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SLUMS IN AND AROUND MADRAS CITY

SOCIETAL EXPECTATIONS OF SCIENCE AND TECHNOLOGY



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EDITORIAL - SOME HIGHLIGHTS

I General Economic Scene

State

Climate and Water

July registered a normal and good south-western monsoon. As a result, as noted in the last issue, the hydel reservoirs in the state are in a satisfactory condition. The inflow into the Meltur reservoir was 20,000-30,000 cusecs per day, with the water level reaching 56 feet. It will be possible for the irrigation authorities to meet the tail-end areas' demand for more water for irrigation. More than 10,000 cusecs of water are being drawn from Bhavanisagar to meet the demands of the delta farms. Papanasam reservoir reports a marked improvement in storage. With the large flow in the Sarvalar, the major tributary of Tambaraparani, the inflow has been conserved in the reservoir, the level passing 75 feet by the end of July. The second mine cut at Neyveli will, as a spin off result, provide 40 million gallons of additional water to Madras city. The World Bank is to aid this project of pumping out the second mine cut water which will be available at the rate of 80 gallons per minute. The confined ground water below the lignite seam in the acquifer sands exerts an upward pressure of 5 to 8 kg. per sq. cm. For mining the lignite, there has to be depressurisation of acquifer. The pressure sur-

face is maintained constantly below the lignite seam by large scale pumping of 32 gallons per minute. For mining 1 tonne of lignite, 20 tonnes of water from a depth of 100 metres has to be pumped. From the present Neyveli lignite mine, the water is used for irrigation. The pipes manufactured and partly laid and the head works constructed in Panruti under the Veeranam scheme are to be used to carry the ground water from Neyveli to Madras city.

Power

In July, the power situation in the state was normal. The first 210 MW unit in the Tuticorin thermal plant was commissioned on July 8. It is the first part of the largest power generating station in the state which will have an installed capacity of 630 MW. Discussions are under way between the government of Tamil Nadu and Karnataka with regard to the Hogenakal hydel project, which would have a capacity of 1,000 MW. The state government is also negotiating with the Union government for the approval of a thermal plant at Koodangulam in Tirunelveli district, in addition to the thermal plant at Mettur which was referred to in Vol IX, pp. 125 and 236. During the current year, about 1,000 MW will be added by Tuticorin, Vijayawada and Kalinadi to the regional

grid. For the southern region, the Union Energy Ministry estimates that by March 1983, the total installed capacity will be 10,460 MW (60 per cent hydel and 40 per cent thermal) resulting in a marginal surplus. Among the Southern States, Tamil Nadu will have a deficit of 460 MW by March 1983, and after the other states' surplus is used to meet this deficit (inclusive of the power produced by the two super thermal plants at Ramagundam and Neyveli), there will be no power left for export.

For the country, July brought some relief to areas like Maharashtra, but saw difficulties in West Bengal and Delhi. During this month, continuous process industries except in the Bombay and Pune regions were allowed to use 80 per cent of their basic quota. Similarly, textile mills were allowed to function in three shifts with 60 per cent of their quota and the general industries with 70 per cent of their quota. In Delhi, on the other hand, industries were asked to close down once a week to meet the area's power shortage. The Union ministry reports that for the current year, the power generation capacity will be increased by 2,500 MW, that is, by 8 per cent. The total generation capacity at the end of March 1979 was 29,000 MW, which was 50 per cent higher than the capacity in 1974-75. In 1978-79, a 3,000 MW additional capacity was created, of which 2,700 MW became operational by the end of June 1979. It is expected that generation will increase from October 1979, as the new capacity commissioned by March will be available for 50 per cent use. The power shortfall in 1978-80 is expected to be 8 per cent, with the eastern region being the main sufferer. On June 17, 1979, the ministry reports that the total generation in the country was 291.5 million units against a target

of 292 million units. But, as will be noted later, as part of the proposed revision and scaling down of VI Plan targets to meet the increase in costs of more than 10 per cent, the creation of additional capacity is likely to be limited in the last two years of the current plan. The Planning Commission has recommended a reorientation of long term planning towards optimum use of hydel power. At present, only 20 per cent of the country's hydel potential is being harnessed. This would save the hauling of coal over long distances, relieve the burden on the railways, and along with nuclear energy, will be a means of meeting also the oil crisis. But increased use of hydel resources awaits solution of some important technological facilities such as: a) shortening of the long-term gestation period, b) the development of techniques for projects far removed from the load consumption sites, and c) pre-project investigation studies of hydro power in all states. As a result of the BHEL-Siemens controversy (see last issue, Vol IX, p. 315), the Union government is establishing standard technology norms for various equipment needed for power development programmes in the country. It is also planning to professionalise the management of the State Electricity Boards on the basis of binding guidelines for the state governments. The Union government is restructuring DVC to improve its working and its supply of power to coal mines, steel mills and to West Bengal. A cell has been established to coordinate DVC and CIL activities. The Union ministry also announced that the first phase of 600 MW of the Singrauli project is now under way, and that the second phase of 1,400 MW has been approved by the government. Singrauli is the first of the four super thermal plants of the country. The Kerala

government reported in July the complete electrification of all its 4,400 villages.

Urban and Housing Development

The state government announced a Rs. 206 lakh scheme for the supply of drinking water to the areas recently added to the Madras Corporation. (This is in addition to the Rs. 16 crores allotted to water supply schemes to the rural poor during the year.) The Madurantakam Protected Water Supply Scheme costing Rs. 32.92 lakhs is now complete. The state has also formulated a comprehensive integrated urban development programme for all municipalities with a population of 50,000 and above. The plan will be implemented over a period of 5-8 years and involves improvements to water supply, drainage, roads, and construction of overbridges and subways. Twelve housing schemes for the construction of 14,200 dwellings were approved by HUDCO with a loan assistance of Rs. 13.77 crores. Under this arrangement, the Tamil Nadu Textile Corporation will build 554 houses for their employees.

Transport

Madras Port is to have a container handling facility for a two-year period in collaboration with Compagnie Generale Maritime of France which will supply its own container handling fork lift truck of 25 tonnes capacity. During or after the agreement, the Madras Port Trust will have the option of purchasing the equipment. The port will also have cargo handling equipment such as crates of different capacity and fork lift trucks at a cost of about Rs.3 crores. The Madras port has been allocated Rs. 29 crores in the current plan for construction of an outer arm and dry dock acquisition of 2 tugs and a fire float, and remodelling of the boat basin. Under FCI's programme

of food storage complexes aided by the World Bank, the Madras harbour will, in the next 5 years, also have the first modern foodgrain terminal in the country. This involves construction of 8 reinforced concrete sites with storage capacity of 25,000 tonnes of wheat, with facilities for bulk despatch by road and rail to consuming centres and vice versa. The installations would be multi-functional in that they would be used for import and export handling and storage. The silos will have sophisticated dust extraction and separation systems, weighing system and preservation controls. The facility will be particularly useful as insurance against bad and poor monsoons. The import projection at any future date is likely to be of the order of half a million tonnes. The state government set up in July a committee of students, parents, busmen and the police to review the problems faced by the public and personnel of the Pallavan Transport Corporation. The seven transport corporations in Tamil Nadu are experimenting with industrial alcohol in place of diesel, with the help of the Institute of Road Transport. The state has a surplus of industrial alcohol and its use in public transport can reduce the rapid growth rate in the use of petroleum products at around 12 per cent. Diesel consumption this year is estimated at 9.6 million tonnes out of a total of 30 million tonnes of petroleum products. The state's transport corporations are also in cooperation with Tamil Nadu Tourist Development Corporation developing Pulavakal Hill, Thekkadi and the Kannagi Temple and other appropriate places as tourist and picnic spots. TAKK airways—a Bangalore-based firm—has submitted a proposal to the Union government for establishing third-level feeder air service to connect all district headquarters towns in Tamil Nadu and the Southern states. The firm will

become a joint sector enterprise with the four southern governments and will initially operate 24 airports — 6 in Tamil Nadu, 9 in Karnataka, 5 in AP and 4 in Kerala. Further expansion in Tamil Nadu is assured with the development of airports at Thekkadi and Salem.

Tribal Sub Plan

The State government announced in July a Rs.2.5 crores tribal sub plan for the development of the 1.6 lakh tribals in the state through the provision of education, medical, drinking water and other facilities in the tribal areas of North and South Arcot, Salem, Dharmapuri and Tiruchirappalli. The programme is based on an approach to each tribal family and an inbuilt evaluation process. The programme breakdown is. Agriculture Rs. 20.93 lakhs, Animal Husbandry Rs. 23.85 lakhs, Medical Rs. 12.21 lakhs, Rural Water Supply Rs. 10 lakhs, Minor Irrigation Rs. 5 lakhs, Electricity Rs. 8.7 lakhs, Roads Rs. 88.54 lakhs, Village Industries Rs. 1.84 lakhs and Education Rs. 7.5 lakhs.

Agrarian Legislation

In July, the state government issued two ordinances to protect cultivating tenants. The Tamil Nadu Cultivating Tenants (Protection from Eviction) Second Amendment Ordinance, 1979, extends for 6 months protection to a cultivating tenant from eviction for being in arrears of rent for the fasli year ending June 30, 1976 or any previous fasli year. The other, Tamil Nadu Cyclone and Flood Affected Areas Cultivating Tenants Second Amendment Ordinance, 1979, extends protection to tenants in areas affected by cyclone and floods in 1977 from being evicted for non-payment of rent for the fasli year 1978 or any previous years or proceedings for recovery of rent. The State government also in July using the

provisions of the Tamil Nadu Money Lenders Act 1957 fixed a simple interest rate of 9 per cent per annum for secured loan and 12 per cent for unsecured loan. The interest rates are based on the current bank rates of lending fixed by RBI.

National

VI Plan

The finalisation of the VI plan faces two problems. First is the problem of inflation which has pushed up the cost of the targets established in the Plan, which was established at the 1977-78 price level. To achieve the targets at current prices, the total outlay of Rs. 69,380 crores will have to increase by Rs. 4,000 crores. A meeting of the full Planning Commission reviewed this situation and decided on an unsatisfactory compromise of increasing the Plan outlay by half of what is required, that is by Rs. 2,000 crores. This means that the targets have had to be scaled down, particularly in the power sector, in spite of the major part of the Rs. 2,000 crores being allocated to energy and minerals. Also, the ratio of 1:2 between white and Khandasari sugar has been altered in favour of the farmers. The Planning Commission had completed the revision of the Draft Plan by mid-July and was ready to submit the Plan for final approval to the Cabinet and to NDC, which was to meet at the end of July. Then intervened the second more serious event — the fall of the Union Government, with the resignation of the Cabinet on July 15. This has thrown the time-table for the finalisation of the Plan out of gear and has raised questions about whether the new government will abide by the Plan and its priorities.

Prices and Anti-inflation

The inflationary pressure noted in the last four issues continued in June when

the wholesale price index stood at 203.3 for the week ending June 30. This means that the price level was higher by 0.5 per cent compared to prices a week earlier, i.e., June 27, when the index stood at 202.3 and was 8.9 per cent higher than a year ago, i.e., in June 1978. Food price rose by 0.9 per cent due to the rise in the price of all its components: eggs by 7 points, tea by 4, maize, ragi, fruits, vegetables and coffee by 2 points. Among non-food prices, castor seed rose by 8 points, soya bean 6 points, groundnuts 4 points, with raw rubber, raw wool falling by 4 to 5 points and raw cotton and raw hides by 1 point. Among manufactured products, food products rose by 1.1 per cent due to rise in gingelly oil prices by 4 points, gur by 3 points, sugar, salt and groundnut oil by 1 point each, while atta, suji, Khandasari fell by 1 point. The index for textiles showed a small rise (0.1 point), paper and pulp rose by 1.5 points, and non-metallic mineral products rose by 0.5 points. The reasons for this continuous inflation are increase in money supply and the high state of liquidity of the economy, the bottlenecks to production and supply caused by coal and power availability and railway services, continuing poor labour relations and the price increases that have been officially decided. Almost its final act by the Union Cabinet was fixing the support prices for 1979-80 of groundnut at Rs. 190 per quintal (presently Rs. 175) and Rs. 175 for soya beans and sunflower oil seeds. So too prices of coal and steel have been raised. The uncertainty in the political situation has added to the price rise in sugar and textiles, though behind the latter is the power cut in Maharashtra and the over-50 days' textile mills strike in Tamil Nadu. On top of this, the Vadilal Dagli Committee points out that competition in subsidisation of new investment by state government to attract

industries has led both to the inflationary pressure and to non-optimal location of industries. Also, RBI reports that some 21,810 small scale units, whose advances under the credit guarantee scheme totalled Rs. 140 crores, were under default at the end of December 1978. The 30 per cent rise in crude oil prices following OPEC's decision (see last issue, p 356) was also an inflationary factor. Against this background where money supply has closed by 4.9 per cent upto mid-June and 18.1 per cent in 1978-79, RBI has instructed commercial banks to bring the bigger borrowers (those with credit limits of Rs. 50 lakhs and above) under strict discipline through reviews on the basis of normal non-peak level and peak level requirements. Also banks have been asked to strengthen the monthly/quarterly information system to regulate credit on the basis of proper assessment of need-based requirements of borrowers. Banks have also been advised not to meet the full working capital requirements of borrowers, particularly the above-Rs. 50 lakh ones, and not to permit diversion of short term funds for long term use. The government also passed an ordinance in early July postponing by a year the repayment of instalments under the compulsory deposit scheme, amounting to Rs. 345 crores. To compensate the depositors for the delay in repayment, the rate of interest on the amounts being held back is being raised from 11.5 per cent to 13 per cent. Also the Planning Commission has expressed its opposition to the increase in paddy prices proposed by the Agricultural Prices Commission and a system of dual pricing for petrol to keep consumption and the price rise down to manageable amounts. As a further measure to control the prices of essential consumer goods, the revised public distribution scheme was launched on July 1. In addition to the 2,39,204 fair price shops on July 1, 31,988 additional shops are to

be opened. Tamil Nadu has 10,148 shops and will open 1,700 new ones. Besides cereals, kerosene oil, soft coke and controlled cloth (which are controlled items), tea, coffee, matches, soap and exercise books have been included in the production plus distribution scheme. The target is to have a shop for a population of 2,000, and in remote and hilly areas for a population of 1,000. The authorities in the Delhi area decided that sugar, pulses and bathing soap will be supplied to 11 lakh ration card holders through its 2,250 fair price shops. The first public reaction to the operation of the scheme is a mixed one. In most states it has been welcomed and has opened to a good start. In others like Madhya Pradesh, there are complaints that the expansion has not been carefully prepared and there are problems of production, procurement, storage, transportation and distribution that the enlarged scheme is facing.

NDC Bonds

The seventh $6\frac{1}{2}$ per cent National Development Corporation's Bonds for Rs.9 crores, referred to in the last issue, opened on July 12. They were over-subscribed and so the Corporation retained the extra 10 per cent of the subscriptions, making the total bond collections Rs. 9.9 crores.

Economy

The economy faces serious strains and challenges at this leaderless time. There is the problem of increased money supply earlier referred to, the problem of continuing inflation, the problem of rise in crude prices and its effect on the domestic prices of diesel, kerosene, petrol, etc., the problem on ONGC's future direction including recoverable oil reserves and the approval of crores of Rupees of contracts

the problem of getting the giant fertiliser projects, with Bassein offshore gas off the ground, the problem of increasing power and coal supplies that industry awaits urgently and the further coordination and streamlining of the Railways and the follow through of the Rs 2,256 crores 3 million tonnes Vizag steel plant project and 1,400 MW new generating capacity of the Singrauli project. All these and a host of other problems await the leadership of the new government. On a longer term basis, an OECD review of the Indian economy calls attention to three constraints that it faces, namely the concentration of the benefits of the green revolution among rich farmers, the demand constraint in the capital goods sector, and the difficulties in the way of mobilising financial and human resources. It forecasts that 300 million people (which will be one-third of the then population as against the present half) will be living below the poverty line in 2000 AD. For speedy employment growth, agricultural expansion is inadequate. Speedy industrialisation alone will provide the necessary jobs, the report says. Again, it points out that the expansion of the capital goods sector cannot come from exports alone, but through the volume and variety of domestic demand, calling for increasing people's and institutions' purchasing power and an integrated economic policy on incomes, savings and investment. This is also the answer to the constraints on resource mobilisation. (For all this a clear political governance and direction is of course needed.) This view of India is set forth against a global forecast of : a) world population increasing from the current 4 billion to 6 billion by 2,000 AD, b) food demand will not by then reach global physical limits but India and China will have to double their foodgrain production, and other developing countries will have to treble theirs, c) transition from an oil-based energy

system to other energy sources will be halfway through with main reliance on nuclear and solar energy, and d) Japan emerging as a major centre of economic growth and China entering the \$1,000 per capita stage by then.

Industry

The industrial production index for 1978-79 registered a rise of 7.8 per cent over 1977-78. For the period January-March 1979, industrial growth was 6.4 per cent, and for March 1979 at 167.4, it was 5.1 per cent against March 1978. Sharp increases were registered in textiles, electricity, mining and quarrying, transport equipment, and basic metal industries with slight decreases in miscellaneous manufactures, tobacco, rubber and metal products. DICs have been asked to identify sick units and revive them by offering assistance packages. Income tax rebate to persons undertaking the construction of industrial sheds in rural areas, the exemption for procedures of approval of various authorities for tiny units, posting an assistant engineer in each DIC to give clearance up to 25 HP, introducing diesel engines for a cluster of artisans where power is not available, the establishment of common facility workshops and testing centres to improve the quality of goods, the creation of a system of sales outlets through rural marketing and service centres, the organising of comprehensive training programmes for artisans and draftsmen including carpet-weavers and the active involvement of the public in the formulation and implementation of DIC programmes are other decisions of the General Managers of DICs held in early July to expand and intensify the small industry programmes.

National Production Front

Steel

The possibility of steel production reaching the year's target of 7.4 million tonnes is an open question. According to SAIL, against the daily coking coal needs of 40,000 tonnes for the integrated steel plants, during the last three months the supply has been 33,000 to 35,000 tonnes per day, with a promise of 38,500 tonnes per day in July. Because of this coking coal supply position, the government had announced in April an 8 per cent reduction in the target. At the end of the first quarter April-June 1979-80, the integrated steel plants had suffered a production loss of 2.56 lakh tonnes. Rourkela was, upto June, 47,000 tonnes behind target. DSP, due to coal and power shortage, lost 13,893 tonnes in saleable steel, and 28,360 tonnes in sinter. Equally serious is the damage done to the refractory linings of coke ovens due to thermal shocks resulting from operational adjustments called for by fluctuating coal supplies, and in the case of Bhilai, coal blast furnace No. 1 being closed down due to coal shortage. On the other hand, the Union ministry reports that from mid-July the coal supply has been improved and 30,000 tonnes of imported coal is being rushed to plants from Vishakapatnam and Paradip. A long term agreement for an annual import of 2-3 million tonnes of coking coal is under negotiation with USSR. To make up for steel shortage, the Union government announced that during the current year, 2 million tonnes would be imported. The Union government also announced a comprehensive programme of modernisation of the public sector steel plants to raise production involving: a) doubling Bhilai's capacity from the present 2.5 million tonnes of ingot steel by incorporating advanced Soviet technology as part of increasing the

country's steel production capacity from 10.6 million tonnes to 14.6 million tonnes, b) modernisation of Rourkela's hot strip mill to increase the supply of better quality hot rolled coils, c) commissioning feasibility reports to increase capacity of Durgapur and Rourkela, d) the extensive rehabilitation of IISCO, and e) an item-wise perspective plan preparation of new research programmes for Bhilai. On the distribution side, in order to enable farmers, blacksmiths, artisans and tiny units in rural areas to purchase steel at controlled prices in or near their location, SAIL has launched a scheme to open 80 rural distribution centres in different states with the help of village level bodies such as the Apex Cooperative Marketing Federation and the State Agro Industries Marketing Corporation. A start has been made at Umbraj in Maharashtra, and by July end, three centres each will be functioning in Maharashtra, West Bengal, Gujarat and Orissa, and two each in Tamil Nadu, AP and Kerala. Mini steel plants report in July difficulties as a result of continuing fall in ingot prices viz., the non-availability of melting scrap at the right price. It is urged that the import of duty free electrodes and regular and assured supply of power are needed if the mini steel plants are to meet their target of 3 million tonnes of liquid metal. On prices, the Vadilal Dagli Committee has recommended that except for the defence and export sectors, SAIL should be free to charge prices as per market demand—a recommendation which will not be accepted in the present inflationary situation.

Crude

India's crude imports for 1979 are 16.5 million tonnes plus 4.2 million tonnes of petroleum products, all of which have been negotiated and half of which had actually been received by mid-June. For 1978, the crude import bill for 15 million

tonnes was Rs. 1,600 crores. For 1979, with the two OPEC price rises, the bill will amount to Rs. 3,000 crores, at which rate the outgo for 1980 could amount to Rs. 5,000 crores. Hence there is immediate need to shift from our energy mix, and move from oil to coal as the next step. There is also the need to intensify domestic crude production both onshore and offshore and to fix prices of crude and its products in relation to our supply and our demand priorities. The development of coal and its use in the transport industry, and that of social forestry to provide alternative domestic fuel need constant emphasis. The government has to take a decision on petrol and diesel prices including the proposal for a dual pricing system as referred to earlier. The government is importing two jack-up drills at a cost of Rs. 60 crores to speed ONGC's onshore drilling programme.

Coal

At long last after more than a two-year delay, the Union Government (the caretaker government) raised, from July 17, coal prices from Rs. 64.71 per tonne to Rs. 101.18 per tonne for CIL, and from Rs. 68.70 to Rs. 99.92 per tonne for Singareni. The government states that the impact on consumers will be Rs. 25.67 per tonne of CIL and Rs. 21.22 per tonne of Singareni coal, that on the general price level will be 1.2 per cent, and on the cost of living index, 0.4 per cent. The total additional earnings from this price rise is estimated for this year at Rs. 350-380 crores, which will cover the CIL loss of Rs. 300 crores. CIL, which has sustained a cumulative loss of Rs. 1,300 crores, will now earn a profit of Rs. 3 per tonne. CCL and WCL will earn a profit of Rs. 19 and Rs. 16 per tonne, while ECL, BCL and NECL will still be making losses of Rs. 18.92, Rs. 10, and Rs. 27 per tonne. The government also

claims that as against the fact of poor (2 days) stock position of most of the country's thermal stations in July, the backlog in coal movement to thermal, cement and fertiliser units would be cleared by the end of August. In fact, by then, hydel power stations would be in full operation as a result of the good monsoons (everywhere except in Maharashtra) so that the railways can concentrate coal movement to other industrial sectors. In early July, the Union government announced an investment of Rs. 1,700 crores during the plan period in coal to develop existing mines, reconstruct old mines and open new ones. As a result, coal production will be increased from the current 101 million tonnes to 113 million tonnes in 1980-81, to 123 million tonnes in 1981-82 and 136 million tonnes in 1982-83, when the demand is estimated at 145 million tonnes. CIL will produce 123 million tonnes, and Singareni and Tatas, 22 million tonnes.

Non-ferrous Metals

The government reports that in 1978-79, zinc production increased by 50 per cent to 64,281 tonnes, and for the current year, the zinc target is 78,000 tonnes. The stabilisation of operations at the Vizag zinc smelter led to the increase. Zinc ore production will increase considerably with the completion in 1981-82, of the Rajpura-Dariba mines and the increase in zinc recovery at the Debari zinc smelter in Udaipur. The country has a zinc reserve of 4.7 million tonnes. On copper, Hindustan Copper is to undertake a study of the integrated development of the Singhbhum copper belt in Bihar to increase copper ore availability and reduce the gap between supply and demand. On this basis, production will meet 40 per cent of the demand by 1982-83. At present, production is 16,000 tonnes against the installed

capacity of 31,000 tonnes. The Malankand project will produce 23,000 tonnes at a cost of Rs 91.90 crores. Lead production in 1978-79 increased by 38.87 per cent to 10,475 tonnes and for the current year, the target is 15,000 tonnes. The installed capacity in lead production is being raised from 18,000 tonnes to 30,000 tonnes by 1982-83 and for this, two projects were cleared in January 1979, involving a new lead mine at Sargipalli at a cost of Rs. 11.88 crores (yielding 6,400 tonnes annually) and the lead zinc mine at Baroi in Rajasthan at a cost of Rs. 2.15 crores. On the aluminium front, the detailed project reports on the proposed aluminium complexes in Orissa and AP are in the final stages, with the help of French and Soviet firms. The Andhra project will produce 6 lakh tonnes of aluminium and the Orissa Plant, 8 lakh tonnes. The latter also includes a captive bauxite mine for raising 2.5 million tonnes of bauxite a year from the Panchpatmali mine.

Paper and Sugar

To ease paper shortage, the government promulgated the Paper Control Order 1979, under which the ex-factory price of white printing and cream wove paper were fixed at Rs. 3,000 and Rs. 3,785 per tonne. The government is also empowered to issue directions to the manufacturers as to the disposal of their stock or sale of both varieties of paper. So from July 1, the price of imported newsprint increased by Rs. 300 a tonne, which, together with the April rise of Rs. 150, has meant a rise of Rs. 450 per tonne. Indian produced newsprint at Nepanagar has also been raised by Rs. 500. On the sugar front, the rise in prices has been the subject of discussion in Parliament. With sugar decontrol from August 16, 1978, sugar prices declined to Rs. 220-240

per quintal from Rs. 310-355. By end of April, the prices rose to Rs. 248-Rs. 280 per quintal and at this point the government took over the monthly release of sugar as from June 5, 1979. In June, 5.25 lakh tonnes, and in July 5.40 lakh tonnes were released, and for August notice of release of 6 lakh tonnes has been given. Also from July 1, sugar factories are required statutorily to sell and despatch a minimum of 20 per cent of the monthly quota in each of the four weeks in a month to ensure even flow in the market. Any contravention of this order will call for a jail sentence. The rise in sugar prices has been due to hoarding by the trade, and the increased releases have helped to bring down the prices. Also to deal with the problem of cane arrears to farmers, the Union government announced that it will take over units which had more than a 10 per cent overdue to farmers. The government on July 24 has reimposed controls on sugar stocks to be held by traders from 375 to 1,500 quintals, to prevent price rising. The decontrol has led to the near doubling of sugar consumption in the country from 35-38 lakh tonnes in 1978-79 to 60 lakh tonnes in 1979-80. Despite the 8 per cent decline in cane cultivation in AP, the Union government has formulated a 6 point programme to increase sugarcane production so that there will be no sharp increase in the sugar price. In 1977-78, 180 million tonnes of cane were produced, and in 1978-79, there was some decline. Hence for the current year, the government is ensuring the production and distribution of disease-free nutrient-rich seed cane, increased fertiliser availability and adequate credit facilities to the farmers.

Agricultural Production

Wheat procurement in the current rabi season was, as at July 20, 7.934 million tonnes against 5.43 million tonnes during

the corresponding period of 1978-79, surpassing the previous best of 6.6 million tonnes in 1976-77. Total wheat arrival in the mandis was 8.389 million tonnes against 5.813 million tonnes last year. Similarly, AP's rice production in 1978-79 was a record of 73.01 lakh tonnes, beyond the previous best of 64.61 lakh tonnes in 1975-76. Rice production during 1978-79 kharif was 53.15 lakh tonnes compared to 37.73 lakh tonnes in the previous year. There was a large increase in Telangana as well as in the coastal districts. The area under rice was 39.23 lakh hectares, kharif hectareage was 29.79 lakhs (an increase over the previous 27.07 lakh hectares), and during rabi, 9.44 lakhs (a fall of one per cent). Despite the marginal decrease in area, rabi production increased by 8 per cent to 19.85 lakh tonnes. For the current year, some areas report poor conditions. Kharif prospects in AP are bleak because of the failure of the south-west monsoon in the state. The crop had been sown only in a third of the normally cultivated dry lands and even there, the plants started withering due to the dry spell. As on mid-July, transplantation was completed only in the delta areas and areas under Nagarjunasagar and Pochampad projects, accounting for less than 50 per cent of the normal area. Tanks in Telangana are yet to receive rain. Even more serious, the delay of monsoon in the north-west region along with diesel shortage and erratic power supply due to coal shortage, meant that in the first week of July, various parts of Punjab, Haryana and Western UP, which produce the bulk of rice surplus, were facing a serious situation. The scattered rains were inadequate for transplantation of paddy. Fortunately, the monsoon set in by the second week of July and prospects improved. The Punjab Government has fixed a rice production target of 33 lakh tonnes against last year's 27.5 lakh tonnes.

10.4 lakh hectares are to be brought under HYV paddy, along with crop loans of Rs. 36 crores for timely purchase of fertilisers. The basmati target has been fixed at 25,000 hectares. 3 lakh tonnes of gypsum have been made available to reclaim 40,000 hectares of Kallar land during kharif. It is facing the problem of storage in view of the huge 11.2 million tonnes wheat production. The grain has had to be stored in the open, and with the rains is rotting. The maize production target has been fixed at 8 lakh tonnes, to be grown over 1 lakh hectares. The Union government also forecasts a steep fall in jute production in the ensuing season because of the drought in West Bengal. Production of jute in 1979-80 is expected to be 13.20 lakh bales against a normal 41.24 lakh bales. As West Bengal produces 50 per cent of the country's jute, jute supply this year will be low. The area under jute is 2.2 lakh hectares against the normal 5.33 lakh hectares. Total jute production in 1978-79 was a record 8.29 lakh bales, to which should be added the carry-over of 25 lakh bales. Similarly aus paddy production in West Bengal is expected to be half of the normal 8 lakh tonnes with 3 lakh hectares (against the normal 8 lakh hectares) under cultivation. The Union ministry reports plans to increase the production of 4 varieties of pulses to 13.5 million tonnes this year, 1979-80, and 15.5 million tonnes by 1982-83. The varieties are gram arhar, moong and urad which accounted for 8.87 million tonnes out of the total pulse production of 11.8 million tonnes in 1977-78. The strategy is: a) to bring additional areas under short duration varieties of urad and moong, b) to adopt package practices, and c) to develop a viable price policy. 1.7 additional hectares of arable and 1.7 million hectares of dryland using 50 kg of DAP per hectare are to be brought under moong, increasing its supply from 0.79

million tonnes to 1.4 million tonnes. Arhar area will be increased by 0.3 million hectares, enlarging its production from 1.89 million tonnes to 2.14 million tonnes. Emphasis is to be laid on the use of adequate organic manure, like gobar gas material, compost, farm yard manure and waste, in preserving the texture of the soil along with fertilisers to increase productivity. Judicious use of fertilisers on the oil seeds crop is aimed at reducing the import bill of Rs. 800 crores of edible oils. The problem of crop insurance came up for study and discussion during July. There is general agreement on its need. The farming community loses Rs. 1,000 crores every year due to natural calamities, and pest crop insurance can provide cover against such losses and has been tried in Punjab, Tamil Nadu and Madhya Pradesh. There is need for agreement on the premium rate and the amount of indemnity in relation to the farmers' capacity and needs.

Exports

India's export performance in April and May was good, with a growth of 30 per cent, and a favourable trade balance of Rs. 27 crores. During the two months, exports totalled Rs. 941 crores and imports, Rs. 914 crores. Exports in May were Rs. 394 crores and imports Rs. 392 crores. According to the latest figures, the adverse trade gap for 1978-79 was Rs. 1,107 crores. Imports were Rs. 6,752 crores and exports Rs. 5,645 crores. In fact India's export drive is resulting in both product diversification and acquisition of new markets. Diamond and jewellery exports have increased by 88 per cent in 1977-78, gold jewellery alone by 116.93 per cent. Capital goods exports are rapidly expanding; as on January 1979, contracts for Rs. 812.60 crores were signed up. New markets are developing: UK (coffee), Saudi Arabia (gramophone

records), Kuwait and Australia (walnut kernels), Hongkong (curry powder and finished leather), Yemen and Djibauti (mango pulp and juice), and Iraq (peanuts). Thus, despite domestic inflation and the rise in crude prices, India's exports of garments, leather goods, gems and jewellery, engineering goods, sugar and marine products, and in the traditional tea and jute manufactures, are moving forward and might help in the greater trade deficit for the current year that is anticipated primarily because of the oil price rise. Engineering exports in 1978-79 were Rs. 685 crores against the target of Rs. 720 crores because of the acute shortage of iron and steel together with shipping problems and lack of infrastructural facilities. The current year's target is Rs. 850 crores, and already orders for Rs. 750 crores have been received, which indicates that actual engineering goods exports will be Rs. 700 crores. However, the Engineering Export Promotion Council has fixed an export target of Rs. 9,313.22 crores in 1990-91, which is a growth rate of 25 per cent per annum in value terms, and 15 per cent in physical terms. Capital goods and turn key projects have risen from 12 per cent in 1956-57 to 38 per cent of total engineering exports in 1978-79, will be 40 per cent this year and will be 50 per cent in 1990-1991. This involves tapping new markets in Latin America, Eugene and in neighbouring Pakistan, Sri Lanka, Bangladesh, Nepal and Afghanistan. The policy for export of fabrics and made-ups to the US and EEC countries announced for the first half of 1979 (see Vol. IX, p 139) will continue for the second half of the calendar year. Export of fans, which has been rising, declined in 1978-79 by 30 per cent mainly because of the price factor, which calls for productivity improvement and not simply increased subsidy. The Union government has decided to allow

private sector in the cashew industry to import raw cashewnuts from non-traditional countries like Brazil on the basis that 50 per cent is handed over to the Cashew Corporation of India for distribution to various existing processing units. In view of the fall in the value of US dollar in relation to the pound sterling, the Indian rupee was, in July, devalued by 1.39 per cent vis-a-vis sterling. On the country's foreign exchange reserves (excluding gold and SDRs), the government announced in Parliament that they were Rs. 2,862.99 crores in March 1977, Rs. 4,499.75 crores in March 1978, Rs. 5,216.86 crores in March 1979 and Rs. 5,423.73 crores in June 1979. It also said that there was a slow-down in the rate of reserve accumulation since March 1978 mainly due to the increased import bill, reflecting the liberal import policy. The government set up in June end a 13-man committee headed by P.L. Tandon Director-General, NCAER, to formulate a long term strategy and perspective plan for exports in the eighties.

Aid

India in July signed a series of agreements for development aid: with US, a Rs. 55 crores loan for rural electrification and development; with Switzerland Rs. 15 crores for rural development through the Agricultural Refinance Development Corporation; with IBRD \$ 250 million to support the construction of a fertiliser plant in Western Maharashtra, and Rs. 30 crores for slum improvement in Calcutta; with Denmark Rs. 6 crores for fisheries development in North Kanara, and with SIDA and FAO Rs. 3.5 crores for a small fisheries project in the Bay of Bengal; with IDA \$ 260 million credit for irrigation, plantation, horticulture and fisheries; and with UNFPA \$ 100 million for family planning.

International

Bangladesh

1.5 lakh tonnes of rice are being exported from Madras, Vishakapatnam and Tuticorin to Bangladesh in accordance with the agreement reached during Prime Minister Desai's visit to Bangladesh. Like West Bengal, Bangladesh also reports a fall in jute production at 50 lakh bales against the target of 60 lakh bales, due to the drought. With last year's carry-over of about 75 lakh bales, its total jute availability is estimated at 65 lakh bales. Bangladesh plans to export goods worth 11,000 million taka and import goods worth 18,500 million taka. This deficit of 7,500 taka for the year takes into account the crude oil prices.

China

China announced that at the end of 1979, its population including that of Taiwan was 975.23 million, which means that the population in the mainland is 960 million. Population growth for 1978 is estimated at 1.2 per cent compared to the rate of 2 per cent till the seventies. This represents a successful population control policy.

World Bank

The 140 member countries of the World Bank have decided to increase its capital of \$40 billion so that it can increase its aid to the poor countries. In the past 12 months, the Bank lent \$7 billion to 44 countries. The Bank's capital now is \$37 billion of which \$3.3 billion is paid in. Of the new capital, 7.5 per cent, \$3 billion, would be paid in. The US share is about \$10 billion, \$750 million of it to be paid in. Without the capital increase, the Bank would have been forced to curtail its lending. The new capital will allow the

Bank to keep up the level of its own as a counter to world inflation.

FAO conference on Agrarian Reform

A world conference on agrarian reform and development of rural areas was held in Rome from July 12 to 21, attended by experts and representatives from 150 countries. At its opening, the FAO Director-General called for a poverty-oriented development strategy instead of the present urban-biased one in order to enable the rural poor to obtain gainful employment and increase their purchasing power. 200 organisations of rural people attended the conference. The conference called for the redistribution of economic and political power to ease the plight of the world's poor peasants. It recommended land reforms, participation of farmers in decisions affecting them, and equality for women in agriculture. In the Declaration of Principles, it called attention to past development efforts and programmes failing to reach and benefit the rural areas while contributing to the present rural-urban imbalance. In the future, there should be a positive bias in favour of rural development. Of the world's 1.3 billion rural people, 700 million, who are classed by FAO as poor, have a per capita income of less than \$200. On land reform the recommendation was mild, advocating ceilings on private holdings and arresting unequal ownership rights and absentee ownership. On people's participation, it recommended setting up peasants' associations which will be free of government control and will participate in agricultural policies. On women, it recommended repeal of laws which discriminate against women in inheritance, ownership and control of property and asked for programmes to facilitate and ease the burdens of women's household work in which men must share. There was the usual North-south

confrontation, which was a reflection of UNCTAD V (see Vol. IX p. 363). The Third World found of course that they would not gain further farm trade concessions from the rich countries and the conference was described as a hoax, an essay in international elitism. Also the question was asked as to the use of boosting farm production if it was for export and not feeding the hungry and starving people at home. Another comment on the conference was that with 500 million people starving, the industrialised countries had nothing better to suggest than a model which has aided the west and created deep imbalances in the Third World. The world conference could not feed the hungry rural masses, but no international framework arose from the conference to promote rural development.

UN and the Moon Treaty

The UN Outer Space Committee, after 7 years of negotiations, reached agreement on a draft treaty on the moon, proclaiming that the unexplored natural resources are the common heritage of mankind. The moon is not to be subject to national appropriation by any claim of sovereignty, by means of use or occupation. Its provisions are made to apply to other celestial bodies within the solar system till treaties are evolved in respect of these bodies. It declares that the moon shall be used by all national parties exclusively for peaceful purposes and forbids any state from placing in orbit or other trajectory any object carrying nuclear weapons as well as establishing military bases, testing of weapons, etc. The exploration and use of the moon shall be for all mankind and the draft treaty emphasises the principles of cooperation and mutual assistance. States are allowed to land their space vehicles on the moon and establish manned and unmanned stations. Now

the draft treaty goes before the General Assembly for adoption.

Energy and OPEC Aid

Arab oil states are prepared to invest in a \$ 500 billion plan for developing alternative sources of energy. Negotiations are under way with IEA and some European countries on this programme. France began domestic fuel oil rationing on July 1, cutting oil supplies to consumers by 10 per cent. In Japan, energy conservation measures have been put into effect, and the US has a proposal from the President on energy conservation and economy. OPEC announced in mid-July loans of \$ 17.5 million to five countries in Africa and West Asia. The OPEC Special Fund loans are to Burundi, Gambia, Guinea Bassau, Somalia, Yemen and Paraguay.

World Food and International Wheat Council

The US Agricultural Department estimates that due to lower harvests in USSR and some other countries, there will be a decline of 18.3 per cent in global grain reserves by mid-1980. Most of the decline will occur in US grain reserves though it will have bumper crops of wheat and corn in 1979. This will mean increased trade in grain to cover production shortfalls in Europe and USSR and to support growing livestock industries in South Korea, Mexico and Taiwan. By the beginning of 1980, world reserves of wheat and corn, oats and barley will be about 167.3 million tonnes, down from this year's record of 204.7 million tonnes. World production of grain in 1979-80 is forecast at 1.108 billion tonnes, down from the previous year's 1.179 billion tonnes by 6 per cent. The International Wheat Council met at the end of June to negotiate the deadlock on

the world wheat agreement (see Vol. IX, p. 201). The 1971 agreement was extended for 2 years till June 30, 1981 to allow for these negotiations. The producing nations, US and Australia, want a higher range of floor price and

larger reserves, while the consuming nations of the Third World want lower prices. World trade in wheat flows in 1978-79 was 71 million tonnes. The negotiations did not result in an agreement.

* * * * *

II Agricultural Development

Paddy Cultivation

Farm operations were under way in July all over the state. With the Mettur Reservoir receiving adequate inflow, water was released from June 12 to help Thanjavur farmers. Of the 68 lakh acres under all the three crops of paddy in the state in a year, normally 14 lakh acres are cultivated in the first crop season. Of this 14 lakh acres, 9 lakh acres served by flow irrigation and the rest by wells. In Thanjavur district, 4.6 lakh acres are brought under kuruvai, 6.8 lakh acres under samba and 3.9 lakh acres under thaladi, all served by Mettur. Farmers in the tail-end areas in the Tiruthuraiipoondi Taluk were facing inadequate water supply and special arrangements were made to meet their needs. Tirukoilur farmers, who have raised a second paddy crop over 1,500 acres this year, made representations for the release of water from the Sathanur dam to meet their needs, as the two lakes—Peria Eri and Chitteri—which normally feed the first crop and which did so this year, had no water for the second crop. Government officials were attending to this demand.

Jute

The state's prospects for jute cultivation are being explored. In the state (and in Kerala) jute can be grown as a mono crop or an inter crop. It can be cultivated in-between rows of sugarcane. Jute experts state that though Tamil Nadu's summer temperature is high, it will not affect jute cultivation. Jute can be grown as a mono crop between two paddy crops in coastal areas of South Arcot, Thanjavur, Chingleput and Tirunelveli. Jute cultivation, now being tried on a pilot scale in South Arcot and Thanjavur, is to be broadened. Arrangements for retting were being made, and the crop will be purchased by the commercial crop and produce corporation. The several varieties of jute and maesta grown at the Madras Gunny Exchange Institute in Saidapet have passed all tests.

Forestry

The Forestry Plan prepared by the State Planning Commission in 1973 (see Vol. II, No. 12, p. 9) had noted that the state had

one-sixth instead of the required one-third of its land under forests. Even these limited forest areas are being depleted due to various malpractices, the government points out. Among such malpractices are : a) the export to Japan of large quantities of red sanders wood on the pretext that they were from old houses being demolished whereas they were from the denuded forest lands; b) paper manufacturing companies felling 10-15 times the trees permitted in their license from the Tiruvannamalai forest; c) large scale theft of sandalwood in Hosur; d) the illegal felling of 4,000 silver oak trees in Salem district; e) destruction of thousands of acres of forests in Megamalai and Tiruvannamalai forests. Hence the state government and the Forestry department are taking measures to arrest this further deterioration of the forest resources of the state.

IRD

Under the programme of Integrated Rural Development, the state government reports that over 1,40,000 families of small farmers, agricultural labourers, rural artisans and others living below the poverty line have been given about Rs. 7 crores as subsidy for improving irrigation facilities, buying farm implements or milch cattle, developing orchards or starting agro-based industries. As a result, there has been, or will be a 20 per cent rise in the income of the beneficiary families, the government reports. The government claims that about a fifth of the budget for the year 1978-79 amounting to Rs. 181 crores is being used for IRD.

Research Results

A new variety of paddy, Pudukai Ponni, released from the Farm Science Centre, Pondicherry has given an yield of 7,300 kg. per hectare which is about

1, 200 kg. more than the present Ponni variety. It is suitable for cultivation in the samba-thaladi season (September-February), has a duration of 130-135 days, and is tolerant to major insects, pests and diseases. Also, the CRRI, Cuttack has identified a new paddy variety CR-1000 which is tolerant to flood conditions and is to be tested in the flood-prone Balasore area of Orissa during Kharif. In sugarcane, a new variety CO LK 7701 has shown good performance, recording 80 tonnes of cane per hectare and is a good ratooner and keeps its foliage green even during summer. The All-India Research Workshop on Millets has identified 2 new hybrids, PBH 47, and BM 146, which have constantly shown better results than the earlier hybrid BG 104. At the annual kharif oil seeds work shop in Junagarh sound oil seed hybrids were released — BSH-1, a hybrid developed at Bangalore, UPS-2 developed at Panthnagar, Composit -2 developed at Ludhiana, PAK-SUF 72-73 developed at Akola, and TC- 25 developed at Jalgaon. The Central Arid Zone Research Institute, Jodhpur has released some budded varieties of ber, called gold, seb, mundia, which are suited to limited soil moisture conditions. These reduce the period of preparing the budden sapling from 2 years to 5 months. The Aduthurai station reports that the water from well, tank, river or irrigation canal used in the districts of Coimbatore, Salem, Dharmapuri, Ramanathapuram and Madurai contain more than the tolerable salt concentration, above EC 3.0. In addition, varying chemical application in accordance with the chemical composition of the water and applying of zinc, iron and manganese, the choice of the right crop is indicated by the Station. Among paddy varieties, IR-8, IR-8-68 and Jaya are preferred, with SR-26 B, PUR-1, and Bhavani paddy following. Sorghum, ragi

and bajra are semi-tolerant and give satisfactory yield. Cotton, chillies and coconut, as well as sugarcane CO-453, CO-875, CO-1148 and B-37172 give good yields. The Tamil Nadu Agricultural University released a new safflower seed strain: CTS-7403, which matures within 120-125 days with an average yield of of 800 kg. per hectare. It is drought-resistant and grows well in black cotton soils under dry farming conditions. This non-spiny safflower variety released as CO-1 is tolerant to alternative leaf spot and wilt. In cashew, 4 Vriddhachalam types are seen to maintain yield of nuts above 10 kg. per tree from the fifth year of the orchard life. On the basis of this and other successful research in improving cashew growing as an orchard crop, the Union government is negotiating a Rs. 25 crore loan with the World Bank for initiating a multi-state Cashew Research and Development Project which will be aimed at producing 4.5 lakh tonnes of nuts within the next five years. The Madurai research centre has reached a stage in its study of juvenile hormone (JH) whereinsome 10 plants have been identified for high JH activity, including Vettiver, Pachilai, Nithya Kalyani and carrot weed. Extracts from these plants are shown to inhibit the growth and cause the extermination of crop pests like the red cotton bug, the cotton prodenia and worked against their nurturing. All these plants grow wild and freely in the state and now can be used for pest control. Cotton research by the Cotton Research Station has released two cotton seeds SVPR-124 and SVPR-134 to be grown in wetland rice fallows which compare well with MCU 7 grown in rice fallows Tiruchi & Thanjavur districts. It has also in demonstrated that the high yielding MCU 8 which is usually grown in winter irrigated land will do well in summer, as demonstrated at Rajapalayam, Watrap, and

Vasudevanallur with an yield of 2,427 kg. per hectare compared to 1,842 kg. yield by MCU 8, another summer variety. The Tamil Nadu Agricultural University has identified a fungus that destroys prodenia and other caterpillars on cotton, castor, and sugarcane. Further research on it is under way.

Fish Farming

For the development of fish farming, the Union Fisheries Task Force has recommended a series of steps: a) to increase the supply of fish seed, research on suitable methodology for induced breeding under agro-climatic conditions in the states concerned is to be undertaken; b) the technique of using cold water drawn from deep tube wells and reservoirs in these locations is to be developed; c) detailed study of temperatures and rainfall pattern is to be carried out in prospective sites for new fish breeding farms; in view of the high cost (Rs. 10,000 to Rs. 50,000 per hectare) of initial construction of fish farms, the possibility of leasing water areas to other parties capable of developing such farms is to be studied; e) incentives by way of margin money, tax concessions and interest rates as applicable to agriculture are to be applied to fishermen; f) pisciculture is to be included as an approved item of cultivation under the Land Ceiling Act to which no land ceiling should be applied; g) more fish sanctuaries are to be set up to counter the declining trend of many natural fisheries; h) to promote mechanisation and modernisation, excise duty on diesel engines and diesel oil for fishery boats is to be removed; and i) a government factory to manufacture out board motor which can run on diesel or kerosene is to be explored,

Dairy

A first group of 4 metre-gauge milk van bogies built by ICF was handed over in July to IDC. ICF is to manufacture also 100 broad gauge and 40 metre gauge milk vans for IDC in order to transport milk over long distances to implement the Operation Flood Programme. This will enable milk to be transported from Madurai and Coimbatore to Madras quickly and safely. The bogies are for being fitted to stainless steel milk tankers of 40,000 litres capacity on the broad gauge and 21,000 litres capacity on the metre gauge.

Tea

The Tea Board notes that tea exports this year have not picked up and remain at the low level of last year. Last year's low exports (see Vol. IX, p. 258) may have been due to over-stocking by overseas importers, but this factor should no longer operate this year. The industry is confident that this year's export will be 200 million kg. To ensure this and make Indian tea internationally competitive, the industry wants that the excise duty drawback on export tea should be reintroduced. The government is considering a plan for the compulsory registration of all concluded tea export contracts so that they can be excluded in the future if export duty is reimposed. The government has also, in July, decided that tea exporters may start holding some special varieties of tea in warehouses abroad for ready supplies to buyers and blenders. By ensuring that steady supplies are maintained without interruption, Indian teas abroad will also be promoted. India and Sri Lanka tea industry representatives met in Colombo in July to consider joint marketing of tea and collaboration in developing an alternative package for bulk tea, repla-

cing plywood tea chests. Both these proposals depend on all tea exporting countries agreeing to a quota system in export marketing, and a shift-over to a new container system.

Coffee

In view of the increase in the international price of coffee, the government, in early July, increased the export duty on coffee from Rs. 750 to Rs. 900 per quintal. At the international level, a two-day meeting of the International Coffee Organisation met in July at London, and after review of stocks and supplies, found that there are 29.1 million bags in store and a further 60.5 million bags coming as the year's supply. With world consumption of 4.2 million bags a month, the total availability can meet world coffee demand for 18 months. This assessment is on the assumption of a normal coffee crop in Brazil and no interruption in supply from Nicaragua and other Central American countries as well as from Uganda, Zaire and Cameroon.

Rubber

The average yield of natural rubber in India has increased to over 800 kg. per hectare, while Malaysia's remains at 1,000 kg. Rubber production in 1979-80 is expected to be between 1,45,000 to 1,55,000 tonnes (in 1977-78 it was 1.47,000 tonnes, and in 1978-79, due to bad weather and strikes 1,35,300 tonnes), placing India in the 4th position among rubber producers (after Malaysia, Indonesia and Thailand). Synthetic rubber production will increase to 35,000 tonnes this year. Consumption of natural rubber was 1,64,500 tonnes in 1978-79 plus 37,600 tonnes of synthetic rubber. For 1979-80 total rubber consumption is estimated at 2,20,000 tonnes.

III Industrial Development

Salem Steel

The Salem Steel Plant project reports that of the Rs. 41 crores allotted to the plant this year, Rs. 26 crores have been spent in excavation work for the skinpass mill and annealing and pickling lines. On this basis, the major part of the equipment foundation for the cold rolling mill complex will be completed by June 1980. This foundation will be to a maximum depth of 10 metres and involves excavation of about 23,000 cubic metres, and concreting of 13,000 cubic metres. Out of the 10,000 tonnes of steel structures needed for the cold rolling mill complex, 6,200 tonnes have been fabricated and are being erected. The plant also reports that orders have been placed for the Rs. 65 crores major processing equipment.

Neyveli

Neyveli's second mine cut was inaugurated by the President on July 4. This (second) new complex, which will come into operation in April 1983, will have a lignite production capacity of 4.7 million tonnes, a power station of 630 MW (three units of 210 MW each) at a cost of Rs. 400 crores. Now that the inauguration is over, the Union government, with the help of the state government, should acquire the needed land. At present, only 1,500 acres of poramboke land is available (south of the present mine), and it is on this that the inauguration took place. The second mine cut needs 6,000 acres additionally, and as a first stage, 3,000 acres are to be acquired. This means buying off 1,000 families, and the compensation price to be paid by the government, which is challenged by the farmers, should be

finalised soon. The government has fixed Rs. 3,000-7,000 per acre, while the farmers are demanding Rs. 25,000 per acre. The actual mining area will cover 2,600 hectares where lignite reserves are estimated at 370 million tonnes. The importance of the second mine cut to the state and country is underlined by the current international crude oil price crisis, which makes this so-called inferior fossil fuel an important energy source. In addition is the water supply from this mine to Madras city, at the rate of 40 gallons per minute, via the Veeranam infrastructure as referred to earlier.

Fluoride Factory

The state government and TIDCO announced the setting up of the Tamil Nadu Fluoride and Allied Chemicals Ltd. at Mansalur in Ramanathapuram District. It involves an amount of Rs. 12.50 crores and will manufacture aluminium fluoride, with a capacity of 6,000 tonnes per month. Aluminium fluoride is used as a flux in aluminium manufacture. The factory will employ 265 persons and will go on stream in early 1981.

Small Industry

Small industries in the state as noted in the last issue (p. 371) are facing a serious crisis due to the lack of pig iron and coke and steel. 300 foundries and 4,000 engineering units in the Coimbatore district alone are facing closures. On top, the movement of steel materials, both imported and from the main producers and stock yards are not being moved to the small units in the state because of the three-week strike in July by tractor-trailer drivers and cleaners

in the Port Trust area. These small units cater to the casting needs of the whole state and other states and to the public sector undertakings viz., BHEL, BEML, HMT, IL and the Railways. Also the livelihood of 30,000 workers working in this unit is at stake. The Union government should rush the needed pig iron, steel and coke and further, to prevent future crisis build at Coimbatore a buffer stock of 20,000 tonnes of pig iron and 10,000 tonnes of coke. The state government has appointed the Nayudamma expert group to monitor the implementation of approved recommendations of the study group. It will be known as the Committee for Monitoring Rural Industries Development, with Mr. HBN. Shetty as full-time Member-Secretary.

Textiles and Sugar

After 54 days of strike, a settlement was reached on July 17 between textile mills managements and trade unions on the basis of the Chief Minister's proposal involving an increase of Rs. 45 in basic wages and DA at 31 paise per point beyond the 1000 point level of the Madras city cost of living index. It will be effective from January 1, 1979 and will benefit 1.3 lakh workers in 151 member-units. The production loss due to the strike was Rs. 112 crores, loss in wages Rs. 18.5 crores and loss of revenue to the government and power charges to TNEB Rs. 9 crores. Meanwhile yarn prices have shot up in the state and country the roll back decision becoming ineffective. On the sugar front, the state sugar industry proposes the setting up of a government sugar marketing board to meet its problem of over-production and unremunerative prices. Under this proposal, the entire marketing activity will be taken over by the Board, and the mills will function only as processing units converting cane

into sugar, for which it will receive from the board processing charges and return on capital. The industry will continue to be responsible for cane development research work. This proposal will have to await the formation of the new government.

Handloom

SITRA, in a study sponsored by the government, recommends the establishment of an Institute of Fashion Technology to increase exports of readymade handloom garments. This would help diversify production from its present limited concentration on ready-made shirts and blouses with cotton fabric and cheap varieties character. It would also enable the industry to go beyond constructional and dimensional specifications and result in correct construction, less weaving defects, colour fastness and uniform shades, as well as modern textile finishing. Also there is need to adopt standard purchase policy, establish cells for testing and assessing quality of sewing threads and buttons. These recommendations are appropriate in the light of the Indian Institute of Foreign Trade's market orientation tour team which visited Malaysia, Indonesia, Singapore, Hongkong and Thailand, which obtained Rs. 4.2 lakhs sample orders. An export of Rs. 50 lakhs to these countries can be made through handloom furnishings and made-up articles.

Leather:

Leather exports in April-May 1979 increased at 35 per cent at Rs. 63.08 crores against Rs. 46.62 crores in April-May 1978, and at this rate, the year's export earnings might well be Rs. 400 crores compared to the target of Rs 390 crores. Finished leather is expected to contribute Rs. 190 crores and here there is a problem

as the government has taken seriously the complaint that the trade is passing off as finished leather goods which are not so. In Madras, the government held up shipments of Rs. 1 crore in order to check and ensure that the finished leather conforms to the classification. El tanned and wet blue chromes will earn Rs. 120 crores, footwear Rs. 50 crores and leather goods Rs. 30 crores. In April-May, finished leather earned Rs. 37.86 crores (69 per cent rise), El tanned Rs. 12.73 crores (14 per cent rise), and leather goods Rs. 2.42 crores (60 per cent rise). The Export Promotion Council for finished leather and leather manufactures in its report on the New York International Leather Show recommends that India's methods of planning production and marketing should be changed to meet design style shifts for leather goods and garments.

Private Sector Reports

The annual report of EID-Parry for the year ending December 31, 1978 shows

higher crushing but lower recovery of sugar at 6.58 per cent compared to 7.92 per cent. The functioning of the spirit and carbonic acid gas was normal; increases in production of and demand for phosphatic fertilisers, and a lesser increase in pesticide because of the erratic supply of imported technical material were registered. Production of seeds and animal feeds increased sharply and ceramics, which should have reached capacity production, fell below due to technical problems and labour unrest. Chemicals show a marginal drop, with some disappointment in marine development. The financial position is still a rather tight one. The annual report of South India Viscose for the year 1978 shows a poor performance in the fibre and pulp plant units and a start with the 20 tonne polynosic staple fibre project. The Company is facing a problem with the resignation of its director, which is a reflection of a poor year.

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IV Education and Science

Unrest in Educational Institutions

In July, 18 cases of unrest in educational institutions were reported. 7 cases were due to the demand of students to copy in the examinations, and violence, destruction of property and injury to students and staff in the resulting disturbances in Moradabad, Bareilly, Rampur and Budaun in the Rohilkhand University examinations, in Arrah

in Magadh University intermediate examinations, in Jaipur in Rajasthan University law examinations, and in Sahranpur and Jain College in University examinations. In Jammu, University examinations had to be postponed because of the strike of the non-teaching staff. The other cases were due to various causes: in Punjab, Ludhiana, Moga, Jullunder for the murder of a student leader and teachers agitation; in Lucknow

University for meeting certain students' demands, the Vice Chancellor's house was attacked; in Jaipur as part of a clash with bus drivers; in Benares to protest against the stationing of PAC and police on the campus, in Bangalore to protest against the upward revision of marks card and revaluation fees; in Madras against arrest of students who had broken the rules and law; in Delhi against the closure of a college and on the question of administration; and in Allahabad, through a bomb in the Vice Chancellor's house. The atmosphere of indiscipline and violence calls for the kind of general restructuring of higher education which is still in the talking stage.

Educational Reform

In the State the role of the headmasters and that of the teachers in regard to academic standards and examination results is under study by the Department of Education with a view to determining the management of schools. The state also has decided that economic backwardness and not caste or community should be the criterion in deciding the backwardness of a person for providing educational concessions and facilities. The Minister of Education, explaining this decision, points out that non-brahminical or pseudo-brahminical cult has developed with the growing numbers of the influential and affluent among the backward classes following the enjoyment of concessions over the years. This number continued to increase at the cost of the poor in the community. The government had now cut this vicious circle and had decided that the backward class candidates whose parental income was less than Rs. 9,000 per annum would be eligible for concessions. The percentage of reservation for backward classes (31) would continue. The issue has been made a political one and a controversy on

It is under way. The government announced that the NSS scheme will function in all higher secondary schools from 1980-81. UP has decided to teach moral education as a compulsory subject and as a compulsory subject in the examinations conducted by the UP Board of High Schools and Intermediate Examinations. UGC announced that it would develop post graduate colleges in every district to meet the needs of the weaker sections, which means a total of 750 such colleges for the whole country. UGC is also planning to classify universities into developed, developing and underdeveloped, and would vary its grants according to this classification. The developed universities would be given grants for quality programmes, the underdeveloped given general development grants. In this state, 433 college teachers who have been rendered surplus as a result of the plus two course are being sent to the Universities and recognised colleges to do their M. Phil by the Director of Collegiate Education. Out of the 433 teachers, those doing M. Phil in Tamil are 110, in English 103, in Chemistry 96, in Physics 76, in Zoology 22, Botany 16, Logic 4, one each in Economics, Home Science, Geography, Hindi, Urdu, and Malayalam. They comprise 117 professors including 1 principal, and 316 assistant professors. 177 are from government colleges, and 256 from private colleges. Madras University and its affiliated colleges have taken 256, Madurai Kamaraj 134, Annamalai 39 and Anna University 4. It is to be hoped that this will not be a mere deployment operation but will lead to raising the quality and standard of higher education in the state. In accordance with the agreement reached with the teachers union (see vol. IX, p. 261), the state government has set up 5 regional offices to make direct payment of salaries to aided college teachers at Madras, Coimbatore, Tiruchi,

Madurai and Tirunelveli. These offices are expected to streamline procedures, decentralise educational administration and regulate the direct payment to aided college teachers. In addition, these offices will look after inspection and auditing of accounts of government colleges.

Non Formal Education

The Union Minister explained in Parliament the non formal education system for the 9-14 age group. A total 57,380 primary and 16,310 middle nonformal education centres covering 29.63 lakh children are envisaged under the VI Plan. At the primary stage, the cost has been estimated at Rs. 64 per pupil per annum, and at middle stage at Rs. 77 per student. The United Commercial Bank at its Titagarh branch in West Bengal is running a bank where the majority of account holders are illiterate. Out of 9,638 savings bank account holders, 7,000 are illiterate and operate their accounts through thumb impression. The savings habit has spread among the illiterate who work in the industrial units and to maintain long term fixed deposits, of which there are 1,100 held by the illiterates, has become an accepted practice. To offer more benefits to such depositors loans against savings accounts are granted. This "bank for the illiterates" is a successful experiment in mass banking and provides a fertile base for an Adult Education Programme.

Technical Education

In the state, the polytechnics report an unusual rush of students for admission. For the 320 seats, the Central Polytechnic has received 5,000 applications. For the 180 seats in the women's polytechnic, 1,682 have applied. For 180 seats at the Murugappa Polytechnic in Avadi 2,000 have applied. This is explained as being

due to the middle and low income groups wanting their children to acquire an earning capacity quickly. Also the new courses offered by the polytechnics such as Fisheries Technology, Cosmetology are much in demand. To meet this increased demand, the government is considering employing the shift system in the polytechnics. In regard to admission to engineering colleges, in addition to marks scored in the examination, a student's co-curricular and extra curricular activities as well as his talents in fine arts and culture are being taken into account for the first time this year. Women from 18 countries attended a 3 day seminar organised by ESCAP's Technology Transfer Centre at Bangalore on the subject of participation of women in Science and Technology. The conference recommended that the role of technology in changing the life of women be studied along with action to counter the widening gap of the economic relation between men and women caused by modern technology.

Science

India's second satellite, Bhaskara, whose launching was reported in the last issue is facing problems. A number of attempts made to turn on TV cameras have failed due to large scale electrical disturbance on board. Also the X-ray telescope after 350 orbits is not functioning well. Hence while laboratory simulation studies to correct these faults are being made, Bhaskara is being operated routinely to gather data on other experiments. The micro wave radio meters which are the other remote sensing instruments are sending data on temperature and water vapour content over Indian land and sea mass. Other technological experiments on solar cells, tracking equipment and data collection platforms are under way. But the main purpose of Bhaskara is remote sensing of our resources, and for

this the TV cameras should work. As noted earlier, the first experiment of running a car with gashol (80 per cent petrol and 20 per cent power alcohol) was

successfully completed at Trivandrum. Cassava and sugarcane can be used to produce alcohol in abundance and this state has a special interest in it.

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V Employment

On the basis of a) the Food for Work Programme having created 1 million man years of employment, b) the antyodaya programme in Rajasthan having benefited 1,60,000 families, c) the employment guarantee scheme of Maharashtra employing 9,11,000 persons in 1978-79, d) the 2.6 million hectares of additional irrigation in 1978-79 generating 3,80,000 additional man years of employment, e) the additional beneficiaries from SFDAs being 7,76,000 in 1978-79, f) 9,00,000 persons benefiting from the Operation Flood Scheme, g) the number of persons employed in Khadi and Village Industries being 2.4 million in 1978, the Planning Commission states that the unemployment rate in the country has declined from 8.5 per cent in 1973 to 8 per cent in 1977-78. The total investment made under the Food for Work Programme in 1978-79 was over Rs. 300 crores which generated 301 million man days of employment. Against a target of 1 million tonnes of foodgrains to be used, the actual use was 1.25 million tonnes costing Rs. 175 crores. The programme also helped to stabilise grain prices in the interior rural areas, helped in providing minimum wages to rural labour, and better nutrition to the people. Considerable community assets at low cost have

been created. In Rajasthan, it has slowed the rural exodus, and the programme is operated by village panchayats. In Orissa, it helped workers bargain for their minimum wages. In all participating States, popular enthusiasm for the programme is reported in this government review. CSO reports that there are 3.18 million non-agricultural establishments employing 27.25 million persons in the country as a result of the 1977 Economic Census. 55 per cent of these units are based in rural areas and account for 40 per cent of the employment. The census showed that 24.24 million out of 27.25 million (8 in every 9) worked as hired labour and 12.5 units operated from resident households and 3.5 operated without any premises. The Institute of Applied Manpower Research in a report on middle level technical and scientific manpower (TS) states that the number of such personnel about doubled in 15 years, from 9.07 lakhs in 1964-65 to 17.76 lakhs in 1978-79. Employment in the organised sector at 116 per cent during 1967-77 increased faster than in the unorganised sector at 74 per cent in that period. Middle level manpower increased by 3 per cent per annum at 14,200 during 1964-67, at 6.6 per cent per annum at 33,600 during 1967-74 and

at 8.4 per cent per annum at 59,300 during 1974-79. During 1964-69, the construction sector absorbed one-seventh of the middle T and S manpower, and in 1978-79, the increase was one-fifth. The share of civil engineering technicians increased from 1/4 in 1964 to 1/3 in 1978-79 mainly at the cost of mechanical and engineering technicians and textile supervisors. Only 43 per cent of the middle level T & S manpower are professionally qualified, 48 per cent among engineering technicians, 21 per cent among science technicians, 37 per cent among medical technicians and 17 per cent among supervisors and foremen of crafts and processes. The proportion of professionally qualified persons is more in the public than in the private sector. Out of the 45 manufacturing industry groups employing T & S manpower, 32 are in the private sector, 12 in both

the public and private sector, and 1 in the private sector. The Ministry of Agriculture reports that it has finalised a comprehensive programme to train 2 lakh rural youth every year in agriculture and allied fields for self employment. This national scheme of training rural youth for self employment (TRYSEM) will be launched on August 15 and cover each of the 5,000 development blocks, training at least 40 persons in every block every year. The youth will be trained in necessary skills and technology to enable them to seek self employment, and after training, the government will help the trainee set up his enterprise. For this the various fields and sectors with scope for self employment are to be identified at the district/block level. The programme will be centrally financed and in the case of private organisations, on a 50-50 basis by the Union and state governments.

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VI Other Items

Director's Section

Introducing new faculty members

Dr. R. N. Poduval is joining the Institute in September as Honorary Professor. Dr. Poduval was formerly Professor of Economics, Annamalai University, Reader in Economics, University of Madras, and Chief Professor of Economics, Presidency College, Madras. He also worked as Economic and Statistical Adviser, Ministry of Food & Agriculture, Government of India and has worked with many agencies of the United Nations, primarily

the Food and Agricultural Organisation. He is a distinguished scholar in Economics and in Public Administration and the author of many publications. Dr. Poduval thus brings to the Institute his rich experience in a variety of fields.

Also joining the Institute in September is Mr. S. Guhan who has voluntarily retired from the Indian Administrative Service to become a full time researcher. Mr. Guhan, who will be a Senior Fellow in the Institute, had a brilliant academic record. After working as Assistant Professor in the Presidency College, Madras,

he entered the Indian Administrative Service in 1955 securing the first rank in the all-India competitive examination. After joining the Service, he served the Government of Madras in many capacities before going to Delhi as Chief, Survey and Statistics Division of the Union Planning Commission. Subsequently he was Director, Department of Economic Affairs, Union Ministry of Finance, and Alternate Executive Director for India in the International Bank for Reconstruction and Development and First Secretary (Economic), Embassy of India, Washington. Mr. Guhan was Secretary, Finance and Planning, Government of Tamil Nadu from 1974-78 and Senior Economist, Independent Commission on International Development Issues, Geneva in 1978-79. As a member of the Commission, Mr. Guhan visited the People's Republic of China in August, 1979. Mr. Guhan thus has had considerable exposure to planning and development issues at international, national and state levels and practical experience in economic ministries and departments at Central and State levels. Mr. Guhan's experience in these different spheres and intimate knowledge of the working of the economy will be a major asset to the work of the Institute.

Dr. Ashok V. Srinivasan joined the Institute as a Fellow on August 1, 1979. Dr. Srinivasan took his Master's degree from Osmania University and Ph.D. from the Bombay University. His Ph.D. thesis was on "Productivity in Indian Railways". He has worked as a Consultant on transport problems to the UNDP Adviser in the Planning Commission and to several overseas agencies. He has also worked as Assistant Editor of *Indian Demographer* and as a Lecturer in the Jai Hind College, Bombay. He has several papers and

articles on transport problems to his credit.

Dr. John C. Harriss and Dr. Barbara Harriss will be joining the Institute as Visiting Fellows in September for about one and a half years. Dr. Harriss took his Ph.D. from the School of Development Studies, University of East Anglia and has also worked as Lecturer in Development Studies in the same University. Between 1972-75 he was a research officer, Centre of South-Asian Studies, University of Cambridge and was an active member of the University's research team that made a comparative study of agricultural development in Tamil Nadu and Sri Lanka during that period. He is the author of many research papers as also several chapters in B. H. Farmer (Ed), *Green Revolution? Technological Change in Rice Growing Areas of Tamil Nadu and Sri Lanka*. Mrs. Barbara Harriss also took her Ph.D. from the University of East Anglia. Her doctoral dissertation was "Piecemeal Planning in Rice Markets: The effects of Partial Government Intervention on Marketing Efficiency in a South Indian District". Along with her husband she too was a member of the Cambridge University's project on "Agrarian Change in Rice Growing Areas of South Asia" (1972-75). She has served as a Consultant to FAO and other international agencies. She is the author of many research papers. A major study of hers *Paddy and Rice Marketing in Northern Tamil Nadu* has just come out as one of the publications of the Institute. Another work of hers *Transitional Trade: The Nature of Agricultural Trade and its Role in Rural Development in a South Indian District* is soon to be published by Vikas Publishers. During their stay with us, the Harrisses will continue their research studies on Tamil Nadu.

Mr. K. Nagaraj joined as Research Associate in the Institute in April 1979. Mr. Nagaraj took B. Tech (Hons) (in Metallurgical Engg.) from IIT, Bombay and then took a two-year course in Economics from the Indian Statistical Institute, Delhi. He is currently working on his Ph. D thesis "Structure of Agrarian Markets and their interrelations with specific reference to South Kanara District" which he expects to submit to the Indian Statistical Institute, Calcutta in October 1979. Apart from the quantitative aspects of development planning, Mr. Nagaraj's academic interests relate to evaluation of agrarian relations.

Two more faculty members are expected to join the Institute, one in October and the other in December. The Institute can therefore look forward to a period of active research effort in the coming months.

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TNBCE and SRC

A meeting of the Executive Committee of the Tamil Nadu Board of Continuing Education was held in early July. The Committee reviewed the three ongoing NAEP projects and decided to continue and expand them with Union government help. It also decided to convert the five Action Research Projects into NAEP centres. It noted the evaluation of the Kotturpuram out-of-school project under way and decided to expedite its completion. It opened a Fund for the award of the Sister Catherine Mclevy Awards for distinguished services to Adult Education in the state and appealed for contributions to the Fund. The Committee was followed by a meeting of the Governing Board of the State Resource Centre at which the ongoing programme was reviewed. The further use by the government of the services of the Centre for its programme

of Adult Education was discussed. The budget of the Centre was reviewed and confirmed

MIDS

A meeting of the Selection Committee of the Madras Institute of Development Studies was held in July at which selections were made for the post of a Professor and two Fellows. The Executive and Governing Council of the Institute also met and confirmed the recommendations of the Selection Committee. They reviewed the revised budget of the Institute presented by the Director and approved it. It also accepted the invitation of the Union government to act as reviewing body of the NAEP programme in the state.

NAEP, Orissa

A seminar of some 70 voluntary agencies participating in NAEP was held at the historic Navajeevan Mandal, Angul, where also the Orissa SRC is located. The seminar pledged the support of the agencies and made a number of recommendations to integrate the National Adult Education Programme with the programme of Integrated Rural Development in the state. The problem of coordination, planning at the district and village level, production of materials, assessment and follow-up, and training were discussed in depth, and guidelines for the agencies established.

Conference on Culture

In early July, the Union minister of culture called a conference of state ministers of culture and specialists to review the cultural activities of the Union and state governments and formulate a programme. The meeting was important, as such a dialogue had not been held for over two decades. It was decided to promote the activities of the various

Akademies to help states develop their own cultural infrastructure to make culture and fine arts part of the formal and non formal education learning and step up the resources for cultural activities primarily by closer links with tourism, NAEP and libraries.

Jammu and Kashmir

Two meetings of the Commission of Enquiry on Regional Imbalances in Jammu and Kashmir were held in July in Srinagar at which the terms of reference of the commission were examined and publicised. Questionnaires were finalised and addressed to the government, political parties and universities. Visits were made to some districts in the state and evidence recorded of the problems faced by the groups who met the Commission.

Rajya Sabha

The Rajya Sabha was convoked on July 9 and began consideration of a

number of issues of importance such as prices, the North East region and communal disturbances. It also began consideration of 3 Bills placed before it by the government. On the resignation of the government on July 15, the Chairman adjourned the Rajya Sabha *sine die*.

August Seminar

The paper for the August Seminar, Slums in and around Madras City by Dr. C. M. Abraham, Professor and Head of the Department of Sociology, Autonomous Post-graduate Centre, Coimbatore together with a summary of the discussion on the paper at the seminar chaired by Mr. A. Joshua appears as the first article.

Second Article

A paper, Societal Expectations of Science and Technology, appears as the second article.

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Slums in and around Madras City

By

C. M. ABRAHAM

Coimbatore

The Edinburgh Conference on internationalisation of cities held in 1976 has warned that the metropolises in developing countries are growing far too fast and may end up as monster cities with unmanageable problems. The relevance of this warning can be substantiated by what is happening in our metropolitan cities. The urban population of India had increased threefold during the period 1931-1971, from 34 million to 110 million. During 1961-71, i.e., one decade, the increase was as much as 30 million. In the same decade Bombay (4.4 per cent), Calcutta (2.2 per cent), Delhi (5.4 per cent), Madras (4.3 per cent), Hyderabad (4.4 per cent), Bangalore (4.3 per cent) and Ahmedabad (3.8 per cent) grew at the annual rate of 2.2 to 5.4 per cent. In 1950, there were only two cities in India with a population of more than one million. In 1985 this number is likely to be 17. Of these, Bombay, Delhi and Calcutta will probably be saddled with populations nearing eight million each—a staggering figure indeed.

Even now life in most of the metropolitan cities has become an ordeal. Calcutta, once a metropolis of majestic edifices and salubrious climate, has now become a sick city choked with an enormous

and mostly redundant population. An expert who had conducted a study of Calcutta pointed out that over a million persons lived in slums and that almost every poor household had some active TB patients. The Smoke Nuisance Commission has revealed the fact that not an inch of Calcutta city is free from air pollution, and hence a large number of inhabitants of Calcutta and Howrah constantly suffer from one type of respiratory disease or another. The plight of Calcutta City has evoked and provoked many sociologists to ask the question "Can India survive Calcutta?". Joseph Lelyveld in his heart-breaking report on the decaying city writes: "To the squeamish onlooker, Calcutta's poor are so depressed that they do not seem quite human. The question is always posed — How can human beings live like that? — as if they did it by choice!" Some even label Calcutta as the world's worst disaster. Joseph Lelyveld in his article "Calcutta is not one disaster, but many" (*Imprint* November 1968) writes "Calcutta is not one disaster but many, each breeding its own kind of despair, its own special nightmare. The City planner scans the decaying water, sanitation and transport systems and holds out the prospect of total failure, a breakdown so complete

that people would flee as if running from war or plague. The Sociologist talks of the frayed fabric of society coming apart altogether, the economist of a depression so deep there could never be any recovery. The Political analyst resorts to words like "anarchy" and "nihilism" and asks whether Indian democracy can survive the erosion of faith that is taking place here. These nightmares seem an inescapable part of the future demographers see for Calcutta. Twenty years from now, they say, there will be 12 million people in the metropolitan area as against 7.5 million in the stifling conditions of today. But the unthinkable is not just in the future: it is here and now. Calcutta is already the worst example of a malignancy of social purpose, organization and resources, that can be found in a number of cities in the world's poorest countries (not to mention some that are not so poor)."

At one time in Bombay city, slums were concentrated in areas where the standard of living was low. Now it is a different story. Slums have invaded the posh south Bombay alongside skyscrapers. Every day waves of migrants came into the city in search of jobs, and finding no place to live, pitched their huts in almost any available space. Now there are about 640 slum pockets in Greater Bombay. Of these, 259 are on government land, 150 on Corporation land and 231 on private areas. The density in the city is one of the highest in the world — 50,000 a square kilometre. Here, one person out of five lives in dingy and disease-ridden hovels. In 1975, it was estimated that Bombay requires atleast 3,00,000 housing units immediately and 50,000 units should be added each year to accommodate the increasing population.

Even the capital city of India — New Delhi — cannot emancipate itself from the slums. The report prepared by the National Committee on Environmental Planning and Co-ordination (NCEPC) for the United Nations Conference on Human Settlements (Habitat) at Vancouver states that in Delhi alone more than half a million people lived in 1,300 clusters of slums. In 1951, Delhi had one squatter household to 20 non-squatter households. In 1973, the proportion increased to one squatter household for every five non-squatter households. The export investigators point out that the squatter settlements are "communities of under-privileged living in a marginal physical environment devoid of any public services and community facilities and remain relatively non-integrated to the central urban community". In addition to the slum dwellers, there are about 20,000 homeless persons — pavement dwellers in Delhi. This grave social problem is increasing in its dimensions with the passage of years. In 1961, there were only 6,296 shelterless persons in Delhi. But there has been an increase of 149.81 per cent in the houseless population against the overall increase of 54.57 per cent in the urban population of Union Territory of Delhi during the decade 1961-1971. In the 1971 census, 15,136 persons in Delhi were listed as pavement dwellers of whom 13,120 were males and 2,016 females. The comparative figures for Bombay were 59,169 (49,415 males and 9,754 females), and for Calcutta 48,802 (37,911 males and 10,891 females). Madras has only 7,049 houseless persons (3,687 males and 3,362 females).

Compared to Calcutta and Bombay, the Madras Metropolitan area recorded the highest growth rate of 63 per cent between 1961 and 1971, when the population came to 3.17 millions. Projected population figures for the next three

decades are : 4.5 million (1981), 5.8 million (1991) and 7.2 million (2001). The population explosion in the city exposed the utter inadequacy of civic services and housing accommodation. Thus the city is afflicted with acute problems of slums, inadequate transport facilities, and water shortage. There were 1,202 slums of varying sizes in the city of Madras in 1970. In these slums one-third of the city's population welters in ugly life.

This is the grim story about most of the Indian cities. A large segment of their population is living in dungeon-like huts, which are the plague spots of our cities. There seems to be no end to the problem of housing in our cities; the situation is growing worse day by day. The housing situation in aggravated due to the fact that during the last two decades our large cities and towns are attracting more and more people. "The dominant role of cities with population of 1,00,00 and over in the urbanization process is evident from the fact that about 56 per cent of the total urban population resides in these cities. They grew by 59 per cent during the 1961-71 decade compared to the overall growth rate of the urban population of 38 per cent. Out of the net increase of 30 million persons in urban areas during this decade, the cities claimed 22.5 million people or 75 per cent of the total urban increase." (Asish Bose. *Urbanization in India: A Demographic Perspective*.) The number of cities classified as Class One has increased from 81 in 1951 (41.77 per cent of the urban population) to 113 in 1961 (48.37 per cent of the urban population) and 147 in 1971 (56 per cent of the urban population). Asish Bose again points out: "Today there are 147 large cities with an aggregate population of about 61 million persons. Of

these, 9 cities have a population exceeding one million each. Except for the Calcutta Urban Agglomeration, the growth rate of all these cities has been very high. But compared to the 59 per cent growth of cities with a population of 1,00,000 between 1961 and 1971, that of towns with a population between 50,000 and 1,00,000 grew by only 33 per cent; smaller size categories of towns grew at an even slower rate, below the national average; and the smallest towns actually decreased in population. Thus, the overall growth of 38 per cent in urban population conceals the stagnation and decay of small towns." (Asish Bose. *Ibid.*) This trend brings to our notice some valid and coherent observations about the growth of Indian cities and towns. Highly urbanized and industrialized areas and least urbanised and industrialised areas are found side by side. These highly urbanised and industrialized areas grow practically at the expense of the surrounding areas by exploiting the human and natural resources of these areas — both villages and small towns.

In an interesting paper on Urbanization, the World Bank highlights the fact that in the developing countries, the urban population is currently growing at about 5 per cent a year, or doubling in about 15 years, a rate only occasionally reached by the developed countries for short periods at a much later stage of economic development. The magnitude of migration to the big cities is revealed by the pressures reflected in employment, income distribution and living conditions, especially in the growth of slums. The World Bank's estimate is that the rate of increase in employment is generally about half the rate of the increase in industrial output and still if the level of unemployment is not high enough to discourage migration to the cities, it is mainly because most

migrants are occupied as casual labourers and in petty trade. This is the result of a dualism in the urban economy wherein, as in rural agriculture, modernised industry co-exists with traditional industry, leading to the separation of the small wealthy group from the poorer masses of the urban population. This trend, observed by the Bank, is unlikely to abate because most urban areas are characterised by settlements, similar to shanty towns in which residents are prepared to reconcile themselves to abominably low standards, water supply, sewerage and other facilities. And as it points out, "Surprising to the town dweller, the neon lights and billboards may also appear more beautiful to the migrants than the countryside." (Editorial. The Hindu. Sunday, August 13, 1972.)

With this background material, let us now discuss the topic Slums in and around Madras City.

Let us first of all clarify the concept by posing the question "What constitutes a Slum?"

The Report of the Selected Buildings Project Team on Slum Clearance (April 1958) writes that it is difficult to define a slum precisely and concisely due to the fact that different cities seem to have different notions in this regard and every city has its own nomenclature for its slums. But there seems to be general agreement that it is an area in which the housing is so unfit as to constitute a menace to the health and morals of the community and that the slum is essentially of social significance. The U. S. A. Housing Act of 1949 defines a slum as "any predominantly residential area, where the dwellings which by reason of dilapidation, over-crowding, faulty arrangement of design, lack of ventilation, light or

sanitary facilities or any combination of these factors, are detrimental to safety, health or morals."

The Seminar on Slum Clearance, held in Bombay in May 1957, has suggested the following general description of Slums for the purpose of analysis, classification and selection of specific areas in a city for improvement, clearance and development:

"A slum may be described as a chaotically occupied, unsystematically developed and generally neglected area which is over-populated by persons and over-crowded with ill-repaired and neglected structures. The area has insufficient communications, indifferent sanitary arrangements and inadequate amenities necessary for the maintenance of physical and social health and the minimum needs and comforts of human beings and the community. There is a general absence of social services and welfare agencies to deal with the major social problems of persons and families in respect of substandard health, inadequate income and low standard of living, who are victims of biological, psychological and social consequences of the physical and social environment."

Mr. Harvey Warren Zorbaugh of the Chicago School writes: "The slum is a bleak area of segregation of the sediment of society; an area of extreme poverty, tenements, ramshackle buildings, of eviction and evaded rents; an area of working mothers and children, of high rates of birth, infant mortality, illegitimacy and death; an area of pawnshops and second-hand stores, of gangs, of "flops" where every bed is a vote. As distinguished from the vice area, the disintegrating neighbourhood, the slum is an area which has reached the limit of decay and is on

the verge of reorganization The slum harbours many sorts of people; the criminal, the radical, the bohemian, the migratory worker, the immigrant, the unsuccessful, the queer and unadjusted." (Quoted by P. K. Nambiar. *Census of India, 1961*, Vol. IX. *Madras*. Part. XI-C. *Slums of Madras City*. 1965. p. 4.)

The Conference summoned by President Hoover on Home Building and Home Ownership held in 1931 defined a slum "as a residential area where the houses and conditions of life are of a squalid and wretched character and which hence has become a social liability to the community We think of the slum as the abode of half-starved, filthily clothed children of diseased and crippled individuals; a place of poverty, wretchedness, ignorance and vice. We think of it as a recession from the normal standards of a sound society." (Quoted by Nambiar, *Ibid.*)

Mr. Nambiar, in his monograph, adopted the following definition given by the Commissioner of the Madras Corporation. "Slum is taken to mean hutting areas with squalid surroundings. In such areas huts are erected in a haphazard manner without proper access. Minimum basic amenities are lacking in these areas. Protected water supply and drainage arrangements do not exist in these areas. . . . Slum will also include such dwellings which on account of such overcrowding, dilapidation and lack of ventilation are detrimental to safety, health and social morals." (p. 5)

Interim Report: The Existing Situation 1979 prepared by the Madras Metropolitan Development Authority, a slum in Tamil Nadu is taken to mean "hutting areas with huts erected in a haphazard manner without proper access, without protected water supply, and

drainage arrangements and so congested as to allow little free air to get in." (Para 4.4, Chapter 4. Shelter and Social Facilities.) The Madras Metropolitan Development Authority has accepted the definition of slum given by the Madras Slum Clearance Board.

Herbert J. Gans, the author of the book *Urban Villagers*. Free Press: New York, 1962, has argued that the term "slum", particularly as used by those who have dominated the urban redevelopment process, has been an evaluative concept, not an analytical one. Evaluation of certain conditions or behaviour in a given area as pathological has more often than not reflected a class bias rather than an objective appraisal. Only certain housing characteristics and anti-social behaviour are singled out by officials and planners according to their own values, without careful studies of the actual harmfulness of the physical and social environment for a majority of the local residents (perhaps most important) or for the city as a whole. (Quoted in the book *The Urban Scene: Myths and Realities* edited by Joe. R. Feagin. Random House, New York. p. 54). Gans continued: "Low-rent structures and districts may be distinguished from slums by the fact that they provide shelter that may be inconvenient but that is not harmful. . . . A set of parallel social standards is even more difficult to define, because most of the social problems found in slums cannot be traced to the area itself. Undoubtedly some people live in slums because they have problems or unacceptable behaviour patterns. But economic and social conditions, rather than the slum itself, have caused these." (*Ibid.* p. 54). He further opined that "One might even press this argument a bit further and raise the fundamental question of self-determination; that is, should officials have the right to

disrupt or destroy a community without seriously considering the desires and needs of the local residents?" (*Ibid.* p. 54).

Now the next question I would like to raise is — In what ways are housing conditions in the slums different from that of the villages? The housing conditions in the villages are equally bad. But the rural people have certain advantages which the slum dwellers do not. Though they might live in poverty-stricken hamlets, they have the benefit of open spaces and clean air. There is also absence of delinquency and crime, prostitution and other vices, which go with an urban slum.

Phenomenal Growth of Madras City

Thirty years ago, Madras was a garden city. Since then its character has changed and it has turned into a sprawling industrial metropolis little different from other metropolitan cities in India.

The 30 years between 1941 and 1971 marked a tremendous growth in population and economic activities. The population crossed the million mark in 1943 and doubled in about 20 years. This has further increased to 2.47 million in 1971, an increase of 43.6 per cent. The population of the entire metropolitan region covering 450 sq. miles stood at 3.5 million and is increasing rapidly. Mr. G. Dattatri, Senior Planner of the Madras Metropolitan Development Authority writes that there is today in Madras and its suburbs an undesirable mixture of incompatible land uses, acute shortage of housing accommodation, overcrowding of residential areas and proliferation of slums. The strain on utility services of water-supply, sewerage and mass transportation has become so intense that these services have virtually reached a breaking point. Social fac-

ilities offered are far too inadequate to cater even to the minimum needs of the present population.

According to Corporation records in 1932, there were 181 slums in Madras City containing a total of 15,942 huts. The civic survey of slums undertaken by the Corporation in 1953-54 showed 306 slums containing 57,436 families and having a population of 2,65,000. The 1961 census indicated the existence of 548 slums consisting of 97,851 families. The Survey conducted by the Planning and Investigation Cell of Slum Clearance Board records 1,202 slums in 1971 in Madras City — 1,63,804 families, and a total of 7,37,531 people are living in the slums. The percentage of persons residing in slums in 1961 was 23.8 per cent. In 1971 it rose to 33.49. Upto 1961 there were only 7,008 immigrated families in the slums. But during 1961-71, 61,266 families have immigrated to the slums of the city.

A recent ad hoc survey conducted by the Slum Clearance Board in 1979 reveals that there are 1,401 slums.

"The slums are scattered throughout the city. Out of the 1,202 slums, 454 are in North Madras and 748 are in South Madras. As South Madras has larger tracts of open space than North Madras, which is predominantly an industrial area, the number of slums are more in South Madras. Due to scarcity of land in North Madras, huts are built mostly in Corporation dumping grounds and even over the drainage and sewer pipe-lines." (*Socio-Economic Survey of Madras Slums*. 1975. p. 11).

Out of the 128.83 sq. km. of Madras City area, slums covered about 6 per cent of the total area. The distribution of the slum families according to the land on which structures have been constructed clandestinely is given below:

Ownership of land in which structures are constructed

Ownership of land	Percentage of slum families to the total slum families
1. Private land	31.96
2. Corporation land	8.11
3. Government (State) land	35.69
4. Housing Board/Slum Clearance Board	13.09
5. Port Trust	0.03
6. Hindu Religious Endowment/Wakf Board and other missions	9.01
7. Others	2.12

The Madras Metropolitan Development Authority is conducting a new study of the slums and low-income settlements on the basis of aerial photographs taken in

1977 and supplemented by sample surveys. The extent and number of households of slum areas as per the above study are given below :

Description of Type	Extent (Hectares)	Total Number of households
1. Linear slums along water front	10	2,800
2. Linear slums along road	34	10,200
3. Hut development on left-open space	36	8,600
4. Cluster of huts on identifiable site	575	1,43,800
5. Planned hut settlements	95	30,900
Total	750	1,96,300

Source : Interim Report: The Existing Situation 1979. Madras Metropolitan Development Authority, Table 4.3.

It is estimated that every year, some 6,000 additional huts are constructed by the slum dwellers.

Distribution of Households in Different Income Groups — 1975 — Madras City

Income Category	Upto Rs. 350	Rs. 351-600	Rs. 600-900	+ 900	Total Rs.
No. of Households	3,66,470	79,648	35,106	38,224	5,19,448
Percentage	70.5	15.3	6.8	7.4	100

Income Distribution in Slums — Madras City

Percentage Distribution	Income per month/household		
15.0	Rs. 0	—	100
53.0	101	—	200
23.0	201	—	300
6.5	301	—	400
2.5	401	—	500

Source : Interim Report : The Existing Situation 1979, MMDA.

The Slum Clearance Board's survey revealed the income ranges of the slum households :

Percentage of Households	Monthly Income in Rs.		
29.77	0	—	100
52.36	101	—	200
13.68	201	—	300
2.92	301	—	400
0.81	401	—	500
0.46	500	and above	

Source : Socio-Economic Survey of Madras Slums, Slum Clearance Board, 1975.

Per capita income remains exceedingly low with 40 per cent of the population of Madras City falling below the poverty (line compared with 8 per cent in Bombay). Equally per capita consumption expenditure (unadjusted) is half that of Bombay. This means that 1,280,000 people live on or below the poverty line within Madras City and 1,700,000 within the MMA. From this it can be assumed that 40 per cent of the population cannot afford to pay for any basic urban services. Here it is important to understand that while the population of Madras City has grown in recent years by a factor of 50 per cent, there has been a corresponding increase in employment of 45 per cent. On the surface, this does not seem too worrying.

But the growth in employment has very largely been made up by growth in the informal sector. Formal sector employment in recent years has registered almost nil growth. (*Interim Report*, MMDA, Para 0 22 to 0.25)

Occupational Break-up of Slum Dwellers

The slum dwellers are engaged in different occupations. They are milk vendors, domestic servants, carpenters, masons, rickshaw-pullers, cart pullers and other manual workers. Others are employed in government services as last grade servants, policemen, ward boys in hospitals, drivers

and conductors of the transport department, sweepers in the Municipal Corporation, etc. Apart from these, there are some who carry on their traditional occupations like washing of clothes, fishing, etc.

Of the slum population, 2,00,620 persons, i. e., 27.20 per cent, are workers. Female workers account for 8.02 per cent. The total working force, i. e., in the age group of 15 to 59, is 56.99 per cent of the total population out of which 47.73 per cent are employed.

Occupation of Slum Dwellers

Occupation	Total	Percentage to Total
1. Agriculture	152	0.07
2. Mining, fishing & quarrying	5,162	2.57
3. Household industries	5,762	2.87
4. Manufacturing industries	20,769	10.35
5. Construction	12,914	6.44
6. Transport and Communications	22,922	11.42
7. Trade and Commerce	20,873	10.40
8. Other Services	1,12,066	55.88
Total	2,00,620	100.00

Source : Socio-economic survey of Madras Slums. SCB, 1975, p. 25

The Present Housing Situation

The rapid pace of urbanization during the last two decades in India has not been directly related to the industrialization and modernization of the economy. It has been in response, in large part, to the impoverishment of large numbers in the countryside, who have been forced to migrate to the towns in a vain search for alternative means of livelihood. Official pronouncements often talk of policies and measures to discourage further influx of rural surplus labour into urban concentrations. But all such talk is meaningless unless agricultural development and the diversification of the rural economy eases the pressure on land and the rate of growth of avenues of gainful work in the rural sector keeps pace with the increase in labour force.

The urban concentrations cannot absorb the new entrants. Hence the acute and growing scarcity of urban housing and the mushrooming of squatter colonies and slums. This situation has been greatly aggravated by a misguided housing policy. Unrealistically high standards are set for new housing construction, resulting in the foreclosure of the limited resources for housing by the middle and high income groups. According to the World Bank study of the housing situations in six cities in India, between one-third to two-thirds of the population are unable to afford even the lowest-cost housing presently being built by the government in these cities. "The supply of urban land and urban services, such as water, sewerage and electricity, in these conditions tends to be

constrained and skewed towards upper-income groups", the report writes.

Hopes that slum dwellers in big industrial cities could be happily rehoused in elegant skyscrapers, "communities in the sky" have turned sour. Many of the high-rise apartment complexes in places like New York and London have swiftly become vertical slums of concrete and glass, breeding grounds for vandalism, loneliness, crime and delinquency. This is the view of planning experts from 134 countries who participated in the UN Habitat Conference at Vancouver. The British Environment Minister Mr. Peter Shore remarked that the multi-storeyed housing blocks in the inner cities created more problems than they solved. He told the meeting: "I do not want to see any more massive schemes of high-rise block of family dwellings . . . we are determined henceforth to build on a human scale." The decay in many high-rise blocks starts with vandalism in lifts, corridors and entrance halls. Planners now believe that rot is allowed to take hold precisely because these amenities are communal. "We have forgotten home environment"—this is how American Architect Newman pinpoints the root cause of the problem in a book *The Exploding Cities*. Collective space, which is the responsibility of no single family is liable to become a no-man's land, he says. Planners from the developed countries now hope that the richer governments in the third world will not rush into high-rise buildings, duplicating all the mistakes, in a misconceived desire to solve housing problems with status symbols.

It is heartening to note that the Slum Clearance Board of Tamil Nadu proposes to abandon the policy it has been following so far of building permanent multi-

storeyed tenements. Now the Board is thinking of putting up semi-permanent single tenements. It will lay the foundations and build the four walls and the roof. The allottees will construct the rest. The new programme has been initiated because the colonies of tenements built in many parts of the city are in danger of reverting to slum conditions. The reason is the lack of a sense of hygiene on the part of the dwellers.

A much-voiced suggestion to prevent the proliferation of slums and provide relief for over-crowding and congestion is to attract people towards the countryside by locating some industries there. Despite a number of concessions given from time to time for dispersal of industries, the policy has failed to produce the desired results. It is obvious that unless the necessary infrastructure facilities are available, industrialists will continue to be shy. The lack of infrastructure facilities means a higher order of operative expenses. Another serious drawback is that backward areas are not a repository of skilled labour. According to the World Bank past experience indicates that "it is easier to choose an appropriate location for an individual industry than to identify a group of industries that can be attracted in a given area." Its point is that investment in infrastructure in the expanded segments of a city are over-utilized before fresh investments are undertaken. On the contrary, similar investments in the countryside, being necessarily based on guesses about industrial growth, may result in their underutilisation since the guesses more often than not are proved to be less accurate than anticipated. Decentralization of industry cannot, therefore, offer the most effective solution.

The alternative is the creation of intermediate urban areas between the cities

and the countryside, and also undertaking, integrated and comprehensive regional planning along with planning of cities. Experience of planning in India has revealed that an overall economic development based on centralized planning, or planning from the top, will not automatically ensure economic development of all regions. This means that while a country may experience fairly rapid economic growth and development, pockets of backward areas may continue to remain in existence, or some regions may deteriorate and get worse. Moreover, our planners and administrators have now rightly realized that economic growth and development are not merely economic concepts, they have an important social and human connotation as well.

Let us hope that the new three-tier strategy proposed by the Madras Metropolitan Development Authority, along with integrated and comprehensive regional planning, will ease the extreme shortage of housing and the menace of the spreading of slums in and around Madras City. It must take note of the fact that the intermediate towns and satellite towns should not be allowed to share the metropolitan facilities.

The crux of the matter is that most of these remedies are of a long term nature. While resources are scanty and getting

depleted, the problem is growing in dimension. At the same time over half the urban population in the metropolitan cities of India cannot also afford minimum housing construction expenses. So the emphasis should be on achieving a better lay-out in new settlements to the extent possible and encouraging private initiative to build houses.

A realistic solution has to be found in the conservation of existing low-income housing and improvement of municipal services and facilities and sanitary conditions for upgrading slums and squatter dwelling areas as far as possible. This has to be combined with socially meaningful use of urban land and encouragement of low-cost housing on a massive scale. The slum clearance programme calls for a new look primarily from the point of view of the poor people affected by it. Unrealistic and expensive building standards, costly land acquisition and bureaucratic procedures, which stand in the way of the poor building their own houses and public authorities building houses for the poor, need drastic modification. The World Bank report recommends the upgrading of slums and squatter dwelling areas by conserving the existing low-income housing stocks, improving services and municipal facilities and undertaking some additional construction in these areas.

Appendix 1

Dimensions of the task

The position today in the MMA as far as shelter is concerned is not encouraging. 225,000 households in the MMA live in slum hutments and a further 360,000 households live in houses in older parts (a good proportion of which may be seriously over-crowded and lacking amenities). Totally, this involves 3.5 million people i.e., more than two-thirds of the total population. Further, the population of the MMA is now growing by 160,000 people each year, and this is expected to increase to 220,000 a year. Assuming a household size of 5.5, this implies an extra 30-40,000 families looking for accommodation each year. To offset this, the current production of formal housing is estimated to be in the order of 5,000 a year, by the two major public sector agencies (Tamil Nadu Housing Board and Tamil Nadu Slum Clearance Board) and 3,000 by private real estate developers, co-

operatives, banks and other similar institutions. It means that the present backlog of poor condition housing remains and that each year a further 22-32,000 families have to be accommodated within the existing housing stock or by informal housing.

The problem is clearly of enormous dimensions and one that cannot possibly be met solely by public provision of formal housing. Areas of thatched hutments or otherwise improvised houses play a vital role in providing shelter to the city's inhabitants. These must be accepted as being a part, and a valuable part, of the city's fabric, and schemes for their upgrading and improvement must continue.

(Extract from the Interim Report: The Existing situation 1979. Madras Metropolitan Development Authority. Paras. 0.28 to 0-30.)

Appendix 2

Table 1

Dwelling needs of Madras Metropolitan Area 1971-1991

Year	Estimated No. of Households	Stock of Dwelling Units	Anticipated storage of dwelling units
(Figures in lakhs)			
1971	6.17	2.39	3.78
1976	7.49	2.98	4.51
1981	8.61	3.67	4.94
1986	9.84	4.43	5.41
1991	11.20	5.24	5.96

Source: Report of the Task Force on Urban Development (Industrial Housing and Regional Planning 1972 - 84). Tamil Nadu State Planning Commission, Plan Document No. 12, January 1973.

Table 2

Estimate of Housing Construction to meet full deficits and future needs till 1984. (Tamil Nadu)

Category of Housing	% of population in each range	Number of dwelling units to clear present deficits	No. of dwelling units to provide for new families	Total
Economically backward including slum rehabilitation	19	15,60,000	93,600	16,53,600
Low income group	45	18,00,000	1,08,000	19,08,000
Middle income group	9	3,60,000	21,600	3,81,600
High income group	7	2,80,000	16,800	2,96,800
All categories	100	40,00,000	2,40,000	42,40,000

Source : Tamil Nadu State Planning Commission, Plan Document No. 12, January 1973.

Table 3

**Estimate of Future Households in Tamil Nadu 1972-77
Using Regression Model
(in thousands)**

Districts	1972	1973	1974	1975	1976	1977
Madras	530.78	547.10	563.59	580.44	597.20	615.24
Chingleput	615.47	628.95	643.33	657.39	671.39	685.09
N. Arcot	790.94	803.31	815.49	827.75	839.47	851.35
S. Arcot	763.88	775.73	787.40	800.07	811.30	822.69
Dharmapuri	357.93	367.40	376.94	385.73	395.32	404.18
Salem	636.42	650.30	664.17	678.26	692.04	706.11
Coimbatore	925.38	942.98	960.47	978.17	995.34	1012.83
Nilgiris	104.76	107.64	109.64	113.50	115.50	118.48
Madurai	834.59	849.57	865.33	879.43	893.93	909.64
Tiruchi	814.51	827.33	839.95	853.59	865.76	878.10
Thanjavur	811.02	823.77	836.33	848.05	860.12	872.37
Ramnad	606.74	618.27	629.74	640.42	651.67	663.12
Tirunelveli	675.70	685.88	694.98	705.94	715.52	724.27
Kanyakumari	261.90	267.77	273.64	279.61	285.46	291.43

Source : Abstracts Section, Department of Statistics, Government of Tamil Nadu, Madras-6.

Table 4

District-wise Distribution of housing needs in Tamil Nadu in 1977

Districts	Dwelling needed by assuming density of dwelling as				
	6 persons	5.5 persons	5 persons	4.5 persons	4 persons
Madras	10437	11386	12525	13916	15656
Chingleput	11620	12677	13944	15494	17430
N. Arcot	14440	15753	17328	19254	21660
S. Arcot	13954	15222	16745	18605	20931
Dharmapuri	6855	7479	8227	9141	10283
Salem	11977	13066	14372	15969	17965
Coimbatore	17179	18741	20615	22905	25769
Nilgiris	2010	2192	2412	2680	3014
Madurai	15429	16831	18514	20572	23143
Tiruchi	14894	16248	17873	1959	22341
Thanjavur	14797	16142	17756	19729	22195
Ramanathapuram	11247	12270	13497	14997	16871
Tirunelveli	12285	13041	14742	16380	18427
Kanyakumari	4943	5392	5933	6591	7415

Source: Abstracts Section, Department of Statistics, Government of Tamil Nadu, Madras-6.

* * * * *

August Seminar

Summary of Discussion

The paper "Slums in and around Madras city" was presented by Dr. C. M. Abraham at the seminar on August 30, 1979 at the Institute. Mr. A. Joshua chaired the seminar.

In his presentation, the author reviewed the dimension of the problem of slums in Madras city. This problem was evaluated in terms of various parameters such as income, population, employment, location of slums and ownership of land on which structures were constructed. The solution the author envisaged was mainly in terms of developing appropriate housing and employment policies. Two alternatives were available: to attract people towards the countryside by locating industries there, or to create intermediate areas between the cities and the countryside. However, both these alternatives being long-term solutions, the immediate action advocated was to retain the existing low-cost housing, upgrade slums by providing basic facilities, and by setting realistic building standards and simplifying bureaucratic procedures, encourage low-cost housing on a massive scale.

The discussion following the presentation of the paper dwelt chiefly upon the issue of definition of slums and the whole approach to the problem of slums. It was felt that definition played a very important part. To illustrate: Several public sector undertakings in the South,

with the deliberate intention of preventing slums from developing, constructed low-cost houses with the basic facilities required for their workers. While according to some definitions, these buildings could be termed 'slums', it would be difficult to justify this as they were deliberate, pre-planned constructions. Although not attractive by any standards, these houses contained basic facilities, which the slums did not. Hence the need to have a proper definition of slums was stressed.

Further, it was felt that the basic approach to and evaluation of slums was one-sided. It was undesirable to regard slums as merely representing degradation or disaster and sit in judgement of slums and their dwellers. In defining and approaching the problem of slums, the social angle had been overlooked.

On the basis of a recently published discussion on urban problems, it was pointed out that in Bombay, 50 per cent of slum dwellers enjoyed a household income of between Rs. 600 and Rs. 1,000. They were also found to take advantage of the benefits available to them including concessions offered to small producers. Such being the case, the slum dwellers of this city could no longer be deemed as belonging to the weaker section of the population. The question therefore arose as to why slum dwellers of Madras lagged far

behind those of Bombay. It was suspected by another participant that this was because of the lack of political consciousness among slum dwellers. The case of Latin America, where at one time the problem of slums was acute, was cited. However, over time, the problem had been tackled by this country and slums replaced by well-established residential buildings. This metamorphosis was attributed to the development of political consciousness among slum dwellers.

One participant expressed the view that institutions like MMDA should grant licenses on priority basis to those organisations which had pre-determined plans to build houses for their workers since this would curb expansion of slums to a great extent. (It was conceded that a minimum level of slums would still exist.) This policy did not receive the favour of other participants since it was felt that only public sector undertakings, which had large funds, could provide housing for their workers. Moreover, what had to be borne in mind was the fact that the bulk of increase in employment was in the informal sector. Workers belonging to this sector could therefore not be covered under the housing scheme of organised industry. At this stage, however, it was pointed out that the organised and unorganised sectors were not entirely segregated. The construction industry, for instance, (which belonged to the organised sector) depended chiefly on labour from the informal sector.

Hence it was concluded that in such cases where the organised and unorganised sectors overlapped, the former had to be responsible for the housing of workers.

It was pointed out during the discussion that the very process of urbanisation assisted the growth of slums. It was observed that in the past, whenever there were plans to build towns around metropolises, slums began developing near the new towns. Concrete examples of this phenomenon were the slums which sprang up in Tiruvottiyur and Tambaram even when the growth of the latter had just begun.

Some areas which required further investigation, it was suggested, were the migration trends of the population residing in slums, the organised and unorganised components of labour in the slums, and the (much-debated) political motivation behind the growth of slums.

In conclusion, it was noted that a positive approach to slums would be to educate the slum dwellers. In order to avoid concentration of slums in some areas, primary services had to be made accessible in all areas. The idea of nationalisation of urban land could also be pursued. Since slums could not be completely eradicated in the near future, it was suggested that present efforts be aimed at making them cleaner and providing them basic facilities such as water, sewerage and electricity.

Societal Expectations of Science and Technology*

Prolegomena

Three prefatory remarks seem to be in order as a kind of prolegomena to this note on societal expectations on science and technology.

First, the title is appropriate and avoids the embarrassment and error of setting science and technology apart from or against society. Science and Technology, whether it be nuclear fission leading to the bomb, or molecular biology leading to genetic engineering, or information science leading to computers, automation and miniaturisation, determine a part of society. Equally, society through its requirements and resources establishes the parameters of science and technology. The title *Societal Expectations of Science and Technology*, as against the usual enquiry into the impact of science on society (which approach is enshrined in the Unesco journal *Impact*¹ suggests an integrative approach, the father's expectation of his son, and is one aspect, a very important aspect of knowledge, which is socially determined.

That points to the second comment, and that is to bring out into the open the

ambivalence involved in referring to society's expectations. In a hierarchical and unequal society such as ours, the question should be asked, which society? Is it the society which finds all the needed resources to produce sophisticated textiles but not handloom material, to develop nuclear power but not gobar gas, to multiply and import, if need be, cement and let lie wasted our lime resources, to produce cars and neglect the bullock cart, to build bigger and better ships and leave aside the country fishing craft and so on.² Or are we thinking of the silent mass of people, whom we term the weaker section, who are really the majority section of our people, who are the society which is excluded, exploited and down-trodden. There is here a somewhat tragic choice to be recognised. As science and technology have grown as the organic products of the first group of society the privileged group, they have become alienated from the second group, which is the major social sector. This growth of elite science for elite groups in society is in turn traceable to the alienation of the mass of people from the educational system (in the words of the National Policy on Education, "it is

* Extracts from a note prepared by Malcolm S. Adiseshiah for the International Seminar on Science and Technology in Developing Countries, Nehru Centre, Bombay, November 13-17, 1979.

mainly the upper and middle classes — who form the top 30 per cent of society who benefit from the educational system³), which in turn is a function of the power networks and culture of our society. The answer to the question, as to which society are we speaking of in this note, is the majority who are currently excluded from science and technology.

A final opening comment is to recall the connotation of the other half of the title, Science and Technology. Science is our understanding of the working of the observable world, technology is the instrumental use of that understanding, each interacting on the other to the point where the two, science and technology, form a single culture. Scientific discovery may chronologically seem to precede technological invention but the latter in its turn presages the former. In this sense, modern science and technology, which are late-comers to India, have made rapid progress. In fact the rate of growth of science and technology in India in the three decades since our Independence is faster than the rate of growth of the economy or our population during that period. From about 40 research institutions in 1947, we have in 1979, 900. From 38 engineering institutions enrolling 2,900 students in 1947, we have in 1979, 142 institutions with an admission capacity of 25,000. Our scientists have increased from less than 1,00,000 to 1.5 million in this period, and we have increased our expenditure on science and technology from 0.011 per cent to 0.6 per cent of GNP in this period.⁴ Has this resulted in the development of a scientific culture in India? This question must be answered in the light of the considerations advanced under the second preparatory comment above.

Societal Expectations — Over-all

Societal expectations of science and technology in over-all terms were clearly expressed by Jawaharlal Nehru when he said: "It is science alone that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people. Who indeed can afford to ignore science today? At every turn we have to seek its aid. The future belongs to science and those who make friends with science."⁵ This expectation is embodied in the science policy resolution of the Parliament in its statement: "It is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community."⁶ Similarly, at the international level, the discussions of the United Nations General Assembly, the United Nations Conference on Trade and Development and the United Nations Conference on the Application of Science and Technology for Development look to Science and Technology to solve the great problems faced by society in our times of peace, poverty, population, pollution, dependence and inequality.⁷

These generalised statements of societal expectations of science and technology raise three basic questions: the first is whether science and technology deal with these issues at all or if they do in some cases, as with regard to population, do they do so directly and massively or only peripherally and indirectly — a question posed by the fact that judged by the achievements of science and technology to date in the area of poverty or inequality at the intra- or international level, the record is rather a bleak one. A second question is whether science and

technology can effect a balance between the physical energy which our exploding population needs with the present and perspective energy supplies, a question which may seem a major current issue but which is also an accumulation of past actions and errors. A third issue is whether science and technology can help the individual to deal with the increasingly complex world of information which they bring into being, a question posed by the fact of the exponential increase in a person's sensory impressions as against his limited information absorptive capacity, despite the instruments of automation and computerised storage and retrieval of information systems.⁸ In connection with these basic issues, the proliferation of scientists in society, as they are to be found not only in the laboratories and in schools and universities producing and purveying science but also in government, industry, management and in almost all avocations, raises the question of where else should they be and what else should they be doing to address themselves to the issues — whether they be poverty at the rural level or inequality at global level.

Expectations of Indianisation

Society expects our science and technology to be Indianised and not continue as a foreign product. This might seem a heretic statement in view of the so-called universalism of science. It is true that chemistry is chemistry everywhere, that quantum physics is such in all countries, the research results of basic science are published freely and openly and exchanged across national boundaries, leading some economists⁹ to conclude that from the cost-benefit point of view, it does not matter if such research is undertaken in India, UK or US; and in fact such analysis leads to the proposition

that this form of human capital — basic scientific research — should be concentrated in the most affluent countries both as an expression of the free market principle of goods (in this case scientists) going to the highest price market, of receiving the highest pay off and so making for even faster scientific progress. Against this internationalism of science is the fact that science is everywhere integrated into national plans and objectives so that any cross-national out-reach is the privilege of the elite among scientists: government scientists and those employed by industry are tied by bonds of secrecy and even the freedom to publish is restricted to a few innocuous scientists. The universities which were the home of this universalistic faith have become part of the military-industrial complex in the industrially advanced countries; in one year there were over 2,000 defence contracts for secret research in over 200 US universities, and in UK 786 such contracts were given to 24 universities.¹⁰ As for the economic argument for the Brain Drain referred to earlier, its effect will be and is to make the rich countries richer and poor countries poorer through the withdrawal of university teachers (usually mostly the best scientists), the drying up of research which is the basic feeder of the innovation chain, leading to the suspicion that the so-called universalism of science is a cover for what political scientists call neo-colonialism.

Society expects science and technology to become Indian and self-reliant. One corollary of this expectation is the language in which science is learnt, taught and researched, which is still English. This means that neither Hindi nor the regional languages have developed the language of science or the terminology to express the new ideas that science

represents; and such scientific investigations that take place and their results stay within a small English language-speaking circle and do not reach out to the farmer or artisan where science and technology meet their crucible. The language of science must be the languages of the country as only then will it become part of the art, living and culture of the country.

Self-reliance in science and technology is one facet of this process of Indianisation of science and technology. Self-reliance here must be distinguished from autarchic self-sufficiency. The import of high-level technology in the steel, machine building, fertiliser and power systems has contributed to the country's industrial growth. Self reliance involves absorbing these selective technological flows into the Indian science system through detailed technological assessment and adaptation mechanisms which are yet to be developed. There is still however too much dependence on import of foreign technology whose glamour and ease of acquisition leads to endless and repetitive collaboration agreements in which they are embodied. Self-reliance also calls for creation of indigenous technology for which the infrastructure of design and consulting engineering organisations and the marketing of indigenous technology through NRDC have been set up and need to be more purposefully used.

Another aspect of self-reliance in science and technology is the development of technologies which are appropriate to our agreed socio-economic goal and our resource endowments, which are employment generation, use of local raw materials, decentralized production including development of so-called backward areas, conservation of energy

resources and cost effectiveness in terms of money cost, skills use and training and use of and updating of local techniques. In this broad area of appropriate technology which is people's science and people's technology, we have hardly made a start and I mean more than the efforts that are being made to improve the bullock cart or develop gohar and biogas plants. It is our whole rural economy which expects and awaits the application of science and technology and the development of the necessary linkages and the innovation chains, starting with a decision on our priorities which are today urban, large scale industry, and sophisticated — imported/imitative — in nature and bias.

Expectations in relation to priorities

Society expects science and technology to be planned as they have always been everywhere, for the work-a-day reason there are too many scientific and technological projects competing for too few funds, and for the basic reason that science and technology are a part of national development. So conceived, the priorities of science and technology fall into two broad groups—external and internal.

The external priorities are set forth in the Draft Plan 1978-83 document succinctly thus: "(a) to secure for the people of the country, particularly those in the rural areas, all the benefits that can accrue from the acquisition and applications of scientific knowledge and research, to remove unemployment and fulfill their basic needs, to enhance the quality of their life and to enable them to realise their full human potential, and (b) to improve and expand the quality and quantity of the science and technology research, and harness the science and technology capability for maintaining self reliance."¹¹

The internal priorities relate to the significance and relevance, the inherent

nature and value of each project. The significance aspect refers to the importance of the area chosen or suggested and the level of competence of the scientist(s) to work in the field. This internal priority facet depends on peer judgement and assessment, and society accepts that here science and technology must function within the closed circle of those who know. The relevance aspect has many sides to it. A simple test of relevance is the training of students who can carry on the science and technology tasks of the future. An applied science project must be relevant to the urgent practical problems defined in the Draft Plan document. This is particularly so, since many of our scientists prefer investigating limited problems which have rigorous parameters rather than the problems relevant to our major poverty sector or to human survival. In fact when I called for a self-assessment of the research results of a group of scientists, I was given an inventory of the equipment which each had designed and not what the equipment would do in relation to the external or internal priorities which were staring us in the face. Basic research must be relevant to the advance of the whole body of knowledge, which is somewhat distinct from any potential technological or social benefit that might accrue from it. When planning how the scientists could contribute to the programme of Integrated Rural Development, which had just been launched, I recall our pure mathematicians explaining their science as being of no conceivable practical use to anyone. But even here there is a question mark, as in the case of Galston's study of the mode of action of plant hormones which he described as "a reasonably harmless way to spend my time" but which, used through the extensive defoliation and crop destruction campaign of the US Air Force, was turned into an instrument of mass starvation in Vietnam.¹³

However relevance must allow for and accept the unpredictability of basic science and its being not necessarily technology-resulting and economics-justifying. And in our societal expectations of priority, basic science must be given its full and proper place, as it is significant and relevant to all of science and technology and to producing the creative innovators which our society needs.

Expectations of Accountability

Society in terms of objectives and priorities determines what science and what technology are to be supported and these objectives and priorities are themselves subject to our critique of society, whose broad lines have been indicated earlier. On this basis, science and technology, it was pointed out at the start, are being allocated an annual 0.6 per cent of the country's Gross National Product. At this level of financing, science and technology are no longer responsible only to their peers and the pursuit of science, but also and essentially to society. This societal expectation of the accountability of science and technology brings the scientific community into the realm of political relations, budget-making, expenditure controls, and assessment of results.

To start with, accountability is complicated by the difficulties of measuring the results of science and technology expenditures. The simplistic economic equation that science and technology contribute to the economic growth of the country via "the residual factor" which I have elsewhere termed as "disguising a confession of our (the economists') ignorance"¹³ is not empirically provable. This is not to say that science and technology in our country has not contributed to economic progress and military strength, as in the case of the atomic energy programme which has begun making a contribution to our energy

resources, of the hybrid jowar and bajra and HYV wheat and paddy varieties that have been evolved which have helped the near trebling of our annual farm output, and in a number of other fields such as man-made fibres, electronics and chemicals. The accountability of science is however not met by these generalised statements, as the process by which science and technology affect growth is far more complex, and has not as yet been disengaged. One rather crude example is the continuing controversy around the question of the extent to which favourable weather rather than investment in science and technology is responsible for our increased annual farm output during the past four years. Further, countries like Korea, Taiwan and Brazil spend far less of their national income on science and technology and yet have registered about 3 times the growth rate of their economies compared to India. This raises also once more the basic question of the relative long term and short term costs of buying science and technology from abroad versus developing them as indigenous plants. Anyway, accountability through precise measurement of results is not a possibility.

A second related accountability problem is the nature, scope and validity of the measurability criterion. Science and technology and the related disciplines like economics deal only with the external, the measurable and quantifiable, and leave aside the non-measurable, internal factors. These latter include art, religion, culture, morals and social and political relations. In our society to leave out these essential elements is to make of science and technology an empty foreign borrowed box. The Western scientific tradition—represented by its scientific luminaries, Galileo (not Leonardo da Vinci who however became historically classified as a cultural personality and not a scien-

tist), Descartes, Newton down to the present day Lord Snow—which we have taken over, deals only with the external quantifiable world. It is the internal world which it is felt that should adjust to the external, it is the social and human sciences which we insist that must learn from science and technology. For this country however, the accountability of science must be science and technology adjusting to our art, religion and culture, which means an integration of all sciences, the physical, natural, social and human, which only can bridge the growing gap between facts and values, between processes and purposes.

There is a further facet of accountability, and that is an explication of the factors that enter into a decision to fund the various science bodies or finance one science or technology project rather than another. Neither Parliament nor the public has any real information on how such decisions are actually arrived at. At the organizational level, the science and technology plan of the National Council of Science and Technology sets forth an impressive inventory of research-worthy projects covering the areas handled by the Council of Scientific and Industrial Research, the Indian Council of Medical Research and incidentally, by the University Grants Commission. This meant that 70 per cent of the country's science and technology financing handled by the departments of Atomic Energy, Electronics, Space and Defence and the Indian Council of Agricultural Research were not included in this rudimentary plan. Their programmes and projects and the problem of how these actual project decisions are made are both unclear and uncoordinated with the rest of science and technology programmes. Even with regard to the inventory set forth in the National Plan, what is known is what the scientific community

consider research-worthy, not whether and how it is decided to fund individual programmes and projects. Society wants those responsible for science and technology in the country to devise an over-all national planning and policy-making mechanism which can review and decide on financial allocations for the entire area without departmental prerogative, preconceptions and barriers, and come out into the open on the details of how and why programme and project decisions are taken. In their absence, Science and Technology accountability became reduced to the mystic of growth curves and projection trends.

Other Expectations - Science futures, Science learning and Science limitations

The reference to growth curves and project trends leads on to the question of societal futures of which science futures are a part. The study of Futures should be distinguished sharply from short term, medium term or perspective planning, which use as methodology the projectionist frame, whereas Futures first fixes the goals to be attained in a time frame — the current time frame for convenience being 20 years hence, India in 2001 AD — and delineates the resources and demand interplay which the attainment of the goals requires. The study of the futures is thus not an exercise in planning, it is the base on which current decisions can be made and lines of action set.

Society expects science and technology to study and delineate not merely the Futures of science and technology, but that of Indian society. In this context certain futurist goals are becoming established for society, which in sum is a sensible reduction of poverty as a function of public ownership of means of production

and a more equal distribution of income-earning assets. The breakdown of this goal in terms of land and industrial and financial assets ownership, employment and self employment, meeting of basic needs, cultural growth and planning and social and political participation of all people are the areas of study. There are innumerable methodological tools that are available, some of which are being developed by our scientists, which will have to be fashioned into varied and varying scenarios that should be placed before the people and their elected representatives for their information, discussion and decisions.

It is within such a societal futurological frame that science and technology futures will have to be studied. Here too the methodology of science and technology assessment and forecasting can help us to draw up both an outline of the Futures sub-system and the paths and options that science and technology will have to follow from now to reach these futures. The National Council of Science and Technology has for this purpose identified 12 areas of future study to which immediate attention should be given: energy generation, food, transportation, communication, urbanology, rural development and rural life styles, housing, management, water, wealth, future of the islands, teaching and research of futurology, and education.

This inventory ends with education and teaching where societal expectation in regard to science teaching is precise. Currently our universities have too many science faculties teaching obsolete subjects and too few considering the new and emerging. In society there is no such thing as chemistry or biology or astronomy or economics or sociology. There is man who is, there is society which is a compound of all these fragmented

pieces of reality. One urgent task is for interdisciplinary studies to supplement effectively and complement massively the disciplinary studies on which our school and universities are founded.

But the teaching and learning of science has wider connotations. There is a growing and almost frightening gap in understanding between scientists and non-scientists. The majority of our illiterate people are left out of any dialogue, they are subjects not objects of science and technology teaching and learning. Even among the educated minority, as debates in our university senates and legislative gatherings show, there is no understanding, leave alone a meeting point, amounting to consensus on science and technology. As far as the masses of people — illiterate, neo literate and literate — are concerned, the satellite we are sending up next year presents us with an opportunity not only to inform and instruct our people in the ways of science but also make them actors and participants in the INSAT programmes. Here our experience in 1975-76 with the National Aeronautical Space Administration Satellite has helped us in mastering the hardware aspects and make a beginning on the software, whose outline include the credo for science, the interdisciplinary team imperative, and the constraints and necessities of localisation as against the general individual values and social attitudes. These science software aspects must now be fully developed to make INSAT an effective instrument for science participation of our people. That might also begin to close the gap within the educated minority.

A final societal expectation is with regard to the limitations of science and technology. First there is the danger that to science and technology is ascribed magical powers which they do not possess. The ignorance of science and technology referred to earlier leads to its being held as the cure-all, the new witch doctor, to deal with all the ills of society. Political irresponsibility, social nepotism, financial corruption are the kind of areas where science and technology only where comprehensively defined to include political science, management, religion, morals, sociology, psychology, can point to the causes and the nature of the malady. It cannot cure the disease. On the purely physical plane, science and technology cannot abolish poverty — a societal expectation with which this note started. They can show how it can be done at the lowest cost and optimum benefit. Similarly science and technology cannot generate employment or counter underemployment by themselves. They can outline the technologies to be used and their cost effectiveness to attain these ends. Whether or not science and technology are used for these societal expectations and how and where they are used to meet these expectations are a matter of political decision and hence of societal commitment. In this sense Politics is the master of science and technology and it is to generation of the political will and societal commitment to use science for the purposeful interaction of technology that we are now called — a call that is now timely and urgent, as we the people, all the people, will have to fill the political vacuum at the Centre.

Notes

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