The total cost may be slightly higher than the bank's rate of interest. But when we take into account the other services rendered by the factor the ultimate cost is not much. It is quite reasonable.

The factors can also advise their clients on economic conditions/trends and expected future developments in their respective industries. In advanced countries factors also advise their clients on replacement of machinery and offer other technical advice. Some of them even advise on selection of sales agents and recruitment of suitable technical personnel. In short, if there is a close and continuing relationship between a factor and a client, the factor can act

as a friend, guide and philosopher to the client.

Prerequisite

The prerequisite for factoring operation is the establishment of factoring relationship between the client and the factor. On the basis of credit evaluation, the factor fixes credit limits for individual customers of the client indicating the extent to which and the period for which the factor is prepared to accept the client's receivables of such customers.

Even in international trade factoring services will be very useful. Here there will be two factors—an import factor and an export factor. However, we do not still have in India international factoring. We have domestic factoring only.

The advantages of factoring to the client can be summed up as follows—

1. Benefits of the financial facility from the factor: He can pay his suppliers promptly. This enhances his credit reputation. He can get cash discounts from the supplier which will improve his profit margin. He can easily cope with the seasonal demand for cash. He can improve return on his capital without giving up equity or control.

2. Benefits of sales accounting service: There will be a lot of saving in the cost of maintaining his own sales administration. Management time previously spent on supervising the accounts can be saved. There is no need for the management to spend its valuable time on following slow paying customers. As the accounts are collected in time, there will be saving in interest payment. Relations with the customers are not spoiled by repeatedly requesting for payment. Time thus saved can be used for increasing sales and overall development of business.

3. Benefit of the factor's credit management:

Client need not spend his time on

investigating credit standing of his customers as up to the minute credit information about existing and new customers is available from the factor. Thus he can avoid easily poor quality and risky customers. Factoring business has just started in India. As per SBI Factors first annual report (1991-92) it has on its books 25 units who are manufacturers and sellers of goods and 164 customers. 60% of the units are small scale units. They deal in chemicals, packaging, plastics and allied products, consumer durables, castings pharmaceuticals and light engineering.

India is in the process of opening up and liberalising its economy. This includes reforms in the financial sector. There is a tremendous potential for growth for the financial services industry including Factors. For further development of factoring in India it is necessary to implement the following recommendations of the Kalyanasundaram committee:-

1. There should be stamp duty exemption on assignment of book debts.

2. Legislation providing for registration by an appropriate authority assignment of book debts in favour of a factor.

3. Norms should be prescribed for regulating new entrants to factoring business.

4. The Civil Procedure Code should be suitably amended facilitating recovery of factored debts through summary proceedings under order 37 of the Code.

In addition factoring companies should have refinance facility from I.D.B.I., S.I.D.B.I. etc. Factoring companies should be allowed to raise funds through public deposits and the General Insurance Corporation should undertake insurance of factored debts at reasonable cost. □

*The author is Vice Principal,
D.B.T. College, Chiplun, Maharashtra.*

Export Potential Of Minerals: A Perspective

B.D. Jethra and P.N. Shali

MINERALS are essential inputs for economic development. During the past 40 years of planned development, mineral production in India achieved a significant growth. Presently, India is producing iron ore, bauxite, lead-zinc ore, copper and many other minerals. India has one fifth of the world's bauxite reserves at around 2,900 million tonnes. While India possesses a large potential for export of minerals particularly that of iron ore, bauxite, granite, bentonite, barytes, etc., due to a variety of factors, there has been slow growth in mineral exports. One of the main factors has been slow growth in the expansion of mining activity, infrastructural and logistics problems.

The process of liberalising Indian economy commenced with many forward looking policy changes brought about in 1980s. The objective is that the Indian economy should become competitive internationally. The Government has further intensified this process. A series of policy measures have been taken recently for giving the economy an impetus to development through export-led growth. The major policy changes are a new industrial policy, full convertibility of the Rupee, a new trade policy apart from major reform of the fiscal policy, etc. With these changes, it would be possible for the private sector including MNCs to commercially exploit the mineral wealth of the country. With these reforms, a higher growth in exports in general and of minerals in particular

is expected in the 1990s. The export growth targets for the Eighth Plan (1992-97) is 13.6% and policies have been brought about to aim for this target.

While minerals contributed about 21% of foreign exchange earnings in 1987-88 vis-a-vis other commodities that were exported, it is expected that mineral exports will grow in 1990s because of the policy reforms. But given the long gestation involved in creating new mining capacities and financial bottleneck in increasing investments particularly in the public sector, these policy reforms are likely to have their major impact on the mineral sector in the long-term.

Present Status

The value of mineral production continued to record an increasing trend in the Seventh Plan period and the distribution of value of mineral production shows that mineral fuels (coal and oil) accounted for around 87%, metal mining 5%, non-metal mining 3% and minor minerals 5%. The entire value of metallic mineral production in 1989 was shared by iron ore, copper ore, chromite, zinc concentrates, gold, manganese ore, lead concentrates and silver—in that order. Among the non-metallic minerals, about 89% of the value was shared by limestone, phosphorite, magnesite, dolomite, fire clay, kaolin, gypsum and barytes. Limestone and other calcareous minerals alone contributed 64% of the total share of non-metallic minerals.

The National Income (at current

prices) from mining and quarrying sector recorded an average increase of 15-17 per cent per annum during 1987-89. Presently, mining operations are confined to about 51 minerals—2 fuels (coal & lignite), 11 metallic minerals and 38 non-metallic (industrial) minerals—from about 4400 mines under production. These, however, exclude oil and natural gas, atomic minerals and minor minerals.

The public sector continues to play a dominant role in mineral production in the country with around 90% contribution to the value of mineral production from 850 mines for 42 minerals. The entire output of fuel minerals, copper, gold, silver, lead-zinc, illeminite, rutile and tungsten concentrates in metal mining sector and diamond, fluor-spar, phosphorite, pyrite in non-metal mining sector is from the public sector.

The private sector operates small mines either as proprietary or partnership ventures and the mineral production is generally marketed as such with little processing except sorting, screening, washing and grading of materials. Iron ore, bauxite, limestone, etc., some of the major minerals, are, however, also mined by the private sector. The share of the private sector in mineral production and exports is likely to increase with the new policies.

The contribution and position of India in the world production of principal minerals and metals is as follows:

It would be seen that India contributes significantly to the total world production of minerals such as mica, chromite, barytes, iron ore, bauxite, coal and lignite, etc.

The life of proved plus probable reserves at the 1994-95 consumption level for metallic minerals such as bauxite, iron ore, etc., is more than 150 years, but the balance life of other metallic minerals such as copper, lead-zinc, manganese, chromite, etc. is only around 20-35 years. Thus there is not much potential for additional export of metallic minerals except for iron ore and bauxite. The position can improve when resources in possible category are brought into proved or probable category and some new major discoveries are made by exploration.

The recoverable reserve position of non-metallic/industrial minerals as on 1.1.1985 indicates that there are

Minerals & Ore	Value in Rs./crore			
	1988-89	1989-90	1990-91	1991-92
A. Granite, Stones & products thereof	127	152	235	250
B. <i>Processed Minerals</i>				
—Calcined alumina, Barytes)				
—Bentonite, Quartz/Fluorspar)				
—Calcined Magnesite, Kaolin)	227	422	271	260
—Fuller's Earth, Steatite Block)				
—Dolomite, Ilmenite)				
—Atomic Minerals, Iron Oxide, etc.)				
C. <i>Bulk Minerals & Ores</i>				
—Iron Ore, Chrome Ore)				
—Manganese Ore, Coal)	858	1129	1282	1502
—Bauxite, Salt & Aluminium Metal)				
Total:	*1212	1703	1788	2012

(*These figures do not include the export of diamonds, and precious/semi-precious stones as these are more in the nature of re-exports rather than exports from our own production).
(Source: CAPEXIL—A Statistical Profile 1991)

significant reserves of barytes (71.3 million tonnes), bentonite (275.8 million tonnes), china clay, kaolin (871.6 million tonnes), fire clay (703 million tonnes), fuller's earth (236 million tonnes), kyanite (319 million

tonnes), talc/steatite/soap stone (75.6 million tonnes), etc.

There are also significant reserves of limestone, dolomite, gypsum, quartz-silica sand, quartzite, etc. These include inferior grade reserves which will need beneficiation before they can be exported.

Trade In Minerals

India's foreign trade includes exports of minerals both in the raw form and as semi-processed and processed forms in the nature of mineral-based primary manufactured products. Minerals in both raw and processed forms contributed significantly to India's export trade during 1987-88 with a share of 21.2% in the total value of merchandise of Rs. 15, 611 crore. The contribution of minerals in raw/unprocessed forms was, however, 5% while semi-processed/processed forms contributed 17%.

During the last decade, while there was a decline in the export earnings from raw minerals, the value realisation from the export earnings of semi-processed/processed forms showed a gradual increase every year after 1984-85. On the

Commodity	Production contribution (%)	India's ranking in production (quantum)
<i>Minerals</i>		
<i>Mineral fuels</i>		
—Coal & Lignite	4.3	6
—Petroleum (crude)	1.0	20
<i>Metallic minerals</i>		
—Bauxite	4.1	6
—Chromite	7.0	3
—Iron Ore	5.2	6
—Manganese Ore	5.7	7
<i>Industrial minerals</i>		
—Barytes	9.1	4
—Kyanite, sillimanite & other related minerals	9.5	4
—Magnesite	4.4	8
—Rock Phosphate (including apatite)	0.5	16
—Talc/steatite/pyrophyllite	6.3	5
—Mica	2.8	1
<i>Metals/Alloys</i>		
—Aluminium	1.9	10
—Copper (electrolytic)	0.4	31
—Steel (crude)	1.3	15
—Lead (primary & secondary)	0.5	30
—Zinc	1.0	25
—Ferro-chrome	1.4	15
—Ferro-manganese	2.9	11
—Ferro-silicon	1.5	15

Source: Indian Mineral Year Book, 1991.

(Contd. on page 17)

Bright Prospects For Exporting Farm Goods

B.K. Mukhopadhyay

COMPOSITION of India's exports clearly show that the share of agriculture and allied products have been on the wane. The share stood at a much higher level at 44.2 per cent in 1960-61. But in 1970-71 it came down to 31.8 per cent, 30.7 per cent in 1980-81 and finally to 19.4 per cent in 1990-91.

According to the latest provisional data available, agricultural exports—which now form 16.5 per cent of exports—are expected to contribute more in future, are in fact on ebb in dollar terms. The Economic Survey, 1992-93 says, such exports faced a sharp decline in dollar terms by as much as 11 per cent during the first six months of 1992-93, compared to the corresponding period a year ago.

During the first six months of 1992-93 the exports under review were at Rs. 4,020 crore, as compared to Rs. 3,650 crore for the corresponding period during 1991-92.

The decline in international demand, poor infrastructural facilities in the economy coupled with low quality of exports stood in the way of smooth growth. Sharp drop has been experienced in commodities like spices and non-basmati rice. For example, during 1991-92 chilli (one of the prominent spices) forged ahead as Bangladesh, the major chilli exporter, backed out of the inter-

national markets due to a bad crop and Indian exporters made full use of the situation. India exported around Rs. 100 crore worth chilli to South East Asian markets during 1991-92. For pepper and tobacco exports have failed to grow steadily due to a number of reasons like—poor infrastructural facilities, exporters failing to maintain time schedules in respect of the orders procured. For non-basmati rice, the exports came down from 5.7 lakh tonnes to 2.5–3 lakh tonnes. The Government decided to hold back the export of the item by fixing a high minimum exports price, considering the likely domestic demand—supply disequilibrium.

It is a welcome decision that the target for agricultural exports has been stepped up by at least 12.5 per cent in dollar terms. Though the \$ 2,000 million exports target for 1992-93 has been stated to have been

Table
Exports of major farm goods

Items	1990-91	1991-92	1992-93 (Apr.—Sept.)
Cashew Kernels	4.5 (251)	6.8 (276)	3.5 (123)
Marine Products	9.6 (535)	14.4 (584)	7.1 (249)
Oil Meals	6.1 (340)	9.2 (373)	5.4 (189)
Raw Cotton	8.5 (474)	3.9 (122)	6.3 (11)
Rice	4.6 (256)	7.6 (308)	4.8 (168)
Spices	2.3 (128)	3.7 (150)	1.8 (63)
Tobacco	2.6 (145)	3.8 (154)	2.6 (91)

Amount in Rs. 100 crore.

[Amount in US\$ Million (within brackets)]

achieved, yet the need for determined and coordinated efforts to step up exports to a much higher level can hardly be over-emphasized. No doubt, as per the present facts and circumstances—the exchange rate adjustments, introduction of a unified exchange rate, expansion of the definition of 'manufacture' in the Exim Policy for 1992-97 will include agriculture and allied activities—the efforts have been there and a conducive environment is being created.

Tough competition prevails in the world markets. We have been experiencing tremendous threats from Guatemala in the cardamom market, where we almost held a monopoly even a few decades back. Indian spices dominated the scene for decades together. But gone are those days. Now for every item severe competition has come up since each

producer wants to have a better share in the market. With good harvests in Indonesia, Malaysia and Brazil and with the prevailing conditions in the East-European region, we are not sure what the performance would be during 1993-94 so far as this item is concerned. The same is true for items like onion, etc. The pruning of the negative list of exports and extending substantial concessions to boost agriculture and allied sector exports are welcome. Now the urgent need is for evolving a long term and consistent policy for agro-exports, both in terms of minimum export price and quantitative allocations and incentives for investments in infrastructure in the rural sector.

The very poor share of ours in world agricultural exports (about 1 per cent) needs to be improved, atleast to the 1960 level of 2 per cent. Major problems like near stagnant output, low productivity and lack of competitive outlook require to be handled on a solid footing.

This is true both for the traditional and non-traditional type of farm goods like plantations, cereals and preparations, fruits and vegetables, horticulture products, marine products, and other commercial crops. The FAO estimates that by 2000 AD, the world agricultural exports will amount to \$ 452 billion. As per projections of the Economic and Scientific Research Foundations, if new directions are given to our farm export strategy so as to touch the estimated level of \$ 36 billion, India's share in the world agricultural exports could rise to nearly 9 per cent. The responsibility therefore, lies before the Government and the private sector in the matter of promotion of agricultural investment and creation of exportable surplus.

There definitely exists within our reach a vast European market which has been traditionally captured by exporters from the EC countries. To be specific, during 1992, the EC imported 45 billion ECUs (or £ 56

billion) worth of agricultural (inclusive of marine products) from outside EC. We had just a 1.5 per cent market share there (for items like tea, cashewnuts tobacco castor oil, rice, molasses and spices, in which we took part). Still, we happen to be the fourth largest exporter of shrimp to EC (after Ecuador, Greenland and Thailand). Indian marine exports were worth at £ 180 million last year, next only to Thailand. In 1991 more than a third of Indian exports to EC went to Britain alone. Out of Britain's last year's imports of fruits and vegetables to the tune of £ 3 billion, our share was around £ 20 million. For other items also we stand a good chance—banana apples, grapes, oranges and lentils, provided appropriate exploration of such markets is done. □

*The author is Chief Officer,
UBI, Bhubaneswar.*

(Contd. from page 15)

other hand, the share of manufactured mineral-based commodities did not show any significant improvement. However, minerals as a group continue to face adverse balance of trade. For example, in 1987-88 the total value of mineral exports at Rs. 3,312 crore was lower than the total value of imports of minerals at Rs. 5,724 crore.

The position of foreign exchange earning from mineral exports is given in the table:—

It may be observed from the table that important minerals for export in value term have been iron ore, chrome ore, calcined alumina, aluminium metal, barytes and other

industrial/non-metallic minerals as well as granite/stones.

Minerals constitute an important segment in the total world trade. It was around 35-40 per cent during the last decade. The share of minerals in the total commodity exports of India (excluding precious/semi-precious stones) has been on an average 5 to 10 per cent).

In absolute terms, the share of minerals and ore sector in the total exports increased from Rs. 160.9 crore in 1970-71 to Rs. 170.36 crore in 1989-90 (estimate). Out of the total exports in 1989-90, regional share was 60% to East Asia, 21% to East Europe, 7% to West Europe, 6% to

West Asia and 2% each to Africa, USA, Canada and other countries.

The major share of mineral exports in 1989-90 was to Japan at 37%, followed by 14% to USSR, 6.9% to DPR Korea, 4.1% to China, 3.2% of USA and 3.1% to Republic of Korea and a minor share in percentage terms to other countries. The potential areas for increasing our exports of minerals and ores are, therefore, those areas of the world where our present share is low. Besides, it is possible to increase our share significantly in the markets of West Asia and neighbouring countries. □

(To be concluded in the next issue)

Leaching Of Saline Soil

Nishi Sinha

IRRIGATION projects involving inter basin transfer of water without adequate drainage have disrupted the equilibrium between the ground water recharge and discharge resulting in acceleration to the ground water table. This is the major cause for salinisation in various irrigation commands. Millions of hectares of agricultural land in the country have become too saline to economic agricultural production. Though salt infestation results in gradual yield reduction the severity of the problem is not fully realised till the crop suffers heavily due to excessive salts. In most such cases the land is abandoned for good as the land has become non-productive due to salinisation.

The option left is to reduce the salts to an acceptable level for crop growth by leaching with good quality water. Although subsurface drainage is the key to successful management of water logged saline soil, it is not an end in itself. Post drainage management of water logged salt affected soils through leaching and prevention of secondary salinisation should form an integral part of the reclamation technology. Five critical stages could be identified in any leaching programme, that is—preparatory stage, construction stage, leaching stage, leaching cropping stage and normal cropping stage.

Leaching of saline soil is essentially a process whereby water of low salt concentration is applied to displace soil solution of relatively high salt concentration. Excess water

is allowed to pass through the rootzone which in turn move the salts away from the root zone through leaching. Leaching is also done to maintain salt balance in normal or reclaimed lands with the objective of long term crop production.

The importance of leaching to reclaim salt affected lands has been recognised since long. There are reports on leaching of salt affected soil by the State Agriculture Departments (Uttar Pradesh) far back in the year 1882 when mild alkali soils were reclaimed by flooding with water for several months followed by paddy transplanting. The experiments on leaching behaviour of saline and alkali soils continued to be studied to develop site specific technique for reclamation of saline soil. On the basis of these efforts method for salt removal could be identified into three categories. The method of physical removal of salty soils to fields or land not used for agricultural purpose is not being practised. It is now known that leaching alone is the most effective means of reclamation. Flushing has limited application in certain situation. The method of flushing for salt removal differs from leaching in a way that in the former salts are removed by surface washing of the soil as compared to pushing of salts below the rootzone in the latter. In this method salts move along with excess rainfall or irrigation water as the surface water moves down the slopy land. The water alongwith the salts is removed through a surface drain provided at the tail end. But

this technique is useful only under limited situations. Heavy soils are suited to this method of salt removal. Even in these soils limitation on the available slopes, water requirement and the need of a good surface drainage system may restrict the efficient working of this method. Because of high water requirement sufficient salt removal and several practical difficulties, use of this technique as a means of reclaiming saline soil is limited.

Removal of salts from rootzone is an important aspect in the reclamation and management of salt affected land and in maintaining long term productivity of irrigated land. For efficient leaching it is essential to level the land and bund the fields to be followed by a shallow or deep ploughing to loosen the hardened surface. Smaller plots are ideal for uniformity of leaching. It is difficult to prescribe any specific time of the year for leaching operation since several factors are involved in the process. In general periods of low evaporation demands are beneficial though availability of water is the major criterion for identifying the time of leaching. In location where water is a limitation, periods just before the rainy season should be preferred because of two reasons. The incoming rainy season with excess rainfall will help in leaching of salts with increased efficiency. At the same time ground water table is lowest at this time of the year and therefore salts are leached to a greater depth. As the salts are moved to a deeper level upward movements of salts at a later stage will be slowed down.

Since reclamation is meant to grow crops leaching should be in conformity with the tolerance limits of the crops to be grown. The cost will be high if salts are leached beyond a threshold value as no additional benefits will accrue, because yields stabilise at the threshold

value. Crop tolerant tables can be of help for selecting crops. Once the fraction of soil to be leached is known then the amount of water required could be estimated. A thumb rule that 1 cm. of water should be applied for each centimeter of soil to be reclaimed is the common deciding factor. However the quantity of water may vary with soil texture and fraction of salts to be leached. For medium texture soils (sandy loam) 0.5 cm of water for each centimeter of soil is sufficient to remove 80% of the salts present in the soil profile. The amount of water required to leach a predetermined fraction of salts from known depth of the soil indicate that to leach 85% or 90% salts one would require to pass 0.44 cm/cum and 0.53 cm/cum of water respectively.

In continuous leaching water is ponded continuously over the soil surface to allow water to pass through the rootzone. In case of intermittent leaching water is ponded at intervals. The leaching could be inefficient with continuous leaching because most of the water could pass through micropores and through established channel such as cracks or root channels. The difference between degree of saturation and rate of water movement are also responsible for difference in leaching efficiency. It is known that a net saving of 30% to 35% can be made through intermittent compared to continuous leaching in the amount of water needed to leach the salts to same degree. The contradictory report in many cases need fresh interpretation taking into account evaporation, time interval between leaching and the amount of water applied initially before allowing redistribution. However, intermittent leaching may not be advantageous for highly degraded alkali soils with restricted infiltration rates. The time taken to leach a given fraction will be less in continuous leaching and to save time continuously ponded mode of leaching should be preferred.

Leaching is more efficient with water content below saturation. Rate of application of water to the soil will affect the degree of saturation in the profile. Differences in Leaching due to different rates of water application would vanish provided the redistribution time compensated for the difference in time between the water applied at the two application rates. However this is applicable to the situation where evaporation was not allowed in the experiment and hence this finding cannot be transferred straight to actual field situation as evaporation under field condition is difficult to control. The leaching efficiency increased with decreasing application rate compared to continuous ponding. However depending upon the evaporation rate there may or may not be any beneficial effect when rate of water application is reduced below an optimal level. Leaching efficiency improved with an application rate of 3 cm/day compared to steady state (saturated) and non-steady state (continuous ponding) but it did not improve further with 1 cm/day. In a trial with still higher evaporation rates the leaching efficiency in fact decreased when application rates were reduced from 3 cm/day to 2 or 1 cm/day. The available information on the subject suggests that leaching efficiency with the sprinkles is usually intermediate of the continuous and intermittent modes of leaching. Therefore investment on the sprinkler irrigation sets for this specific purpose may not be necessary as similar situation if needed could be created by intermittent leaching.

In many situation specific ion affect crop yield more than the total salinity. One such ion is chloride which affects citrus crop even at low level. Another specific ion boron is toxic to many crops but is slow moving. These specific ions need to be evaluated and crop tolerance to these ions should be taken into account in deciding fraction of

leaching. Chloride is leached much faster while boron is slow to leach and requires two, three times more water than required normally to leach soluble salts. However under Indian conditions boron requires high amounts of water for leaching. This may be because Indian soils are absent in high level of boron. Moreover application of gypsum to alkali turns boron into insoluble form thus making it ineffective to plant growth.

In arid and semi arid regions having salt affected soils ground water is of relatively poor quality and fresh water is in short supply. These areas offer greater potential for the conjunctive use of saline and fresh water for crop production. Conjunctive use of water should be undertaken if the electrical conductivity and sodium absorption ratio of the saline water is less than the salinity and sodium absorption ratio of the soil. Fresh water should be available in adequate quantities following application of the saline water. With conjunctive use total quantity of available irrigation water (saline + fresh) increased by 18-33 per cent with a net saving of 18-40 per cent in the fresh water requirement. Exact quantity of saving depends upon initial soil salinity, ground water salinity and the quantity of the ground water applied.

Rainfall is of paramount importance in leaching saline soils or soils irrigated with saline water. In the Indian context rainfall during monsoon substantially affects the annual salt balance. Intensity and duration of rainfall, duration of dry spells between the two rain events and soil condition including initial salinity and its distribution in the profile, initial water content at the time of rainfall and land management practices like land levelling, bunding and surface soil condition affect the efficiency of rainfall. Levelling and bunding alone improved the rainfall

CROP TOLERANCE TO SOIL SALINITY FOR WORKING OUT LEACHING REQUIREMENT

Sites	Soil type	Crop	Threshold (ds/m)	Slope (%)	EC (ds/m ⁵⁰)
Sampla	SL	Wheat	4.0	29.0	5.7
		Mustard	6.0	15.0	9.3
		Barely	7.0	19.0	9.6
Karnal	SL	Mungbean	1.8	20.7	3.3
		Mustard	3.8	6.9	11.0
		Sorghum	2.2	10.6	6.9
Agra	SL	Wheat	8.2	19.8	10.7
		Mustard	6.1	20.7	8.5
		Berseem	3.5	12.5	7.5
		Potato	4.4	16.1	7.5
		Tomato	1.3	6.5	9.0
Dharwad	BC	Wheat	2.3	20.5	4.7
		Safflower	2.8	20.7	5.2
		Sorghum (W)	2.1	3.9	14.9
		Italian millet	6.1	50.0	7.1
		Sataria	1.1	2.2	23.9
Indore	BC	Berseem	2.0	11.2	6.5
		Safflower	2.8	5.0	12.8
		Maize	0.5	7.9	6.8
Chalakudy	LS/SL	Transplanted rice	0.6	2.7	19.1

W = winter season

contribution to leaching by 40-50 per cent. The leaching effect per unit of rainfall is relatively low in humid regions (coastal saline soils) because of intense storms resulting in high run-off.

In most saline soil, soil salinity is too high for crop growth. For crop production, tolerant varieties of crops are identified so that cropping could be possible. A common belief that more salt tolerant crop should be grown during initial years should be viewed more in the context at the irrigation requirement of the crop to be grown. There is every likelihood for the surface salinity to increase if Barley is grown as the first crop compared to others like wheat, with relatively more water requirement. Similarly rice which is often considered unsuitable for these lands mainly because of the constraints of the water availability and its less tolerance could greatly modify the salt status in the profile. Because of liberal requirement of water in case of rice, crop salinity could be significantly reduced and its benefits

to subsequent crops could be immense. It is recommended that one rice crop should be included in the long term crop rotation on such land even after the lands have been reclaimed.

The effect of varying amount of water applied for leaching is that yield increased with increasing amount of water applied except in case when the soil salinity was in the low range. It is mainly because once the threshold salinity is reached there was not much beneficial effect. Without leaching establishment of the subsequent crop was difficult and germination in plots without leaching was poor. The other aspect is without drainage the secondary salinisation is quite high and may interfere in crop production. It is, therefore, apparent that sub-surface drainage and leaching are essential to reclaim water-logged saline soils.

The type of soil salinity level at different depths, location of the hard pan with respect to ground surface and depth to water table at the time of leaching are some of the factors

that could be modified to influence leaching. For modifying leaching certain things are suggested. Such as subsoiling improves infiltration rate, removes or reduces the natural channel. Tillage with inversion improves infiltration rate of the soil as it physically moves the surface accumulated salts to lower depths. It improves infiltration rate, controls surface crusting and maintains soil structure. Breaking hard pan improves water movement and reduces chances of water table build up. Irrigation practices improve leaching efficiency by controlling the moisture content. Situations resembling intermittent leaching could be created.

One can say that sub-surface drainage and leaching are the two essential components of the reclamation process of water logged saline soil. Leaching should be practised extensively in States like Punjab, Haryana and Rajasthan to reclaim saline land in a big way. □

The author is a free-lance journalist.

Apiculture In North Eastern Region

Dr. A.N. Sarkar

THE North Eastern Region, with rich natural endowment of forests, orchards and wide ranging field crops and other flora, offers immense potentialities for growth and development of Apiculture (bee-keeping). Honey is regarded as a highly nutritional and medicinally important food. The average composition of quality honey comprise: Levulose (40.50%), Dextrose (34.02%), Sucrose (1.90%), Dextrins (1.51%), Protein (3.00%), Organic acids (0.08%) and Water (17.70%). However, such a composition would vary depending on the type of feed substrates and quality of honey itself. In addition to these major constituents, honey contains traces of iron, calcium, sulphur, sodium, magnesium, potassium, mananese, phosphates etc. as well as vitamins like A, B1, B2, B6, C & K.

Besides production of honey, honey bees increase crop production to the tune of 10-25% by effecting cross polination. Important fruit crops like orange, lemon, lime, grapes, mangoes, peach, pear, plum, black berries, straw berries etc. and vegetables like cauliflower, coriander, cucumber, melon, pepper, pumpkin, water melon etc. and some of the oilseeds such as mustard, rape, sesamum, sunflower etc. are greatly benefited by visit of honey bees in terms of polination and yield of crops. The symbiotic effect between honey bees and host plants benefited by polination results in synergistic response on yield: both for honey and the plants ensuring higher farm income to the farmers.

As an occupation, Apiculture is unique in many ways, since it does not involve much capital investment and use of complicated technology. Maintenance of healthy bee colonies, bee boxes and other minor simple bee-keeping implements are essential components to start bee-keeping. Because of relative simplicity in technique/skill required for operation and maintenance and low cost, bee keeping provides for full time employment in case bee keeping is taken up on a commercial scale by maintaining a few hundred bee colonies. In the event of a commercial venture, besides honey, bee wax and bee venom can also be extracted on commercial scale.

Generally speaking, the tribal communities of the Region have been practising bee-keeping in a traditional way using claypots, log hives etc. for centuries. So, it would be easier for them to switch over to modern Apiculture using movable frame bee-hives, automated honey extractor etc. with suitable training and Demonstration. This can be an attractive profession for rural women, small and marginal farmers, landless labourers, young entrepreneurs etc. ensuring good rural self-employment opportunities.

Bee Species

Different types of honey bees have been recognised in the North East, differentiated and identified on the basis of their size, morphology, habitat and insect behaviour. Out of these, four species have been identified to be the dominant species in North East India; namely (a) *Apis florid*—

the little bee (b) *Apis dorsata*—Rock bee, (c) *Apis cerana indica*—Indian bee and (d) *Apis mellifera*—the Italian bee.

The species *A. florid* builds up a single comb nest—measuring 75 x 30 cm. mostly available in plain areas and the colonies migrate frequently from one to the next habitat. Colonies are covered by more than one layer of bees and honey production per colony is about 250 gms.

The species *A. dorsata* is usually called the Rock Bee or Giant bee. The colonies of this species are found in plains as well as in the hills upto 1,500 metres m.s.l. Rock bees form single comb which remain suspended from rocks, ceilings of uninhabited house and branches of trees. The comb is hexagonal in shape measuring about 2.00 x 1.20 m. This bee species despite ferocious temperament is an efficient honey collector with honey yield going upto 50 kg per colony.

Apis cerana Indica is a typical Indian honey bee species which allows domestication under all kinds of captivities ranging from hollowed cut logs, wooden boxes, packing boxes, mud receptacles etc. This bee species is easy to handle, docile in temperament and responds to smoking. Honey yield varies from 8 to 10 kg per hive per annum.

A. mellifera, a native of Italy and found all over Europe. It is a commercially successful honey bee all over the globe. It is larger in size than other indigenous species having wider pollinating range and capable

of producing larger quantity of honey. This bee species has low swarming instinct and virtually no absconding tendency. This species was first introduced in 1960s and found to be successful in the States of Himachal Pradesh, Jammu & Kashmir, Punjab, Haryana, Orissa and Bihar. The average honey production is 25-30 kg per colony per year. Testing of performance of this species is under investigation in the Apiaries of the Department of Entomology, Assam Agriculture University under an All India Co-ordinated Project on Honey Bee Research and Training at Jorhat. In a comparative study of foraging rate involving honey bee species and lichi flowering plants it was observed that the *A. mellifera* has the highest ability of foraging which directly accounts for its highest honey production efficiency. as may be seen from following table.

Insect Species	Foraging rate (No. of flowers visited per minute)
<i>Apis mellifera</i>	— 8.76
<i>A. cerana indica</i>	— 3.12
<i>A. dorsata</i>	— 1.35
<i>A. florea</i>	— 1.02
<i>Vespa magnifica</i>	— 1.32
Other Hymenoptera	— 0.51
Diptera spp.	— 0.42

Besides water, honey bees thrive on nectar and pollen gathered from visiting host plants. Pollen or nectar being a sugar and protein-rich natural substrate, it allows a quick convertibility into honey. Shifting or swarming—which is basically a regrouping phenomenon takes place in the quest of natural abundance of this food source. Colour and quality of honey (including granulation) is dependent on the type of flowering plants visited by honey bees. Fruits, vegetables and ornamental trees/plants are major sources of pollen and nectar. The dominant plant species in North Eastern context include: citrus, banana, lichi, guava, jaman, ber, mango, cashewnut, carrot, corrianlu, mustard, cucurbits,

corn flower, hollyhock, honey suckle, poppy, sunflower etc.

Honey bees are environmentally friendly and social insects. They colonize in a highly organised system with clear division of labour. The bee colonies have three kinds of bees with distinctive division of labour. These three types are queen, workers and drones. The queen is the developed female and is the mother of the colony. The worker bees are imperfectly developed females and hence unable to reproduce. They, however, perform all the duties in the hive according to division of labour and take special care of queen bees as well as her off-springs. The drone is the male bee and this helps in propagation with the help of queen bee. In a normal colony there is only one queen and 30,000 workers and a few hundred drones.

Swarming by the bees is a natural way to satisfy their urge for propagation as bee colonies are increased through swarming.

Apiary Equipments

Modern apiaries involve rearing of bee colonies in well designed bee-hives. These are specially designed on the principle of optimal "bee space". Such a concept was first coined and introduced by Rev. L.L. Longstreth in 1851 in the USA. According to this principle sufficient breathing space is provided between the frames, between top bars of the frames and inner cover and between the frames and inner walls allowing free movement of honey bees. Because of bee space, the parts are not attached to each other.

The hive is composed of bottom board, broad chamber frames, super chamber, super chamber frames, inner cover and top cover. In most countries, 44.1 cm x 13 cm spacings have been adopted as standard. In India, different types of hives with different bee space have been adapted for different species of honey bees to suit local conditions. In view of wide

ranging insect behaviours, swarming habits and size of the bee colonies, there is a need to standardize the dimensions of the frames in the bee boxes; species-wise. The Department of Cottage Industry as well as Khadi and Gram Udyog Centres have developed, and standardised frame dimensions and designs that are meant for sale and distribution in a pre-determined price to bee-keepers.

For commercial venture the following equipment are used in modern apiculture centres in the North Eastern Region: Bee-hives (a) Newton type for Asiatic spp. (*indica* bee), (b) Longstroth type for Western spp. (*mellifera* bee), queen excluder, wire embedder, bee veil, smoker, swarm catcher, uncapping knife, honey extraction equipment (combined with processor & dehydrator), comb foundation mill, brushes for clearing, feeder and queen cell protector.

Formal training on modern bee-keeping should form an integral part for any commercial venture both for traditional bee-rearers and enterprising new entrepreneurs. In North-East, such training opportunities are available in a regular manner in the Field Research Station of CBRI Unit at Khetri, Kamrup District, Assam and under the All India Coordinated Project (ICAR) on Honey-bee Research and Training at Assam Agriculture University Campus, Jorhat. Under the training programme, short term courses (one month) are offered to bee-keeping demonstrators and traditional bee-rearers for special skill development. Under the second category, three months training is rendered to commercial entrepreneurs and unemployed youth.

Training

The training programme includes imparting knowledge, skill and demonstration on such aspects as: importance of bee-keeping, bee-species identification, honey-bee

colony characteristics, colony organisation, insect behaviour of honeybees, bee-hive and other apiary equipment and their handling, routine apiary management practices, seasonal management, handling of colonies, disease and insect management and control, honey production and quality control, bee wax and its industrial use, bee flora, floral calender and cycle etc.

Management is the key to success of bee-keeping industry. Training imparted on various aspect of bee-rearing can be fully utilised, when management of apiaries is fully planned. Ideally, it is better to start apiary with a few promising bee-colonies with proven performance and gradually build up the stock in a phased manner. Proper management of apiary does mean extreme care and proper management during dearth period to off-set the tendency of swarming, absconding and effective control against invading diseases and insects. Various precautionary steps and control measures that are taken for modern apiary management include: swarm control, rearing and timely displacement of old exhausted queen bees, de-queening and requeening, control of natural enemies (viz. wax moth, predatory wasp etc.) and control of brood diseases (viz. American Foul Brood, Thai sac Brood, European Foul Brood, fungal and Nosema disease).

Taking full advantage of vast reserve of evergreen forests, horticultural and plantation crops and seasonal crops and vegetables available in NE Region, bee-keeping technology has already taken its natural root in the region. Though, initially, bee-keeping was being practised in an unorganised manner, of late this has been treated as an established cottage industry. For example, Khadi & Village Industries Commission had undertaken the task of introduction and development of modern bee-keeping in this region way back in 1957. KVIC's programme

for promoting bee-keeping includes imparting training at all levels, providing grants and loans for establishment of small and medium size apiaries by individual artisans, financial assistance for migration of bee-colonies according to major floral resources, introduction of bee-keeping as a craft in school, small institutions etc.

With regard to organisational structure in NE Region, KVIC with State Offices at Guwahati, Dimapur and Agartala; Regional Office at Shillong, Itanagar, Kohima, Imphal and Aizawl and sub-offices at Shillong and Kokrajhar, is sufficiently equipped for implementation and co-ordination of apiculture programmes in the region. Apart from KVIC network, 7 Khadi & Village Industries Board (under the Department of Industries), one in each State, and Directorate of Agriculture & Extension have also taken up Apiculture Development Programme at flied levels in all the NE States.

According to available information, the approximate number of bee colonies in existence and honey production achieved during 1989-90 for the NE States are estimated as given in the table.

As opposed to potantialities, the current production level of honey in the region is extremely low, allowing a great scope of rapid expansion of the programme in the region.

In the existing apiculture pro-

Name of bee State	No. of the colonies	Quantum- production of honey in 1989-90 (in kg)	Sale value (Rs. in lakh)
Arunachal Pradesh	1,200	6,357	1.91
Assam	34,406	3,64,411	100.31
Meghalaya	10,965	54,825	16.45
Manipur	28,802	99,536	29.86
Tripura	1,089	1,020	0.31
Nagaland	3,257	11,729	15.17
Mizoram	338	9,285	2.79
	80,057	5,47,163	166.80

gramme, the dominant existing species of honey bee is *Apis Carona Indica*. This species of honey bee has been found to be a victim of attack since 1980 by a dreadful disease called "Thai Sac Brood". The disease is estimated to have destroyed 15,000 bee colonies kept in apiaries and probably thousands of wild bee colonies as well throughout the region affecting honey production to the extent of 60-70,000 kg resulting in an annual loss valued at Rs. 4.5-5.0 lakh. In this manner, this dreadly disease has been systematically destroying several thousands of bee-colonies (both domestic and wild species) for the past ten years and as a result, a large number of the bee keepers have already abandoned bee-keeping altogether thereby increasing poverty and unemployment in sections of rural areas of North Eastern Region.

In a situation like this, a possible remedy seems to be introduction of *Apis Melifera* (Italian bee), which has already been tried and found successful in the States of Haryana, Punjab and parts of Uttar Pradesh and Himachal Pradesh. This strain of bee, unlike the indigenous *Apis Cerana Indica*, is immune to "Sac Brood" disease. Establishment of a Central Bee Nursery by introducing *Apis Melifera* colonies can go a long way in setting up of modern bee-keeping industry on commercial lines in the region. The Central Bee Research Institute, Pune, which is an R&D establishment under KVIC,

(Contd. on page 25)

Vegetables Production In Mizoram

Dr. A.K. Pandey & Dr. R.P. Shukla

IN Mizoram, production of vegetables during 1990-91 was estimated to be 37,635 tonnes, while the requirement is estimated at about 55,000 tonnes. Although majority of the people of the State is non-vegetarian and they consume less vegetables, still the production of vegetables is so low that it cannot meet its own requirement and it is dependant on nearby States of Assam and Meghalaya.

The State has peculiar physiography mixed with hills and plains, intercepted by rivers, streams and slant slopy hills with elevation ranging from 30 metres to 2,210 metres above m.s.l. The State has varied climate—cool and humid sub-tropical type climate occurs over the lower altitudes. The annual mean rainfall is around 2,640 mm spreading over from last part of April to October through South West monsoon. The relative humidity is high throughout the year and it increases as high as 90 per cent in the peak monsoon season. The climate of the State is mild, not too hot in summer; nor too cold in winter. In high hills the average summer temperature varies from 20°C to 23°C and between 8°C to 19°C in winter, whereas in low hills and valley the temperature fluctuates from 22°C to 33°C during summer and 15°C to 21°C in winter. The whole State is almost free from hazards of snowfall in winter and hot wind in summer.

Below Average

Vegetables status of Mizoram in respect of area and production is far below the national average. According to the available informations, vegetable crops occupy only about 0.69 per cent of the total cultivated area of the State. It is encouraging to note that lately more attention is being paid by the Department of Agriculture, Government of Mizoram on vegetable cultivation. The total area under vegetables which was only 1831 Ha during 1987-88, increased to 4,770 Ha in 1989-90.

In Mizoram, Cho-cho (*Sechium edule*), a type of squash having perennial growth, thrives well at higher altitudes and its annual production during 1990-91 was estimated to be about 20,000 tonnes with per hectare productivity of 35.45 tonnes and ranked 1st in terms of production. Cultivation of pumpkin is very popular in kitchen gardens as

well as in jhum lands. Its production during 1990-91 was 4,127 tonnes and ranked 2nd after cho-cho. Cabbage is generally grown and during 1990-91 its production in 223 ha area was 1390 tonnes with the average productivity of 6.23 tonnes per hectare. Tomato, brinjal and chillies are also grown. Cultivation of brinjal is very popular and it is available in the market almost throughout the year.

The productivity (tonnes/ha) of all the vegetables, except cho-cho is quite low at present against the average productivity of the country. The average productivity of the vegetables in the country is 12.30 tonnes per ha whereas the State average is estimated to be only 8.48 tonnes per ha.

Future Strategy

The following strategy may be tried for enhancing vegetable production the State:

Table 1
Improved vegetable varieties recommended for cultivation

S No.	G. Crops	Varieties
1.	Beans (bush type)	Contender
2.	Beans (pole type)	Mize SI-2
3.	Brinjal	Azad Kranti, Pusa purple long
4.	Cabbage	Pride of India
5.	Carrot	Pusa Kesar, Early Nantes
6.	Cauliflower	Snowball-16
7.	Garden Pea	Arkel, Bonneville
8.	Knol-Khol	White vienna, Purple vienna
9.	Radish	Japanese white
10.	Tomato	Pusa ruby, Marglobe
11.	Turnip	Pusa Kanchan

- (i) At present only 0.69 per cent area of the total cultivated area of the State is under vegetable cultivation, while there is vast area under shifting cultivation. The area under vegetables should be expanded.
- (ii) Kitchen gardens should be encouraged.
- (iii) In Mizoram, there is dearth of ground water. So providing irrigation after monsoon season is difficult and it affects the production of winter season vegetables. However, there is good land below the valley and that can be utilized for vegetables

production in winter season. Different types of mulching materials like-Sungrass, Paddy straw and Jungle plants which are easily available can be used as much for vegetables production under low moisture stress conditions.

- (iv) Tribal farmers should be provided more information about new seeds and their growing techniques.
- (v) Development of varieties having characters for growing in high acidic soil conditions and under low moisture conditions may be initiated.

- (vi) Proper attention should be paid for fertilizer application which is very limited in the State.
- (vii) Proper care should be taken for plant protection measures to control the pests and diseases of the vegetable crops.
- (viii) Suitable credit support may also be provided to vegetable growers so they are able to purchase the required inputs at appropriate time in required quantities. □

The authors are Scientist and Joint Director respectively of ICAR Research Complex for N.E.H. Region, Mizoram Centre.

(Contd. from page 23)

has been running a bee-keeping experimental station at Khetri, Nowgoan District, Assam. Given adequate support, the Centre may be strengthened to enhance capabilities so as to be able to supply required number *Apis Melifera* colonies to seven NE States annually.

Another problem faced by the bee keepers of this region concerns marketing of honey in acceptable price. The main limitations associated with the problem is the difficulty in grading the honey meant for marketing. As such, production of quality honey followed by compulsory Agmarking should be the first step in tackling the marketing problem. With a view to achieving this, followed by quality testing of the product by way of strengthening the existing testing laboratories maintained by State Government, would be crucial to development of apiculture in the small scale sector.

Joint Venture

Recently, a technical group consisting of experts from CBRI, KVIC, AAU, NEC had gone into some depth looking into the possibility of taking up pilot programmes for quality honey production by introducing *Apis Melifera* in certain selected and potential areas of North

East. Based on preliminary survey of resource base, the group has made certain specific recommendations in respect of locational suitability for setting up a Composite Training and Demonstration Centre, nucleus bee nurseries; honey production, testing and quality control unit etc. Based on this, KVIC has drawn up a project on apiculture development for joint funding between NEC: KVIC.

The project broadly aims at strengthening, expansion and qualitative upgradation of existing apiculture Development programmes by way of creating additional facilities and providing incentives in the form of training, financial and technical input support to NE States, establishment of pilot scale modern apiaries involving participations of traditional bee-keepers and entrepreneurs in the rural areas. In order to achieve these objectives the following programmes are proposed to be implemented under the Project during the VIIIth Five Year Plan.

- A. Setting up of two Central Apiculture Nurseries.
- B. Establishment of a Model Apiculture Demonstration-cum-Training Centre.
- C. Setting up of Pilot Scale Commercial Apiaries through EDP.
- D. Setting up of a Honey Processing

Unit (70 MT capacity) and creation of Centralised Quality Control & Testing facility.

To begin with, 100 *Apis Melifera* colonies brought from CBRI centres will be multiplied to develop 400-500 bee colonies in two Bee Nurseries in a period of two years. Simultaneously, 50 traditional bee rearers will be trained. Necessary counselling, infrastructural, material and equipment support will be extended to entrepreneurs to help establish commercial apiaries.

Initially, entrepreneurs will be trained covering three States. When the project becomes fully operational the other N.E. States will be included in the project with regional ramifications. The target for setting up of pilot scale commercial apiaries will also be increased correspondingly.

Honey produced by the commercial apiaries and those produced by the traditional bee rearers will be collected, processed, quality tested (conforming to BIS) and marketed. These activities will be handled by private, cooperative sector, voluntary agencies etc. and coordinated through KVIC network. □

The author is Adviser, Agriculture, N.E. Council, Shillong.

A Glorious Feat

—D.K.B.

IT was a glorious feat indeed, an incredible achievement which thrilled the entire Indian mountaineering fraternity and brought immense pride and joy to all Indians. Seven young Indian women climbers set their feet atop the world's highest peak within less than a week as members of the all-women Indo-Nepalese Everest Expedition 1993, which was led by India's first woman Everester Bachendri Lal. How prophetic was India's first Prime Minister, Pt. Jawaharlal Nehru, when he uttered as early as January, 1961, the following words:

"The spirit and the lure of the Himalayas is spreading now all over Indian among our young people, and that is a sign and a symbol of the new life and the new spirit that is coursing through India's vein."

No doubt, this very same spirit has inspired our women mountaineers to accomplish what was considered not so long ago as unconquerable and unattainable. On Monday, May 10, 1993, young Santosh Yadav, an officer of the Indo-Tibetan Border Police, along with two of her compatriots—Kunga Bhutia and Dicky Dolma—scaled Mount Everest and in the process became the only woman in the world to conquer this awe-inspiring mountain peak twice. Only last year, precisely on May 12, 1992, Santosh had ascended Mount Everest as a member of ITBP expedition and had become India's second woman Everest after the legendary Bachendri Pal. Another record was created by the teenaged Manali girl Dicky Dolma, who became the youngest climber in the

world to set foot on the Everest summit. She is only 19.

Six days later, on Sunday, May 16, 1993, four more Indian women—Dipu Sharma, Radha Devi, Suman Kutiyal and Savita Martoliya—successfully scaled the fearsome Mount Everest. It was really a big triumph for the all-women Indo-Nepalese expedition as it created another world record by putting 18 climbers atop the world's highest peak including seven Indian women. Others were male technical instructors and sherpas. These girls have shown to the world that Indian women are second to none in grit and determination.

To the outsiders Mount Everest may be merely the highest landmass of the planet, but it has a special place in the hearts of all Indians. The Himalayas have greatly influenced India culturally, socially and economically. Life without these snow-capped lofty mountains is simply unthinkable. Mount Everest was the last bastion to be conquered by the indomitable mountaineers. After the first World War, the British mountaineers made the conquest of Everest as their particular goal, but they could succeed only in early fifties. Two members of a British expedition led by Col. John Hunt created history when they successfully scaled Mount Everest on May 29, 1953. They were New Zealander Edmund Hillary and Tenzing Norgay, the Sherpa guide.

After the British expedition's success in 1953, members of a Swiss expedition in 1956, Chinese expedi-

tion in 1960, US expedition in 1963 and Indian expedition in 1965 scaled the mighty Everest. In fact, the first two Indian Everest expeditions ended in failure. The first Indian expedition was led by Brigadier Gyan Singh in 1960 and the second by Major John Dias in 1962. However, lady luck smiled on the third Indian expedition led by Captain M.S. Kohli in 1965 and nine members of this expedition in four successive teams in nine days in May, 1965 were scaled the lofty mountain peak on earth. After a long gap of 19 years, five members of the fourth Indian expedition led by Col. D.K. Khuller, Principal of the Himalayan Mountaineering Institute, Darjeeling, successfully scaled the Everest summit in 1984. These climbers included the first Indian and world's fifth woman Everester Bachendri Pal. Last year, the Indo-Tibetan Border Police expedition added another golden chapter by conquering the mighty Everest.

No doubt, once inaccessible Mount Everest has been conquered by the indomitable spirit of man many times by now, but its fascination is as irresistible as ever. It will continue to attract mountaineers from the world over as it still offers the stiffest challenge to the climbers. But the gritty women mountaineers like Bachendri Pal, Santosh Yadav and the teenaged Dicky Dolma will be a source of inspiration to other Indian girls to attempt and accomplish even bigger and tougher tasks in mountaineering as well as other walks of life. □

(Courtesy: AIR)

Drinking Water Supply In Rural Areas

PROVISION of safe drinking water facilities in rural areas is primarily the responsibility of the States. However, the Central Government has been giving top priority to this core sector of meeting one of the fundamental needs of rural masses. Technical and financial assistance has been provided under the Accelerated Rural Water Supply Programme (ARWSP) which was introduced in 1972-73. With the introduction of rural water supply under the Minimum Needs Programme (MNP) in 1974-75, ARWSP was withdrawn but this was re-introduced in 1977-78. In order to give a further boost to the programme, National Drinking Water Mission was launched in 1986. The Mission has now been renamed as Rajiv Gandhi National Drinking Water Mission.

With the joint efforts of the States/UTs under the State sector MNP and the Central assistance under ARWSP and the Mission, it has been possible to provide safe drinking water facilities to 75.41% of the rural population by the end of 1991-92. This has been possible with the special central assistance of about Rs. 178 crore given specifically for coverage of No Source problem villages.

With the coverage of about 94,000 problem villages till the beginning of VI Plan and resurvey carried out by States and Union Territories for identification of problem villages, about 2.31 lakh problem villages remained to be covered as on 1.4.1980 out of which 1.92 lakh villages were covered in the VI Plan and the balance 0.39 lakh

spilled over to the VII Plan. PVs were again identified through a fresh survey conducted in 1985 and as a result 1.62 lakh PVs remained as on 1.4.1985 to be covered in VII Plan.

About 1.54 lakh problem villages were covered during the Seventh Plan, in addition to 1.92 lakh villages covered during the Sixth Plan. Out of the balance of 8,365 problem villages of the total of about 5.83 lakh villages in the country, 3,032 were covered in 1990-91 and 2168 in 1991-92. The target for coverage of 'No Source' problem villages in 1992-93 is 2,968 and partially covered villages as 31,500. The actual achievement reported by the States/UTs based on the reports received upto February, 1993 is 1,469 'No Source' problem villages and 23,500 partially covered villages. About 600 problem villages are likely to spill over to 1993-94. However, the target for partially covered villages is likely to be achieved. The target for 1993-94 has been provisionally fixed at 42,000 villages including spill over 'No Source' problem villages.

Under the scheme, a total of Rs. 2,961 crore has been utilised during the Seventh Plan and in 1990-91 and 1991-92. In addition, an expenditure of Rs. 3,751 crore has been utilised under the MNP in the State Sector. For 1992-93, an outlay of Rs. 460 crore was provided under ARWSP, Rajiv Gandhi National Drinking Water Mission, etc. in addition to the outlay of Rs. 811.31 crore under MNP in the State Sector. For 1993-94, an outlay of Rs. 740 crore has been provided and Rs. 819.85 crore is under MNP in the State Sector.

Allocations for Eighth Plan for Drinking Water Supply in rural areas is Rs. 4,954.52 crore under the State Sector MNP and Rs. 5,100 crore under the Central Sector.

Special emphasis is given on provision of drinking Water facilities for SCs and STs. Apart from the provision under the State sector special component plan and tribal sub-plan and earmarking of funds under ARWSP for a minimum of 25% for SCs and 10% for STs, the Central Government has also been giving special assistance in order to accelerate the coverage of the weaker sections with safe drinking water facilities. Special assistance of Rs. 19.80 crore was given in March 1990. Similarly, special assistance of Rs. 58.94 crore was released in 1991-92 and early part of 1992-93 as part of Dr. Baba Saheb Ambedkar Centenary Programme.

Special emphasis is also given on the quality of drinking water supply. Under the Sub-Mission on Eradication of Guineaworm, it has been possible to bring down the number of affected villages to 1906 and affected cases to 563 as on 1.1.93. The problem is likely to be eradicated by the end of 1993.

Under the Sub-Mission on Control of Fluorosis, setting up of 481 defluoridation plants was approved. Out of this, more than 260 plants have already been commissioned. An awareness campaign for imparting health education and the importance of use of drinking water free from excess fluoride has been launched in 150 districts in 15 States.

(Contd. on page 29)

Management

M.K. Ghoshal

AN extra-ordinary book from a scholar who is gifted with twin wisdom of economics and philosophy. He is fully aware of grass-root realities as well as opportunities and challenges. What makes him different is his vision. He believes in setting laudable goals to be achieved by only pious means. In a way, like Gandhiji he strongly advocates purity of action and condemns the opposite view that the end justifies the means. His approach to management reflects a point of view far from prejudice.

Prof. Simha rises above professionalism to give management and its related issues—a novel treatment. He is neither critical nor analytical in his observations on the most sought-after subject. His style is conversational and language simple. His book has the semblance of a story that neither thrills nor chills but leaves a lasting impression with a clear message: 'follow Dharma all the way'. Surely, it is meant for general reading by educated people from different walks of life including company Managers and Chairmen, bankers, judges, college principles and vice-chancellors, bureaucrats, ministers, members of parliament and legislators.

In all, there are eighteen chapters beginning with "Introduction" and ending with "Management: A Process

of Integration". Management is a key word which means a lot and is most widely used. It was as much relevant in the past as it is now; mainly to emphasise success in the business and commercial ventures. Students of economics are aware that of the four factors necessary for production of wealth, namely, land, labour, capital and organisation the last one is a combination of entrepreneurship and management, the latter gaining in importance in post-second World War competitive economic environment. Management is needed not only to run a factory for profit but also a household for happiness. It is a 'must' within and outside government.

What are its fundamentals? Beginning with acquiring knowledge and skill and applying the same to the best advantage, management calls for planning, organising, leading, motivating, co-ordinating and controlling. These ingredients of management are not mechanical functions of a manager. A strong ethical and spiritual basis summed up in the Indian concept of 'Dharma' for all work performance and for discharging one's duties is absolutely necessary, says Prof. Simha. The management function involves a dynamic process of communication, decision-making and leadership with "Dharma" as the main driving force in all

activity, endeavours and aspirations—business, non-business or personal. Dharma is a Sanskrit word and its dictionary meaning is the righteousness that underlines the law. Literally it means something which supports and holds together. It is a code of laws or principles. Doing one's duty with efficiency and devotion, striving for excellence, not being motivated by profit alone, subjugating personal ends for the larger benefit of the group, organisation, institution, community and the country, caring for fairness, justice and equity are some of the cardinal principles of Dharma which apply with equal force in all spheres of life including industry, business, commerce, government, semi-government and corporate sectors. Prof. Simha has placed Dharma on a practical footing in support of his thesis for combining the same with dynamic modern concept of management.

Management needs are not confined to business/industrial houses alone but also extend to non-business or quasi-business organisations like hospitals, schools, colleges and universities. Manager is the key figure and much depends on how he conducts himself in discharging his managerial functions. That again depends mainly on how he has groomed himself for the job. His duties are onerous and he has to deal with his men as their leader. He should excel in the art of communication, be able to judge people's abilities, create healthy work environment, provide training and other job improvement facilities, introduce suitable organisational pattern, pay due attention to production, marketing and financial management, co-ordinate the activities of the different units/wings in a business organisation and finally exercise overall control. He has to face challenges, exploit opportunities and deal with crisis situations. On all vital issues he is required to take decisions one way or the other and assume responsibility

MANAGEMENT WITH DHARMA ALL THE WAY by Professor S.L.N. Simha, Founder Director, Institute for Financial Management and Research (IFMR) Published in January, 1992 by I F M R, 30 Kothari Road, Nungambakkam, Madras-600 034. Pages 336 Price; Inland Rs 150; Foreign US \$ 15.

for the consequences. At the national level, the Prime Minister fits into the manager's role.

Planning is an integral part of management. It is a continuous process and is needed not only to set up an enterprise but also to run it efficiently. Adequate attention should be paid to evolve an appropriate strategy of implementation so that the operational plan relating to production, operating efficiency, absorption of new technology, marketing, human resource development, employee welfare, consumer protection, environment conservation etc. gets executed in all earnestness. Monitoring reinforces planning and implementation system by introducing flexibility and adaptability to meet the requirements of changing environment.

Prof. Simha concludes his writing by projecting management as a process of integration of various

objectives, faculties, techniques, strategies, resources, personalities, temperaments, emotions, interests, time horizons, material, ethical and spiritual values, risk and caution, reasoning and intuition, change and stability, modernism and conservatism, the new and the old, of family and business life, individual interests and community welfare. According to him, management is much wider than just business management and encompasses Government—central, state, local, its individual organs such as the legislature, the executive and the judiciary, business corporations, educational institutions, political parties and finally family and home. The process of integration involves harmonisation of conflicting interests as also pooling of talents and resources for effective and efficient attainment of social objectives.

The author accords top priority to planning and leading functions in

management while treating organisation and control as secondary elements. Better integration leads to higher quality management, which in turn results in greater success and more prosperity. Developed economies of U.S.A., Germany and Japan demonstrate the beneficial fall-out of good management whereas dismal economic performance in developing Third World countries is attributed, among other things, to poor quality management. The leading countries also adhere to a code of business ethics and work culture, comparable to Indian concept of Dharma, in the management of business and economy. Surely there is no substitute for good management. In this context, Prof. Simha's perception that management with its root deep in Dharma holds the key to socio-economic development in India does not sound entirely utopian. □

(Contd. from page 27)

Under the Sub-Mission on Control of Brackishness, setting up of 152 desalination plants was approved with special central assistance. 137 plants have already been commissioned. The affected villages are covered with alternative safe sources. Treatment plants are sanctioned as a last alternative wherever other cost effective alternative sources are not feasible. As regards removal of excess iron, setting up of 11,908 iron removal plants was approved as against which more than 5,000 plants have been commissioned. The problem is mostly in North-Eastern States, West Bengal, Bihar and Orissa.

With the coverage of identified

No Source problem villages, adequate importance is now given to coverage of habitations/hamlets. All the States/UTs were requested to conduct a fresh survey of status of drinking water supply in rural habitations in 1992. The survey is being conducted in two parts—part I relating to drinking water situation in rural habitations and part II about the quality of drinking water used by the rural masses. The report is likely to be available by the end of June 1993.

The new strategy for the VIII Five Year Plan is oriented to tackling the problems of drinking water supply based on the results of the fresh survey. 115 district level labor-

atories and 17 mobile laboratories have already been commissioned. All the States/UTs have also purchased potable water quality testing kits. It is proposed to set up one water quality testing laboratory in each district in the country before the end of the VIII Five Year Plan. The main objective during the VIII Five Year Plan is to cover the unserved and under-served rural population and for better management of operation and maintenance of water supply schemes with active involvement of the community, particularly the women, human resource development and better S&T and R&D inputs in the sector. □

Book Review

METHODOLOGY FOR POPULATION STUDIES AND DEVELOPMENT edited by Kuttan Mahadevan & Parameswara Krishnan; Sage Publications, New Delhi; pp 469; Rs 375.

THIS volume contains 20 contributions from Indian, American and Chinese scholars, sociologists and demographers. Most of the papers were presented in a seminar held in honour of Dr. N. Krishnan Namboodiri, Lazarus Professor of Sociology at Ohio State University, who also happens to be a methodologist, social demographer and statistician. It is a comprehensive book on substantive and methodological aspects of population and development. The papers included in this volume explore and focus on various aspects of research methodology in population studies and development.

The entire volume is divided into five parts: theory and research design, interdisciplinary methods, third world development, models for data analysis, projection and old age survivorship and action research.

In the first part, Hubert M. Blalock examines the implicit theoretical assumptions in a research design. K. Mahadevan presents an overview of the various theoretical frameworks in social demography emphasizing his own contribution to the study of mortality and fertility. Modelling is the subject of J. Jayachandran's paper. He has focussed on the casual aspects of regression modelling with illustrations drawn from a Candian situation.

The second part is devoted to interdisciplinary methods in history, mathematics, geography, psychology, anthropology and sociology. Dennis J. Willigan explains a number of multi-level conceptual and methodological strategies from a life history perspective, conceptualising the life course as a temporal sequence of interactions. A critical assessment of the major issues relating to human migration has been made by Nurun Nabi and Krishnan. They are of the opinion that a single theory of migration is neither possible nor feasible, as the process is multi-dimensional over space and time. The interrelation between sociology and demography has been examined by K. Mahadevan, R. Jayasree and S. Sivaraju, Loszek A. Koninski and Feroz Kurji have defined population geography delineating relationship between geography and population issues. Systems framework, currently the popular methodological technique, has been developed by three scholars from China—Jingyuan Yu, Chi-hsien Than and Guangtian Zhu. They examine population issues, target population and control measures in China. A review of mathematical modelling has been made by P. Krishnan. Epidemiologic methods have been discussed by Lory Laing. Anil Kumar Koshy, M.S.R. Murthy and N. Viswanathan Nair discuss the role of the anthropological framework in population studies.

The third section of the book is on models for data analysis and development. Michael Todaro examines the problem from a wider perspective. K. Mahadevan, Baha

Abu Laban, Sharon McIrvine Abu-Laban and M. Sumangala have proposed a very comprehensive approach to development in their paper on "Third World Development and Quality of Life". This model should pave way for future research, both theoretical and applied, in this area.

Fourth part of the book is concerned with the projection of households and families in Canada as well as strategies for dealing with uncertainties in estimating survivorship at the higher ages. Alfred DeMaris and K.V. Rao present an overview of loglinear modelling and illustrate it with actual data on first marriage dissolution in Canada. A computer programme for tracing the changes on the age-gender composition of population and any age structure dependent characteristic has been described by N.M. Lalu in his paper, "A Computer Programme for Macro-Simulation in Demography". A.V. G  rge and K. Perreault discuss the methodology used for such a projection in Canada. In the estimates of survivorship probabilities, mathematical strategies to deal with such issues have been discussed by Charles J. Mode and Herman E. Gollwitzer in their paper.

The fifth part contains two papers contributed by K. Mahadevan: one is on Successful, Diffusion through Satisfied Adopters, and the other is on Population Education through Integrated Development. Mahadevan, in his first paper, discusses family, and in the second he concentrates on population education.

It is a useful volume for applied research institutions, administrators, consultants, demographers, sociologists, planners and decision-makers. It can be used both as a textbook and a reference volume.

M.L. Ahuja

Independence Day Special Issue

Dear Reader,

Yojana has been bringing out special issues from time to time especially on the occasions of Republic Day and Independence Day, which have invariably received warm welcome from you.

This time we have chosen "Agriculture" as our theme for the Independence Day Special Issue 1993. True to Yojana tradition, this issue too will contain stimulating articles from eminent writers.

You are requested to place your order with your agent or you may get in touch with the Business Manager, Publications Division, Patiala House, New Delhi-110 001, to avoid any disappointment.

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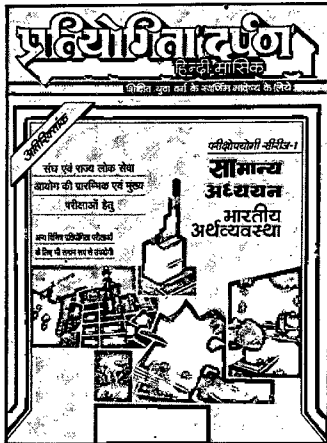
हिन्दी की सर्वाधिक बिकने वाली सामान्य ज्ञान पत्रिका

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प्रतियोगिता दर्पण
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विगत 15 वर्षों से कड़ी मेहनत व अथक प्रयासों द्वारा परीक्षोपयोगी सामग्री उपलब्ध करा रहा है

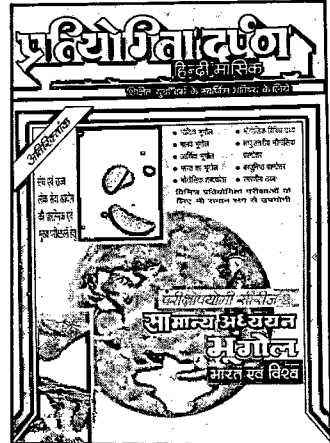
इन वर्षों के अनुभव और परीक्षा में बढ़ती हुई चुनौतियों को ध्यान में रखते हुए सिविल सेवा परीक्षा तथा अन्य प्रतियोगिता परीक्षा के अभ्यर्थियों के लिए परीक्षोपयोगी सीरीज का प्रकाशन किया गया है



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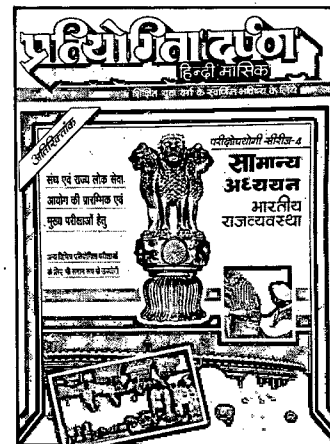
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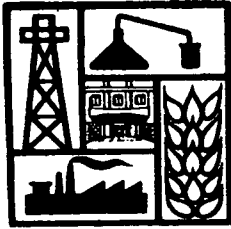
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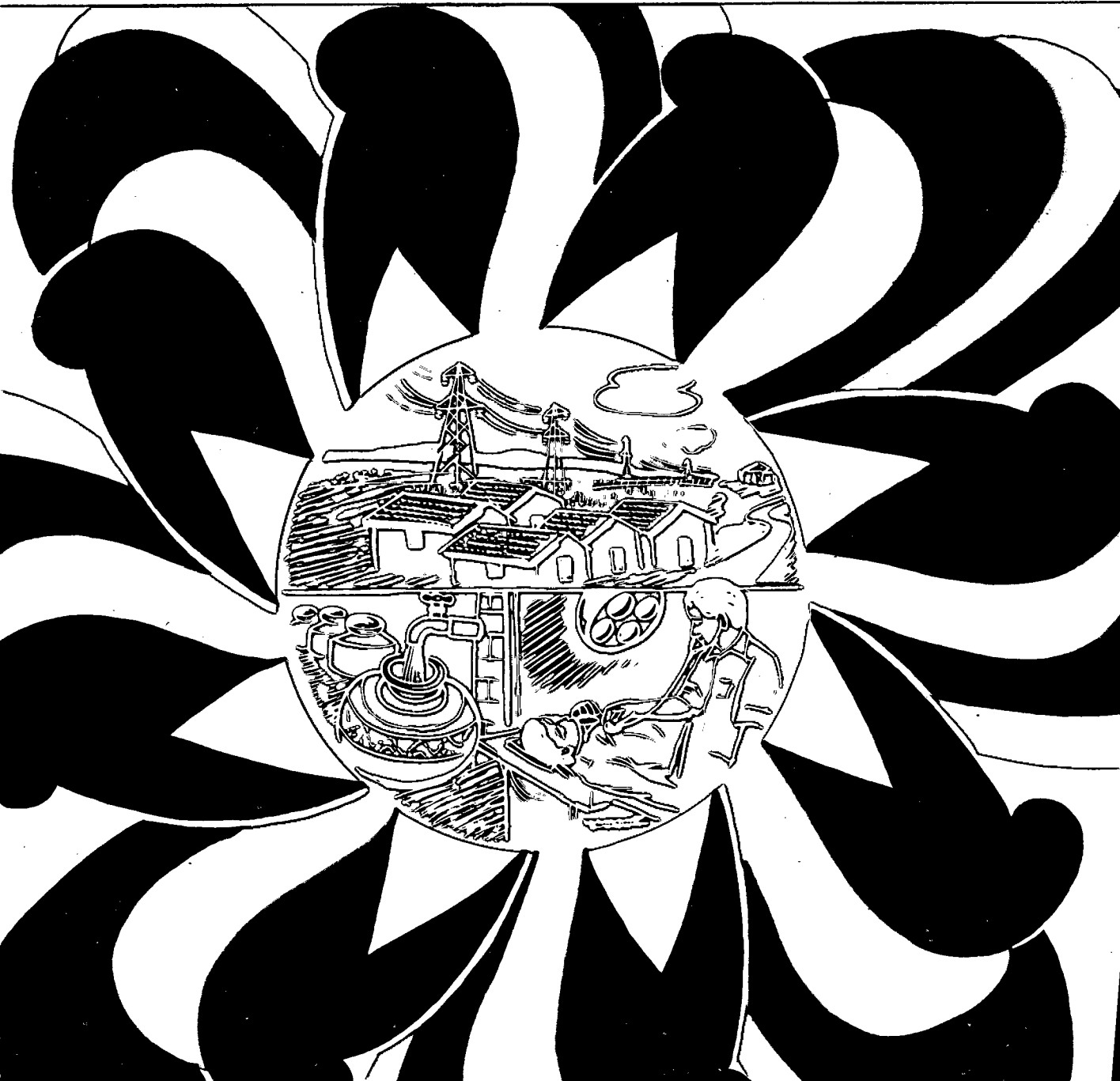


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Development Diary

Closer Cooperation

INDIA and Israel will encourage contacts between private and public sector organisations in a bid to promote closer ties in trade, economic and technological cooperation. The areas will cover industry, agriculture, solar energy, research and development, natural resources, tourism and transport. Both the countries will also encourage establishment of joint ventures in agriculture, agro-industry, telecommunications, medical equipment, non-conventional energy and computers. They will also promote third country venture in trade and industrial sectors, participate in international fairs and visit of delegations. This was agreed to on a Memorandum of Understanding (MoU) signed by the visiting Deputy Prime Minister and Minister of Foreign Affairs of Israel Mr. Simon Peres and the Minister of State for Commerce and Civil Supplies Mr. Kamaluddin Ahmed in New Delhi.

Record Profit For Major Ports

THE performance of all major ports in 1992-93 was noteworthy. They handled the highest ever cargo of 166.55 million tonnes as against the target of 157 mt. during the year. At the end of March 1993, the Indian Merchant fleet had 440 ships, totalling 6.27 million GRT. Shipping Corporation of India recorded the highest ever profit of Rs. 110 crore. Indian Shipping policies were liberalised to allow free acquisition, sale and chartering of vessels.

Pest Resistant Soyabean

A new Soyabean variety JS 335 has been developed by agricultural scientists. This variety is resistant to a number of diseases and tolerant to the pest "stemfly". This variety, which has about 18% oil and 36% protein, has a yield potential of 25-35 quintal per hectare. This is suitable for cultivation in Madhya Pradesh, Rajasthan, Bundelkhand region of Uttar Pradesh, northern and western Maharashtra and northern and western Orissa.

Foreign Contract For TCIL

THE Telecommunications Consultants India Ltd. (TCIL), a public sector company under the Ministry of Communications, has won an additional contract of Rs.40 crore from Mauritius. TCIL is already executing a Rs. 28 crore contract which is expected to be completed this year.

Discussions are under way for setting up joint ventures for the manufacture of telecom equipment with Indian knowhow and software packages. The other areas of cooperation include short term training, network planning and financial management.

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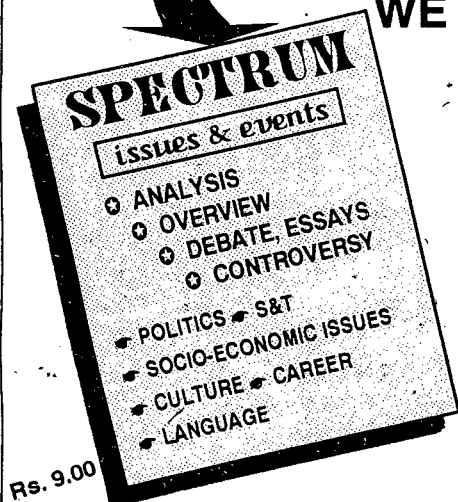
— ON THE NEWS STANDS IN AUGUST 1993 —

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Ocean Resource Planning

Pranav N. Desai

OCEANS around the country have proved to be rich deposits of food, fuel and minerals. But these are not unlimited and hence the need for ocean resources policy and management. The author feels, while exploration of hydrocarbons and minerals should be speeded up immediately, the study of ocean climate which has an important bearing on our agriculture and marine food, should be pursued as a long term policy.

THE draft paper for a New Technology Policy introduced in April 1993 includes exploitation of Ocean resources as one of the thrust areas. The increasing realisation that ocean resources and ocean space are not boundless but finite and have competing uses or abuses, had brought into sharp focus the imperatives of ocean resources policy and management the world over. The increasing population pressures in absolute terms and concomitant demands have led to fast depletion of land resources. Some of the land based reserves are likely to be depleted in near future of 10-15 years period. This phenomenon has forced the planners and administrators to shift the attention towards generating an efficient ocean science and technology system to develop, utilise and protect ocean resources at accelerated pace.

In the last twenty five years, oceanographic research and development activities in India have made significant contribution which has a bearing on diverse sectors such as agriculture, defence, energy, environment, health, industry etc. These activities are being carried out by

various governmental organisations, universities and other agencies including the National Institute of Oceanography (NIO).

The Indian peninsula bound by the Arabian sea on the west, the Bay of Bengal on the east and the Indian Ocean on the south along with the archipelagoes on either sides, form a total coastline of 7500 kms. The Exclusive Economic Zone (EEZ) formed along this coastline covers 2.01 million sq. km. This zone which is one the largest in the world is as large as two third of the land mass of the country. In addition to this, the country was also allocated a mine site by the international Seabed Authority covering an area of 0.3 million sq. kms. to explore and develop resources of the deep seabed which include polymetallic nodules and other rich deposits of important minerals.

In the last four decades of planned development Indian economy has witnesses a striking structural transformation. The share of agriculture to GDP which was around 50 per cent in the fifties dropped to 33 per cent in 1990-91. However, this has not led to a

proportionate decline in the share of population still depending on agriculture which is as high as 70 per cent. This situation is compounded by the fact that despite planned efforts in the direction of irrigation, drought-proofing etc., about 70 per cent of the cultivated land is rainfed and hence simply depended on vagaries of monsoon. Thus the resultant fluctuation in agricultural production not only affect the domestic supply of food grain, protein-rich pulses and oilseeds but also affect our foreign exchange earnings. Agricultural (16 per cent) and marine products alone constituted about 20 per cent of export earnings (1991-92). This explains the emphasis in the Eighth Plan on agriculture and rural development which will account for almost 50 per cent of the outlay. It seems from the preceding that monsoon system and its understanding and precise forecasting is the basic necessity of Indian agricultural activities. The response of the oceans to the atmospheric changes and vice versa are sensitive topics to be studied. As far as marine food is concerned, India needs to catch up with the growing demand estimated to be about 11.4 million tonnes by the

year 2000 A.D. This cannot be achieved unless new potential areas for production are identified.

The Eighth plan has set a target of 5.6 per cent growth rate in GDP as the previous two plans achieved similar targets. Moreover, any target lower than this figure would not receive enthusiastic public support. This task of achieving higher growth rate will require greater attention at this juncture. The Eighth Plan cannot but afford to aim an increase in the volume of net export in the context of the current forex shortage, changed international situation and a decline in exports from certain countries. At present the Indian foreign trade is characterised by intriguing features. In the year 1991-92, the non-oil trade revealed a trade balance of Rs. 1,600 crore. Against this figure the oil trade showed a negative balance of Rs. 11,200 crore, emerging as the major drain on foreign exchange. This gap could have widened but for off-shore oil production at Bombay High. This is evident from the fact that the country produced only 8 million tonnes of crude oil in the mid-Seventies and in ten year period this figure jumped to 31 million tonnes. However, at current consumption rate, the target was short by 2.5 million tonnes and the increasing demand will have to be met by imports. Thus ocean exploration holds great promise for future in identification of alternative sources.

Mineral Resources

Oceans are also rich source of important and strategic minerals. These minerals can not only substitute scarce land based resources but can also help generate considerable employment from ocean-based industries. The sea-floor of the continental margins of India is covered by a wide variety of biogenous, chemogenous and terrigenous mineral deposits.

Biogenous sediments are reported from shallow off-shore areas of Lakshadweep (712 million tonnes)

and the Gulf of Kutch (2 million tonnes), the outershell of Bombay and the backwater of Kerala (3 million tonnes).

As far as calcareous sand or limestones are concerned, its demand by 2000 A.D. is likely to exceed 100 million tonnes due to its wider industrial use. The cement industry may require 79 million tonnes and the iron and steel industry 14 million tonnes. The total requirement of dolomite has been estimated at around 6.5 million tonnes. Thus the production of limestone and dolomite will have to be increased by 3.3 times to meet the rising demand from the present level and this cannot simply be met by land based resources.

Occurrences of chemogenous deposits i.e., phosphorites are reported from the south/western continental shelf but these occurrences at present do not appear to be of economic interest. However, due to increasing demand of agricultural activities, despite increasing production of rock phosphate the country's import of rock phosphate remains steady. Thus in future mining of such resources from ocean might become cost effective.

A major area of substantial economic interest in this category is polymetallic nodules. The polymetallic nodules in the deeper bed of the Indian ocean cover an area of 10-15 million sq. km. The deposits are categorized as paramarginal.

An average polymetallic nodule from the Indian ocean is composed of metals such as manganese (15.1 per cent), iron (14.74), nickel (0.464), copper (0.294), cobalt (0.230), and a combination of nickel and copper (0.758). Except copper most of these metals are used in steel alloys of special quality, coinage and other related industries. Out of these metals nickel and cobalt are being imported and at current rate of consumption the land-based resources

of the country are likely to be exhausted in the range of twenty years.

Rich Potential

A resource evaluation conducted for the area (0.15 million sq. kms.) in the central Indian Ocean revealed that a combined metal to the tune of 10 million tonnes are expected from this area. This at the rate of Rs. 100/kg. The economic value of these resources could be estimated to be around Rs. 100,000 crore. The value is calculated at the minimum possible rate and for the area just half the total mine site.

Terrigenous heavy mineral placers containing ilmenite, magnetite, monazite, zircon and rutile are reported from many beaches of India. The deposits are expected to extend to the inner shelf, but very little work has been carried out to trace their offshore extension except along the Konkan coast, Maharashtra, where reserves are expected to be more than 12.5 million tonnes.

Some of these minerals are exported or used in the production of export commodities. Ilmenite is used in the production of titanium which is used for space craft and nuclear powered submarines. Rutile is an export commodity used in the production of synthetic rutile and is also used in ceramics industry. Oceans are expected to provide a rich source of such minerals.

In the light of the foregoing discussion, the future research priorities and technologies are required to be evolved in the following areas. The immediate or short-term target seems to be the exploration of hydrocarbons and minerals. The study of ocean climate and identification of potential productive areas of marine food seem to hold long-term interest in ocean S & T. □

The author is Director, Centre for Research in Environment Science & Technology Policy, New Delhi.

Linkages Between The Universities And Industry

R. Mehrotra

CROSS fertilisation between universities and industrial organisations is more than just desirable. Basic research without applied dimension is theory without measurement and applied research without basic research is measurement without a theory. A sound and judicious wedlock between the two is essential to guarantee beneficial fruits to the society, says the author.

CONSISTENT with the overall spirit of the New Education Policy, the major tasks of the universities and other seats of higher learning in the years to come are to do everything to transfer vigour and action to academia, to remove roadblocks and obstacles to interaction, to let teachers, students and researchers have the freedom and responsibility to innovate in teaching and research, to bring about the much needed wedlock between these universities and seats of higher learning and the industry in order to create an exuberant society capable of facing the challenging problems of our times, be they academic, technical or societal. As Professor Yash Pal, the former Chairman of University Grants Commission, exhorted the Vice-Chancellors of Indian Universities in his demi-official letter on the Seventh Five Year Plan, "The universities must be brought centre-

stage. Anything new which affects peoples' lives can never be imprisoned within one discipline. Disciplines exist as a concession to the limitations of human mind. While there is a growing need for specialisation in different disciplines, to absorb, assimilate and add to the growing body of discipline-based knowledge, simultaneously we must range across disciplines to be able to touch reality in the raw 'and to grapple with vexatious and burning problems of the day which in form and content transcend disciplines'. It is only across the boundaries of disciplines that cross fertilisation of ideas is most potent".

It is this perspective alone that should guide and strengthen the need and justification for establishing and strengthening the linkages between disciplines on the one hand and, simultaneously on the other, those between the universities and the

industry most broadly construed. This requires that there must first be a happy wedlock between pure science and applied research so that the marriage between the universities and industry is successfully consummated. Both aspects are "compossible" to use a word coined by Leibnitz.

Pure science has enjoyed almost everywhere much greater prestige than applied research, and this is more accentuated in countries where science is comparatively a new thing. Unless special care is taken, pure research will tend to dominate and even drive out applied work. It seems that left to itself, there is nearly always a tendency for research, even in project-oriented laboratories, to become 'purer and purer' unless there are strong countervailing forces. These institutions should place special emphasis on applied and industrial research.

It is often held that universities should perform, almost exclusively pure (basic) research leaving applied research and development in all branches of science to other institutions. This belief or ideology is based on an image of university role and of research which prevailed among a minority of university teachers in the scientific world some decades ago. The universities in the industrialised countries make a substantial contribution to applied research and some of them, in varying degrees, even to development research. Today, with the advance of science and technology the distinction between pure and applied research, between a research scientist and a research engineer, has become artificial, and in fields like Electronics it has almost disappeared. The same individual may be working at one time in pure research and at another time on an applied problem. The difference between pure research and applied work is one of motivation and goals, and not of techniques and creativity. In pure research one is

year 2000 A.D. This cannot be achieved unless new potential areas for production are identified.

The Eighth plan has set a target of 5.6 per cent growth rate in GDP as the previous two plans achieved similar targets. Moreover, any target lower than this figure would not receive enthusiastic public support. This task of achieving higher growth rate will require greater attention at this juncture. The Eighth Plan cannot but afford to aim an increase in the volume of net export in the context of the current forex shortage, changed international situation and a decline in exports from certain countries. At present the Indian foreign trade is characterised by intriguing features. In the year 1991-92, the non-oil trade revealed a trade balance of Rs. 1,600 crore. Against this figure the oil trade showed a negative balance of Rs. 11,200 crore, emerging as the major drain on foreign exchange. This gap could have widened but for off-shore oil production at Bombay High. This is evident from the fact that the country produced only 8 million tonnes of crude oil in the mid-Seventies and in ten year period this figure jumped to 31 million tonnes. However, at current consumption rate, the target was short by 2.5 million tonnes and the increasing demand will have to be met by imports. Thus ocean exploration holds great promise for future in identification of alternative sources.

Mineral Resources

Oceans are also rich source of important and strategic minerals. These minerals can not only substitute scarce land based resources but can also help generate considerable employment from ocean-based industries. The sea-floor of the continental margins of India is covered by a wide variety of biogenous, chemogenous and terrigenous mineral deposits.

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concerned primarily with gaining a new insight or in the discovery of new knowledge whereas in applied work the objective is to meet some urgent felt need in industrial or agricultural development or production. Therefore applied research of necessity carries a time schedule limit for its completion.

Applied work such as developing important new techniques or designing or fabricating special instruments or apparatus should receive proper recognition and it should be made possible for such work to earn Ph.D. awards. Whereas in the case of pure science a research contribution must bear international comparison to be of any value, the same is not equally valid in the field of applied science. In the case of pure research the value of contribution in a particular field lies in the stimulus it provides to research in that field, but in the case of applied research the value of contribution lies in the stimulus it gives to the development of instrumentation, processes and techniques.

Professor P.M.S Blackett, President of the Royal Society (UK) and a Professor of Physics at the Imperial College of Technology (UK) in his discussions with the Education Commission (the Kothari Commission to be precise) particularly stressed the importance of applied research for India. This necessarily implies close and intimate cooperation between research in the universities and that in large industrial houses and concerns. The problems of industrial research need to be jointly tackled on a cooperative basis by staff in the universities and engineering institutions as well as those working in the industries. In the long run, the universities should develop some concrete kind of extension services analogous to what is obtainable in the agricultural universities. There could and should be a movement of staff from university to industry and vice versa. Consultancy and advisory

positions and even directorships in industrial concerns can be offered to dynamic academic people so that effective and successful interaction and its much-needed by-product are well established. In West Germany industry has put up research institutions in collaboration with some of the university departments and they work together closely on many projects. This is worthwhile implementing in India wherever conditions and facilities are favourable.

In the Commonwealth of Independent States-CIS (formerly USSR) educational institutions work in close and active touch and collaboration with industry. A considerable amount of basic and applied research for industry is carried out in universities and other educational institutions and is paid for by industry. In certain specialised fields high grade industrial engineers and scientists work on part-time basis as Professors in educational institutions. Also, it is quite common for postgraduate students to do part of their research in industrial establishments using industrial plant and facilities.

Prerequisites

In an article published in *Komsomolskaja Pravda* of 20th January 1966, Professor P.L. Kapitza had stressed the following essential prerequisites for effective and long-lasting linkages between universities and industry: favourable material conditions for industry for learning and adopting new technology, adequate preliminary training in the industry concerns, and favourable moral and material conditions for the cooperation of scientists and university personnel with industry.

A survey should be made in India showing, for any recent year, how the university research potential is distributed along basic, mission-oriented basic, applied, and development research. Towards this comprehensive

survey, initial efforts may be directed towards analysing the surveys made in the universities in various branches of science and technology, economics and management, and by statistically collating, compiling and analysing the topics of various Ph.D. theses in the universities and other institutions of higher learning.

One of the principal aims of the universities should be to make higher education more relevant to national needs and to forge forward linkages of higher education with employment and economic development. There is need for restructuring of courses to bring about the necessary concern for relevance and use, application orientation, flexibility and diversification. Towards this end extension activities should be developed as components within each subject or discipline to provide for the necessary linkage with industry as well as with financial and other infrastructural institutions. The development of interaction between the university departments, industry, and apex financial and development bodies should be on an institutional basis to be long-lasting.

Within the country there are enormous differences between infrastructural facilities and capabilities available in specialised scientific agencies, national laboratories, industrial undertakings, and in the universities. These create in the initial stages disparities and become obstacles in forging linkages with the industry. The state universities in particular have been allowed to run down to an unbelievable extent. The situation needs to be remedied rapidly to bring about the desired linkages with industry. The weak coupling between science/technology infrastructure and capabilities and the production system in the country has led to an insufficient use of the science generated and a lack of appreciation by decision makers in government and industry of the

capabilities in the universities. This can be remedied by completing the total innovation chain consisting of basic research, applied research, design and development, prototype fabrication, up-scaling, extension, awareness building, production engineering, design and consultancy, and production and services.

Goal-Directed

Relating science and technology to the objectives of planned industrial growth calls for goal-directed science and technology (S&T) efforts. Most natural linkages arise between two or more organisations when they are jointly engaged in accomplishing a task. This applies par excellently to industry and the universities. Representation of senior academicians from the universities on the boards of industrial enterprises and vice versa, agreements between industry and universities for exchange of personnel, etc., are some of the measures which can bring about the required conditions for forging these linkages. Industry must be made to spend an appropriate amount on research in universities from which they would directly benefit. Similarly, while

setting up separate S & T and R & D units within and outside industry, it should be ensured that they have the desired formal linkages with the higher educational system in the country. Universities should be encouraged to take up applied research of value to the regions in which they are located functionally.

Cross fertilisation between universities, and industrial organisations is more than just desirable. It is essential for excellence to flourish. It is also necessary to develop industry-oriented centres of excellence, and it is all the more necessary to strive to maintain that level of excellence in those institutions because excellence is a vulnerable entity even after it is established or attained.

Basic research is concerned with the discovery of new knowledge and with increasing our understanding of natural phenomena. It may not be directed towards solutions, but is at the frontiers of knowledge. Higher education is primarily the responsibility of the universities, and quite clearly there must be basic research in the universities in the overall

interest of higher quality of education. Basic research is important not only for its own sake but also because of the solid and permanent foundation it provides for applied research and development (R&D). The dichotomy between basic and applied research is, in an important sense, intrinsically artificial. They are related to each other as Siamese twins. Know-why is as important as Know-how. Basic research without applied dimension is theory without measurement and applied research without basic research is measurement without a theory. A sound and judicious wedlock between the two is essential to guarantee beneficial fruits to the society. Hence, to ensure cross fertilisation they must go to bed together.

Any research, or education, for that matter, must be both light-giving and fruit-bearing. This perspective alone provides the rationale for forward and backward linkages between the universities and the industry. Basic research to the exclusion of researches in its applied dimensions is jejune and infertile. □

(Courtesy: University News)

Essay Competition

To commemorate the Centenary of Swami Vivekananda's Bharat Parikrama and his Address at the Parliament of Religions at Chicago, Yojana (English) is organising an essay competition open to its subscribers only. The theme of the essay is : Swamiji's Bharat Parikrama, the Chicago Address and the message of Unity and Amity. The essay should be of about 1500-1600 words.

On popular demand, it has been decided to throw the competition open to all students. However, they will have to affix a certificate of the Head of the Deptt./Institute to prove the bonafide of the competitor. They should write on the top of the envelop "Essay Competition". There will be three prizes viz., First Prize : Rs. 1000/-, Second Prize : Rs. 800/- and Third Prize : Rs. 600/-. There will also be two consolation prizes of Rs. 400/- each. The prize winning essays will be published in September 1993 issue.

The last date of receipt of the entries is 31.7.1993.

Teacher Education Search For Alternatives

Dr. G.L. Arora

IN the present age of specialisation, the multipurpose B.Ed. courses have lost their relevance. There is now the need for devising alternative programmes keeping in view the requirements of teachers and teacher educators of different levels and subjects.

QUANTITY of school education is a function of the quality of teacher education to some extent. But the system of teacher education in our country is characterised by inertia as it has been painfully slow in responding to the need and demands of school education.

The educational world has extensively debated during the past many years that teacher's education in India needs restructuring, strengthening and modernisation. A number of experiments have been tried, a host of schemes have been floated but dissatisfaction has persisted. It is felt that instead of improving the quality of teacher's education, standard of colleges has deteriorated over the years. The establishment of four-year integrated courses leading to B.A./B.Ed. or B.Sc. B.Ed. degree was heralded as a great innovation in teacher education but the experiment has not crossed the boundaries of the four Regional Colleges of Education. The lone example of the four year integrated course outside the Regional Colleges is that of University College of Kurukshetra, which had

to be discontinued after a few years in favour of the traditional one year B.Ed. course in addition to the 4-year integrated course. The National Council for Teacher Education (NCTE) set up to lay down broad policies with regard to structure, admission requirements and curriculum has remained almost non-functional for the past many years. In order to mobilise resources for their development activities, many universities have started correspondence courses leading to the conferring of B.Ed. and M.Ed. degrees. This reckless and misguided act on the part of some universities has taken the standard of teacher education to the rock bottom level.

To think of restructuring and strengthening of teacher education, it is imperative to have a critical look at the present system of teacher education for elementary and secondary stage of education. The existing teacher education system is based on the following assumptions:

1. Lower academic qualification is required to teach in lower classes.

2. Professional needs of teachers are the same or almost identical at the pre-school, elementary and secondary levels. Hence, one general multipurpose course of B.Ed. type is alright for the preparation of teachers and teacher educators of different levels.

3. Professional education should begin after the completion of general academic education. Therefore a prospective teacher should first complete his general education in a school/college/university and then join a teacher education programme.

4. Teacher educators, educational administrators and researchers should possess some sort of higher qualifications in education. Therefore, a multipurpose M.Ed. programme was conceived for the preparation of teacher educators, planners, administrators and researchers.

The teacher's education programme has undergone a number of changes during the post Independence period. The entry qualification for

the elementary level has been raised from middle pass to senior secondary level in most of the States while in some of the States it is still matriculation. The duration of the course has also been raised from one year to two years. In view of the increased availability of trained teachers, the phenomenon of untrained teachers has become a thing of the past in majority of the States. The number of secondary teacher education colleges has increased substantially during the post Independence period.

Better Prospects

Teaching has not remained a last resort for those who could not manage admissions or jobs elsewhere. With the revision of pay scales of all categories of teachers, teaching has become an attractive profession, specially for women. There was a time when 'first come, first served' was the basis of admission in teacher education colleges, many of which used set up camps in the other States or cities to attract students to their colleges. The situation has now changed as there is a great rush for admission to recognised colleges. In some parts of the country, the phenomenon of donation or capitation fee for buying admission has also become a reality. Keeping in view the great demand for teacher education courses, universities and State education departments have initiated measures including conduct of combined entrance test to regulate admissions.

The problem of unemployment among trained teachers is very serious in some States. The problem is more serious in the case of trained graduate teachers than the elementary school teachers. The problem does not assume alarming proportions as most of the women candidates are not very keen for full time employment as teachers. In many States, teachers possessing B.Ed. degree are eligible for employment as teachers

in primary schools, although they are trained for teaching at secondary stage and not at primary stage.

The past few decades have witnessed little attempts at modernisation of the curriculum of various teacher education courses. The latest researches in various aspects of child's development are reflected in the courses on 'educational psychology'. The study relating to sociology and philosophy of education has been replaced by the study of 'education in India' at the B.Ed. level. The emerging specialisations and problem areas in education have been accommodated as 'optional' in B.Ed. courses such as educational technology, non-formal education, adult education, guidance and counselling, population education, women education etc. But these changes are just cosmetic touches rather than full scale attempt at restructuring of teacher education courses.

In the B.Ed. courses, every teacher trainee is required to offer two teaching subjects i.e. he is trained for teaching two subjects at the secondary level. In many cases it so happens that a trainee has studied only one school subject at the graduation level but has to offer another subject also as his second teaching subject which he might have studied upto matriculation level only. For example, a candidate graduating with English, Philosophy and Psychology/Sociology, if admitted, will offer English and Social Sciences/mother tongue as his teaching subjects. A student teacher, who studied Chemistry, Botany and Zoology at the graduation level will offer English and Science as his teaching subjects. A trainee, graduating with two social sciences, if admitted, will offer 'Social Sciences' but in schools he will be called upon to teach all the four components of social sciences syllabus i.e. History, Civics, Geography and Economics upto secon-

dary level. In addition, he will be called upon to offer one language also and the general feeling is that any graduate can teach a language irrespective of the fact whether he has studied it at the graduation level or not.

The undergraduate courses, which are general in nature, are not tuned to the needs of any specific profession. There are various openings for the students who acquire BA/B.Sc. degree. They can join postgraduate courses or prepare for competitive examinations, but the undergraduate courses hardly meet the demands of the teacher education programmes, specially for the subjects of Social Sciences and Science. Moreover, instead of keeping the teacher education system dependent on the university system, it would be better to make it self dependent. Besides pedagogical training, the system should provide such academic education to the trainees as will equip them to teach their subject with confidence.

The present model of teacher education envisages academic education of 3 years duration followed by one year professional education. The alternative integrated model of teacher education envisages simultaneous professional education along-with general education. In most of the countries the integrated model of teacher preparation is followed as students desirous of adopting teaching as a career join the teacher education courses after completing their school education. A bachelor degree in teacher education is considered as first degree in education like other bachelor degrees in Science or Commerce or Arts. Therefore, bachelor programme should be specifically tailored to the needs of teaching profession. The content of this programme should comprise only those subjects/areas, the knowledge of which a trainee would require as a teacher. A prospective teacher of

Science should study the content as well as pedagogy of the four major branches of Science viz. Physics, Chemistry, Botany and Zoology.

The above discussion reveals that in the present age of specialisation the multipurpose and omnibus courses of present B.Ed. and M.Ed. type have lost their relevance. There is need for devising alternative programmes keeping in view the requirements of teachers and teacher educators of different levels and subjects. The system of teacher education may be restructured and reorganised along the lines suggested below:-

1. There is need for a statutory organisation at the national level to oversee the teacher education institutions. The organisation should be responsible for the formulation of broad policies regarding teacher education programmes, development of norms for the recognition or derecognition of teacher education institutions, development of model curricula and admission, procedures and development of suitable mechanism for the evaluation of teacher education institutions with a view to phasing out sub-standard institutions.
2. The multipurpose general type B.Ed. course should be replaced by specialised courses designed to meet the demands of different levels of education such as nursery

education, elementary education and secondary education. A candidate offering B.Ed (secondary) will specialise in the teaching of one school subject. Besides some core courses in foundations of education, he will study the content of one subject upto graduation level. Thus there will be as many types of B.Ed. (secondary) as there are subjects. Likewise, a student of B.Ed. (elementary) will also study one subject upto graduation level as he will be called upon to teach upto class VIII.

4. There will be a need to institute post graduate courses in education for the preparation of teachers for senior secondary schools, teacher educators, researchers and administrators. The course will be of two years duration and should be open to the students possessing bachelor degree in nursery or elementary or secondary education. The course may be known as M.Ed. (elementary) or M.Ed. (Nursery) or M.Ed. (secondary) in different subjects. These courses will aim at preparing teacher educators or administrators at different levels. Another purpose of these courses will be to train researchers in these areas. The courses for senior secondary teachers may be labelled as M.A/M.Sc. in the education of different subjects such as history, political science, geography, phy-

sics etc. The content of these courses will include some core areas in foundations of education, content of the concerned subject of post graduation level and its pedagogy. Initially, during the transition period, candidates possessing general B.A/B.Sc. degrees may also be allowed to join M.A/M.Sc. (education) courses.

In view of the integration of content with pedagogy, it would be difficult to run integrated courses in the existing colleges of education in the absence of adequate infrastructure and staff possessing competence and expertise to teach different subjects at the graduation or post graduation level. The problem can be easily solved if some of the existing science and arts colleges are converted into colleges of education. The staff working in the existing training colleges can be shifted to the colleges running integrated courses. The universities can run M.A/M.Sc. courses in the education of different disciplines in addition to the usual post graduate courses. The newly established District Institutes of Education and Training (DIETs) can be further equipped to run B.Ed. (elementary) and B.Ed. (nursery) courses. □

*The author is Director,
State Council of Educational
Research & Training, New Delhi.*

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Flood Insurance—Concept And Operational Problems

B.N. Navalawala

CLIMATOLOGICALLY and geographically, it is peculiar that out of total geographical area of the country (329 million ha.) the estimated area prone to floods is nearly one-eighth (40 million ha.) and drought prone area is about one-third (108 million ha.). Every year millions of people in some region or the other are affected either by droughts or floods. The Rashtriya Barh Ayog (1980) has on the whole identified the northern sub-basins of the Ganga basin and Brahmaputra basin as the most flood prone areas. Based on the available flood affected area of the States and adopting the criterion of adding maximum area affected in each State in any one year during the period of 1953-78, the RBA has estimated the area vulnerable to floods as about 40 million hectares (m ha.), including the area which has been protected from floods. The RBA had identified, based on the analysis of flood damage data of years 1971-78 that the States of Uttar Pradesh, Bihar, West Bengal, Orissa and Assam are more prone to floods as well as mentioning that Gujarat, Andhra Pradesh, Tamil Nadu and Rajasthan also suffered in recent years. Flood damage data of years 1953-90 indicate that on an average and annually, area affected is 7.94 million ha., total population affected is 32.86 million, the cropped area affected is 3.66 million ha., human

lives lost 1,532 nos. and total damage is Rs. 937 crore. In the 1977 flood alone as many as 11,316 human lives were lost. The maximum value of total damage i.e. houses, crops and public utilities that accrued in a single year was of Rs. 4,630 crore in the year 1988. It is estimated that the total damage that this country has suffered due to floods during the period from 1953-90 is of the order of about Rs. 3,52,627 crore.

Due to topographical and economic factors, protection cannot be provided to all areas prone to flooding as well as same degree of protection need not be provided to all areas susceptible. Protection is provided on the basis of frequency of flooding and based on this, areas would be categorised as protectable under flood frequency of 25, 50, 100 years or a higher order depending upon the site conditions including features of assets to be protected. Considering these factors, it has been assessed that the protectable area is 32 m ha. against which a reasonable protection has been provided to about 13.5 m ha. as a result of total investment of about Rs. 2,500 crore by the end of Seventh Five Year Plan (1985-90). It is estimated that as a result of construction of 15,600 kms. of new embankments and 33,100 kms. of drainage channels, afforestation and raising of villages above flood

level, 400 towns and 4,700 villages have been benefitted by the end of Seventh Plan. An outlay of Rs. 1623.37 crore including Rs. 282 crore under Central Sector has been approved for flood control sector programmes during Eighth Plan which works out to 5% of total outlay for irrigation sector as a whole.

Basically, there are two types of measures namely structural and non-structural for mitigation of flood damage. Major thrust, so far, in flood management in India has mostly been in the form of structural measures, mainly construction of embankments. The experience has shown that this approach has created its own problems, besides time and cost over runs, large investments needed and post-construction maintenance problems involved. Although structural measures are desirable for densely populated areas, it has to be realised that the same give protection to lives and properties only for certain level of protection and do not provide complete protection from floods. Further they increase the potential for major flood disaster once the assumed level of protection is exceeded. Also, investments on structural measures encourage people to move into known hazard areas, fully expecting and often receiving Government help. These ground realities must be recognised by policy makers, planners, engineers and

others, involved in flood management activities. Against this, due to cost effectiveness and speedier implementation of the non-structural measures, the main thrust is now on the non-structural management measures.

The non-structural measures can be broadly grouped under two categories as follows:

- (a) Modifying the susceptibility to flood damage
 - Flood Plain Management
 - Flood Proofing including Disaster Preparedness and Response Planning
 - Flood Forecasting and Warning
- (b) Modifying the Loss Burden
 - Disaster Relief
 - Flood Fighting including Public Health Measures
 - Flood Insurance

Effective Adjustment

Flood modification, acting alone, leaves a residual flood loss potential. It can also encourage a false sense of security leading to inappropriate use of lands in the areas that are directly protected and often in adjacent areas as well. For this reason, measures to modify possible flood should usually be accompanied by measures to modify the susceptibility to flood damage by land use regulations and by flood plain management, development and re-development policies, structural changes, flood proofing, disaster preparedness and response plans and flood forecasting and warnings. This strategy is expressed as actions to avoid dangerous uneconomic, undesirable or unwise use of flood plains. Experience in other countries has shown that such adjustments are very effective and that they cost less than conventional measures, besides tending to pass the burden of costs from the public at large to those who reap the advantages of flood plain location with the result that it also promotes increased awareness of the need for efficient flood adjustments.

This approach to flood management is to modify the incidence of the loss burden. This is actually a strategy for mitigating the losses by means of actions designed to assist the individual and the community in the preparatory, survival and recovery phase of floods. This category comprises: (i) Emergency measures, consisting mainly of evacuation, flood fighting and public health measures and (ii) Redistribution of losses which is for spreading the burden over a large segment of the community than that immediately affected or by spreading it more evenly over time. The common methods are disaster relief, tax remission and flood insurance.

Flood Insurance

Although, the flood insurance has so far not been widely adopted in India, it has several advantages as a means of modifying the loss burden. It enables an individual property owner to spread an uncertain, but potentially large loss, uniformly over a long period of time. It is somewhat similar to automobile insurance in the sense that the average annual premia are paid to avoid an uncertain but possibly catastrophic loss. However, it must be borne in mind that flood insurance does not reduce flood loss potential since it simply provides a mechanism for spreading it over time, area and a large number of individuals. It has advantages for both the public and the Government. It places part of the burden on those who enjoy the benefit of flood location as well as losses that are associated with the latter than making it the responsibility of the public at large and thereby of Government. The advantages of this measure are that only those activities that can afford to pay the requisite premia can continue occupation. Further insurance requirements in mortgage agreements can become a factor in stimulating the adoption of flood proofing measures.

Though flood risk has been included in "cover" issued by the General Insurance Companies in India it is more popular in urban areas and big towns where damage due to inundation caused mostly by excessive rainfall is taken care of. In Hungary, a scheme has been in operation since 1968 covering losses in the agriculture sector. A scheme has been instituted in the USA with the Federal Government providing a subsidy to the insurance industry, insisting that its applicability be contingent upon the adoption of land use regulation and other measures to reduce flood damage potential.

The Insurance industry has been generally unwilling to enter this field, mainly due to uncertainties over the reasonably priced assessment of damage potential in an operational area and thereby difficulties in fixing charge rates on some rational consideration. If uniform rates were charged, a company would find itself burdened with an adverse selection of risks because people only in the highly flood prone areas are the ones most-likely to take a policy. On the other hand, if an attempt were made to charge rates proportionate to the risk, the premium would be much higher than the property owners would be willing to pay. The insurance cover works successfully for a class of people who are subjected to such risks more or less equally. In case of floods, the risk of loss even in areas liable to flood is not equal. For example, those owning land or property at lower elevation in a flood plain are subject to higher risk both in magnitude as well as frequency. Therefore, those living at high levels would need to be equally willing to obtain insurance cover at the same rate.

It is quite a difficult task to accurately adjust insurance premium. Recently a study has been taken up for demarcating different flood risk zones in the country for arriving at a

suitable criterion for insurance premium. It may, however, be noted that all these efforts are in respect of properties only and not crops which are more liable to flood damage due to inundation. The insurance industry has also pointed out that even though it is possible to estimate flood frequencies, it is possible that a given insurance company might have to pay out claims for several years in succession and this might result in the company going bankrupt. The only way of surmounting this problem would be for several companies to join hands in providing flood insurance or for the Government to underwrite the claims.

Experience

In this connection, it will be interesting to cite the experience of Comprehensive Crop Insurance Scheme (CCIS) implemented during the Seventh Plan (1985-90) period, jointly by the Ministry of Agriculture and 19 States and 4 Union Territories in one or more seasons. This scheme covered loanee farmers only as well as selected crops namely, paddy, wheat, millets, pulses, and oil seeds. The premium was at the rate of 2% for paddy, wheat, millets and at 1% for oil seed and pulses and 50% premium subsidy was for small and marginal farmers. The limit of sum under this scheme was fixed at Rs. 10,000 per farmer. Since the implementation of the scheme, the income from premium has been of the order of Rs. 120 crore only as against the total payable claims of the order of Rs. 943 crore. Thus, the premium-loss ratio has been roughly 1:8. Now, taking various constraints, mainly limited coverage for both the farmers and crops and low premium, the Ministry of Agriculture has formed a Pilot Scheme, charging actuarial rates of premia, covering all farmers and all crops against all risks, including due to hail storm and without premium subsidy element. Under this new scheme, the limit of sum is increased to Rs. 45,000 per

farmer. The scheme is presently under discussion between the Union Government and States.

Another problem being faced by the insurance companies is the assembling of basic data for working out a fair and equitable premium for all areas according to flood risks. The present methods of assessing flood damages also need improvement. The RBA recommended that the State Governments should carry out realistic evaluation of the flood damage, river-basinwise, under three separately identified categories, namely, (i) unprotected areas, (ii) protected areas due to failure of protective works and (iii) areas between the embankment and the river. There are at present different departments in the States and different Ministries in the Centre entrusted with the collection of flood damage data. This creates some confusion as well as hinders timely collection of flood damage data. The improvement of the present techniques of field collection, assesment, recording and reporting of flood damage statistics is very much essential. Further, the present arrangements for collation of such data and keeping them in a retrievable form for users need to be improved. Computerisation is helpful, even necessary, but the more important problem is to induce the universities/research institutes who devote so much time and resources and take such pains in collecting data to match it with systematic analysis of the data. There is also need for a thorough recasting both at the conceptual and operational level, of statistics on floods and flood damages. Each system needs to be encouraged and helped to compile the detailed data relevant for flood management. Remote sensing technique would prove to be a very useful tool in this regard.

For successful operation of flood insurance scheme, it will need an

effective machinery for supervision and monitoring which is today almost absent. Therefore, a wide network under such machinery will have to be set up, may be by integrating with existing flood forecasting network.

Flood Plain Zoning aims at disseminating, such "potential loss" information on a wider basis so as to regulate indiscriminate and own planned development in flood plains and is relevant both for unprotective as well as protected areas. Flood plain zoning recognises the basic fact that the flood plains are essentially the domain of the river and as such all developmental activities in flood plains must be compatible with the flood risk involved. Heavy encroachment on flood plains has been responsible for increasing trend of damage over the years, notwithstanding the large investments being made year after year. The RBA also recommended that flood plain management measures should be undertaken and a suitable legislation enacted wherever necessary. Subsequently, the National Conference of the States' Irrigation and Water Resources Ministers have endorsed this view while recommending the enactment of necessary legislation by each State expeditiously alongwith other related measures. It has also been recommended that pending enactment of legislation, development activity in the flood plains should be regulated by administrative measures.

Central Water Commission (CWC) had prepared a model draft which was circulated in 1975 by the then Ministry of Irrigation, to all the States advising them for enactment of a suitable legislation. The response from the State Governments has so far been not encouraging. Except Manipur, no other State in the country has enacted a legislation so far, though it is stated to be under

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Training And Visit Programme: A Case Study

Dr. Hemchand Jain

THE project was started in September, 1977 in the first phase covering 5 districts of Madhya Pradesh. In the second phase the remaining districts were covered. The project was launched mainly to develop better contacts of agricultural scientists with extension field workers and farmers to provide them with latest technology for agricultural development in Madhya Pradesh.

The project has three components, viz, extension, research and project monitoring and evaluation. The re-organisation of the extension system was done by the state government to ensure better implementation. The monitoring and evaluation component was entrusted to the State Department of Agriculture. The applied research part of the project and organisation of training programme to the field level extension workers was the responsibility of the agricultural Universities.

The farm universities of the state organised the training programmes and to equip extension workers with latest crops and allied technology.

Prior to the implementation of training and visit programme, the extension service was found to be

involved in fulfilling the targets, and has forgotten to bring about changes in behavioural pattern of farmers. Hence a wide gap in generation of technology and its utilisation by the clients was found. The T and V-a better approach to agricultural extension provides a systematic and regular upto date advice on farm practices to the farmers under location specific conditions having immediate impact on their production and consequently income.

Thrust Areas

The increase in production in the past has come largely from the irrigated crops while yields from rainfed areas have remained low and stagnant. Of course, the new technology is neutral to scale but in actual practice the benefits have been availed largely by the farmers having better resource endowment. The marginal/small farmers could not reap the fruits of new farm technology due to lack of availability of adequate resources. To reduce these imbalances and to increase the participation of farmers with poor resources endowment, a need was felt to raise the yield levels of crops through improved agricultural practices. The strategy implied in the T

and V is to increase agricultural production through the reduction in gap between present practices of the majority of the farmers and the existing technology used by the progressive farmers. Thus the thrust area to improve the productivity levels of crops was to transfer the know how of already proven but simple technology to the farming community. This could be achieved through improvements in agricultural research programme under T and V system.

Objectives

(1) A coordinated approach for increasing agricultural production particularly food grain through best possible use of extension, research, training and monitoring and evaluation under the project.

(2) Re-organisation and strengthening of extension system to ensure regular contact with the farmers to identify and solve location specific problems on their farms.

(3) Motivating the farmers to adopt the new technology quickly so that the gap between research and extension is reduced.

(4) To arrange and organise training programmes to equip the

extension workers of the state Department of Agriculture with the new developments of farm technology research and practical knowledge of different crops production technology.

The project had a very modest target of attaining a minimum increase in yield of 25 kg/ha. in case of food crops in 7 years after launching of the programme.

Keeping in view the genesis of T and V programme, the present study was undertaken to evaluate the programme in Jabalpur district of Madhya Pradesh. The objectives of the present study were to examine the organization and operation of T and V programme, the rationale of adoptive research, lesson plan and feedback received from extension workers/farmers, assess the impact of the programme, scrutinize the targets and achievements and finally to suggest ways and means to improve its functioning.

To evaluate the programme in the selected district, Patan sub-division and Nunsar, R.A.E.O. Circle was purposively selected. The selection of contact farmers numbering 34 was done on the basis of stratified proportionate random sampling and the non-contact farmers numbering 34 were selected by simple random sampling. The results of this study were based on the 68 sample respondents.

Findings

- (1) The selection of the farmers belonging to different castes and categories was in line with the directives of the programme.
- (2) In selection of the farmers, educational level was kept in view and hence about 80 per cent of the contact farmers under the programme were educated.
- (3) The contact farmers were better placed in terms of possession of land holdings and irrigation facilities in the study area.

(4) The sample farmers reported the production technology, plant protection and input related problems as the first, second and last preference problems respectively. But the contact farmers suggested a large number showing their deeper understanding and ability to identify problems because of the linkage with the extension agency. The contact farmers were found more conscious of plant protection measures as against the non-contact farmers.

(5) Out of the problems suggested by the respondents, 54 per cent were solved by the field extension worker, showing the extent of effectiveness of extension service. The number of reported problem and their solutions were found positively associated with the size of holdings.

(6) More attention was paid to visiting fields belong to large farmers. Extension agency was found to be biased towards contact farmers. The visits of R.A.E.Os. were more at the residence of respondents rather than on fields as envisaged in the programme.

(7) The R.A.E.Os. were found to be over burdened with routine work which hampered their visits and allocation to time for field work.

(8) The extension agency was partially equipped for solving location specific problems and also lacked initiative due to excessive administrative assignment.

(9) Sixty per cent of the identified problems were attributed to personal contacts only. Remaining problems were from other sources.

(10) The coordination between extension workers and research scientists was by and large found to be satisfactory.

(11) Monthly training programmes were reported to be effective and of practical use by forty per cent only. Necessary feedback is essential to improve upon the contents of training programmes. The scheduled training programmes have become rituals and stereotyped for want of proper feedback and flexibility in the programme. The trainings were less oriented towards practicals and remained merely classroom lecture. The improvement in the training programme depends upon timely feedbacks and interest of the trainees.

(12) The number of adoptive trials conducted on farmers' fields were one-third of the total planned. The large size farms had availed of the advantages of these trials. The maximum number of adoptive trials were related with the input use in farming whereas production technology and plant protection were next in order of importance.

The purpose of these adoptive trials was to attain higher levels of production, adopting of improved cultivation of crops as a business activity and improving technical knowledge of farmers.

The adoptive trials were conducted to the extent of 58 per cent in case of non contact farmers to solve their location specific problems. There was less involvement of field extension workers in conducting trials of testing of the technology on farmers' fields.

The results also reveal that there was poor or no co-relation between lesson plans and adoptive trials. The lesson plans were mostly on production technology whereas the adoptive trials were mostly on input use.

(13) The data in respect of coverage of area under recommended improved farm technology by the sample farmers revealed that

the contact farmers got more advantages as compared to those non-contact farmers in adoption of new farm technology in terms of improved seed, fertilizer use, seed treatment and plant protection measures.

The reasons reported for non-adoption of recommended facilities were untimely availability of inputs and unfavourable conditions. As regards knowledge and efficacy of improved farm technology, the contact farmers had the better knowledge as compared to efficacy in using improved farm practices.

(14) There was a definite increase in the yield levels of wheat and gram showing the positive impact of T and V programme.

(15) In this study about 76 per cent sample farmers reported the usefulness of T and V system. The maximum proportion of large farmers responded favourably in this respect as against other categories of farmers. The agricultural extension services were reported significantly useful for sample farmers in comparison to non-contact farmers.

The farmer-respondent opined

for making improvements in the programme:

- (a) Extension workers should have rural back-ground and they should be well-versed with the service area.
- (b) The extension workers should devote more time to field visits and personal contacts with the families.
- (c) The problem identification and the feed-back to the scientists for obtaining solution should be well documented so as to help in the entire machinery for agricultural development.
- (d) Informal meetings and group discussions should be the essential components of T and V programme.
- (e) There should be flexibility in the training programmes and correspondence with the lesson plans, radio talks and adoptive trials.
- (f) Voluntary organisations for farm advisory services should be organised for popularising the programmes among the farmers and having target participations in the T and V programme.

Recommendations

1. In view of the difference between contact and non-contact farmers, the selection criteria needs to be changed in favour of those who have resource constraint and fall below the poverty line.
2. Problem identification, feed-back and planning of adoptive trials need greater emphasis in the T and V programme.
3. The training programmes should be flexible and oriented to feel needs of the farmers to minimise technological gaps.
4. Extension workers should allocate more time on field visits and contact of the farmers.
5. Targets need to be revised in the light of the productivity of the resources specific to the farming situations.
6. T and V programme should be integrated with IRDP.
7. The T and V programme should be concentrated in an area instead of following scattered approach resulting in dilution of efforts and low performance.

The author belongs to J.N. Krishi Vidyalaya, Jabalpur.

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active consideration in a few other States. Assam has stated that enactment of flood plain zoning legislation is not envisaged at this stage. Madhya Pradesh is considering physical demarcation of 36 towns affected by floods at least 3 times in the last 30 years. The matter regarding legislation for flood plain zoning is before the State Flood Control Board for consideration. Uttar Pradesh feels that flood plain zoning legislation is not considered necessary at this stage. West Bengal is in correspondence with its Law Department regarding the draft bill

on flood plain zoning. Orissa has reported that the formulation of Flood Plain Zoning Bill was under consideration of the State Government. Tamil Nadu has intimated that it agrees in principle to enact a suitable legislation for flood plain zoning. Delhi Administration has informed that the enactment of Flood Plain Zoning Act is not required as the objective is proposed to be achieved through the existing provision of Delhi Development Act 1957. However, CWC has informed the Ministry of Water Resources that the Delhi Development Act does not

cover the flood aspects and is mainly meant for urbanisation etc. Gujarat has not considered it necessary to enact such a legislation in view of the situation prevailing in the State. Also, the Government of India took lead in getting flood plain zoning maps prepared through satellite imageries at a cost of about Rs. 6 crore and has made the same available to the States. □

The author is Adviser, Planning Commission.

Export Potential Of Minerals: A Perspective

B.D. Jethra, P.N. Shali and S.B.S. Chauhan

FOR working out an effective strategy for increasing exports of minerals, some of the important factors that would need to be considered include environmental factor, competition from competitive materials, price, etc.

The export marketing strategy for minerals and ores would have to take into account the new developments in environmental laws which are becoming stringent in the Western world. Last two decades have witnessed increasing global concern for protection of environment and ecological balance. Sustainable development is the theme of global concern reflected in the Brundtland Commission, 1987, the World Conservation Strategy, 1982 etc.

It is evident, therefore, that the environment has become the single most important issue which mining sector and mineral exports will have to reckon with. Its impact will be that stricter environmental requirements in the developed countries of the western world will force companies to move away or close down; while in the third world countries, it will take some more time before such stringent environmental laws are brought into force. Consequently, minerals, produced in the third world countries are likely to become competitive, given the fact that stricter environmental requirements will be the significant area of cost increase for new capacities in the western world. Besides, decreasing area of land available for exploration, improved

air quality standards and the need for reclamation commitments in these countries will add significantly to the costs of mineral production.

The third world countries are likely to gain some time because of these developments. There may be a possibility of multi-national mineral producing companies moving away from the western world into the third world countries for exploitation of minerals and ores there. This is likely to result in a new trend either of sole multi-national operating in the exploitation of minerals or joint sector ventures coming up in the third world countries. In both the cases, third world countries will stand to gain particularly with regard to investments and marketing infrastructure from the multi-nationals.

It is also likely that in the investment sensitive area of mineral exploration, multi-national inputs will help in speeding up mineral exploration activities in the third world countries which is likely to lead to overall increase in mineral production as well as in the international trade of minerals particularly from the third world.

Competitive Materials: The mineral markets in the 1990s will be influenced by possible substitutes—which might compete with specific commodities. This will require a detailed investigation based on the present trend in this direction. For example, in the USA, the materials market share for metallic minerals has decreased and

that for organic-based materials has increased significantly in the last few decades. Plastics are now the main competitors with metals. International material markets are by and large depicting the same pattern as those seen in the United States.

The price will be the other important factor on which will depend export potential of minerals from India. Presently, we are not price competitive internationally, by and large. It is likely that we may become competitive in the near future now that the forward-looking policy changes have been brought about which is going to give impetus to the development of a competitive Indian economy. But these policy changes will yield results when there is sincere and willing response of the industry to adjust to the new changed conditions. Besides, minerals are low value bulk materials, requiring special attention in regard to their handling, movement and freight charges. In the export of any mineral, railway freight and port charges together consume around 70% of their f.o.b. realisation.

The movement of high value bulk minerals will be advantageous rather than low value bulk minerals. Even semi-processed commodities could be advantageous from the point of view of high export earnings.

A Perspective

There would be a medium-term and long-term perspectives for mineral exports from India. The medium-

term perspective will be based on the existing reserve position (proven) and the long term on the likely reserve position of the minerals—when possible and probable resources are brought into proven category through investments in exploration. The thrust in the VIII Plan will be on the later aspect of mineral development in India.

With the advancement of processing technologies including that of beneficiation, presently minerals of inferior grades can become a potential reserves for commercial exploitation in the distant future. We have large resources of such minerals. Therefore, at present a long term scenario can only be guessed.

For medium term perspective, broad indications are that in the next 10 years or so, we might be in a position to improve the status of mineral exports.

Minerals in which we are, reserve-wise, well placed today and have potential for exports are Barytes, Bauxite, Bentonite, granite, Chrome Ore, Dolomite, Fire Clay, Fuller's Earth, Gypsum, Iron Ore, Ilmenite, Kyanite, Limestone, Magnesite, Manganese Ore, Rutile, Silica minerals, Talc/Steatite, Pyrophyllite, etc. By and large these are the minerals which are being exported except limestone. Mostly, these minerals are commercially exploited in the private sector. Barytes occupies the first position in the list of exports of these minerals. India is one of the largest producers of barytes in the world.

Iron Ore is the major mineral and contributed Rs. 8834.6 million in foreign exchange earnings in 1989-90. This was followed by calcined alumina at Rs. 3925.9 million, chrome ore Rs. 665 million, manganese ore Rs. 379.9 million, ilmenite ore Rs. 215.9 million, salt Rs. 154.1 million in export earnings in 1989-90. These minerals could be

placed in 'A' category in their foreign exchange earning potential.

Barytes, Granite, Marble, Alabaster and other stones and products contributed Rs. 1682.8 million in our foreign exchange earnings in 1989-90. Out of this, granite and products thereof contributed about Rs. 1470 million followed by Barytes Rs. 162.8 million, marble and other stones Rs. 50 million in our foreign exchange earnings in 1989-90. These minerals could be placed in 'B' category list.

Minerals like Bentonite, Calcined Magnesite, Felspar, Fuller's Earth, Kaolin, Sillimentite, Dolomite—all processed minerals—contributed Rs. 134.9 million in our foreign exchange earnings in 1989-90. These minerals are in the 'C' category list.

From the above A,B,C analysis, one could say that our strength in earning foreign exchange lies in bulk foreign exchange earning minerals—placed in 'A' & 'B' category. In case we intend to aim at higher growth in foreign exchange earnings from mineral exports, our efforts must concentrate first on these two categories of minerals and then on the third.

In the perspective next 10 years, a variety of factors will come into play which will determine the growth in mineral exports from India. The most important will be how we are placed vis-a-vis other competitors in these minerals in price, quality and in maintaining continuous supply. The other important factor would be the investments required to increase mining capacities both in mines and in the infrastructure—roads, railways and port facilities. Besides, technology in the use of these minerals for manufacturing industrial products will also be one of the important factors to be considered.

Private Exploitation

While it will be difficult to increase significantly investment in the public sector, it might be possible to

increase investments in the private sector for mineral exploitation during the next decade. From this viewpoint, export oriented alumina plants and more iron ore producing capacity in the private sector will be desirable. The other minerals in the above stated list will be exploited by and large by the private sector and there should be no difficulty in increasing mine capacities provided we are sure to penetrate fairly widely in the international market for these minerals.

It will be also pertinent to assess the better option for increasing our foreign exchange from the export of minerals. For example, a pertinent question would be whether it should be gainful to export raw ores or semi-processed or processed minerals. In case of iron ore, export of sponge iron or pellets will be the other options available. Similarly, in case of bauxite, calcined alumina will be a value added option. Exporting bauxite may not be a profitable proposition. Aluminium exports in the immediate future will not be possible since we will be re-entering a deficit phase in this metal by around 1996-97.

In some cases, however, India might gain in exporting ores rather than ores/minerals in the semi-processed or processed forms. A case in point is the export of manganese ore at the present juncture. While the prices of manganese ore have firmed up considerably in the last two years after a gap of three years, the prices of ferro-manganese have not proportionately increased.

Coming to specific minerals, while exporting bauxite will not be profitable since global bauxite trade had come down by 9% due to high energy cost of transportation of bauxite to alumina refineries from mine heads in the recent past; alumina is a value added internationally traded commodity. It has attained the status of a free market

commodity due to significant structural changes in the global alumina market. There is much scope for India to increase its present share at around 0.5 million tonnes out of the total international trade of 9 million tonnes. Aluminium production facilities are progressively shifting to energy-rich regions of the world and alumina prices as a consequence are tending to be attractive. The setting up of export oriented calcined alumina capacity will be profitable investment for India in 1990s. India will have to make a considerable amount of marketing efforts to take best advantage of the opportunities going to be available in international alumina market.

After a long period of decline and stagnation, the world iron ore market is expected to attain a level of buoyancy in 1990s. India ranks fourth with its contribution to the world iron ore trade at around 8%. The largest importer being Japan with 60% share of our total exports. It is expected that the present level of export at 34 million tonnes is likely to be maintained by 1994-95 keeping in view the constraints of large investment required for increasing the capacities in mines, railways, ports, etc. as well as considering the significant increase in the domestic consumption.

Other Minerals

The other minerals which have contributed a large sum of money in our foreign exchange kitty are chrome, manganese and ilmenite ores. We have sizeable deposits of high and low grade friable chrome ore which can be easily upgraded by beneficiation. The reserves of lumpy ore grade-I are limited. A substantial potential for increasing exports of chrome ore can arise with mining at deeper levels from 60-200 metres in Sukinda Valley in Orissa, for which we need a new State-of-Art technology particularly to tackle 'Fragile Ore Bodies'. Due to low reserve

position, we may not be in a position to increase export of manganese ore significantly in the immediate future. Impurities such as vanadium, chromium, etc., put the Indian ilmenite in a slightly disadvantageous position vis-a-vis other world suppliers. It would be, therefore, necessary to develop beneficiation technology to improve the grade of ilmenite ore for increasing its export.

Coming to 'B' category minerals: in this list barytes, marble and other dimensional stones are the major minerals. Given their reserve position, there is significant potential for earning foreign exchange through higher exports of these minerals in the next decade.

Presently, India is one of the major exporter of barytes to U.S.A., Middle East and Iran. East Europe and Japan can be potential target markets for achieving a higher growth in export of this mineral. From the present almost a stagnating condition, demand for barytes is likely to increase due to recent spurt in oil prices consequence of which will be that the oil drilling activity is likely to increase. India is in a position to corner a bigger share of the total international trade of barytes, being one of the largest producers in the world.

In 1989-90, Rs. 152 crore worth marble, granite and other dimensional stones were exported. Indian share in the world market of these minerals can be increased by setting up more 100% export oriented units in the private sector. Since, by and large, these minerals are found on the surface as out-crops and can be easily mined, the major investment is required in setting up cutting and polishing units.

In 'C' category minerals, bentonite stands at the top of the list, followed by Felspar, Calcined Magnesite, Kaolin, Sillimenite, Iron Oxide and so on. While India has large reserves

of these minerals, these are low value items. Our share in the world trade of Bentonite is only 5% and almost negligible in other minerals. Due to likely spurt in oil drilling activity the world over, demand for Bentonite is likely to increase. The new markets for Bentonite will be East and West Asia and neighbouring countries. Manufactured sheet Mica, Slate, Felspar, etc. are some of the other mineral of high export potential.

Supportive Measures

In order to achieve the objective of increasing our exports of minerals, infrastructural inputs for marketing both for dissemination of information on international markets of minerals and for actual market promotion will be necessary. An Export Promotion Council exclusively for minerals will be desirable.

The Government has already initiated measures to liberalise various policies pertaining to mineral development for making these in line with the liberalised economic environment that has now been created for faster economic development of the country. A new mineral policy has been announced and the existing Acts and Rules pertaining to mineral development are being amended. These changes will encourage the role of private entrepreneurs in mining and export of minerals who are likely to contribute in a great measure in achieving higher growth in the export of minerals in the years to come. Besides, some concessions such as extension of benefits available under Section 80 HHC of the Income Tax Act to the exporters of minerals and ores and liberalisation in the grant of mining rights, etc., also need conservation.

Any policy and strategy that might become necessary to increase exports of minerals must, however, take into account the mineral inventory position both in the immediate and on the long-term basis.

Conclusion

India continues to be a net importer of minerals and metals. Broadly, India's contribution in the total international trade of minerals is not significant and there is potential to increase this share substantially.

The minerals that can contribute in a great measure in achieving this objective are iron ore, bauxite refined as calcined alumina, marble, granite and other dimensional stones, barytes, bentonite, fuller's earth, etc.

Reserve-wise India is well placed in the minerals and in the long run the reserve base is likely to increase with intensive exploration drive that will be taken up in the Eighth and subsequent Plans.

While there may not be much contribution of the public sector in further increasing mining capacities for bettering our share in the international trade of minerals, a significant contribution is likely to come from the private sector in this regard. Specific investments both in increasing mining capacities and infrastructural facilities including railways and ports will have to be worked out. It will also be pertinent to study the alternative options of exporting minerals in raw form or semi-processed or processed forms, depending upon the international prices.

The international markets for minerals will also be influenced by changes in technology, and through

substitution effect of materials etc. This will have to be taken into account while working out the detailed export strategy for the next decade.

In order to help private sector to increase its role in mining and export of minerals in the next decade, institutional and policy support like exclusive Export Promotion Council for minerals is needed, extension of income-tax benefit under Section 80 HHC, liberalisation in the grant of mining rights, etc., will also deserve consideration. □

*The authors are Addl. Adviser,
Jt. Adviser and Adviser
respectively in the Planning
Commission.*

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Women In Development: A Case Study

Pritha Sarkar

DEVELOPMENT of Women and Children in Rural Areas (DWCRA), a sub-programme of the Integrated Rural Development Programme (IRDP) is specially designed to improve the quality of life of women and children in rural areas. Although there is a specific target for coverage of women beneficiaries under IRDP, experience shows that the flow of assistance to women in rural areas has been marginal. The male members of the family usually take the decisions on the mode or utilisation of the fund provided for the womenfolk. There are innumerable cases where a woman member in the family is totally ignorant of the fact that a loan has been granted in her favour. Hence, it was felt that there was need for a sharper focus on the status of rural women and for adopting a different strategy for offering the services of IRDP to women. To fulfil this need, DWCRA was launched in 1982-83 with special assistance of the UNICEF.

Objectives Of DWCRA

The basic objectives of DWCRA are:

- (i) To organise women's groups (of 10 to 15 members) in rural areas for dealing with problems-social, economic and political faced by them.
- (ii) To make rural women critically aware of the society in which they live.
- (iii) To increase the earning capacity of the poor rural women by

developing their abilities and skills.

- (iv) To provide opportunities to the women for self-employment on a sustained basis.
- (v) To help rural women learn and take advantage of the various social development resources and services available in the area and to participate in planning and implementation of different programmes in the area.

As a woman's earning in a family is likely to be spent largely on the welfare of the children, it is expected that the children's development will automatically follow the mother's development.

DWCRA was launched in West Bengal in 1983-84 in the districts of Bankura and Purulia. At present, there are twelve districts where this scheme is in operation. Till the 31st March, 1993, 2535 groups had been formed covering about 45,000 women beneficiaries in the State.

DWCRA was introduced in the district of North 24-Parganas in 1989-90. Of the 22 blocks of the district, 20 have so far been brought under its purview. The areas covered range from semi urban tracts on the town fringe to extremely backward and remote riverine islands of the Sunderbans. In the first year, 100 groups were covering about 1750 women beneficiaries. At present there are as many as 293 groups with about 5000 women benefitting from

the scheme. Out of these, 50 groups have been formed under a Pilot Project for Bank financing of Informal Groups. Besides, more than 1800 beneficiaries have received training under TRYSEM. About 1200 women have been provided with different types of loans under IRDP, the economic activities varying from traditional scheme like dairy, poultry and weaving to newer projects like making of gauge-bandage and embroidering intricate designs with Kantha Stich.

There has been a perceptible improvement in the economic status of the families to which the DWCRA beneficiaries belong. What is even more significant and what holds bigger promise is the fact that these beneficiary groups have become forums of articulation of the problems faced by the poor rural women in the area. Recognising this new dispensation the North 24-Parganas District Rural Development Agency (DRDA) organised a series of seminars and workshops at the district and block levels involving Panchayat members, bank officials, representatives of women's organisations and DWCRA groups members in order to create and sustain general awareness about this scheme. There was wide and spontaneous participation including that of local M.L.A.s, the Zilla Parishad Chairman and the Collector. Successful group leaders narrated their stories of success and pooled their experience in these meets.

Convergence

Improving the quality of life of the poor rural woman does not mean making her an economically self-reliant individual only, but also involves the enhancement of her social awareness. A successful DWCRA group is one which has generated self-confidence among its members and has inculcated in them a positive self-image. All round development of the women in a DWCRA group is possible only

(Contd. on page 26)

Renewing Commitment To Better Environment

I.J. Bahl

EARTH is the only planet, so far known, to have an environment that can sustain life. Environment consists of land, water, air and plants etc. Another external component of environment is the perennial energy that it receives from the Sun.

The adequate natural resources, if wisely managed can fulfil the basic needs of every one now as well as of posterity. However, the need of the poor, the greed of the rich and the inappropriateness of the technologies employed in various sectors have resulted in a rapid erosion of our resource base, depletion of our forests, decimation of wild species, pollution of air and water which threaten future development.

No doubt, environmental degradation directly stems from uncontrolled deforestation the emission of pollutants, excessive use of toxic products and the exploitation of non-renewable natural resources which can be described as acts of aggression against nature. Man's dependence on the environment is greater than that of other organisms and the conservation has, therefore, become very important today to maintain the essential ecological processes and life supporting systems, to preserve the diversity of species and the genetic resources.

The World Environment Day is indeed an appropriate occasion to remind ourselves that we all belong to one human family and must work together for our common good—be at the regional, national or global level. We have a responsibility to

future generation as well as to our own to preserve the unique ecosystems of this ancient land and to play our part in contributing to the maintenance of the earth's biodiversity.

There has since been growing awareness of global environment concerns such as Ozone depletion, the green-house effect and climate change, trans-boundary movement of hazardous substances and wastes, the threats to the biological diversity etc. There has also been growing acceptance about the linkages between environment and development.

India has played a great role in harmonising the conflicting views on global environmental issues. The United Nations conference on Environment and Development was held in June last year in Brazil in which over 100 Heads of State and government participated. The stand of the developing countries was articulated and the Rio Resolution was adopted. While the treaties on climate change and bio-diversity were agreed upon and signed, poverty alleviation was made the basic item in the Agenda-21. Indian representatives have also participated in several other international conferences such as in Beijing, Geneva and Kenya to discuss and develop a common approach among the developing countries towards issues like Montreal Protocol, Green-House effect, Biological diversities and Funding Mechanism.

Unique Initiative

India and Britain have proposed

a joint initiative on Environment matters and have prepared position papers on crucial environment issues. It is hoped that this unique initiative between a developing and a developed country will be fore-runner and provide the basis for a common platform to be adopted by other like minded countries.

For us environmental conservation is not a new concept. The Indian tradition of love, respect and reverence of nature goes back to the time immemorial. Historically the protection of nature and wild life formed an ardent article of faith reflected in the daily lives of the people and also enshrined in myths, folk lore, religion, art and culture. Twenty two centuries ago, Emperor Ashoka made it a King's duty to protect wild life and forestries. He got edicts inscribed on rocks and iron pillars all over his Kingdom prohibiting the destruction of forests and killing of the various species of animals. This historical evidence surviving till today is the first recorded measure on conservation anywhere in the world.

But today, India is no exception to the global phenomenon of environmental degradation. Development programmes based on utilisation of natural resources of the country with the aid of Science and Technology have been carried out in the post-Independent era. It was in the early seventies that alongwith the rest of the countries of the world, India realised another disquieting trend. The same efforts which helped to

bring people above the poverty line also put greater pressure on the natural resources of the country. The irrigation facilities provided the much needed water to the parched fields, but sometimes, produced salinity in the land. The industrial technology based on the old models of the developed countries, provided products but also polluted water and air. The roads provided better communication facilities but this was at the cost of forests which were cut to meet the demands of the people. The medical facilities improved the health of the people but increased population dramatically raising the demand for the products of nature.

The Ministry of Environment

and Forest with separate departments for Environment, Forests and Wildlife was formed in 1985. The main objective and activities of the Ministry include the conservation of forests and wildlife, prevention and control of pollution, afforestation and regeneration of degraded areas, protection of environment and research related to these topics. The Environment Protection Act, enacted in 1986 envisaged co-ordination of activities of various regulatory agencies. The Ministry serves as a model agency in the country for the United Nations environment Programme, South Asia Cooperative Environment Programme, International Centre for Integrated Mountain Development and Inter-

national Union for Conservation of Nature and Natural resources. A large number of development projects are being carried out in collaboration with the International agencies.

After completion of the Ganga Action Plan aimed at reducing pollution the Government has now launched the Yamuna Action Plan in the Capital. The launching of the Plan coinciding with the World Environment Day is reminder of a challenge to development caused by deforestation and unplanned discharge of residues and wastes into the rivers.

(Courtesy: AIR)

(Contd. from page 24)

when the group has access to the various economic and social resources and services available in the area. Keeping this end in view, the district authorities of North 24 Parganas are formulating a specific plan for Convergence in the DWCRA the efforts of various departments like Health and Family Welfare, Mass Education, Social Welfare and Public Health along with DRDA and the UNICEF. This plan for concerted action aims at interweaving within the DWCRA group various personal and social issues like literacy, safe motherhood, immunisation, safe drinking water, improved sanitation, correct dietary habits, clean environment etc. Special plans to ensure access to primary education for the children of the DWCRA beneficiaries and to reduce school drop-out rates are being made. Linkages are being established with on-going programmes like ICDS (Integrated Child Development Scheme), MCH (Maternity & Child Health), UIP (Universal Immunisation Programme), UPE (Universalisation of Primary Education), TLC (Total Literacy Campaign) etc. Special Monitoring Cards, in the

likeness of Vikas Patrikas for IRDP beneficiaries, have been introduced for monitoring the progress of DWCRA groups. After the Panchayat elections of May 1993 about 1765 elected women members will be integrated into the Panchayati Raj hierarchy of the district. If they share the responsibility of implementing the programme at the grass root level DWCRA may as well become a model scheme of women's active participation in the planning process. The fact that a significant number of DWCRA group leaders and beneficiaries are contesting the elections is in itself an indication of the emerging scenario and a measure of the success of the programme that DWCRA stands for.

A New Strategy

The district authorities have designed a new strategy for effective implementation and monitoring of DWCRA. It is the strategy of GROUP ADOPTION. Bankers and non-Government organisations are requested to adopt a DWCRA group within their service area and to nurse the group till it stands on its own feet.

The activities of a successful group are bound to have a multiplier effect in the village where the group is located and on society at large.

Statistics on the status of women in India clearly reveal what has been aptly termed Feminisation of Poverty—a phenomenon which emphasises the selective deprivation, exploitation and social oppression faced by poor rural women. They are the poorest in the family of the poor. It is being increasingly felt that this vast number of human resource which has remained largely untapped has tremendous potential for the growth of the country.

DWCRA holds promise for a brighter future as it draws its sustenance from the faith that all round development of the women in the family holds the key to the uplift of the status of the family and of the society. If properly implemented, it may serve as one of the most effective instruments in our plan strategy. □

The author is Asst. Project Officer,
(Women's Development)
West Bengal.

Raising Of Vegetation Belt Along The Cyclone Prone Coast

H.K.N. Trivedi

THE United Nations General Assembly through its Resolution 44/236 adopted on 22nd December, 1989 declared 1990s as International Decade for Natural Disaster Reduction. It called upon nations throughout the world to give special attention to programmes and projects designed to reduce loss of life, property damage, and economic and social disruption caused by natural disasters. In India, efforts are underway to take various short and long terms measures to observe the Decade in letter and spirit. India, because of its geographical location and extent, is affected by almost all types of natural disasters. Keeping in view the annual loss, these are the tropical cyclones which have been causing maximum damage in terms of loss of life, property, and economic and social disruption practically every year. The damaging factors associated with a cyclone are: strong winds, heavy rainfall and the storm surge which is abnormal rise in the sea level above usual astronomical tide due to cyclone. One of the most devastating cyclone was the one that crossed coast of Andhra Pradesh at Chirala on 19th November, 1977. For 2 days rainfall varying from 20-45 cms per day continued in Prakasham, Guntur, Krishna, East and West Godavari and adjoining Vishakhapatnam and Khammam districts. This area was also lashed by wind with speed of about 200 kmph. The most devastating was the storm surge of about 5 metres above sea level which extended upto 12 kms inland between 5 p.m. to 11 p.m. of

the fateful day. The losses associated with this cyclone included more than 8000 human lives, above 6 lakh cattle heads and other livestock, and damages to public utilities of about Rs. 170 crore. About 71 lakh people and a cropped area of about 36 lakh acres was directly affected.

Efforts have always been made to minimise the damages by taking various measures. It was the above mentioned cyclone which led to the constitution of the Cyclone Review Committee (CRC) by the Government of India in March, 1979. The Committee took stock of situation not only within the country but also the arrangements in other cyclone affected countries and submitted the report in May, 1984 to the Department of Science and Technology. Altogether, the report contains 317 recommendations. Of these, 107 recommendations, pertain to Cyclone Monitoring/Cyclone Warning System, 124 to National-Cyclone Code and the Cyclone Emergency Action Plan, 77 to Community Preparedness Plan against Cyclone and 8 for Research and Training.

The CRC recommended creation of a Coastal Development Authority, in each cyclone prone State, which will be responsible for execution/coordination of all developmental activities in the coastal belt including establishment of forest belts in the coastal strips for protection against cyclones and prevention of soil erosion caused by these.

If a thick forest belt comprising

trees which are not easily blown off by strong wind and which may be in a position to sustain the salinity affect caused by the winds blowing from sea or due to inundation, is grown, it may help in cyclone disaster reduction in the following ways:

- i) This will form a wind-break. Thus, the stronger winds, particularly at the surface level will not be able to damage structures, crop etc.
- ii) The storm surge which is the most severe killer will find it difficult to cross the belt with its fury and height. The sand carried by storm surge will get deposited on the trees, thus ultimately forming some sort of natural dyke which will strengthen the protective effect in future.
- iii) Most of the sand carried by storm surge will be stopped by the forest belt thereby the valuable agricultural land may be saved from becoming a waste due to sand deposition. It will also help in avoiding the burying of the standing crop under the sand. At present, once storm surge has inundated an area, it may not be possible to grow subsequent one or two crops due to salinity and sand cover. If the benefits accruing out of even a single crop be taken into account, the total cost of the establishment of the forest belt will not be more than the damages due to one or two Cyclones.

In order to make the vegetation belt an economically viable programme, it is proposed that this be planted in three rows:

- i) Front belt facing the sea with a thickness of about 100 to 300 metres consisting the trees which are potentially wind resistant like the casuriana equisetifolia, prosopis juliflora, anacardium occidentale etc.
- ii) Behind this belt, and also covering this belt a thick biomass vegetation be grown up which may be used as raw-material for bio-energy. This vegetation will cover the stem portion of the front belt, practically making that an opaque belt and thus increasing the strength of the front belt to reduce storm fury.
- iii) The rear belt should consist of the plants/trees which have economic potential in terms of fruit, resin etc. This belt will provide a source of employment and income for local population.

A detailed plan may be worked out, after study of the cyclone prone coastal areas with reference to soil, salinity, topographical features etc.

If the initial cost of growing these belt be borne by the government and leased to the local people who maintain the belt and reap the benefits from the bio-energy and fruit/resin belts etc., it will provide the local population with a permanent source of employment, income and thereby helping in alleviation of poverty in those areas.

After development of the vegetation belt the developmental projects in the cyclones prone areas may be undertaken at far lower risks.

Efforts And Problems

As part of efforts for implementation of the CRC recommendations, the Department of Science & Technology convened a meeting in

August, 1986 for preparation of action plan for cyclone shelter belt. In that meeting, the Secretaries of the Department of Science and Technology, Environment, Non-Conventional Energy were present in addition to the senior level representatives of the other concerned Central Government Departments, and State Governments of West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Maharashtra and Gujarat. Position in different States at that time was:

West Bengal: The Government was seized with the problem of growing shelter belts and the activities in this regard have been going on since early 50's. However, the major constraints have been high salinity of soil and high rate of wave erosion. The need for conducting research to overcome these impediments was stressed. About 2,000 hectares were covered with shelter belts with notable help received from Swedish International Development Authority in this regard. Another facet of this programme was with regard to the protection of some recently emerged off-shore islands from sea erosion. The Government was planning to grow protective tree belts around these islands. These shelter belts would be combined with fuel wood reserves to stabilise the land-form of these islands.

Orissa: The shelter belt plantation, as an anti-cyclone measure, was an on-going programme of the State but it could not be implemented fully due to private land holdings. After the Government decision that the benefit of the tree plantation in private land would go fully to the land owners, better implementation of the programme was expected.

Andhra Pradesh: Of the total coastal line, some portion is reserved for forests on Government land and some portion is not suitable for plantation. The Shore Area Development Authority set up by the State was taking up the work of shelter belt plantation with resources from the

Department of Forests, Fishery and Energy.

Tamil Nadu: About 5000 hectares was covered before 1979. The Coastal Afforestation Division was charged with this assignment.

Maharashtra: Most of the land along coast is private and there was practically no shelter belt at that time. Need for shelter belt plantation in 3 coastal districts was felt.

Gujarat: Under the Coastal afforestation programme, a portion of the coastal line was covered till then. However, serious difficulty was faced in the work due to non-availability of land with Government, unsuitability of land for growing vegetation due to high salt content and inundation of the land by tidal water. In this regard, it was mentioned that efforts were being made to overcome some of the difficulties and intensify afforestation and raise shelter belts under a World Bank aided project which started in 1977-78. The need for conducting research on the selection of right type of species which can be grown in soils of high salt content was stressed.

As may be seen from the preceding paragraphs, there are a number of problems to be tackled on administrative, scientific and technological levels. Some of these are:

- i) As entire land along the coastal area does not belong to the Government, the programme cannot be implemented. The Government may acquire the coastal land for the purpose.
- ii) Salinity and land erosion are two other serious problems which have to be dealt with on scientific and technological basis.

In view of the aforesaid, the implementation of the above plantation programme may be taken up as part of the International Disaster Reduction Decade. □

The author is Principal Scientific Officer, Deptt. of S&T, New Delhi.

Book Review

PRINCIPLES AND PRACTICES OF VALUE ADDED TAX: by Mahesh C. Purohit, Gayatri Publications, Delhi, 1993, Price: Rs.250.

The Value Added Tax has emerged as one of the most important fiscal innovations of the century. In 80's alone about 30 countries of the world adopted this tax bringing the total number of countries adopting VAT to more than 60. The rationale for adoption of VAT lies in the fact that it is considered a relatively superior form of tax. It avoids cascading, has a simple structure, does not distort the allocation of resources, and it is neutral among labour intensive and capital intensive techniques.

India also introduced a modified form of VAT (MODVAT) with effect from March 1, 1986. Initially the MODVAT was introduced to a select number of commodities. However, the coverage was extended with effect from March 1, 1987 to all commodities except petroleum products, textiles, tobacco, cinematographic films and matches. Today, half of the revenue of Union excise duties is being collected through MODVAT. The existing MODVAT is only a step towards adopting a full-fledged VAT.

There is a lot of misunderstanding and ignorance in this country about the true nature and implications of a Value Added Tax. It is in this context that the utility of the present book has to be seen. The book provides a comprehensive coverage of various aspects-economic as well as administrative-relative to the introduction of VAT.

The economic effects of VAT like the price effects, distributional effects, neutrality and efficiency and effects on growth has been analysed in chapter II. The analysis of economic aspects presented here indicates that it is due to the superiority of VAT in respect of these economic effects that it has come to occupy a place of pride in the fiscal structure of most countries in the world. The properties of VAT are also in conformity with optimal tax theory.

The book also tries to outline the characteristics of VAT as it is practised in various countries of the world. Chapter VI is exclusively devoted to a portrayal of the management of VAT in France. VAT was first introduced in France in 1954, though its origin can be traced as far back as the writings of F Von Siemens, who proposed it in 1918 as a substitute for the then newly established German turnover tax. However, for its rejuvenation, the tax owes much to Maurice Faure and Carel Shoup.

The book includes in analysis of the indirect tax system in India and provides guidelines as to how it can be improved by the introduction of VAT.

The book is a timely addition to the literature on Public Finance in India. It could serve as an indispensable text book for post graduate students of Public Finance in this country besides being of immense value to tax administrators. A low priced paper back edition would be of help to the student community.

P.V. Rajeev

THE WORLD ECONOMY IN THE 20TH CENTURY by Angus Maddison, Oxford & IBH, New Delhi, pp. 147, Price: Rs. 250

This is an Indian edition of the research study brought out by the Organisation of Economic Cooperation and Development (OECD) in 1989. The author, Angus Maddison, had been head of the Economics Division in OEEC responsible for analysing developments in member countries in the 1950s. He was a director in the development department of OECD and one of the first fellow of its Development Centre. He had also been a policy advisor to government in Brazil, Greece, Ghana and Pakistan. Since 1978, he has been Professor of Economics at the University of Groningen in the Netherlands, working on problems of growth and development.

In this study, the author provides a succinct view of the twentieth century experience of 32 countries in Latin America, Asia, the OECD area and the erstwhile USSR countries, which form a fifth of the 160 nations in the UN and in 1980 represented 85 per cent of the world GDP, 76 per cent of the world population and 79 per cent of the world exports.

Illustrated with six graphs and fifty tables, this book studies comparative economic history using quantitative growth accounts to marshal much of the evidence and examines interrelations between different parts of the world economy. Sources and measurement procedures are described in the four appendices to enable the reader to judge the quality of the evidence. Appendix 'A' deals with the Estimates of GDP Level, 'B' with Estimates of GDP Growth, 'C' with Population, Employment and Education and 'D' with Exports and Related items.

The entire study is divided into eight chapters: Economic Growth in

the 20th Century; International Economy in the 20th Century; Phase of Development; Performance and Policy in a Liberal World Order 1990-13; Wars, Depression and Autarky 1913-50; the Postwar Golden Age 1900-70; the Slowdown in the World Economy since 1973. Eighth Chapter is a summary of earlier account.

In short, it is a useful and informative study for research students, teachers and economists.

M.L. Ahuja

LEGAL ENVIRONMENT OF BUSINESS: By K. Aswathappa; Published by Mrs. Meena Panday for Himalya Publishing House, Bombay; pp. 380; Price Rs. 190

This book, primarily written for students of Madras University, can be a good reference Work for M.Phil. (Commerce) students of Bombay University for their subject 'Business Environment'.

It contains extensive illustrations of business successes and failures, a good, concise commentary on different industrial policies, sufficient coverage of industrial licensing, Industrial Development (& Regulation) Act, 1951, Monopolies and Restrictive Trade Practices Act, 1969, Stock Exchange, FERA, NRI Investment, Patents Act, Industrial Sickness including Sick Industrial Companies Act (SICA) and Board for Industrial and Financial Reconstruction (BIFR), Social Audit, in a lucid style.

It's no crime to remain undiversified and yet we find companies like DCM, Brooke Bond, ITC, Larsen & Toubro, Britannia rushing head-long into diversifying their business activities, thanks to the liberalised policy of the Government. It is this 'not' sticking to the knitting' characteristic of Indian business enterprises which distinguishes them from excellently run American compalnies which find

a mention in Thomas Peter and Robert Waterman's 'In search of Excellence' which is a much talked-about book in academic circles.

Business is an activity revolving round people-Business is People-a point the book makes by quoting a Chinese saying: "If you want to plan for a year, plant corn; if you want to plan for 30 years, plant a tree; but if you want to plan for 100 years, plant men". This point alas is not taken seriously by many Indian companies where development and satisfaction of employees is not given any priority. Exhorting business community to have a good corporate citizenship as one of its goals (besides profit, growth, power, market leadership) like the Tatas, even if it means sacrificing 100% growth, the author defines good corporate citizenship as complying with rules of the land, paying taxes to government regularly, caring for employees and custmers...

In the chapter on Industrial Licensing, he has, by way of illustrations, brought home the point how the licence-permit-raj has not been able to achieve its objectives of directing investments in industries according to plan priorities, regulating location of industries to secure balanced regional development, preventing monopoly and thereby concentration of wealth in a few hands... In fact, production of Crompton Greaves, Hindustan Lever, J.L. Morrison (to name only a few) was more than their licensed capacity and yet there has been no sign of any company being prosecuted, thereby making a mockery of the plethora of rules and regulations we have. Very effectively, the author has made a

point that it is the business people who enjoy a considerable clout in our country.

On page 110, the book highlights the irony of the sheltered market in which big business in fact thrived and continued to concentrate economic and political power, rather than help develop backward areas. The author's suggestion in making the jungle of legislations slim and trim needs some consideration. For example FERA Provisions could be a part of the RBI Act. He also questions the usefulness of the MRTP Act. Agreeing with S.S Khera, he quotes from his book 'Government in Business': "Company form of public enterprise was fraud on the constitution. Nevertheless, it seems to be the accepted pattern, and is the pattern which is likely to prevail unless something unexpected happens" (emphasis mine).

Though the book was brought out in 1992, we find statistics on page 83 of assests of top 20 companies as at the end of 1984, and on page 162 numner of foreign collaboration agreements approved by government from 1957 to 1987 only and on page 163, the footnote to the table on foreign private investments in India says: "The details upto 1980 represent the cumulative total as furnished in the Census of foreign investments by RBI. No later figures are available..."

I found the chapter on 'Business and Scoiety' quite interesting, full of facts and figures. I am sure students will immensely enjoy reading this book. All in all, the author's labour in writing the book is appreciated. □

Prof. (Dr.) Ruki Mirchandani

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