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EDITORIAL—SOME HIGHLIGHTS

I General Economic Scene

State :

Inter-State Analysis : Data from the 27th round of NSS, the All India Debt and Investment Survey (1971-72) of RBI, and the RBI report on 13 SFDAs have been correlated in the Annual Number of the *Monthly Commentary* of the Indian Institute of Public Opinion to draw attention to the major problem of the States which is poverty and its dimension and the means of overcoming it. Starting with a definition of severe destitutes as those with a monthly consumption expenditure in 1960-61 of less than Rs. 11 in the rural and Rs. 15 in urban areas, and in 1970-71 of Rs. 21 in rural and Rs. 28 in urban areas, of destitutes as those with a monthly expenditure in 1960-61 of Rs. 13 in rural and Rs. 18 in urban and in 1970-71 of Rs. 24 and Rs. 34 respectively, and of the poor as those spending monthly less than Rs. 15 in the rural and Rs. 21 in the urban areas in 1960-61 and in 1970-71 Rs. 28 and Rs. 43 respectively, the latest NSS report (August 1975) shows the State at the bottom of the inter-State poverty ladder. The State is the second most urbanised State (Maharashtra 15.6 million, Tamil Nadu 12.38 million) and has the largest percentage as well as absolute numbers of urban severe destitutes (32.92 per cent and 4.0 million), destitutes (50.98 per cent and 6.3 million) and poor (64.98 per cent and 8.04 million) of all States in India. In the rural area with 7th largest rural population among the States (28.5 million), it has the second largest percentage of rural severe destitutes (29.46), destitutes (41.68) and poor 56.73 coming after Orissa and the fourth largest in absolute numbers severe destitutes (8.4 million), destitutes (11.8 million) and poor (16.19 million) after UP, Bihar and Madhya Pradesh. RBI's 13 SFDAs survey supports this analysis and indicates the way out and forward, It may be assumed that conditions in MFAL areas will be along the same lines. (Small farmers are those cultivating 1 to 2 hectares and marginal farmers below one hectare). Among the 13 SFDAs surveyed, the Tamil Nadu unit in Tirunelveli has the largest proportion of farmers below an annual income of Rs. 1,200 at 49.4 per cent, the next largest being Junagadh at 21.1 per cent and the Punjab unit—Amritsar—Ferozpur the smallest at 0.4 per cent. Equally the proportion of farmers who have non-farm income of upto 50 per cent and those above 50 per cent of total income are fairly large at 41.6 per cent and 56.9 per cent occupying the 5th or 6th rank among the SFDA units. Again unlike most other SFDAs, the Tirunelveli unit

shows only farmers who had availed themselves of short term production loans and term loans from co-operatives for irrigation and subsidiary occupations, had a total farm and non-farm income above consumption expenditures, and had an annual surplus of Rs. 247, whereas all other farmers who had either received short term credit from co-operatives or not received such credit but who were not members of SFDA, faced an annual deficit of expenditure over income ranging from Rs. 105 to Rs. 237. On the other hand, a study by the Marketting Research Corporation of India shows the largest proportion of small and marginal farmers in this State using fertilisers compared to other States. In irrigated lands, marginal farmers used 30.78 per cent of all fertiliser use in the State, small farmers 25.15 per cent and semi-medium 24.47 per cent, while in dry farms, it is 31.88 per cent and 18.64 per cent. In other States, it is much less ranging from 2.76 per cent to 6.23 per cent. The All India Debt and Investment Survey similarly shows the poverty status of the State: of the Rs. 447 crores of total liabilities, the landless labourer percentage share is 0.62, the share of the marginal cultivator is 29.82 per cent; and that of small farmers 19.40 per cent. It is against this background that a programme for the relief first of destitution and next of poverty needs to be planned in the State—involving SFDA, MFAL, Farmers Society, DFAP and compassionate transfer of resources which was the burden of MIDS publication No. 6, Poverty and Wage Goods Supply in Tamil Nadu. The State Government's round up of its achievements under one year's President's rule strikes an optimistic note. It estimates that during the first 9 months April—December 1976, the State's industrial growth was 12 per cent and might reach 15 per cent by March 1977. It refers to the increase in minimum wages for agricultural labourers from Rs. 3.50 to Rs. 9 per day for adults and Rs. 2.10 to Rs. 3 for non-adults and the appointment of 133 officers in the Revenue Department to implement the wage norms. Workers participation in 206 units employing more than 500 workers had led to setting up 568 shop councils and 228 plant councils. In the leather industry, the State's large foreign exchange earner employing 5 lakh workers, the Centre and the State have joined and set up five co-operative joint centres at a cost of Rs. 50 lakhs. 10,000 new small scale units were registered during the year and 2,652 bonded labourers were freed upto the end of November 1976. These figures will need to be checked against NSS returns for the year, when available.

Flood Relief and Prices: Flood damage repair to the city's road net work to the extent of 40 KMs at a cost of Rs. 133 lakhs was underway and about 50 per cent completed by the end of February. The Highway Research Station is supervising this work, which has to some extent slowed the work, as supervisory personnel have to be deployed and are not available in adequate numbers. In addition the State government provided Rs. 10 lakhs, half as loans and half as grant, for re-laying roads damaged by floods and retaining works to prevent future floods to the municipalities of Kancheepuram, Tiruvottiyur, Alandur, Tiruvellore and the townships of Avadi and Kathivakkam. The other bottleneck has been blue granite metal which has to come from the Pallavaram quarries. On the price front, the government introduced the single point sales tax at 4 per cent on pulses and grams and parched and dried pulses and grains and a waiver of the tax due in respect of them over the past 6 months to keep prices down. The

good North East monsoon referred to in Vol VII pp 1-2 and 73-74, has led to diversification of the cropping pattern in the State. The failure of the South West monsoon led to limiting paddy cultivation and the growing of groundnut and other substitute crops. As the groundnut crop is harvested in March/April, the price of groundnut oil is expected to decline in the coming 2 months. In the few pockets, where both South West and North East monsoon failed, the collectors have been asked to waive water charges and arrange for kist remission, postponement of loan recovery and conversion of short term to long term loans. In the meanwhile to reduce the price of oil, the government imported in February 1,000 tonnes groundnut oil from Gujarat and extended the public distribution system of groundnut oil to Madurai, Coimbatore and Tiruchi. Also the Civil Supplies Corporation has put on the market solvent extracted refined groundnut oil from Gujarat at Rs. 10.50 per kg. and other refined edible oil based on imported soyabean oil. With the good rice position due to the harvest now coming in, FCI's decision to move 1.5 lakh tonnes of rice from the North into the State and the import from Andhra Pradesh, medium boiled rice is selling at Rs. 1.60 to Rs. 2.15 per kg. Also the prices of cholam, cumbu and varagu have declined. The government reported that as at mid February, one lakh of rice from kuruvai and samba crops had been procured from the traders levy, without any subsidy for the procurement. FCI reports that through its programme of acquisition, construction and hiring of godowns airstrips, the total storage capacity in the State has been increased to 18 lakh tonnes. As on date the total grain storage in the State is 11 lakh tonnes. CSO's monthly report of consumer prices for the State which recorded for August a decline of one point showed for September a rise of 3 points due to the 5 point rise in food prices. Rural prices which showed a sharp 17 point rise in August (see last issue p 136), continued at that level in September, being 9 points higher than consumer prices in urban areas. Food prices were some 12 per cent higher in rural areas compared to urban food prices. The report also shows that as at June Madras prices were higher by 5-8 per cent than prices in the mofussil cities of Madurai and Tiruchy.

Power: The government is spending Rs. 350 crores during the current Fifth Plan on power projects and for 1977-78 will be spending Rs. 95 crores on generation, transmission and distribution as well as on rural electrification. For the Sixth Plan, the government has proposed for the approval of the Union government, 12 hydro and one thermal power projects—with a total installed capacity of 1,260 MW. For 3 of the projects work in infrastructural facilities has started. Further investigation is underway on 8 hydro electric schemes with a capacity of 1,515 MW—which pretty nearly exhausts the hydel capacities of the State. Neyveli will be increasing its lignite production to 4.5 million tonnes, in 1978-79 and to 6.5 million tonnes in 1980-81.

For the country as a whole, January was a good month, with the generation of 7,824 million units, thermal stations contributing 4,765 million units and hydel 2,762 million units and nuclear stations 297 million units. For the 10 months April 1976-January 1977, the ministry reports that 73,802 million KWH were generated. The average daily generation was 241 million KWH. The largest deficit was in Karnataka with a short fall of 6 million KWH per day. In February the

national power deficit was 16.90 million KWH, of which the Southern region alone had a deficit of 0.55 million KWH per day. UP staggered power supply to industry. Jammu and Kashmir did not allow industry to run during the peak period. MP, Maharashtra, Tamil Nadu, West Bengal and Assam had cuts ranging from 5 to 40 per cent. In January 175 MW was added and the Orissa system was parallelled with Bihar. DVC reports that in the first 10 months it had crossed the 4,400 million KWH mark and will be meeting its target of 5,300 million KWH for the year due to following modern management practices. The present level of the systems generation is 850 MW, despite the shut down of 2 BHEL units of 120 MW each for repairs. In general the ministry of energy is of the view that the year's target of adding 2,000 MW will be attained. In the first 10 months, 11 generating units of 1,071 MW capacity have been commissioned and by March end a similar number would be commissioned. This means that the Fifth Plan target of 12.5 million KW of additional power generation will be achieved, as in the last 2 Plan years 3.5 million KW capacity will be commissioned. Improved project preparation and evaluation systems and the cell set up by the Central Electrical Authority to monitor and control the entire power system have been helpful. In order to relieve the very poor power situation in Karnataka, the Union government is importing 4 gas turbine generators of 25 MW each. REC reported in February sanction of Rs. 18.19 crores for 57 new projects for extension of electricity to rural areas in 13 States covering 3,387 villages, energising 19,348 pumpsets, 1,620 agro-based industries 47,000 domestic and commercial connections and 10,600 street lights. In this sanction, special attention has been given to energisation of clusters of irrigation pumpsets in small pockets to boost agricultural production.

Water : The government appointed a 4 member committee to examine the extension of the multi-purpose, inter-State Parambikulam-Aliyar Project, which was planned to serve beyond its present ayacut of 2.50 lakh acres to a further 1.5 lakh acres. When the project was first planned, it was expected that 32 tmc of water would be available for irrigation, 80 per cent of which was to be used for dry crops and 20 per cent of wet cultivation. Actually the water available was only 25 tmc, so that the extension of the ayacut might be unhelpful, endangering cultivation in the existing ayacut. The committee is to examine this question of extension and advise the government. The State Planning Commission in one of its studies has recommended that 2 dams be constructed—one across Nallar river and another across Anamaliyar river which would make the Parambikulam-Aliyar project water equal to the 32 tmc originally envisaged. It also points out that contrary to the terms of the project, 80 per cent of the farmers are using the water for wet cultivation and recommends modification in water supply—for 10 days for wetting followed by cut off for the next 10 days as a means of extending the period of irrigation. It has also recommended lining the canals and distributaries of lower Bhavani which will save 6 tmc of water and cost of Rs. 20 crores. These interesting proposals should be subject to professional scrutiny. The Rs. 3.2 crores Periyar-Vaigai modernisation scheme is in the final stage of clearance by the World Bank at the end of February. The system at present has a gross irrigated area of 2.20 lakh acres. Under the modernisa-

tion scheme, another 30,000, acres will be brought under irrigation.

Communication : In order to meet the expanding demand for rail traffic, Southern Railway is developing Madras Beach as an alternative terminal, having used to the full all the space available in the Madras Central Station area. The latter terminal with its 11 platforms handling 50 mail and express trains and 40 pairs of other passenger and suburban trains has reached saturation point. Madras Beach which is the terminal for suburban electric train services, both metre gauge and broad gauge, with facilities for interchange will increasingly receive new train services. Besides the Circar Express, it provides the transfer point for the newly introduced Ganga-Kaveri Express, wherein a person can travel from Benares to Rameswaram, using the same terminal. In regard to goods vehicles transport, the State quota under the special reciprocal agreement with AP, Kerala, Karnataka, Maharashtra, Goa and Pondicherry was increased and the composite permits are being distributed to truck owners by early March as a means of speeding inter-State trade. The government also sanctioned in February, 2 bridges—one across the Adyar connecting Turnbul Road and the Engineering College and the other across the Buckingham Canal, as part of the Madras urban development project, at a cost of Rs. 39.206 lakhs. The Adyar bridge will be built allowing for the heavy discharges for the Adyar, as witnessed in the last floods. The bridges will help speed the traffic flow in the city. On the telecommunication side, the Post and Telegraph Department announces that with the supply of micro wave transmission equipment provided by Japan under the Yen credit, Madras-Ernakulam via Salem, and Madras-Calcutta via Vijayawada will be connected. Also the telecommunication facilities to Sri Lanka have improved with the commissioning of VMF system between Mannar and Colombo. A broad band micro-wave system connecting Bombay and Trivandrum which will also link Madras and Mangalore and which can be used for television and telephone needs has been developed. Trunk automatic exchange and international Telex have been commissioned at Madras, Coimbatore and with London, Singapore and Sydney.

Housing : The State government announced in early February that the Tamil Nadu Harijan Housing and Development Corporation had built 2,550 houses at a cost of Rs 4,000 per house out of the target of 5,000 houses. It also reports that out of 25,000 harijan colonies in the State, 23,600 colonies have been provided with drinking water facilities and 24,000 colonies had been electrified. Under the urban Development Project which has been sanctioned Rs. 50 lakhs by the Union ministry of works and housing and which is to be aided for 3 years under the World Bank scheme (see last issue p 140), the sites and services programme will enable 10,000 EWS families the possibility of acquiring developed and heavily subsidised plots over an area of 168 hectares in Arumbakkam, Villivakkam and Kodungaiyur, and under the slum improvement scheme a further 23,000 families in 85 slums to be given proprietory rights in twin plots which have been provided with basic amenities and community facilities. The first programme, the sites and services programme, will at a cost of Rs. 9.4 crores, comprise 13,100 plots, 77 per cent of which will be for EWS, 20 per cent for LIG and 3 per cent for MIG. The other programme for the slums at a cost

of Rs. 6 crores, provides affordable alternative sites and services, improves the infrastructure, building and living condition and security of tenure through transferable long term household titles which will be an incentive for the inhabitants to improve their dwellings and to keep the infrastructure facilities in good condition. Most of the slums selected for improvement are located near the sites and services project areas. Each improved slum will have its streets, foot-paths and link roads, and a bathroom and fountain for every 10 families and a street light every 40 metres. Also to provide employment, schemes are being worked out in the slums through cottage industries and arts and crafts. The government announced at the end of February an extension of the deadline to April for filling the returns under urban lands ceiling including agricultural land. In the meanwhile, all construction activity in the city continues at a standstill.

Welfare : In addition to the existing 32 land colonisation schemes, the government of India has sanctioned 13 more such schemes for rehabilitating repatriates from Sri Lanka in the State. To date 9,000 acres have been assigned to 2,054 repatriate families and a little over Rs. one crore invested in them at the rate of 3 acres per family and the loan to meet the cost of reclaiming, irrigating and cultivating the land. In the Keelapuliyur land colonisation scheme, the Government has invited the collaboration of the United Commercial Bank for providing agricultural credit to the 217 families and on this basis to enter into similar tie up arrangements for schemes elsewhere in the State.

National :

Fifth Plan : As indicated in the last issue, (page 141) the Planning Commission announced that the financial outlay for 1977-78—the Fourth year of the Fifth Plan—for the States will be Rs. 4,771 crores, which is 25 per cent (Rs. 945 crores) above the 1976-77 outlay of Rs. 3,826 crores. For the Fifth Plan as a whole the total outlay for the States will be Rs. 18,999 crores, the last 2 years involving an outlay of Rs. 2,596 crores. The Commission computes that the States will have to raise as additional resources Rs. 6,200 crores during the Plan period. In the first 3 years, 1974-75 to 1976-77, they have raised as additional resources Rs. 3,682 crores, which means that by the end of the Plan period they would have raised Rs. 5,500 crores, leaving Rs. 700 crores to be raised. This seems small but given the fact that the States revenue sources are inelastic, that on account of their State Electricity Boards they are losing in 12 States Rs. 106 crores for this year and are also losing on their irrigation at the rate of Rs. 235 crores estimated for this year, and their tax on agriculture is 6.2 per cent of total tax receipts according to the RBI survey and the declining trend of shared tax revenues (from 21.7 per cent last year to 9.4 per cent this year), the States will have to make a special effort to raise the additional residue.

Economy : CSO's quick estimates for 1975-76 show that national income rose by 8.8 per cent and per capita income by 6.6 per cent. The Revised Fifth Plan document's estimate of national income growth was 6 per cent, the impressive increase beyond this to 8.8 per cent being due to the record output of 120 million tonnes (compared to 99.83 million tonnes

for 1974-75), involving a 13.2 per cent increase in the net product of the agricultural sector. Other sectors also registered increases, banking and insurance (13.2 per cent), electricity, gas and water supply (13.1 per cent), railways (11.9 per cent) and mining and quarrying (10.2 per cent). The net national income at 1960-61 prices was Rs. 21,952 crores (Rs. 60,293 crores at current prices) and per capita income at Rs 366 (1,005 at current prices). Private consumption expenditure at current prices was Rs. 55,538 crores, being 77.5 per cent—about the same in the last 3 years, food items accounting for over two thirds of the expenditure. Domestic saving was Rs. 10,013 crores (Rs. 8,500 crores in 1974-75) and domestic capital formation Rs. 11,058 crores (Rs. 9,576 crores in 1974-75). Saving was thus 14.7 per cent of national increase compared to 13.1 per cent in 1974-75, and domestic capital formation 16.2 per cent compared to 14.7 per cent in 1974-75. Domestic savings increased sharply between the 2 years, while private corporate sector savings declined from Rs. 843 crores in 1974-75 to Rs. 520 crores in 1975-76. Also its capital formation declined from Rs. 2,065 crores to Rs. 1,194 crores, and the increased overall rate of capital formation was due to the public sector's foodgrains stocks. The savings of the public sector remained the same as that for 1974-75. In this connection an official review of the credit deposit ratio in rural and semi-urban branches of banks show that India's villages saved more than the urban areas. Deposits in rural offices of banks increased from Rs. 144.96 crores in June 1969 to Rs. 1,028.38 crores at the end of June 1975, while rural advances increased from Rs. 54.29 crores to Rs. 536.24 crores. Hence the rural credit deposit ratio which was 37.5 per cent in June 1969 rose to 52.2 per cent in June 1975. In the semi-urban branches deposits increased from Rs. 1,024.06 crores to Rs. 2,817.08 crores while advances shot up from Rs. 406.57 crores to Rs. 1,371.65 crores, moving the urban credit deposit ratio from 39.7 per cent to 48.7 per cent between the 2 years. These findings have led the government to request the banks to energise their rural and semi-urban banks, and increase the flow of production credit as to secure a ratio of at least 60 per cent. The economy's performance in 1976-77 is also likely to be good at 7 per cent. Though the foodgrains production will be lower at 116 million tonnes according to official estimates, the industrial sector is likely to register a growth of 10 per cent with good increases in steel, aluminium and copper and a satisfactory record of capacity utilisation particularly in the public sector units. RBI has asked banks to back up the drive for increased production and quicker growth by maintaining a balance between overall restraint and full support to accelerated growth. This will call for sound judgment at all levels and procedures which will respond quickly and effectively to situations calling for bank support and aid.

Price and Anti-Inflation : The revised wholesale price index, which came into use as noted in the last issue (p. 142), at the end of January—January 29—stood at 178.8 which represented a one per cent rise over the month, and 7.7 per cent over the year. The January rise was due to the rise in the index of primary article prices by 1.8 per cent— pulses going up by 8.7 per cent oil seeds by 2.7 per cent and fibres by 1.3 per cent, cereals went up by only 0.6 per cent and actually declined for the last week by 0.1 per cent. For the year the rise was 3 per cent. It was oil seeds which rose by 66.5 per cent for the year and fibres by 34.2 per cent. Manu-

factured products showed a slight 0.6 per cent rise in prices during the month and 7.4 per cent during the year, the biggest rise being edible oils by 54.9 per cent during the year and 5 per cent during the month, followed by cotton textiles which went up by 14.7 per cent for the year and 2 per cent for the month, and drugs and medicines by 11.7 per cent for the year. The Economic Times retail price index for Greater Bombay follows fairly closely the official wholesale price index summarised above. For January it shows a rise of 0.6 per cent and for the year 8.3 per cent. Food rose by 1.1 per cent during the month and 9.4 per cent during the year, oils and fats by 13.7 per cent, pulses by 6.8 per cent and condiments and spices by 3.4 per cent registering the highest monthly rises. The prospects of containing inflation, for the coming 4 weeks of the election period, are rather disturbing. The relaxation of the RBI credit policy was referred to earlier, in contrast to the tight money and credit policy referred to in the last issue (p 143). Money supply during the first nine months, April to December 1976, increased by 13 per cent compared to the 6.5 per cent increase in all of 1975-76. The 10 per cent limit to increase of the margin for enhanced credit is now left to the discretion of the banks—at a time when the time for increased credit for most industries has already passed. The reduction in fertiliser and cement prices, in imported cotton price, (to be referred to later) and other measures which will increase money supply and reduce government revenue will have an inflationary effect. The government will be importing 50,000 tonnes of soyabean oil at about $ 26 million from the US as part of its decision to import 4,00,000 tonnes to push edible oil prices down. Also the government has decided to increase compulsorily the use of imported edible oils in vanaspati manufacture from 50 per cent to 75 per cent from March 1, to relieve the demand pressure on indigenous oils and slow down their price rise. This means that the vanaspati manufacture will increase from 35,000 in February to 56,000 in March. In March over one lakh tonnes of imported edible oils will be arriving. A long term measure in promoting banking habits in the country is the recommendation of the Rajamannar Committee on banking laws that all salary and wage payments about Rs. 1,000 should be made only through crossed cheques and making it compulsory to maintain checkable accounts by merchants and traders. It also recommends strengthening the penal code against the issue of bad cheques.

Industrial Growth and Public Sector Performance : As noted earlier, industrial growth in the first 9 months, April to December 1976, was over 10 per cent, the good performers being mining, manufacturing and railways, metals, chemicals, fertilisers, commercial vehicles, passenger cars, scooters and tractors. The government has decided to allow an increase of 25 per cent in licensed capacity of industries that had their license endorsed for fuller capacity use under the 1972 scheme, provided no additional plant is installed and no foreign exchange is required. This will further spur industrial production. Also the government has under consideration a limited exposure of Indian industry to foreign competition. With the good foreign exchange situation, some liberalisation in imports will force our industries to modernise, reduce the cost of investment and promote the manufacture of Indian capital goods of high

quality at competitive prices. The automobile industry, the textile industry and to a lesser extent the engineering industry should be exposed to foreign competition in order to adapt the latest technology and diversify production. One glaring example of protection working against productivity is that case of Japan and India both starting at the same time in the automobile industry, with Japan challenging European and American automobile makers today while Indian automobiles are still in the doldrums. This exposure of Indian industry of international productivity and efficiency standards will be a good supplement to the various measures taken in the past 2 years to stimulate industrial investment—starting from the Plan outlay of 7,852 crores, the fiscal incentives, the investment allowance the existing modernisation programmes, liberalised licensing policy and exemptions to certain industries etc. The Economic Times survey of the 20 largest business firms in India —each with assets exceeding Rs. 100 crores as at 1975-76—show that their assets holding increases from Rs. 3,516 crores in 1972-73 to Rs. 4,966 crores in 1975-76 (41.2 per cent) and their net worth from Rs. 1,431 crores to Rs. 2,012 crores (40.6 per cent). Their gross profits increased by Rs. 600 crores (57.8 per cent). As regards capacity use, the government reports a good record in 1976. In a large number ot industries the percentage of utilisation varied from 60 to 115 per cent. The industries which increased sensibly their capacity use were : Soaps (116 per cent), polythelene (111 per cent), viscose filament (105 per cent), DMT (102 per cent), matches (99 per cent), nylon yarn (99 per cent) nylon (99 per cent) GLS lamps (96 per cent), welding electricals (93 per cent), machine tools (89 per cent) etc. Public sector units under the Department of Heavy Industry had a cumulative record production for the first 10 months, April 1976 to January 1977 of Rs. 616.5 crores. fulfilling 91 per cent of the annual target of Rs. 677.6 crores. The best performance were by BHEL 95 per cent of target, HEC 80 per cent, MAMC 89 per cent, Burn 98 per cent, Bharat Heavy Plate and Vessels 92 per cent Richardson and Cruddas 101 per cent, Triveni 102 per cent, Tungabhadra Steel 120 per cent etc. In January the units produced Rs. 83.4 crores exceeding the month's target of Rs. 81.3 crores. The Units under Department of Industrial undertaking recorded for the 10 months, April 1976 to January 1977, a total production of Rs. 99.7 crores against the target of Rs. 99.6 crores and will be achieving the revised target of Rs. 122 crores for the year. The best performances were HPF, Hindustan Cables, Instrumentation, NEPA, and Cement Corporation which together produced in January Rs. 11 crores against the target of Rs. 10 crores.

National Production Front:

Steel: The government estimates that for 1976-77 the output of steel ingots will be 8.5 million tonnes (against a target of 8.2 million tonnes), and saleable steel to be 6.8 million tonnes (target 6.4 million tonnes). For the 9 months April to December 1976, ingot steel production was 6.169 million tonnes and saleable steel 5.062 million tonnes. Overall capacity use was 82.4 per cent for ingots and 90 per cent for saleable steel. Bhilai with 101.9 per cent was at the top, followed by TISCO at 101.2 per cent. Rourkela with 93.6 per cent, produced 3,60,54 tonnes of saleable steel from its cold rolling mill complex in January. The current year's average monthly production of 36,294 tonnes of saleable steel was 21 per cent over the previous year. Work is in full swing on the 4 million tonnes expan-

sion scheme. Five large caves are being imported from the Soviet Union at a cost of Rs. 1.69 crores to ensure simultaneous construction of concrete and structural erection work in the expansion units. According to the Bombay market reports, demand for steel continues to be stagnant, while production is increasing at the rate of 15 to 20 per cent per month. Steel markets are still holding large stocks and the main reason for this is the slow down in building and construction activity due to the urban land ceiling act. The Planning Commission in the meanwhile has allocated Rs. 564.62 crores for the steel and mines department for 1976-77, including clearing Rs. 158.15 crores for the Bokaro expansion scheme and Rs. 140 crores for tha Bhilai expansion scheme just referred to. Bokaro is undertaking Rs. 2.36 crores civil works needed for the expansion scheme. The provision for IISCO township has been increased per Rs. 50 lakhs to Rs. one crore. Of the total approved Rs. 564.6 crores, budgetary support would be Rs. 544.66 crores and the rest will be from internal funds. The ministry's analysis of the demand and sale pattern of steel for 1977-78 is that against the total production of 7.8 million tonnes including 0.7 million tonnes from mini steel plants, total domestic demand will be 6.8 million tonnes. It is estimated that the export for 1976-77 will be one million tonnes and for 1977-78 will be one million tonnes.

Crude: ONGC restarted drilling for oil at Jwalamukhi in HP where the presence of gas has been established and in late January spudding operations of another well begin. With a view to give onshore oil exploration its importance, ONGC plans to drill at Ramshabar in HP and Purampur in UP and in one more site in HP and UP, two in West Bengal, one in Tripura, five in Gujarat, two in Assam and one in AP. On offshore production and exploration, ONGC has been allocated Rs. 500 crores for the third phase of the development of exploration and production in the continental shelf area. In this phase, it will establish a production potential of 1,20,000 barrels per day from Bombay High and 15,000 barrels per day from the Bassein fields have been located. In addition separate sub-sea pipe lines for transporting crude from Bombay High over 170 KM to the coast are to be laid at a cost of Rs. 250 crores. By February end Bombay High crude production had reached 37,000 barrels per day which is 2 million tonnes per year. There was at the end of the month a flash fire in one of the wells which will slow down production for 2 months. By December 1977 in the second phase of development, production will attain 80,000 barrels per day. In phase I, drilling operations of the wells from 4 platforms (A, B, C and D) and an offshore loading facility was completed. From May 21, 1976 when it started, to the end of February, Bombay High had produced 2.5 million barrels of crude. Commercial production at Bassein is expected to start before the monsoons. Another promising structure is off the Konkan Coast called Angria Bank where on the basis of the discovery of oil by " Anweshak ", " Sagar Samrat " will begin drilling by early March. ONGC has been advised by Peter Frankel, its UK consultancy firm that Uran, 16 KMs from Bombay, would be a better location for onshore terminal to which the under sea pipe line transporting oil and gas from Bombay High should be linked rather than its decision to locate it at Nhava Sheva, where considerable dredging operation will be involved. ONGC has accepted this advice of locating its onshore terminal

in the dry area of Uran. Two pipe lines are to be laid for transportation of oil and gas which will be fed straight into the Trombay unit of the Fertiliser Corporation of India. Also a fractionation plant to separate lean gas for Trombay and another plant for producing liquified petroleum gas are being set up at Uran. As noted in the last issue p 146, the supply of one million tonnes of crude in 1977 by USSR was the subject of a signed agreement, against which india will be exporting to the Soviet Union Rs. 80 croras of engineering and industrial goods, making the 2 way trade with the Soviet equal to Rs. 1,000 crores for the year. An important possibility for economy in use of crude is the research result of ATIRA which when applied will reduce the fuel consumption of the average textile mill by Rs. 2.5 lakhs. If this process was applied over the 700 textile mills in the country, there would be considerable savings in use of fuel oil and the consequent import burden, as well as reduction in cost prices of cloth and increase in the profitability of the mills.

Coal and Minerals : Coal India reports that its production in December 1976 met the entire demand for coal in the country for that month. Production for the month was 78.38 lakh tonnes and the increasing despatches to steel plants, cement factories and power stations enabled these major consumers also to build up a stock of 37.40 lakh tonnes in December. From all sources, coal production in November was 8.4 million tonnes and 7.3 million tonnes in October, bauxite 1,58,000 tonnes, copper ore 2,06,000 tonnes, manganese ore 1,39,000 and iron-ore 3.7 million tonnes. Among non-metallic minerals, magnesite production in November was 31,400 tonnes, Phosphorite 68,000, Gypsum 30,000 and limestone 2.3 million tonnes. In February the government announced approval of the Rs. 91.90 crore copper project in Madhya Pradesh, to be built by Hindustan Copper in 5 years. It will be the country's first large sized open pit mine in hard rock and will be fully mechanised with heavy earth moving equipment. In its 4th year, a million tonnes of ore will yield 15,200 tonnes of metal and in the 6th year 23,000 tonnes. The wire bar manufacturing units of the Khetri Copper Complex achieved a record production of 1,711 tonnes of copper in January. Also the concentrator of the complex treated 1,25,000 tonnes of copper ore during January. The country's small but essential copper production will profit from discussions underway in Geneva in February for the creation of a world Copper Organisation that will link producers and consumer countries. The proposal came from US and Canada as a means of introducing some stability in fluctuating world copper prices. Hindustan Zinc is working on a 30,000 tonne Zinc smelter at Vishakapatnam. There are some questions about the project. Originally estimated to cost Rs. 21.24 crores, its present cost is Rs. 44.84 crores, for which the approval of the Public Investment Board is being sought. In addition Hindustan Zinc is requesting withdrawal as reduction of the 45 per cent custom duty on imported zinc concentrates and a lower power rate below 16.5 paise per unit. These and other concessions demanded raise the question whether the unit is a viable one and on this further studies are needed.

Cotton and Textiles : The Cotton Corporation of India announced in February a reduction in the selling prices of imported cotton. The reduction ranged from Rs. 397 to Rs. 525 candy for different varieties of imported cotton with a

view to stabilising domestic cotton prices. The Council has proposed a cotton production target of 75 lakh bales for 1977-78 (Tamil Nadu 3,50,000 bales). For 1976-77 also the target was 75 lakh bales but the production is likely to be 63 lakh bales. To attain the target in the coming year, productivity per hectare of irrigated and unirrigated cotton must increase through intensive cotton district development, use of HYV, increasing area under irrigated cotton and use of non-traditional areas. In Maharashtra cotton growers are being offered a bonus of Rs. 50 a quintal to increase production. The government has also permitted direct import of acrylic fibre by actual users and included rayon grade wood pulp and nylon filament yarn under the scheme of direct allotment of imported raw materials to actual users. The Textile industry has proposed that in addition to the package of relief measures announced by the government (see last issue p 147) the industry should be given more liberal credit, cotton at economic prices and controlled cloth sold at price to cover costs. In this connection, the government is planning to give a major price concession to mills defaulting on their control cloth obligation by allowing a 35 per cent price increase on 50 per cent of the production for which the short fall has to be made good. The industry is meeting the controlled cloth short fall. Also in February the National Textile Corporation announced a 5 year Rs. 250 crores plan to put all its 175 mills on a firm footing. This has become necessary in view of the continuing losses suffered by NTC mills, despite their being relieved of the obligation to produce controlled cloth. For the 9 months, April-December 1976, they registered a loss of Rs. 20 crores and are likely to end the year March, 1977 with a loss of Rs. 30 crores. The 5 year plan will cover production, modernisation, marketing etc. and generally raise the efficiency of the NTC mills.

Small Industry: The government reports that the growth rate in the small scale industrial sector in 1976 was 18 per cent. Given the fact that the share of the small sector in total production is 40 per cent, this is a sizeable increase. In non-factory units, it employed 156 lakh persons and produced Rs. 6,700 crores against Rs. 5,742 crores in 1975. Also the small scale sector has been increasing its exports from Rs. 155 crores in 1972-73, to Rs. 556 crores in 1974-75 and Rs. 600 crores in 1975-76, which is 15 per cent of the country's total exports. The new entrepreneurial class has broadened the management base of the sector which the government has fostered, as a result of which there are 3 lakh new units in the country. Also the government exempted small units from the provision regulating acceptance of deposits by non-banking companies. Now they can receive such deposits without the control of the Reserve Bank.

Drugs, Sugar and Cement: Drug production in 1976-77 is likely to reach Rs. 650 crores, being a 20 per cent increase over the previous years. The production of 16 most essential bulk drugs including anti-biotics, analgesics, anti-TB and anti-malaria drugs will be recording an increase of 25 to 50 per cent. The first three months of the 1976-77 crush season, October to December, recorded sugar production of 13.96 lakh tonnes, compared to 10.24 lakh tonnes in the first 3 months of 1975-76 season. But this good start plus the increased cane production (which was plus 0.5 per cent over that of the previous year has not been followed up by the expected record

production of 50 lakh tonnes. The year's production is likely to be 48 lakh tonnes, primarily because of the massive diversion of cane to gur and khandsari, leading a number of mills in UP to close their crushing by February. Khandsari prices have shot up from Rs. 135 per quintal at the end of February to Rs. 165 per quintal in the hope that the export ceiling of 1,000 tonnes of gur will be lifted. A secondary cause for reduced sugar production is that the drought in Maharashtra has resulted in cane of lower recovery content quality and hence a reduction in its annual output of 17 lakh tonnes. Cement production for 1975-76 is expected to be 18.2 million tonnes and with the low level in construction activity referred to earlier the demand is likely to be a low 16.8 million tonnes. The industry was sustained by an increase in exports during the 9 months April to December 1976 at Rs. 20 crores compared to the April to December 1975 export at Rs. 5 crores. For 1977-78 the production target has been fixed at 20 million tonnes and for 1978-79 it has been reduced from 25 million tonnes to 20.3 million tonnes-domestic demand 19.3 million tonnes and exports 1.5 million tonnes. The Cement Research Institute has perfected its mini-cement plant technology and is setting up such plants in Assam, Maharashtra, Rajasthan and Andhra Pradesh, improved its 20 packaging schemes to reduce seepage and moisture ingress, has diagnosed in 2 cases the damage to civil engineering structures, and has successfully used various forms of industrial wastes, fly ash, paper sludge, blast furnace, slag, gypsum anlydrite waste, asbestos sludge in manufacture of cement and cement production.

Agricultural Production : CSO's estimate of foodgrain output for 1975-76 at 120.83 million tonnes is higher than that of the Planning Commission at 116 million tonnes (see Vol p 447) and ministry of agriculture at 118 million tonnes (Vol VI p 447). This record production is largely due to rice production increase which jumped from 39.6 million tonnes in 1974-75 to 49.4 million tonnes in 1975-76. Wheat production increased from 24.23 million tonnes to 28.34 million tonnes and coarse grains output increased by 3.1 million tonnes. The causes for this good performance are : (a) the plentiful and timely rains, (b) the increased use of rabi fertilisers from 1.44 million tonnes to 1.69 million tonnes, (c) the expansion of the HYV area from 27 million hectares in 1974-75 to 32.5 million in 1975-76, with paddy HYV coming under 2 million additional hectares. The paddy production increase was in turn helped by the mini-kit programme and the new programme of growing community nurseries for paddy. 5 major oil seeds also registered an increase of 20 per cent at 10.2 million tonnes, and potato production by a similar 20 per cent increase at 7.4 million tonnes. Hence as noted earlier agricultural production increased by 13.2 per cent in 1975-76 against the Plan target to 5 per cent. In view of the forecast that foodgrain production this year will be 116 million tonnes, FCI is readying itself to stock 22-23 million tonnes of foodgrains by the end of the rabi season. The only area where the kharif target may not be reached is AP. Against a target of 4 lakh tonnes, by the end of January 2.4 lakh tonnes were procured compared to 5.2 lakh tonnes in January 1976. 3 successive cyclones resulted in serious water logging and washing away of harvested grains. Hence procurement has been low even in the rice rich Godavari districts, Krishna and Guntur areas. The rabi season which starts in April will see 95 per cent of rabi

crops in May-July in the markets or FCI godowns. The stock under cover and plinth is expected to increase from 5 million tonnes to 8 million tonnes. 3 million tonnes of additional covered storage space is being created by the Corporation or by private parties on offer from FCI. Against this background, February the whole country was made one zone for the movement of wheat products and the issue of wheat to roller flour mills for the manufacture of wheat products has been liberalised and the issue price of wheat to the mills reduced to Rs. 125 per quintal. To improve the public distribution system, the rations have been increased by 50 per cent, and wheat and milo are being sold in weekly markets without ration cards. State governments are allowed to indent on FCI directly to meet emergencies and to reduce their incidental charges to lower grain prices to the consumers. The Southern Rice Zone has been expanded to include the Union Territory of Pondicherry, Karaikal and Mahe in addition to Karnataka, AP and Tamil Nadu. Allocation of wheat has been increased to all States and rice rations increased to Kerala, Maharashtra and West Bengal. The government also decided in February to reduce the price of complex fertilisers to the extent of Rs. 645 on an average for P_2 05 per tonne. It has also reduced the price of ureaand muriateof potash/sulphate of potash. These reductions works out to 11 per cent and will result in increased fertiliser consumption and it is hoped in their balanced application. Also in February the government took action to ensure an integrated approach to rural credit by the various financial institutions. It found that commercial banks were lending to farmers at lower interest rates than the regional rural banks which they had created for this purpose or those of co-operative credit institutions. The regional rural banks of which there are 40 with 491 branches by December will add a further 294 by March with a total volume of deposits of Rs. 7.8 crores and loans disbursed at Rs. 8.05 crores to one lakh borrowal accounts. Of this, the loans given to small and marginal farmers were Rs. 4.67 crores and to rural artisans Rs. 2.3 crores. The regional banks are to be increased to 60 covering 120 districts and a committee has been appointed to make recommendations for effective co-ordination among the various lending agencies. A parallel and important decision by the government was the selection of 20 districts under the programme of Integrated Rural Development launched at the time of the budget (see Vol. VI p 195). The Department of Agriculture, Research and Education and ICAR, with a co-ordination committee chaired by Member (Agriculture) Planning Commission is responsible for preparing resource inventories and action plans for the districts. The districts chosen are: Mahboobnagar in Andhra Pradesh, Kamrup in Assam, Rohtas in Bihar, Kutch in Gujarat, Hissar in Haryana, Kangra in HP, Anant Nag in Jammu and Kashmir, Canannore in Kerala, Tumkur in Karnataka, Bastar in MP, Chandrapur and Wardha in Maharashtra, Garo Hills in Meghalaya, Pur in Orissa, Hoshiarpur in Punjab, Banswara in Rajasthan, Dharmapuri in Tamil Nadu, Mirzapur and Tehri, Garhwal in UP and Bankura in West Bengal. The agencies which will implement various phases of this action plan will be universities, colleges, technological institutions, CSIR, ICAR, Agricultural Universities and DST. There will be a science and technology centre in each district from which key operations will be conducted, and provide a permanent training centre—Kishi cum Udyog Vigyan Kendra for importing agricultural,

industrial, technological and marketing skills and demonstration plots development. Training will be learning by doing. The complex will include a mobile training cum demonstration unit and a rural service society, supported by the district lead bank to provide credit for agricultural inputs, and a marketing cum ware housing complex to provide safe storage and efficient marketing from which farmers will get their share of profit. The complex will also have an agro meteorological centre, a forest nursery, a development school with a residential complex for scientists, technologists, teachers and student volunteers. Through optimum resource use the programme will aim at raising agricultural and farming incomes.

Exports : During the first nine months, April-December, exports at Rs. 3,546 crores rose by 31 per cent and imports at Rs. 3,592 crores declined by 8.3 per cent compared to the first 9 months of 1975-76. The nine months trade deficit was Rs. 46 crores as against the Rs. 40 crores deficit reported in the last issue p 150 for the first 8 months. Among the good export performers for the 9 months were tea, coffee, cashew kernals, cotton manufacturers, oil cakes, fish, leather, engineering, iron and steel handicrafts and rubber products. This is good, but as a percentage of world trade, India's share at less than one per cent of the total is unsatisfactory. Another area to be watched is the need to minimise cargo loss which the steady increase in exports and their diversification call for, demanding improved packaging systems and adequate safety measures. The government in a mid year policy change, lowered the floor prices of garments to be exported to the US against the 1976-77 entitlements and has thrown open the entire US quota to garment exporters for reservations. This should increase our exports and quality of garment exports to the US. In this connection the government has successfully managed to stave off the imposition of a voluntary limitation to our garment exports by the European Economic Communiiy for this year. Export of cut and polished diamonds reached a record level of Rs. 39.60 crores in October 1976, Cumulative exports for the period April-October 1976 in diamonds were Rs. 109.18 crores in precious and semi-precious stones Rs. 14.35 crores, in pearls Rs. 12.09 crores, jewellery Rs 1.3 crores etc., aggregating Rs. 128.18 crores. Ready-made garments are steadily expanding in export, by 10 per cent in 1974, 25 per cent in 1975 and 30 per cent in 1976. In 1975-76 the total exports of ready-made garments were Rs. 250 crores, including Rs. 180 crores of handlooms. Handicrafts exports for the period April-October 1976 was Rs. 223.16 compared to Rs. 117.81 crores in April-October 1975. Three more countries from ECM, Italy, West Germany and Holland, have for the first time placed orders for Indian coal in February for a total of 65,000 tonnes. Taiwan has joined this group of first Indian coal buyers. Now electric machinery exports are also on the increase. For 1975-76 they amounted to Rs 108 crores, and for the 6 months April-October 1976 they totalled in Rs. 54.4 crores, power generating equipment alone earning Rs. 16.14 crores. During the same 6 months, April to October, engineering exports shot up by 32 per cent at Rs. 279 crores against the target of Rs. 500 crores revised to Rs. 550 crores. Contracts on hand have also risen and at November 30, 1976 stood at Rs. 767 crores. In this connection, the commerce ministry has come to agreements with firms in

industrialised countries for joint tendering of large projects in the other third world countries. In particular such understandings have been reached with firms in UK, France and USA. This will mean rather large scale export of Indian equipment and Indian scientific and technical manpower. India will undertake on a turnkey basis a project to set up a power station and transmission line in Saudi Arabia and will earn $ 50 million for it. BHEL will be the co-ordinating and executing agency. As noted earlier exports of iron and steel products are also on the raise. For the first six months, April-September 1976 they earned Rs. 183.4 crore (compared to Rs. 43.8 crore in the corresponding 6 months of 1975). Almost all categories of iron and steel exports registered growth during this six month period. Also fish exports during the 6 months, April to September 1976 earned Rs. 86.4 crores compared to Rs. 51.8 crores in the 6 months of 1975. Fresh Fish, frozen varieties and prawns and shrimps are in constant and rising demand. To safeguard the interest of tobacco growers and exporters, the government has decided that all foreign tobacco buyers should open a letter of credit for 100 per cent of the value of the tobacco that they have contract to buy in India before the stocks are actually shipped. This would prevent the Indian exporter suffering from non-payment in full or exchange losses. This was one outcome of the ECM-Tobacco Board seminar on tobacco exports. Also India and EEC concluded an agreement in February to co-operate in solar energy, remote sensing, environmental pollution, waste recycling and scientific information management. The Rupee-Rouble rate on February 1 reverted to Rs. 8.50 roubles to 100 rupees after being revalued by the Soviet authorities to a low 8.22 roubles January (see Vol. VI p 646). This appreciation followed the appreciation of the British pound vis a vis the rouble. By mid February, India's foreign exchange reserves recorded a new peak of Rs. 2,484 crores, showing an increase of over 400 per cent from July 1975 when it stood at Rs. 554 crores. After repayment of IMF short term loans of Rs. 296, in the ten months, April 1976-January 1977, the reserves increase was Rs. 913 crores.

Aid : Japan agreed in February to give a project loan of Rs. 27.86 crores and a commodity loan of Rs. 30.28 crores to India for the development of telecommunication facilities referred to earlier under the State section and to cover the cost of import of machinery, equipment and services. The agreement with the US for the import of soyabean oil under PL 480 also falls in the Aid category. Netherlands has announced in February and to India of Rs. 60.3 crores, including a grant element of Rs. 5.92 crores. Also IDA has made a loan of $ 20 million to finance agricultural development in Orissa.

International :

Bangla Desh : In February, a 3 day review of the trade between India and Bangla Desh was undertaken by Indian and Bangla Desh representatives in Dacca. As a result, it was agreed that during 1977, India will buy from Bangla Desh 5,000 tonnes of newsprint, 15,000 tonnes of molasses, 20,000 tonnes of naphtha, and 20,000 tonnes of furnace oil. Both countries also expressed interest in trade in jute, iron and steel plant and machinery. To promote trade between the 2 countries, the Transport Co-ordination Committee will meet and identify transport bottlenecks in the two countries and propose means of overcoming them.

Pakistan : In Indo-Pakistan trade, Pakistan industrialists have placed an order for 3 lakh kg. of rayon filament costing Rs. 60 lakhs. This order was placed in face of the usual sources of rayon yarn supply form UK and Italy. Till trade barriers were removed, (see vol VI p. 140), this item was a major smuggler item between the 2 countries. There is now a chance to move towards an annual trade of at least 10 lakh kg. of rayon yarn.

World Monetary Reform : In February IMF made the first interim loan disbursements of 31.59 million SDRs to 12 low income countries from the special trust fund. 61 countries including India are listed as countries eligible for trust fund assistance. The actual assistance is given if the country faces balance of payments difficulties. The loans carry an interest of one half per cent and are repayable in 10 equal sums in annual instalments, beginning 5½ years from the date of each disbursement. The first 12 countries to receive loans include Philippines, Zaire, Kenya, Tanzania and Nepal. So far 393 million SDRs are credited to the special fund. The next gold auction (seventh) will be on March 2 and after that on every month. Loans are to be made at six monthly intervals. With regard to the British pound, $ 3 billion agreement was finalised by the Central Banks of US and Western European countries in early February (see last issue p. 152). This 'safety net' stand by credit scheme to compensate Britain for sterling sales by foreign government is to be co-ordinated by the Bank of International Settlements. This resulted in a mild recovery in the UK. The Bank of England cut its lending rate by one point to 12.25—down from 15 per cent in October 1976. This reduction in the Bank rate will lead to a general lowering of lending rates by commercial bank and to increased industrial investment and business revival, it is hoped.

World Debt: A Swedish study reports that developing countries are paying the industrial countries more in interest payments and principal repayments than what they receive as aid. In 1973 the developing countries paid out $ 11 billion in debt servicing, while the aid to them was $ 9.5 billion. In 1975 they paid out $ 14 billion for interest and repayment of principal and received as ODA $ 13 billion. In addition to ODA stagnating at 0.35 per cent instead of reaching the pledged 0.7 per cent, the developing countries also suffer from discriminatory trade, customs and other barriers imposed on them by the industrialised countries.

World Food : U. S. Department of Agriculture estimates that world grain production in 1977 will be 1,321 million tonnes which is 100 million tonnes more than the 1976 production. It also estimated that world grain consumption will fall below the trend in the past 16 years, allowing the building up of increased stocks, mostly in wheat. The good harvests were shared by all countries—rich and poor with East Asia coming first followed by West Asia, Latin America and South Asia. Increased production and stocks will lead to decline in prices of wheat, corn and sugar, but an increase in oil seeds and oils prices because of a decline in US soyabean harvest. So too limited increases in production of cotton and rubber will lead to price rises in those items. In the case of rice and rubber, price rises are also forecast because of the expanding demand.

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II Agricultural Development

Paddy and Foodgrain Production:

As noted in the State section, the official assessment is that the paddy production lost in the Kuruvai season is being made good to a large extent in the long term samba paddy crop. More precise information on the samba harvest will be available in the next issue. The Department of Agriculture estimates that the year's target of 83 lakh tonnes of food grains would near about be achieved with rice being 60 lakh tonnes. In fact this has been due to the effective extension programme which has been reoriented to serve as a mass contact programme, giving the farmers proper guidance. In Kanyakumari district, the compact Block Demonstration programme has been a very successful extension effort. Another cause has been improved scientific water management and the development of commercial farming. In Madurai district, out of the normal 3.85 lakh acres of paddy farms, only 2.85 lakh acres have grown paddy this year, the rest growing cotton and cholam. In the Tirunelveli district the ratooning of the cholam crop has become wide spread, resulting in a second cholam crop after six months of the first harvest. Also good research work at the Ambasamudram Paddy Research Station resulted in a 70 day duration drought resistant PRM 13-5241 which has been grown in dry areas like Paramakudichi, Ramanathapuram district. Similarly the cotton and millets experimental station at Koilpatti made available to the farms improved drought adapted strains of cotton, cumbu, ragi, kudiraivalli, sunflower and chillies. The DPDA programme in Ramanathapuram over an area 1.45 lakh acres has made possible double cropping, replacing low yielding millets with hybrid millets, followed by pulses, tapping underground water and improving farm management practices of small and marginal farmers. The Rs. 55 lakh rehabilitation of wind swept lands in Ramanathapuram and Tirunelveli are now yielding a variety of millets, pulses a well as fruits. Reports from the Chingleput district shows that the farmers grow paddy in some blocks and groundnut in others as a first crop followed by hybrid cholam CSH-6, which gives a good yield, is entering into the food habits of the people and makes sound cattle fodder which is in great demand. The second crop used to be horsegram in these districts but its substitution by hybrid cholam is rapidly spreading due to the efforts of the department of agriculture and its extension agents and the demonstration effect of the cholam fields of the successful farmers. It looks as if hybrid cholam is becoming the second crop in Chingleput and in other Northern districts of the State. For this, there is need for measures to assure moisture preservation as well as fuller exploitation of ground water use.

Research Results :

Research on weed control in a sense is in the starting stages in the country. FAO estimates that world agriculture loses $ 75 billion a year due to pests including weeds. An Indian 1973 estimate is that our annual crop losses are Rs. 5,000 crores which is 18 per cent of our national production and of this 33 per cent

(Rs. 1,600 crores) is due to weeds. The Central Grass Lands and Food Research Institute, Jhansi's division of weed ecology and control has developed methods of control against a large number of weeds including broom rape, which damages the tobacco crop in this State, Kangreoghar, and water and aquatic weeds. Dry land farming faces a particular problem, as the cost factor makes use of herbicide difficult, so that in such cases mechanical treatment has to be supplemented by treating patches of weeds with pesticide. In the case of increasing paddy yields, the use of blue green algae for enriching the paddy lands with nitrogen (see Vol V p 669), has led to new methods of fixing atmospheric nitrogen by using different organisms. IRRI's finding that the nitrogen fixing activity of algae in non-fertilised lands is greater than the lands using chemical fertilisers have led to means of nitrogen fixation in the root zone and isolation and classification of 51 strains of bacteria that fix nitrogen around rice roots and 18 types which harvest nitrogen under certain conditions. A recent and more effective research result of immediate interest to the farmer is the use of water fernazolla which can fix as much nitrogen as legumes do—one kg. per hectare per day. Also the value of phosphorous in nitrogen fertilisation has been proved, high yields at 30 kg. per hectare being obtained by its application in every crop season. In the area of vegetable research, the Bihar Agricultural Research Institute has released a new tomato variety, sabour prabha which is early maturing, high yielding and has all the qualities desired by the farmer and consumer, pulpy, good size and well coloured. As noted earlier, the Koilpatti Cotton and Millets Experimental Station has through its special breeding programme evolved 323 hybrids with male sterile line and elite inbreds. 3 of these—H-388, H-44 and H-417 have been multified for large scale use. Also in KB-433 and KB-436, it has contributed high yield economic variety with progressive tillering with long compact ear head and a short 75-80 days duration. A new research programme has been started in the station on the development of green ear resistance bajra varieties.

Cardamom :

The cardamom crop for 1976-77 is estimated at 2,700 tonnes, of which this State's production share will be 300 tonnes. Of the total area of 91,476 hectares under cardamom cultivation, Tamil Nadu has 8,065 hectares. The cardamom board which has successfully got nearly all cardamom holding to be registered under it should now turn its attention to extending the area and yield of this important crop.

SFDA :

The Small Farmers Development Agency reports that it has provided 65,000 small and marginal farmers Rs. 1.56 crores in agricultural inputs, helping them to use available technology and to practice intensive activities and diversify their activities. During the 9 months, April-December 1976, it has spent Rs. 14.46 lakhs on animal husbandry and Rs. 3.15 lakhs under agricultural schemes. It has assisted land levelling minor irrigation, provision of improved seeds, fertilisers, pesticides, plant protection, tractor and bulldozers at concessional hire charges, supply of bullocks, milk animals, sheep and poultry units. Farmers' sons have been given free training at ITI and also financial assistance for self-employment.

Dairy Farming :

The Tamil Nadu Dairy Development Corporation for 1975-76 recorded a turnover of Rs. 13.18 crores and a net profit of Rs. 25 lakhs—the first profit. The Ambattur Dairy in collaboration with Surgical Instruments Factory has devised a milk dispenser which can be moved up as a mobile tanker. The Corporation markets in Madras 2 lakh litres of milk per day through 543 retail points. 50,000 litres were marketed in Madurai and the surplus in Madurai converted into milk powder through its 80,000 litre milk powder plant which has been working to full capacity since December 1976. During 1977, the Corporation will step up its sales to 2.50 lakh litres in the city and set up 50 new milk booths. The Corporation has maintained milk prices at a constraint level for 2 years, which has also had a stabilising effect on private milk vendors. Three large chilling plants each with a capacity of 10,000 litres, which can be expanded to 20,000 litres are being constructed at Acharapakkam, Dharmapuri and Theni will be ready for functioning by April. The Corporation has also approved for the Erode Milk Producers Union the setting up of a feeder balancing dairy at a cost of Rs. 2.31crores, two chilling plants (Rs. 22 lakhs) and one cattle feed plant. Under the Western Ghats Development Programme a modern cheese plant is being established in Kodaikanal. Also two dairies are being set up at Salem and Jolarpet. The Corporation which relies for the bulk of its milk supply on buffaloss is now turning to improving the cows as the possibility of further improvement in the buffalo strain is limited. A good start has been made in cross breeding cows with exotic high yielding breeds. 65 heads of such high yielding types of Jersey and Friesian arrived in Madras in mid February under the Danish programme, of which 20 Jersey heifers are for the Corporation and are being stationed in its nucleus farm in Ootacamund. Also the Corporation is implementing a special calf rearing programme sponsored by the Union government to preserve and nurse the better quality calves upto their productive age. One area where the Corporation can do pioneering work is in demonstrating the value of fresh fodder in increasing milk output at low cost. The Corporation should intensify its programme for fodder cultivation in co-ordination with the Departments of Agriculture and Animal Husbandry.

Fish Farming :

There are large possibilities of developing inland fisheries in brackish water at the State and Country level. The brackish water farm of the Tamil Nadu Fisheries Wing at Adyar demonstrates the large potential of brackish water farming, both mono and poly culture operations. Brackish water fishery uses less fertilisers, artificial feed and other inputs and at the same time produces a better variety of exportable fishes. A workshop in Madras in February has drawn up a programme for the State and Country becoming self-substaining in fish seeds and providing fish supplies to rural consumers at low prices. This work plan now needs to be executed by the Tamil Nadu Fisheries Corporation and Co-operative and private agencies in the State.

Tea :

1977 looks like being another good year for the tea industry. North India harvested a crop of 11.2 million kg. in December 1976 as against 9.1 million kg.

in December 1975. The total North Indian production for the season 1976 was 400.6 million kg. which was a gain of 20.0 million kg. over the previous season. South Indian tea production for the seasons was 100 million kg. compared to 92 million kg. for the previous year. With these 3 good years in succession and the continued buoyancy of the industry, the target of 1,000 kg proposed for 2001 AD is not an unfeasible one. As against the past 25 years annual increase of one per cent, if the next 25 years produces an annual average increase of 1.5 per cent the target can be attained. 30 per cent of the 3,61,000 hectares now under tea plantation needs replantation which would reduce the increased production needed to 146 million kg. Then 67,000 hectares are the new extension plantations which will yield 167 million kg. The 500 million kg. now produced will increase by 187 million kg. Thus the 1,000 million kg. can be attained. This will call for a total financial outlay of Rs. 1,000 crores or Rs. 40 crores a year—in the last 2 years of the Fifth Plan only a provision of Rs. 12 crores has been made. For replanting 1,10,000 hectares Rs. 308 crores will be needed, for extension of 67,000 hectares Rs. 201 crores will be needed and for renovation, construction of new factories, modernisation of existing factories, staff and labour housing and other infrastructure Rs. 479 crores will be needed. To finance this Rs. 1,000 crores, $\frac{1}{3}$ should be generated by the industry, $\frac{1}{3}$ by reduced taxation and $\frac{1}{3}$ by government and financial institutions. This outline needs to be examined by the government, banks and tea industry sincerely and urgently acted upon, if this major foreign exchange earner and domestic consumption item is to be developed along its potential. At the world level 120 delegates from 71 countries met in Geneva from the end of February as a follow up to the Rome discussions in April 1976 (see Vol VI p 588) for the development of an International Tea Agreement. A 5 day meeting was held of 20 producing countries, India, Sri Lanka, Bangla Desh, Tanzania, Kenya, Uganda, Malavi, Zaire, Mozambique, Cameroon, Argentine, Brazil, Turkey, Iran, Papua and New Guinea—from February 14, followed by the FAO Inter-Governmental group of Tea from February 21 including the major consumers—UK, US, Australia, Canada, EEC, Egypt, Pakistan. The results of these meetings will be reported in the next issue.

Coffee:

In February the international price of coffee rose even higher (see last issue p 158) by £ 3,211 a tonne. Renewed physical offtake, continuing high producer prices and tight supplies were given as the reason for the rise which also contained a speculative element. In the country, a survey conducted by the Coffee Board shows that 40,000 acres are suitable for coffee cultivation in different parts of Andhra Pradesh. On the basis of this study and the plans, for expansion of coffee areas by the Forest Department, Girijan Co-operative Corporation and other land colonisation scheme, the VI Plan should see at least this area of coffee growing extension in Andhra Pradesh. The Coffee Board should provide the demonstration farms and advisory services for this expansion. With the suitable agronomic and climatic conditions, Minimullur is now producing 500 kg. of coffee per acre and the tribal areas 300 to 400 kgs. per acre. Coffee growing in these areas will be both economical and employment generating. The Coffee Research Station at Chinta-

palli should help accelerate and improve coffee growing in the area.

Rubber:

Rubber production in 1976 was 1.5 lakh tonnes,—making India the 5th largest producer of natural rubber in the world. 67 per cent of rubber planters are small planters, who need a better price to stimulate their production efforts and keep them in employment. Also research into various aspects of rubber by CSIR should be stepped up in order to expand the internal demand for rubber.

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III Industrial Development

Salem Steel:

The on again, off again signals for Salem Steel started once more in February with 4 despatches from New Delhi. At the end of January it was reported that the Board of Directors of SAIL had approved the detailed project report for Salem and the release of funds immediately for the implementation of the project. In mid February it was reported that the Union Cabinet was about to decide the first phase of the 70,000 tonne plant including work in the first phase estimated to cost Rs. 116.18 crores. Now with the intervention of the Lok Sabha elections, the decision will not be made until the Budget for the coming year, 1977-78, is formulated.

Neyveli :

Also in February, the State government announced that the Union Planning Commission had approved a detailed investigation of the second mine cut project at Neyveli immediately. A sum of Rs. 1-1.50 crores has been allocated for this investigation to be completed in two years, which will assess the availability of lignite deposits and the pressure of water which should conform to international standards. The Neyveli Lignite Corporation reports that due to an increase in production—during the first 10 months April 1976-January 1977, power generation increased by 30 per cent, fertiliser production by 75 to 93 per cent, and lignite production by 40 compared to the first ten months of the previous year. It will register the first profit since its commissioning. It estimates that it will end the financial year, 1976-77, with a gross profit of Rs. 6.75 crores against a loss of Rs. 4.28 crores during the previous year. It also announced a reduction in the price of urea by Rs. 100 per tonne from February 4. It announced a lower price for Leco from March 1, the reduction ranging from Rs. 40-50 per tonne.

TIDCO :

TIDCO has decided to pull out of the joint sector project, Tamil Nadu Rubber, and turn it over to SIPCOT. Incorporated in 1972 and issued an industrial license in 1974, the capital cost which was originally established at Rs. 3.65 crores, including Rs. 10 lakhs for land, Rs. 35 lakhs for building and Rs. 3.20 crores for machinery, is now estimated to cost Rs. 25.30 crores. The project with an annual capacity of 3 lakh numbers each of automobile tyres and tubes is off to a slow start. As at February, 200 acres of land in Ramanathapuram for Rs. 2.03 lakhs have been acquired, the main factory buildings expected to be completed in the first quarter of 1978 and the project commissioned in the second quarter of 1978. So far orders for indigenous machinery for Rs. 7.18 crores and for imported machinery for Rs. 4.11 crores have been placed. In addition to the State government share capital of Rs. 36.48 lakhs and a Malaysian Indian contribution of Rs. 40.50 lakhs, IFC sanctioned a loan of 91 lakhs, including a foreign exchange component of Rs. 41 lakhs. IDBI has committed Rs. 4 crores in loan and other foreign exchange loans are being negotiated with foreign commercial banks.

B and C Mills :

B and C Mills reopene 20, after over a month's intense negotiations. The problem was the financial viability of the mills. The mill has an over draft with the State Bank of India for Rs. 27 crores, it needs Rs. 45 crores for modernisation and Rs. 5 crores to restart operations. IDBI offered Rs. 3 crores and the State Bank Rs. one crore, provided the wage structure was revised and rationalised. This involves : (a) not paying wages in full for the period when the mills were closed, (b) relating wages to productivity, and (c) taking on most of the 13,000 workers but in a phased manner. Prolonged negotiations between the banks, the governments, the management and labour resulted in agreement under which the government has appointed a manager to run the mill, the banks a financial director and the re-employment of the workers being effected in phases. On the first day, February 20, 2,300 workers were taken for the first shift, 1,300 for the second shift and 1,300 for the third shift.

ACCI :

The Alkali and Chemical Corporation of India commissioned at Ennnore its Rs. 12 crore project for the production of pesticide and bulk drugs and formulations. The unit will have a foreign exchange impact of Rs. 8 crores through import substitution and direct exports. The products of the Ennore plant will include gramaxone, a sophisticated broad spectrum herbicide and specially pharmaceuticals like drugs for coronary heart diseases, a preferred anaesthetic and a drug for control of epilepsy. With the opening of this plant, it becomes the first major integrated pharmaceuticals plant in the country private sector for the full chain from the basic chemicals to the finished product.

TDF :

The Tamil Nadu Industrial Investment Corporation has called the attention of industries in the State, particularly those assisted by the Corporation to the facilities available to them under IDBI's Technical Development Fund (TDF) which provides rupee funds to those who need them to

use their import licenses. TIIC has explained that maximum assistance would be the rupee equivalent of the foreign exchange of the license held by the unit. In some cases, the import duty might also be financed under the scheme. The scheme has been extended to benefit core sector units such as iron and steel, non-ferrous metals, electrical equipment, telecommunications equipment and the transport sector.

Small Sector Industry :

In February, the government announced that small scale industries registered in the State will be given a 15 per cent price preference, in respect of purchases made by its departments, public sector enterprises, autonomous bodies and other bodies where the government has controlling interest. This should have a substantial effect in the promotion and development of small industries in the State. In a further development, the Union government has, in addition to the 28 backward taluks in Dharmapuri, Madurai, North Arcot, Ramanathapuram and Pudukottai districts, declared four more taluks—two each in Dharmapuri and Ramanathapuram districts—as areas eligible for the 15 per cent grant subsidy for new industries started in these taluks.

Textiles :

SIMA reports that 190 mills in the South produced in December 1,06,570 bales of 180 kg. each of cotton yarn and cotton blended yarn. This was 11 per cent lower than the normal production of the mills. After allowing for yarn consumption by the composite mills, the estimated yarn available for the handloom sector in December was, 83,570 bales of 180 kg. each.

Handloom :

In order to relieve the glut in handloom stocks, the Union government has sanctioned Rs 3 crores to the Tamil Nadu Handloom Weavers' Society (co-optex) to procure stocks of handloom cloth accumulated with the primary weavers co-operavtives, so that handloom weavers and co-operatives can continue production. Also the Union government sanctioned in February Rs. 78.32 lakhs as its share towards the special rebate on sale of handloom cloth during the period December 1975 to February 1976, to be used by co-optex and the primary societies to purchase accumulated handloom cloth. The State government in its turn sanctioned Rs. 78 lakhs to co-optex and the primary societies towards the rebate amounts due to them. This means that todate a total of Rs. 453 lakhs have been made available to the co-optex and primary societies for liquidating their stocks.

Leather :

As noted in the last issue (p 162), exports of leather and leather products for 1976-77 are running at Rs. 300 crores. The industry needs machinery for leather processing and finishing, improved quality of hides and skins and sound and reliable market intellingence for its growth. Another problem facing the industry is effluent treatment. The industry feels that it is a sewage problem which should be dealt with by municipalities and corporations and the capital cost of effluent treatment of plants should be met by government. The government, on the other hand, has taken the position that it cannot give tanneries grants for putting up effluent treatment and pollution control plants and the units should get bank finance for this purpose. The issue

is urgent and can be solved by government sharing the cost with the industry. It has been estimated that by 1979 the tanning industry will need 14,600 more semi skilled workers, 18,000 skilled workers, 10,000 maistries, 1,200 supervisors, 300 quality controllers, 250 managers and 60 production managers.

TIIC announced the grant of Rs. 4.28 crores loans to 47 leather units—to augment their capacity for processing hides, skins, semi-finished leather, finished leather and manufacturing leather products. Since most of the units are in backward areas, the loans carry an interest rate of only 9.5 per cent.

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IV Education, Science and Health

Educational Reform :

Continuing the national consensus research through the efforts of NCERT culminating in national conferences on (a) the 10 year curriculum, (b) the vocationalisation of the higher secondary state (+ 2), and (c) the inventory of priority educational research themes, the NCERT has helped in a similar national consensus on teacher education in the country. At a conference in New Delhi in February, agreement was reached on teacher education covering teacher training for pre-primary and renovated primary education, for B. Ed. course to be an integrated post secondary 5 year course or a one year post-graduate course, for 25 per cent of the time of the student trainee to be spent on community service and works, and the programme at all levels to be semesterised and the evaluation systems reformed. At the State level, the government has decided that in addition to the 468 high schools, in a further 220 high schools in internal assessment scheme will be introduced. Under the scheme all parts of a students personality and attainments, such as character, interests, attitudes, health and co-curriculum activities are assessed. Special training courses for the teachers are being conducted in 11 centres on the internal assessment scheme. One of these courses has suggested that mode question papers in the new syllabus should be developed and circulated among all the schools. The development of the paper is not only a good preparation for the examinations when the new tenth standard is introduced next year, but also will clarify the subject for the teacher who sets the model paper and has also to produce the model answers. One problem that the students from central higher secondary schools face is that the Central Board of Secondary Education has permitted only 3 out of 22 higher secondary schools in Madras City and 52 schools in the State to open the 11th standard. To prevent students passing the 10th standard this year being stranded, the Board should permit more of its higher secondary schools to open the 11th

standard. The government also announced in February an increase in the monthly scholarship amounts from Rs. 50 in the mofussil and Rs. 60 in the city to Rs. 55 and Rs. 70 respectively for scheduled caste and tribe students doing technical courses and to these students and those from backward communities doing PG courses in co-operation, rural sociology, community development and health education in Gandhigram, and industrial engineering in PSG college of technology, Coimbatore. Each elementary and secondary school in the State has instituted prizes for the most well behaved student in each class, based on the qualities of honesty, devotion to studies, punctuality, co-operation, obedience and regularity. Also the State government has launched in the districts a nutritional programme to prevent blindness among children through the supply of vitamin A. The real remedy of course is nutritious and adequate diet. NCERT also announced in February a new national science talent-search at the end of class X, under which any student in class X will be eligible to take the 3 hour objective type questions and those winning the scholarships can pursue any course at the plus 2 stage and opt later for basic sciences, social sciences and agricultural and professional courses holding their scholarships right up to the Ph. D. level, subject to periodic revaluation. The President of the Republic announced the National awards to 98 teachers on the basis of their academic efficiency, reputation in the local community and interest and love of the children. 10 of the awards are for teachers in this State.

Satellite :

The second satellite to be launched in 1978 from a base in USSR will weigh 9.420 kg. and will be placed in semi-circular orbit 500 KM from the earth. The new satellite will be similar to Aryabhatta but will be equipped with different instruments to study the earth's surface. India has obtained agreement of the International Telecommunications Satellite Organisation (INTELSAT) for the location of the Indian Satellite in the geostationary orbit over the Indian Ocean The location fully meets the requirements of telecommunications, meteorology and television services that are to be provided by INSAT. Parallelly delegates from 100 countries signed an international agreement on February 14 at ITU, Geneva sharing the orbits over the equator and broadcasting frequency for satellites in every region of the world except North and South America, whose countries will have to reach agreement on a similar sharing. On February 25, the second satellite communication earth station of the overseas communication service was inaugurated, involving an exchange of T. V. relays via satellite between France broadcasting a ballet and India a Bharatha Natyam performance, and a six minute feature in which the Prime Ministers of India and France exchanged greetings.

Technical Education :

A study of the 1975 entrance examination to the IITs shows that 90 per cent of successful candidates were from urban areas and 66 per cent from English medium schools. In Bombay IIT, 94 per cent were from the urban area and in Delhi IIT 97 per cent. For scheduled castes and tribes students for whom there were separate merit lists with reduced minimum qualifying marks, only 3.8 per cent of the candidates who sat for the

examination were from this group and the successful ones 3.5 per cent of the total who succeeded, with Kharagpur having the largest and Madras the smallest number. About 50 of the students from this group come from rural areas. Hence the success rate is 1 : 15 for urban, 1 : 30 for scheduled castes and tribes and 1 : 60 for rural candidates. A high power 7 man committee has been set up to examine the causes and suggest remedies for this urban bias of the IIT entrants. There is a question, however, in this case, as to whether there should be equalisation of rural and urban entrants, as IITs are the one institution which cater to the urban industrial complex and structure of the country.

Science :

An Advanced Centre in Material Sciences to push R and D in electronic and magnetic areas and composite and new building materials has been established in IIT, Kanpur with an initial grant of Rs. 11 crores from the Union government. To begin with, the Centre will implement the R and D projects, such as ceramic materials, composite materials, carbon fibres etc., which are part of the national S and T Plan. Several new industrial units are likely to be developed on the basis of the results of R and D at this Centre. In regard to instruments repair, which is an important need, it can and should be dealt with by Universities, IITs, and CSIR Laboratories for their own instruments: the National Physical Laboratory, New Delhi with its specialised departments of Heat, Electricity, Electronics, Optics, Mechanics, Magnetism, Vacuum, glass blowing and Chemistry can deal with instruments breakdown which require a multidisciplinary approach. NPL has used this multidisciplinary approach in its service for its own as well as for medical instruments and those of other science based institutions in the locality. NPL trains local people in the work that it undertakes and being the only legal calibrating authority in the country, can operate these services on a daily basis. It also provides a buyer's guide for all important Indian made instruments, including the address of the manufacturers and deals in each type of instruments in the country. Its analysis of 1,000 imported instruments brought to it for repair shows that 10 per cent defects are due to users, 30 per cent called for skilled adjustment, 25 per cent needed spares made in India, 20 per cent needed imported spares and 15 per cent had to be returned because it has outlived its usefulness or was defective. In nuclear research, BARC has called attention to the safety for human consumption of irradiated food items—wheat, potatoes, chicken, papayya and strawberries. Also nuclear tools can be used to achieved optimum production through nitrogen fixation without increasing application of energy intensive chemical fertilisers and also for pest management. On new sources of energy, a UNIDO symposium calling attention to solar energy being free, inexhaustible and non-polluting and a means of conserving the world's dwindling reserves of oil and natural gas is of the view that within a decade solar energy will become economically feasible if its conversion equipment can be mass produced with western technology. For instance, solar energy can be used to operate pumping stations in 3,50,000 villages in the remote areas of India. In agricultural research ICAR has identified 3 research gaps and 10 research constraints as follows: (a) the gap between the yield possible in theory and the best yield

actually achieved, calling for removing the factors, that come in the way of achieving in the field the laboratory results: this is called the research gap: (b) the gap between the best yield obtained in a research farm and that by a good farmer, called research cum management gap to be covered by attention to soil fertility, water management and pest control: (c) the gap between the best average yield of a progressive farmer and the average State-wide yield, called the extension gap, to be met by development, extension and research agencies. As far as constraints are concerned gaps in technology, and soil health, improper water management, inadequate plant protection and poor post harvest technology are biophysical and technological constraints. Lack of credit, inadequate inputs, uncertain markets and prices, lakh of institutional infrastructure and socio-cultural problems are the socio-economic constraints. It is proposed that an interdisciplinary team comprising an economist, an extension scientist, a statistician, an agronomist, and a plant protection expert undertake a study of the gaps and constraints, covering not only the major crops but also animal husbandry and fisheries and by areas. Another priority area of research in 1977 will be contingency planning and alternative cropping strategies for flood, drought and cyclone prone areas.

Health :

The Union ministry of Health announced in January that for the first 9 months April to December 1977, sterilisations had passed the 7 million mark which is in excess of the target for the entire year. WHO announced in February that it is co-operating with the government in controlling malaria and is helping in the research for a vaccine which will immunise people against malaria.

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V Employment

About one lakh workers in the Tamil Nadu Electricity Board will have a pay rise from December 1, 1976 ranging from Rs. 20 to Rs, 50 and all casual workers are to be made permanent. The government has also decided to increase the number of old age pensioners in the State by 6,500, bringing the total to 56,500. In may TIIC reports that during the year February 1976 to January 1977 it sanctioned a total loan assistance of Rs.133.33 crores to 426 industrial units for the unemployed, for small scale units by technician entrepreneurs, for units in the backward areas and for transport operations. At the Union level, the Railway ministry announced in February the decision to finance unemployed graduate dependents of railway employees for opening bookstalls at railway stations.

For this purpose a loan to the extent of Rs. 3,000 is to be given from the Provident Fund to the employee. Besides SBI is also planning to finance any unemployed graduate upto Rs. 5,000 for opening a bookstall at a railway station. The Railway in its turn has decided to allot all bookstall contracts at new stations and new platforms to unemployed graduates and as a further incentive charge only a nominal license fee of Rs. 50 per year during the first 3 years, with exemption from paying any royalties on the sales turnover. The Union ministry of labour reported that 1,400 industrial units have introduced the scheme of workers participation at the shop floor and plant level, which have discussed the achievement of production targets, increasing productivity, removal of production bottlenecks, provision of safety and welfare amenities and improving working and living conditions. The government announced in February a new scheme of workers participation in management in commercial and service organisations in the public sector employing at least 100 persons.

Management decisions have been influenced by behavioural scientists research, stressing the need to make fuller use of the latent potential of the workers through management methods based on the assumption that the average worker is willing to accept responsibility, and will respond to the opportunity of using his intellectual faculties. Another research concentrates on a study of worker motivation, the design of jobs and job enrichment that follows from participative management. These are being applied gradually to our industrial scene. On workers housing, starting with BHEL, the government announced a scheme in February under which workers in public sector units who occupy a house in the project townships can purchase from his Provident resources. To date the government has invested Rs. 250 crores in such workers housing schemes. Under this programme, the worker will not be left houseless when he retires from the factory. The amount paid by the worker from his Provident Fund will be ploughed back into further workers housing schemes.

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VI Other Items

Viswa Bharathi :

Viswa Bharathi University, Santiniketan had its annual convocation on February 19. Besides graduating some 600 candidates on the occasion, the plans for the development of the university both along lines conceived by Tagore and to meet the challenges of the present day were discussed. Apart from its unique programmes of higher education in the performing arts, and in sinology, the University has extended and expanded its economic development and extension work in Sriniketan. Through that centre, 25 villages are being covered in agricultural extension, health, weaving and spinning and adult education. Means

of strengthening the programme through links with the Union government's intergrated Rural Development and Non-Formal Education programmes are under discussion.

Medical Education—Stanley Medical:

A one day seminar in early February was organised by the World University Service on reform of Medical Education. The main discussion was concentrated on undergraduate medical education—the objective of that education to be community medicine, the translation of that objective into a curriculam which stresses the behavioural sciences as much as the basic sciences, and the need for the teachers to be trained in the techniques and art of teaching. Also the question of Medical Education and Health Commission and the need for a Medical University to guide education along these new lines were stressed.

NCERT:

During February, there were two NCERT events. One was the national conference on teacher education, referred to earlier, which had been prepared for a period of over 3 years by the National Council of Teacher Education. The major outcome of the conference was an outline for the reform of teacher education by the Universities and the State governments. The other was the meeting of the working groups which finalised the new text-books on our government (Civics) and our economy (Economics) for the new Tenth standard of the High-school. These texts were produced by distinguished professors in their fields.

Family Planning Foundation:

A meeting of the Advisory Committee of the Family Planning Foundation was held in February at which an inventory of projects in the field of Health, Family Planning and the various technologies were reviewed as a means of attracting outside funds from the united Nations system and some of the private foundations. The most important projects were those in the bio-medical field, where a research break through could make an important difference to the efforts in the area of family planning in the country.

IAPL and EI and Tamil Nadu Board of CE:

A meeting of the new executive Committee of the Indian Association for Programmed Learning and Educational Innovation was held in Delhi on February 18. The Programme of the Association for 1977 was discussed and it was decided to support the seminar on computer assisted instruction at Ahmadabad and workshop on the evaluation of educational innovations in India at the Indian Institute of Education, Poona. In addition it was decided to bring out the journal twice a year and other publications as appropriate. The means of strengthening the membership and finance of the Association were also established. The Executive Committee of the Tamil Nadu Board of Continuing Education met in February and reviewed and approved the programme, the staff appointments and vacancies and set up a committee to examine an offer of a property made to the Board. Also a meeting of the Governing Council of the Resources Centre of the Board met at the end of February and received a report on the discussion between the

President and the Union government on the conditions attached to the grant of Rs. one lakh made by the government. It authorised the opening of an account and the running of the Centre as per plans.

College Days:

February is the traditional month of the College Annual Day. During the month college days were celebrated by the Vaishnava College for Women, Chromepet, Hakeem College, Melvisharam, Arignar Anna College for Women, Wallajapet, Auxilium College, Katpadi, Quaid-e-Millat College for Men, Meenambakkam, Santhalinga Adigalar College, Porur and Stella Maris College, Madras when the progress of higher education in the colleges, the plans for the coming year and the reforms in curriculum, community and social service, semesterisation and examination reform were reviewed and favourably commented upon.

University Events:

The University Departments of Indian History and the Indian History Congress jointly sponsored in the Madras University a seminar on the problems of social history. The importance of modern social history and some of the questions that it gives rise to were stressed. There was a University celebration congratulating the NCC team which won the All India prize on January 26 for the Fifth time and the importance playing for playing and playing for winning stressed. Another event was organised by the University Union to felicitate the five men and women teams who won the first place in inter-university competitions—in chess, cricket, tennis, table-tennis and shooting. Also in February there was the first meeting of the 4 Chairmen of the 4 task forces of the undergraduate review commission to co-ordinate their work before the meeting of the Task Force. Two of the Task Forces—in Foundation and Core-Courses—were held at the end of February. There was also the first meeting of the Commission on higher education for women in February when the major tasks and the work programme of the Commission were established. A meeting of the principals of 32 colleges who are eligible for UGC Fifth Plan grants but who have not submitted programmes for them was held in February to orient the colleges to make the grant applications to UGC. The Syndicate held its monthly meeting and reviewed and approved the recommendations of the Board of Studies for the revised semesterised courses.

March Madras Development Seminar:

The paper for the March Seminar, Agricultural Perspectives," by Dr. M. Srinivasan, Research Specialist, Madras Institute of Development Studies, together with a summary of the discussion of the paper at the Seminar on Thursday, March 31, under the Chairmanship of Mr. R. Ramanujam, Prof. of Economics, Vaishnava College, appears as the first article.

Second Article:

A paper, "Some Facts Behind Agricultural Policy," appears as the second article.

AGRICULTURAL PERSPECTIVES IN THE SIXTH FIVE YEAR PIAN OF TAMIL NADU

By

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INTRODUCTION

As stated in the Approach paper presented at the February Seminar what is attempted here is the "Second Best Approach to planning" as regards agriculture. It is clear that ownership of the means of production in the agricultural sector in India is an almost impossible task, unlike in Soviet Russia in 1928. Firstly in the latter a small number of kulaks alone had to be tackled in the 1920s confronted by an army of serfs, though later the collectivisation of the 1930s under Marshal Stalin led to purges, bloodshed and untold loss of human life. Secondly, such a structural transformation will entail a huge amount of compensation under Indian conditions since outright expropriation cannot be thought of in a democracy. Thirdly, there is no guarantee that State farming is necessarily efficient and will deliver the goods. I was asked by the Director of agriculture some years ago to visit all the Agricultural Research Stations and State Seed Farms to ascertain why they were incurring persistent and recurring losses every year. Besides, in Soviet Russia there is no alternative model or free market mechanism to judge the efficiency of kolkhozes also the losses are borne by the nation and do not affect the pockets of individuals unless it be through increased taxation to recoup the losses.

Indian planning has to contend with innumerable production units in agriculture and in the absence of crop planning has to work through existing production units as stated in the Approach paper. It turns out to be a procedure which puts a high premium on rigour with low priority to realism. The human factor plays a decisive role in any planning and particularly farmers in India who form the material which has to be tackled. Farmers in India are mostly ignorant, engendered by poverty and with some habits which die hard and some ideas which are fixed. Thus in Tamil Nadu and elsewhere farmers readily follow recommendations relating to crop practices except with regard to seed rate but do not accept regulation of water, its equitable distribution and scientific management notwithstanding the special on-site demonstration managed by the owner farmers themselves with the technical guidance of the extension personnel. Farmers go back to their fields and to the traditional ways of perennial flooding or "wild flooding". Legal sanctions appear to be the only way out.

Similarly in the Lower Bhavani Project Area and the Right Bank Canal Area of Nagarjunasagar the problem of irrigated dry crops has been there for a long time particularly where such crops come con-

tiguous to paddy crops in the localisation. The temptation to convert such lands into wet cultivation is irresistible and this is done under some pretext or the other. Unless this is resisted firmly it would not be possible to supply water to the full area.

These points are made to illustrate the obstacles to planning posed by the human material in a democracy. Only widespread adoption of the intensive "Banor" system of extension may provide a long-term solution. Under this system 80 per cent of the Village Level workers are withdrawn from block work and put in charge of agricultural extension of 800 to 1,000 farmers in a compact area. Each VEO selects ten per cent of them as contact farmers who will carry out demonstrations in their fields and explain the intricacies of the new operations to their fellow farmers. Planning in a predominantly agricultural country like ours has to face uncertainties posed by the weather and actions of farmers which may upset all calculations. Even in Soviet Russia agricultural production upset the apple cart under Premier Khrushchev and the Great Leap Forward in Mainland China ended disastrously as agriculture played truant.

Thirdly the Approach Paper made a reference to the Market mechanism and Information and Control mechanism and the laws of supply and demand. Unfortunately since 1943 when the Gregory Committee reported and after 1957 when the Ashok Mehta Committee dealt with this question the agricultural front has been dominated by procurement price, issue price, zonal restrictions, movement control, State trading in foodgrains, levy price and plethora of restrictions and curbs and the markets for foodgrain pulses and sugar have not been allowed to operate freely. Similarly demand has been curbed by statutory and informal rationing for foodgrains and now even for groundnut oil. Hence in what follows these limitations have to be borne in mind. Broad trends and what is essential for the economy on the agricultural front have been indicated for the period 1977-1984 but it does not necessarily follow that developments will proceed on these lines bearing in mind the social, economic and political constraints which hamstring the economy.

TAMIL NADU AGRICULTURE—A PROFILE—1950 to 1975

The total area of Tamil Nadu was 12,997,000 hectares in 1974-75 according to Professional Survey of which 5,553,000 hectares or 42.7 per cent is presently cultivated 437,000 hectares were cultivable waste land 702,000 hectares uncultivable wasteland and 1,966,000 hectares under forests. Of the total cultivated area of 5,553,000 hectares, 1,083,000 hectares was cropped more than once. Thus the gross cropped area was 6,636,000 hectares of which 4,948,000 hectares was under food crops and 1,688,000 hectares under non-food crops.

Tamil Nadu had a population of 41.1 million according to the 1971 Census, which constituted 7.5 per cent of the country's population. The State contributed 8.8 per cent of the National Income in 1969-70. Agriculture accounted for 48 per cent of the State's net domestic production in 1974-75 and contributed 8.6 per cent to the country's income from agriculture.

Rice is Tamil Nadu's most important food crop. It has a weight of 41.4 per cent in the State index number of agricultural production. Foodgrains have a weight of 55.8 per cent in the index number of agricultural production in Tamil Nadu. Sowing 76 per cent of the area under food crops is too imbalanced to bring in economic prosperity to the State. Now that Tamil Nadu has attained self-sufficiency in cereal/food grain requirements it has to plan and augment the production of other commodities to meet the needs of the State and to increase the income from unit area of land and that of the farmer.

During the twenty five year period 1950-51 to 1974-75, rice production increased from the base level of 19.5 lakh tonnes to 5,589,000 tonnes in 1973-74 and 4,166,000 tonnes in 1974-75. Foodgrains production rose from 31.63 lakh tonnes in 1950-51 to 73.25 lakh tonnes in 1973-74, and 50.71 lakh tonnes in 1974-75. The achievement is stupendous due to the impact of the High Yielding Varieties Programme in most of the foodgrains. Foodgrains production registered an average compound growth rate of 4.0 per cent per annum from 1950-51 to 1960-61 and 2.7 per cent per annum from 1960 61 to 1970 - 71. The area under foodgrains increased from 40.7 lakh hectares in 1950 - 51 to 43.52 lakh hectares in 1974-75 registering an average compound growth rate of 1.3 per cent per annum. The main increase in production of foodgrains has resulted from increased productivity of rice which registered an average compound growth rate of 3.4 per cent per annum from 1960-61 to 1974-75.

Rainfall and Irrigation

The total average rainfall in the State is 945.7 millimetres of which 307.3 millimetres are recorded during the South West Monsoon (June to September), 449.7 millimetres during the North East Monsoon (October - December), 50.9 millimetres during the winter period and 139.8 millimetres during the hot weather period. This accounts for a total precipitation of 1,22,967 million cubic metres of water. Of this one fifth penetrates into the deeper layers of the soil. The annual rechargeable ground water potential of this State is estimated at 12 million acre feet. Of this the present extraction is only three million acre feet. If we fully extract the available ground water resources all over the State we will be able to irrigate an additional area of 5.51 lakh hectares of land.

In 1974-75 the net area under irrigation was 2,438,000 hectares and 2,816,000 hectares in 1973-74, area irrigated more than once in the same year 595,000 hectares in 1974-75 and 858,000 hectares in 1973-74 and total gross area of crops irrigated was 3,033,000 hectares in 1974 - 75 and 3,674,000 hectares in 1973-74. The percentage of area of crops irrigated to total cropped area was 45.7 per cent in 1974-75, 48.0 per cent in 1973-74. 886,000 hectares were under canal irrigation—34.3 per cent of the area, 594,000 hectares under tank irrigation—38.4 per cent and 981,000 hectares —27.3 per cent under lift irrigation in 1974-75, the total number of wells being 1.4 millions. It was estimated that 95 per cent of the surface water flow in the rivers of the State had already been harnessed and 60 per cent of the ground water had been extracted and utilised for irrigation. 2,028,000 hectares in 1974-75

and 2,485,000 hectares in 1973-74 or 70 per cent of the irrigated area in the State were under paddy cultivation for which 80 per cent of the total irrigation water was used (total cereals irrigated 2,696,000 hectares). Of the other crops under irrigation sugarcane covered 160,000 hectares, oilseeds 184,000 hectares, non-food crops 153,000 hectares, fruits and vegetables 90,000 hectares, condiments and spices 62,000 hectares and pulses only 11,000 hectares in 1974-75 (out of 618,000 hectares under pulses).

The scope for bringing additional areas of any large size under the plough was limited especially as only 14 per cent of the total area was under forests against the national guideline of one third of the area as optimum under forest coverage. Hence there is a need for an examination of the ways to bring about more efficient utilisation of water for irrigation and adoption of most effective and modern technology by farmers in the State. In our situation, it is important to examine whether there is scope for saving water without detriment to yields. This might be difficult in certain coastal areas during the monsoon season when the drainage of excess water becomes a problem. In most other areas where there was limited rainfall it would be possible to regulate the irrigation water for paddy crop without adversely affecting the yield. As water is a very important input and it is in short supply in Tamil Nadu the more efficient utilisation of water for irrigation has to be examined critically.

AGRICULTURAL SCENE—1974-75 and 1975-76

The severe set back on the farm front during 1974-75 had its origin in the delayed and ill distributed South West monsoon of 1974-75 and this together with the poor receipt of 177.5 millimetres of rainfall against the normal 449.7 millimetres during the North East monsoon season had aggravated the problem by placing the State in grip of a severe drought. Consequently the production of both dry and irrigated crops was adversely affected. Area under cultivation dropped significantly, standing crops had withered in certain portions of the cropped area and the yield rate was considerably lower in areas where the crops could be saved. Total production of foodgrains declined by 30.69 per cent from 73.25 lakh tonnes in 1973-74 to 50.77 lakh tonnes in 1974-75. Among foodgrains the fall in the production of millets by 49.41 per cent was more pronounced than the 25.46 per cent reduction witnessed in the case of rice. The decline in the production of commercial crops like sugarcane, cotton and groundnut was also considerable as each of them had registered a steep fall of more than 30 per cent in production over 1973-74. The index of agricultural production had also dropped by 29 per cent during 1974-75 over 1973-74 in contrast to the 7.9 per cent compound annual growth witnessed during the Fourth Plan period.

During *1975-76* the farm sector manifested signs of recovery. The timely onset of the South West monsoon and copious rains in the catchment areas during 1975-76 came as a boon to agricultural operations in the State. Supported by improved seasonal conditions it was programmed to intensify developmental activities through increased distribution of all the essential farm inputs. In addition to the extension of area under high yielding varieties, it was planned to distribute 8 lakh tonnes of

composite fertilisers and make available to the farmers 20.42 lakh litres of liquid and 0.56 lakh tonnes of dust form plant protection chemicals. Total production of foodgrains in 1975-76 is provisionally estimated at 77.71 lakh tonnes signifying an increase of 6.1 and 53.1 per cent over 1973-74 and 1974-75 respectively. This comprised 58.67 lakh tonnes of rice, 17.02 lakh tonnes of millets and 2.02 lakh tonnes of pulses.

AGRICULTURAL SCENE 1976-1977

There is a definite shortfall in the area under paddy cultivation this year owing to bad monsoon but the overall foodgrain production in the State is not likely to be affected significantly. Thus the per acre yield of the short term paddy (kuruvai) harvested had shown a 10 per cent increase over 1975-76. While the South West monsoon was inadequate the North East monsoon had brought copious rains and relief especially to the chronic drought areas in Ramanathapuram and Tirunelveli districts. There was a shortfall in the paddy area in the State but alternative cropping patterns have been evolved which is to the good and shows the resilience of our farmers. Cultivation of groundnut, pulses, millets or gingelly, whichever suited the soil, were recommended by the Department of Agriculture. As a result of this it is hoped to bring into cultivation an additional two lakh acres under groundnut as against the traditional 4.5 lakh acres in the State during the agriculture year 1976-77. The additional area likely under gingelly is 40,000 acres (normal area is one lakh acres). Pulses 1.5 lakh acres in rice fallows (conventional area 5 lakh acres). In Thanjavur district the extent covered under Samba and Kuruvai was 10.5 lakh acres, kuruvai alone accounting for 2.88 lakh acres as against the normal of 11.4 lakh acres. In Tiruchi district the total area under paddy was 3.6 lakh acres but this year paddy was covered over two lakh acres. The shortfall was due to lack of water supplies in the Pullambadi and other canals. In Pudukottai district out of 2.6 lakh acres normally under paddy 1.7 lakh acres had been brought under paddy this year. In Salem 80,000 acres had been brought under paddy cultivation as against the normal extent of 1.5 lakh acres. The total shortfall in paddy cultivation would be around three lakh acres in Thanjavur district and one lakh acres in all the other three districts thus showing how easily planning in the agricultural sector can be upset by the weather God.

13 out of the 15 districts in Tamil Nadu were in the grip of drought in 1976. In the southern districts it was so severe that even the hardy palmyrah withered. Yet rice stocks with the State Civil Supplies Corporation reached an all time record of 8.81 lakh tonnes. The State gave 62,000 tonnes to the Central pool and returned 52,000 tonnes of Thailand rice. In belt areas like Kanyakumari district rice now costs Rs. 2 a kilo as against Rs. 3.50 to Rs. 4 this time in 1975-76. Through the hard work of the farmers the 1976-77 target of 83 lakh tonnes of foodgrains of which rice constitutes 60 lakh tonnes has almost been achieved.

In Madurai district out of 3.85 lakh acres under paddy normally this year only 2.87 lakh acres was cultivated and to compensate the loss crops like cholam and cotton were raised. Bunch planting, close planting with high dosage of fertiliser and plant protection measures led to higher yields of 5.5 tonnes of IR-8 paddy in certain areas as against the normal 2.2 tonnes. In Tirunelveli district

the spread of the practice of ratooning the cholam crop may be considered significant.

WATER MANAGEMENT AND METTUR WATER

It is extremely unlikely that Cauvery water will be received in the same quantity as hitherto in the Thanjavur district, and a change in the cropping pattern is advisable particularly as regards Thaladi paddy unless filter points are utilised to augment the river water supply as in the Mayuram, Nagapattinam, Kumbakonam, Mannargudi, agricultural divisions. There is a move to constitute a Command Area Development Authority with a view to exploiting the rich ground water potential in Thanjavur Delta and it is proposed to energise 72,000 pumpsets in this district alone in the next ten years at the rate of 7,200 a year. Besides modernisation of the Cauvery channels will save some water.

Many farmers in the Thanjavur agricultural division have switched to groundnut-2,380 acres, maize-2,890 acres and ragi-1,742 acres. In pattukottai division also some paddy areas have been converted for growing groundnut-410 acres, maize-1,360 acres and ragi-355 acres. The maize area accounts for 4,740 acres in this district followed by 3,880 acres under groundnut in places where normally paddy is grown.

The State Ground Water Directorate feels that there is over exploitation of ground water resources in five districts—Coimbatore, Salem, Dharmapuri, Madurai and North Arcot. Since 50 per cent of the pending applications for power supply to pumpsets has come from these five districts the State Government is examining the problem of regulating and controlling further energisation of pumpsets in these districts. Thus the future picture that emerges is that of alternative cropping pattern in the Thanjavur district and planned water use in the above districts.

There are 37,000 tanks in Tamil Nadu with a total ayacut of 25 lakh acres. Barring 8,677 each of which has a command area of more than 100 acres and termed as major tanks and the rest are minor tanks with ayacuts of less than 100 acres each. The major tanks are looked after by the Public Works Department which has its schedule for keeping them in good trim. The minor tanks numbering 28,323 and catering to more than half of the total tank ayacut are maintained by the Panchayats. Many of the minor tanks are in a state of utter disrepair and their storage capacity has been very much curtailed. The size of the tanks has been reduced to half due to silt deposition. The catchment areas have been eroded leading to diversion of the run off away from the main tank. Irrigation efficiency in these tanks has declined to one fourth of what it was due to bad alignment of channels, weed infestation in the bunds and mal practices. A three pronged programme—desilting of tanks, protection from further damage and steps for better cultivation is deemed essential to bring the tanks back to full utility. The more formidable task of protecting the catchment area would involve soil conservation measures like contour bunding and vegetative covering in the sprawling stretch of sloping land on which the rainfall is drained to ensure that all the run off is led to the tank.

The irrigation channels in the ayacut have to be properly laid out to ensure

even flow to the last field. Outflo of water should also be regulated to avoid waste. All the conditions necessary for an in-built water management should be incorporated in the system of irrigation so that it will be easy for the whole ayacut to adopt a crop pattern suited to the storage in the tank obtained in a given year. Once such an integrated system offering sufficient latitude for change of crop pattern is stabilised, exploitation of ground water in the ayacut could be started by helping farmers to dig wells in their holdings. This would make it possible to utilise the water that percolates to the lower strata during irrigation, paving the way for conjunctive use of ground water and rainfall. The farmer, who had to satisfy himself with a single crop from the tank irrigation can raise crops throughout the year employing simple devices like mhotes operated by his own pair of bullocks. He would get twice or thrice the income that he now gets from the land and five to six lakh additional acres could thus be brought back to irrigation.

Water management has become an important subject and is likely to figure prominently in the Sixth Five Year Plan. The Tamil Nadu Agriculture department will be implementing a Rs. 12 lakh project for Operational Research on Water Management in Madurai district, the first of its kind to be taken up in the State. The three year project which is centrally sponsored will be operated in a compact block of 400 hectares in the Periyar River Command area. It will work out methods of water use which can maximise production per unit of this vital input. Besides investigating the scope for reducing the quantum of water used for paddy, the possibilities of growing other crops which can lead to higher productivity per unit of land and water and ensure better return to the farmer will be explored under the project. Studies will also be made on percolation of water in the field and seepage in transit from canals and the timing of irrigation for different crops.

The Department of Agriculture is already implementing a water conservation programme at Siddemahalli in the Thanjavur district which will ultimately cover 10,000 hectares. It has plans to take up a massive water management programme for irrigation tanks in the State to ensure best utilisation of this source on Command Area Development basis.

AGRO-CLIMATIC REGIONS OF THE STATE

Agroclimatically the State can be divided into seven regions based on total precipitation of rainfall, its distribution, temperature ranges and soil type. They are:-(i) East Coast Region—Chingleput, North Arcot, South Arcot and Thanjavur has an average annual rainfall of over one thousand millimetres. The maximum area in this region is under irrigation.

(2) Northern Region—Salem and Dharmapuri districts receive 825 millimetres of rainfall spread over all the seasons. Only 20 per cent of the area has irrigation facilities.

(3) North West Region—Coimbatore district receives only 700 millimetres of rainfall. 34 per cent of the cultivated area is irrigated.

(4) East Central Region—Tiruchirapalli, Pudukottai and Madurai districts

excluding Palani taluk have an average rainfall of 850 millimetres half of it being received during the North East monsoon. 30 per cent of the area is irrigated and 70 per cent rainfed.

(5) South Western Region—Tirunelveli and Ramanathapuram districts receive 800 millimetres of rainfall chiefly through the North East monsoon. 35 per cent of the cultivated area is irrigated.

(6) Southern Region—Kanyakumari district gets the benefits of both the monsoons and receives an annual rainfall of 1,326 millimetres.

(7) Western Hill Region—Nilgiris and Palani taluk of Madurai is mainly hilly area and receives 1,891 millimetres of rainfall.

DRYLAND BELTS OF THE STATE :

Of these seven regions dryland farming is predominant in four regions.

(1) Northern Region—entire Dharmapuri district and taluks of Omalur, Salem, Attur and Rasipuram of Salem district comprising 1.2 million hectares have inadequate rainfall and are mainly under dryland farming conditions. In this region groundnut, castor, red gram, ragi lab-lab and cumbu and to some extent potato in Hosur taluk are grown at present. This area has a high potential where, with adequate research, great transformation in dry land farming can be brought about.

(2) North Western Region—Coimbatore district. The ground water table is very low. The co-efficient of variation of rainfall is very high in this area indicating that even this poor rainfall is unreliable. Palladam, Kangayam, Dharapuram and Udumalpet contiguous area is a typical dry belt area with a single crop being raised. Pollachi belt is favourably placed to receive rainfall from both the monsoons and two crops are being raised under rainfed conditions, with groundnut followed by a cereal.

(3) East Central Region—comprises Trichy and Madurai districts. More than half the area of Trichy district with 11 lakh hectares comprising the taluks of Musiri, Tiruchirapalli, Lalgudi, Kulithalai and Karur taluks and Kulathur, Thirumayam, Alangudi and Aranthangi taluks of the recently formed Pudukottai district have poor rainfall. Irrigation from Cauvery channels is available in portions of Musiri Kulithalai, Trichy and Lalgudi taluks. In Madurai district only Kodaikanal area enjoys a favourable, effective rainfall. More than half the district with seven lakh hectares consisting of the southern portion of Dindigul and the entire taluks of Periakulam, Nilakottai, Melur, and Madurai have poor, effective rainfall. Cholam, cumbu, groundnut and red gram are grown in this region.

(4) Southern Region — comprising Ramanathapuram and Tirunelveli districts has poor rainfall excluding small pockets adjoining the Western Ghats. The poorest rainfall in this region occurs in the eastern halves of Kovilpatti and Srivaikuntam taluks and northern half of Tiruchendur taluk. Even this rainfall has a very high coefficient of variation, aggravating the problem of cultivation. The cropping in the dry lands are late cholam, cotton and cumbu grown in large areas. Monoculture of cumbu is common in this tract.

The area dependent mostly on the South West Monsoon is different from that dependent on North East monsoon. Of these two categories of land,1,630,000 hectares of land receive more than 850 millimetres rainfall and hence are not seriously affected by drought conditions. Farming in these tracts, including the hill ranges of the Nilgiris, Palnis, Shevaroys, Javadi and Kolli is with assured rainfall whereas in the 2,576,000 hectares of area with less than 850 millimetres annual rainfall in the districts of Dharmapuri, Salem, Coimbatore, Tirunelveli and Ramanathapuram and in parts of Madurai and Tiruchirapally the farming practices are very much affected by the vagaries of the monsoons.

AGRICULTURAL PERSPECTIVES— 1977-1984 :

The second half of the past decade initiated the transformation of agriculture from a state of chronic stagnancy to one of substantial growth. In the context of a high rate of growth of population and limited resources the State is compelled to reorient its entire farm strategy. The age old farming practices should be transformed to suit the needs of the rapidly growing demands of its people. The strategy for future development of agriculture should aim at removing these constraints and maximise agricultural production, from unit area. The objectives of the Perspective Plan are :-

(1) Providing balanced diet to the growing population. Tamil Nadu produces enough cereals to meet the requirements of its population. In spite of spectacular advances of agricultural production and technology, Tamil Nadu was still facing the problem of acute malnutrition because of the low purchasing power of the people and the alarming rise in population. The problem of malnutrition is complicated by several factors including inequitable distribution of food and faulty food habits.

(2) Ensuring an adequate supply of raw materials to agro-based industries.

(3) Raising the standard of living of the rural population depending mainly on agriculture.

(4) Earning and saving foreign exchange. Tamil Nadu has great potentialities for the production of export oriented crops like tea, coffee, oilseeds, maize, spices, fruits and food products as Robusta or Cavendish banana resulting in foreign exchange earnings. By stepping up agricultural production of commodities like rubber and cotton savings could be effected in foreign exchange.

(5) Providing additional employment —, the introduction of the High Yielding Varieties Programme, Multiple Cropping Programme and Installation of tubewells and filter points have resulted in additional employment. Extension of these programmes and adoption of improved techniques in dry farming areas would keep the agriculturists engaged for longer periods than at present.

(6) The experience gained in countries like Australia, Israel and the United States makes it clear that science can help to mitigate and avoid the ill - effects of aridity and drought. Control of water from the time it falls on the earth until it reaches the root zone of the crop can now be attempted in a scientific manner. Various steps can be devised to forge new

patterns of soil-plant-water-man relationships so as to enhance the production potential of dry land tracts. Hence there is need to carry out intensive research on rainfed farming to serve the specific needs of such tracts and to work out packages of practices for rainfed agriculture in different tracts of the State. Sorghum crop requires 400 millimetres effective rainfall, cumbu and groundnut crops require 300 millimetres, cotton 400 millimetres, pulses 300 millimetres and castor 500 millimetres effective rainfall for their growth and production. It could be assessed as to which areas are suitable for these rainfed crops taking into account the coefficient of variations in the precipitation; furthermore by evolving crop varieties of shorter duration the risk in rainfed agriculture can be minimised.

(7) There is a need for the adoption of most effective and modern technology by farmers in the State. Any progressive agricultural developmental system should ensure higher resource productivity, larger resource employment, larger cash receipts from the farm and equitable distribution of income among the participant farmers and agricultural workers. Since the State has become self-sufficient in food grain production diversification of the cropping programme should be attempted so as to secure more returns from the farm lands. The soil conditions, rainfall, availability of manpower and the economic resources at the farmers' level would have to be taken into consideration in evolving a cropping system for a given agro-climatic region. The following steps are suggested :-

(1) further increase the yield per unit area of rice under irrigation and pave the way to reduce the total area under cereals; (2) the area thus saved be diverted to irrigated pulses, vegetables, fruits, oilseeds, cotton, sugarcane etc. (3) adopt water saving methods and protective irrigation practices to economise water use and avoid wastage so as to bring more land under irrigated farming; and (4) intensify rainfed agriculture with particular emphasis on production of pulses and oilseeds.

FUTURE REQUIREMENTS—DEMAND AND SUPPLY PROJECTIONS

(A) A BALANCED DIETARY—FOODGRAINS

For a quantitative assessment of the food needs over the Sixth Plan period the estimates of demand are made on the basis of (1) population (2) increment and distribution of income (3) income elasticity of demand and (4) likely changes of taste. In the case of foodgrains the requirements for livestock feed, allowance for seed and wastage and provision for bufferstock have to be added to the aggregate human consumption to get the total foodgrains needs. In Tamil Nadu at present there is a preponderance of consumption of cereals while the intake of pulses, fruits, vegetables and fats is relatively low. The following quantities of food items have been recommended for deriving the targets after consulting a number of diet tables given by different authorities.

	Per capita per day in ounces	Calories
1. Cereals	12.0	1,188
2. Pulses	3.0	297
3. Roots and Tubers	2.0	46
4. Vegetables	7.0	70
5. Fruits	2.0	20
6. Sugar	2.5	275
7. Vegetable oil and ghee	1.4	336
8. Milk	10.0	200
9. Fish and Meat	1.4	45
10. Eggs	0.3	15
TOTAL		2,492

P. C. BANSIL in "Agricultural planning for 700 millions".

Against the nutritional requirement of 12 ounces of cereals and 3 ounces of pulses, the present per capita consumption based on the availability works out to 438.35 gms—15.65 ounces—14 ounces of cereals and 1.65 ounces of pulses per day. In other words a model diet of an average man should consist of cereals 400 gms, pulses 55 gms, nuts and oilseeds 30 gms, roots and vegetables 170 gms, fruits 83 gms, milk products 280 gms, sugar 57 gms, fat 57 gms, fish and/or meat 85 gms and egg 40 gm. On an all-India basis a per capita requirement of 440 gms of cereals and 75 gms of pulses for 1981 were projected against the estimated base level availability in 1969 of 395 gms of cereals and 51 gms of pulses per capita per day by Shri J.S. Sarma. The balanced diet stage of 12 ounces of cereals and 3 ounces of pulses may be reached in the Sixth Plan period.

At the rate of 55 gms of protein per head per day there is a need for 8.47 lakh tonnes of protein per year. The available protein accounts for 5.53 lakh tonnes. This consists of protein from cereals —3.93 lakh tonnes, from pulses 0.51 lakh tonnes and from animal sources, 1.47 lakh tonnes. Thus there is at present a protein gap in the State of 2.94 lakh tonnes which is 36.4 per cent in short supply and which will increase with increase in population.

(a) *RICE* As regards rice the high yielding varieties as ADT-31, IR-20 and IR-22, use of recommended doses of chemical fertilisers, better water management and plant protection practices would contribute to the rising trend of rice yields. The requirements of the population of Tamil Nadu for rice could be met through intensive cultivation alone without bringing any additional area under this crop. Research to evolve better strains of rice has to be intensified particularly for the Samba season and adaptive research to evolve suitable package of practices to suit the different agro-climatic regions of the State should be carried out on an intensive scale.

Thus a strain PRM-13-3241 of 70 days duration evolved at Ambasamudram in the Tirunelveli district is claimed to withstand drought. It can be broadcast and is well suited to dry pockets like Paramakudi in the Ramanathapuram district.

(b) *MILLETS* Cholam, cumbu and ragi are the important millets cultivated in Tamil Nadu accounting for 77.8 per cent of the total millet area. The growing of hybrid varieties of cholam is catching up with the farmers in Tamil Nadu. Convinced of the higher yield, better drought resisting character and lesser susceptibility to pests and diseases farmers started cultivating the hybrid first in irrigated lands. Experiments showed that hybrids yielded handsomely in dry land too. Hybrid cholam as Koilpatti Tall, CSH-I, CSH-5, and CSH-6 and IS 3541 serves a dual purpose. The crop gives more grain yield as well as fodder. It responds well to fertilisation. The short duration of the crop—100 days—is an added advantage. The duration of local varieties goes up to 120 to 130 days. The net income in hybrid cholam works out to Rs. 600 to 700 per acre double that of local varieties. An extent of Rs. 10,000 acres was covered by hybrids in dry lands during 1975 - 76. The launching of a massive double cropping programme in dry lands in 1977 gave a boost to the cultivation of the new varieties and so far 40,000 acres have been brought under hybrid cholam in dry lands. In Chingleput, North Arcot and Coimbatore districts the hybrid CSH - 5 is grown in large areas while in Ramanathapuram, Madurai and Tirunelveli districts the CSH-I and Koilpatti Tall varities occupy sizeable area. In Pudukottai and Tiruchi districts the Koilpatti Tall noted for its high fodder yield and IS 3541 varieties are extensively grown. Hence the traditional cholam areas and new areas will be saturated with hybrid varieties in course of the Sixth Five Year Plan.

Similarly some of the hybrid types of cumbu were found to be highly susceptible as in the case of HB varieties to the Downy Mildew disease. Some types have been evolved recently as KB 433 and KB 436 of 75 fo 80 days duration resistant to the disease. Cumbu of a short duration variety could be fitted into the multiple cropping pattern in rice fallows in North Arcot, Chingleput, South Arcot, Madurai, Dharmapuri and Salem districts in summer. Foliar application of nitrogan to rainfed millets would result in increased productivity.

Maize has attained considerable increase in recent years from 4,000 hectares in 1950 - 51 to 19,000 hectares in 1973-74, Maize production recorded an average compound growth rates of 10.5 per cent per annum from 1960 - 61 to 1970-71. Maize is the most economic converter of solar energy and more maize should be grown instead of rice to get food with the best nutritional content. With proper water management it is possible to increase the yield by two or three times. It is possible that the demand for wheat and maize may go up because of the changing food habits of the population and also because of the possibility of developing certain wheat and maize based industries. The white germ of maize was separated and oil was extracted. The oil was good for heart diseases and at present it was mainly exported to Italy and Indonesia. At present every village has a rice mill but there are no facilities for processing maize. In the south there is only one imported mill with 50 tonne capacity in

Bangalore while another mill with 25 tonne capacity was working round the clock in Faridabad making children's food. The first mini-mill has been set up by the Tamil Nadu Agro-Industries Corporation on January 2nd 1977 at the Industrial Estate, Guindy costing Rs. one lakh, and can process five tonnes of maize a day. Such mini - mills should be started by 1983-84 in rural areas to enable agriculturists to sell their produce directly to the mills. There is a shortage of industrial starch in the country and an industrial starch plant from maize must be set up in Pudukottai district, manufacturing also glucose and dextrose. Several 50 tonne capacity maize based mills to produce sojji, oil and flour in the State can be set up and each factory would need 10,000 hectares of land.

The present trend of 5 per cent annual increase in production of foodgrains is likely to continue during the coming years resulting in a large surplus and as against the population growth rate of 2.2 per cent per year there is ample scope for reducing the area under cereals so that other important crops could be grown in an intensive manner. There is a trend among the population with higher incomes and assured employment to eat more of rice and the demand for other cereals is likely to go down during the coming years. Attempts must be made to improve the quantity and quality of protein in the cereal varieties grown since vegetarian diets derive the major portion of protein from cereals. Fortification of rice is an important subject deserving intensified research.

The production of millets in lakh tonnes in 1983-84 on the assumption of further introduction of hybrid varieties is as follows :—

	1970-71	1983-84	1970-71	1983-84
	000 hectares		Lakh tonnes	
Cholam	749	720	5.47	5.50
Cumbu	490	550	3.21	6.60
Maize	18	200	0.19	10.00
Ragi	338	338	3.45	5.00
Other Millets	482	150	3.71	1.20
Total	2,077	1,958	16.03	28.30

(c) *PULSES* area major source of protein supply and grown either as pure or as a rainfed crop mixed with other cereals and oilseeds and rarely under irrigation. The traditional varieties of pulses are low yielding, longer in duration and cannot compete in terms of economic returns with cereals or cash crops. As a consequence pulses are relegated to less favourable areas. Tamil Nadu is importing a large portion of its requirements of pulses from other States. Against a requirement to supply a balanced diet of 16.40 lakh tonnes in 1983-84 the production potential of pulses would be 7.68 lakh tonnes. Short duration varieties should be evolved which tolerate drought and are resistant

to posts and diseases. It would be ideal to increase the area under irrigated pulses but the yield potentials of all the pulse crops, except that of soyabean are not heavy enough and hence the farmers cannot be induced to take up pulse crops under irrigated conditions because of the low economic returns. Therefore, we have to necessarily increase the area under pulses in rainfed areas three fold by diverting the ones grown presently with millets like cholam, cumbu, etc.

In order to produce six lakh tonnes of pulses per year it is necessary to grow them in 10 to 15 lakh hectares of rainfed lands. At present 42 lakh hectares of land is grown to various rainfed crops of which 4.5 lakh hectares are under pulses. The aim should be to replace horsegram, the predominant pulse crop grown under rainfed conditions with better pulses as short duration red gram, green gram and black gram varieties evolved recently and improving the quality and quantity of protein in these pulse crops through intensive breeding programmes.

(d) *FRUITS AND VEGETABLES* are important protective foods. To provide a balanced diet 7 ounces of vegetables, 2 ounces of roots and tubers and 2 ounces of fruits per capita per day will have to be supplied. It is imperative to increase the production of vegetables by 319 per cent in the Sixth Plan period under 4 lakh hectares. Area under fruits could be increased to 2,00,000 hectares in 1983-84, The requirements of fruits and vegetables in lakh tonnes are:

	Vegetables	Roots and Tubers	Fruits
1970-71	29.30	8.37	8 37
1983-84	38.28	10.94	10.94

The area under vegetables could be increased when once irrigation facilities are made available. This has been amply demonstrated in the irrigated belts of Cumbum Valley. A lot depends on the marketing facilities for these crops. An intensive effort to increase the area under fruits and vegetables in close proximity to urban areas will have to be made. Irrigated belts suitable for vegetable cultivation will have to be selected and earmarked and specific projects for intensive cultivation of suitable vegetable crops in such areas will have to be implemented.

Various by-products of :fruits will have to be manufactured through small scale industries so that there is a ready market and fair price for the fruits harvested. This will pave the way for rapid development of agro-based industries in the State. The marginal and below marginal lands which are now sown to cereals at a very high risk of exposing them to the vagaries of the monsoon could be easily grown to such fruit crops like mango and sapota, cashewnut etc., Areas suitable for such purposes will have to be earmarked and the farmers advised to take to such fruit plants in preference to the annuals. There is unlimited scope for introducing many new crops to feed agro-based industries. Several wineries can be set up in Tamil Nadu since each industrial unit needs 1,000 hectares of grape garden for raw material and several thousands of hectares of land in the State are suitable for grape cultivation in Krishnagiri, Hosur and Dharmapuri taluks. Other industries are sago from tapioca particularly in the Salem district, oil and protein from soyabean, paper from mesta etc. The cropping programme should be worked out for each location.

Over the Sixth Plan period there is scope for setting up half a dozon wineries, three or four maize based mills and factories, several sago factories, wheat and barley based breweries, paper mills, starch factories based on tapioca and maize, poultry and cattle feed industries, additional industrial alcohol plants, soyabean, sunflower and cotton oil mills and other agro-based industries.

The problem of Vitamin-A deficiency which is a major cause of blindness has been solved by a new variety of hybrid tomato with a high level of this vitamin content developed at Bangalore. The consumption of two tomatoes (100 gm) by an individual would meet his daily requirements of this vitamin. Large-scale cultivation of such hybrid tomatoes containing high amounts of carotene could be taken up in Tamil Nadu. Horticultural development on the Bulgarian pattern could be taken up in Hosur and other areas under which the agro-industrial complexes integrate production, processing and marketing. The Indo-German project in the Nilgiris could also embark on such a scheme.

ADDITIONAL AREA THAT CAN BE BROUGHT UNDER HORTICULTURAL CROPS IN THE HILL RANGES OF TAMIL NADU

Hill range	Fruits@	Vege-tables	Spices Cacao areca-nut	Cut flowers roses dahila	Total
	Area in hectares				
Singampatti, Courtallam and Papanasam hills	6,000	1,500	5,000	—	12,500
Anamalais, Siruvani and other hills—Combatore dist.	4,000	1,000	1,000	—	6,000
Hills of Kanyakumari district	2,000	800	3,000	—	5,800
Shevoroys, Kolli hills & Kalrayan hills—Salem dist.	6,000	4,000	2,000	250	12,250
Pachamalai hills Salem & Tiruchi	1,000	400	500	—	1,900
Elagiri & Javadi hills - North Arcot	2,000	800	1,000	250	4,050
Kodaikanal, Palani & Sirumalai hills	15,000	1,500	5,000	600	22,100
Miscellaneous not represented in the above	4,000				4,000
Total	40,000	10,000	17,500	1,100	68,400

@The fruits may include apple, pears, plums, peaches, citrus, hill banana, jack, pineapple and other sub - tropical plants and the suitable ones for different tracts will have to be identified through research.

The vegetables include hill and plain vegetables. Spices include pepper, cardamom, cloves, mutmeg, etc. Coffee and tea are excluded.

ADDITIONAL PRODUCTION AND INCOME

	Area in Hectares	Additional Production 000 tonnes	Value of additional production-Lakhs of rupees
Fruits	40,000	540	5,400
Vegetables	10,000	267	1,335
Spices, cacao arecanut	17,500	93.5	16,750
Flowers	1,100	2,911	291.10
	68,600	3,811.5	53,776.10

The value of additional production will be Rs. 537.76 crores against a total investment of Rs. 16.30 crores.

(B) RAW MATERIAL FOR INDUSTRY AND EXPORT POTENTIAL CROPS

(1) *OILSEEDS - GROUNDNUT* The area under oilseeds in Tamil Nadu registered an average compound growth rate of 0.6 per annum over the period 1950-51 to 1960-61. During the next ten years, the average growth rate was only 0.5 per cent per annum. The production of oilseeds increased from 1950-51 to 1960-61 at an average compound growth rate of 3 per cent per annum.

It is estimated that 63,107 tonnes of groundnut or 7.1 per cent and 7,800 tonnes of gingelly or 20 per cent are annually required for direct consumption (1970-71 base) and that total seed requirements for sowing of groundnut in Tamil Nadu per annum at a seed rate of 125 kgs. per hectare works out to 1,78,500 tonnes and 2.4 per cent of total production will be the seed requirement of gingelly or 930 tonnes and castor seed requirements per annum will be 250 tonnes.

A per capite requirement of 1.0 ounces of vegetable oil per day works out to an annual requirement of vegetable oils for Tamil Nadu of 5.47 lakh tonnes in 1983-84. The 1970-71 level of production of vegetable oils was

	Tonnes
Groundnut oil	206,178
Gingelly oil	12,105
Castor oil	1,499
Coconut oil	5,000
Total	224,782.

To meet the above demand the irrigated area—171,000 hectares under groundnut in 1974-75 has to be increased to 400,000 hectares. There are several new varieties of groundnut which have been evolved in the country. Rainfed cholam cumbu and other minor millets will have to give way for groundnut wherever the soil conditions are favourable so that the area under rainfed groundnut is increased to

14 lakh hectares. It can be grown mixed with pulses, cotton etc. In existing varieties of groundnut flowering is extended over a long period specially under rainfed conditions, and this adversely affects uniform maturity and the yield. It is necessary to evolve a variety with synchronised flowering which should flower in a restricted period and at the same time has a potential for high yields. By improved methods of cultivation like improved seeds, application of adequate dose of fertilisers, timely plant protection measures and rhyzobium inoculation it is estimated that the productivity of groundnut of 735 kgs per hectare in 1974-75 could be increased to 1,500 kgs by 1983 - 84 resulting in an additional production of 11.80 lakh tonnes.

With a crop of six million tonnes, India is the biggest producer of groundnut in the world. The USA, the third largest producer, has a yield of 2,100 kg per hectare and China 1,340 kg. The area under cultivation has increased from 0.2 million hectares at the turn of the century to 7 million hectares today. Groundnut yields could be increased by 40 per cent if the known improved technology was adopted by the farmers. Exports of ' hand picked and selected ' (HPS) grade exports went up to 60,000 tonnes in 1974-75 and 190,000 tonnes in 1975-76 in the face of aggressive marketing by producers in the US, South Africa, Nigeria, Senegal, Sudan and China, due to the efforts of the Indian Oil and Produce Exporters Association—IOPEA. Indian growers should be encouraged to cultivate virginian type of bolder varieties of groundnut offered by USA and China, which command a high premium. Exports from India during the crop season 1975-76 are estimated at 200,000 tonnes which is five per cent of the crop in india, and HPS groundnut earned Rs. 80 crores in foreign exchange in 1975-76 because of its high unit value. Production of groundnut in the world is rising at an annual rate of one per cent. The world trade of edible groundnut was estimated at 4.50 lakh tonnes in 1973 and 500,000 tonnes in 1976. 50,000 people are seasonally employed in processing groundnut for export. They hand pick select and grade the crop. Recently Government has restricted export to 50,000 tonnes in the wake of rise in edible oil prices. With liberal export of HPS groundnut the country could earn foreign exchange which could be used to import edible oils on a larger scale to bridge the gap in supply and demand. With every tonne of groundnut that was exported 420 kg oil was lost. But one tonne of groundnut fetched over 700 dollars with which 1,100 kg. of oil could be imported.

II. *GINGELLY* Since it is a highly localised crop, the introduction of newly evolved strains have not been of much avail. Therefore, it is necessary to evolve strains suitable to different agro-climate seasons. It is raised as a rainfed crop. Intensification of cultivation has not been attempted since this is an exhausting crop and the soils would be badly affected if the crop is intensively cultivated. The shortfall in the production of gingelly oil is proposed to be offset by expanding the area under sunflower.

III. *SUNFLOWER* Sunflower could be grown both as a rainfed as well as irrigated crop. One lakh hectares of sunflower under rainfed conditions and 50,000 hectares under irrigated conditions in multiple cropping programmes should be covered and by the end of the Sixth Five Year Plan period 3 lakh hectares. New varie-

ties to suit local agro climatic and soil conditions have to be evolved. More work is required to stabilise the yield and oil content. Sunflower oil is palatable and suitable for cooking purposes. It contains a high percentage of linoleic acid 52 to 62 per cent, Illeic acid—32 to 47 per cent, and vitamins A, D, E and K. The oil reduces the incidence of arteriosclerosis. The crop yields 150 to 1,000 kgs per hectare under rainfed conditions and 2,000 to 2,500 kgs per hectare under irrigation. The duration of this crop is only 80 to 85 days with an oil content of 45 to 50 per cent.

IV *CASTOR* The planting of castor in border areas and raising new hybrid varieties in rainfed areas would enhance the area in the Sixth Plan period to 15,000 hectares from 9,000 hectares.

V *COTTON SEED* Of the 1.29 lakh tonnes of cotton seed produced in Tamil Nadu during 1970-71, 20 to 25 per cent may be utilised for oil extraction. The oil extraction percentage of cotton seed is 15.8 per cent. Assuming a quantity of 30,000 tonnes is crushed annually, it is estimated that a quantity of 4,500 tonnes will be added to the total oil production.

VI *COCONUT* covers an area of 10.5 million hectares in the country with an annual production of 6,077.7 million nuts valued at Rs. 600 crores at current market prices and the value of coconut oil Rs. 200 crores. India stands third in the world in acreage and production, the first being Philippines. Tamil Nadu stands first in the matter of average coconut yield per hectare in 1974-75 the yield was 8,765 nuts per hectare. One farmer realised 19,443 nuts per hectare per year and in the Research Farm in Kerala 21,525 nuts West Coast Tall and 30,520—tall dwarf hybrid. Close planting as in the Sholavandan tract in Madurai district leads to deficient nuts yields. The Central Plantation Crops Research Institute, Kasaragod has worked out that 75 per cent of the land area is available for other crops or companion crops for coconut when the palms are planted with a spacing of 7.5 metres.

The area under coconut in Tamil Nadu in 1974-75 was 109,000 hectares an increase of 50 per cent over the area in 1961-62. Thanjavur, Coimbatore and Kanyakumari districts contibuted 45 per cent of the total area. 86 per cent of the area is under pure gardens offering a conducive climate for introduction of better methods of culture. The target should be an increase of 36 nuts per tree per year over the present average of 55 to be achieved through scientific fertiliser does and irrigation of gardens. It is necessary to increase the potash content of the fertiliser schedule as it is a sure way to boost nut yields.

There is a considerable scope for bringing more area under coconut particularly along the east coast and in the interior parts of Coimbatore, Trichy, Salem and North Arcot districts. Apart from the new plantings a large number of uneconomic old gardens cry for rejuvenation by underplanting. Coconut is grown by small farmers over with 90 per cent of the holdings covering less than one hectare each. There are constraints like lack of credit, deficiencies in input supply and shortage of necessary institutional infrastructure all of which need early correction.

VII. There is scope for extraction of maize oil to supplement the vegetable oil

production in Tamil Nadu and cultivation of Red Oil palm in suitable location has to be explored.

Stabilisation of price is essential for increasing the production of oil seed crops as prices are extremely volatile as shown by groundnut oil prices just now. Unless a suitable organisation with necessary machinery is evolved to give practical meaning to the operation of the prices fixed it will continue to be a problem to bring about increase in area and production. Adequate credit to meet cultivation expenses will remove a major constraint to oil seed production.

(II) COTTON

Of the 678 cotton mills in India 207 are located in Tamil Nadu. They spun during 1970-71, 200 million KG of yarn valued at Rs. 226 crores. Out of the 17.9 million spindles in the country 23.3 per cent are installed in Tamil Nadu. Tamil Nadu consumes 18 per cent of the total cotton produced in the country, while the production from the State constitutes 7.9 per cent. The present per capita cotton cloth consumption is 14.8 metres per year. 563.1 million metres of cloth per year are required at present and this figure is likely to go up to 724.7 million metres in 1983-84. From one kilogramme of cotton 7.2 metres of cloth can be produced. To produce all the required cloth for the present population in the State 4.2 lakh bales of cotton are needed and this requirement will be 5.63 lakh bales in 1983-84 (bale of 180 Kg each). At present Tamil Nadu is producing 338,000 bales in 1973-74 and 220,000 bales in 1974-75 and the small gap can be easily wiped out. The demand for raw cotton for the textile industry in Tamil Nadu is 12.8 lakh bales and this demand is expected to increase to 16.3 lakh bales in 1983-84. Tamil Nadu is importing two thirds of cotton required in the State from other northern States, and part of the requirements are met through imports from outside the country as from Egypt, Sudan and USA. Tamil Nadu has to more than double her cotton production and for better stability of the industry she has to produce the required quantity of quality cotton within the State.

The area uuder cotton was 2.99 lakh hectares in 1950-51 and 4.06 lakh hectares in 1959-60. It remained constant till 1963-64 registering a downward trend thereafter. The area under cotton in 1970-71 was 296,000 hectares and in 1974-75, 247,000 hectares (Final Forecast Estimate).

The production of cotton was 2.26 lakh bales in 1950-51 and increased to 3.74 lakh bales in 1960-61. After 1961-62 the production of cotton registered a downward trend till 1968-69. Thereafter production picked up and reached the maximum of 412,000 bales in 1971-72 but declined steeply to 220,000 bales in 1974-75.

An additional two lakh hectares of area under irrigated cotton in the State has to be found. (1) The possibilities of growing cotton in rice fallows were tried with Punjab American 216 F and later PRS 72 cotton in the Thanjav ur district and ended in failure. Similar attempts with MCU 7 cotton in Trichy district has met with limited success particularly in Manaparai taluk.

(2) The rich tracts of Aranthangi, Thiruvadanai, Pattukottai and Devakottai

blocks are said to be highly suitable for growing irrigated cotton. Under ground water resources for irrigation have to be tapped the possibilities of diverting Cauvery water for irrigating cotton crop in these tracts are gloomy in the present circumstances. High yielding cotton varieties like MUC 5 can be grown in one lakh hectares of land in this tract. This will bring in an additional 1 to 1.5 lakh bales of cotton worth Rs. 10 to Rs. 15 crores per year.

(3) Similarly cotton can be grown in many tracts where presently irrigated millets are grown.

(4) The area under rainfed cotton could be increased considerably. As against the present 2.4 lakh hectares of land the area could be increased to 3.6 lakh hectares by introducing suitable varieties of the crop. Perambalur, Udayarpalayam, Kulithalai, Pudukottai, Kallakurichi, Namakkal, Rasipuram and Jedarpalayam are suitable tracts for growing rainfed *desi* and Cambodia cottons. Though the rainfall is not very heavy in these areas such drought resistant Karunganni varieties like K7 and Cambodia varieties like Bharathi can be successfully grown by suitably adjusting the date of sowing. This would result in an additional yield of a lakh bales of cotton worth Rs. 20 crores per year.

(5) There is also an urgent need for evolving shorter duration cotton varieties of 120 to 130 days duration to fit into the multiple cropping programme in various rice growing tracts and other irrigated belts of the State so that they could be grown annually as a third crop in a three crop relay sequence. Cotton ginning mills in convenient location have to be set up in each of the new proposed cotton belts to facilitate easy marketing. This was the constraint which led to failure of the attempt to grow cotton in paddy fallows in 1954-56 and again in 1970-73 in the Tanjavur district.

The release of varieties MCU 5 and Sujata constitute a major break through in cotton improvement for better fibre and spinning quality in the country thus paving the way for almost complete import substitution. The development programmes on cotton in Tamil Nadu should be intensified in the Sixth Plan period in the following directions (1) Multiplication and distribution of seeds of improved varieties of cotton (2) Introducing improved agronomic practices in the growing of the crop in the irrigated and rainfed cotton tracts. (3) Implementation of package programmes for select areas as the Intensive Cotton District Programme in 60,000 hectares of irrigated area in the Coimbatore district and 20,000 hectares of rainfed cotton in the Tirunelveli district. (4) Enforcing cotton certification and other legislative measures.

(III) *SUGARCANE* The Area under sugarcane which stood at 51,000 hectares in Tamil Nadu in 1950 - 51 increased gradually to 81,000 hectares in 1960-61 and 172,000 hectares in 1968-69 and 186,000 hectares in 1973-74 and 156,000 hectares in 1974-75. A compound growth rate of 4.7 per cent per annum was registered in area during the period from 1950-51 to 1960-61 and 5.2 per cent per annum for the ten year period ending 1970-71.

In view of the recent role of sugar as a foreign exchange earner steps should be taken to extend the area under sugar-

cane wherever possible so that the land and the irrigation potentials are put to full use. The 16 sugar factories in Tamil Nadu crushed in 1970 - 71, 33.29 lakh tonnes of cane and produced 2.88 lakh tonnes of sugar. Another one lakh hectares of land have to be added under sugarcane so as to fully feed the existing mills and to support the newly licensed factories on 28th February and 1st March, 1977 at Karungulam, in the Thanjavur district and Tirupathur in North Arcot district. If the sugar mills work to their full capacity 2 lakh hectares of area under sugarcane may be needed. The additional area under sugarcane could be covered around the existing sugar factories by diverting the land presently grown to irrigated cereals. (2) another possibility is to grow sugarbeet as an alternate crop to feed the mills during the off-season. This is possible in some areas where the climate is favourable for growing sugarbeet as in the Kodaikanal and Ooty areas. 50,000 hectares should be covered under sugarbeet in Tamil Nadu in the Sixth Plan period and the mills reorganised to handle sugarbeet also along with sugarcane for processing.

The possibility of growing sugarcane in Pattukottai, Orathanad, Pudukottai, Cumbum, Theni, Thiruvadanai, Chengam, Barugur and Attur areas are very great. Each sugar factory with a crushing capacity of 2,500 tonnes per day would require an area of 6,000 hectares of land under sugarcane and sugarbeet for feeding the factory. Hence another 8 mills to be set up can be catered to easily. Evolution of drought resistant early maturing varieties of cane with high sucrose content is a necessity.

On the basis of 2.5 ounces of sugar per capita per day to provide a balanced diet 13.67 lakh tonnes of sugar will be required in 1983-84.

(IV) CASHEWNUT

India is the largest producer of cashewnut in the world. 90 per cent of the international trade in cashew kernels and cashew shell oil is monopolised by India. Exports of cashew ke nels and cashewnuts shell liquid from India during the financial year 1968-69 earned Rs. 63.18 crores in foreign exchange. Tamil Nadu accounts for 10.6 per cent of the total area under cashew and 19.6 per cent of the total production in the country. It is estimated that with the increase in per capita income the domestic consumption of cashewnut is likely to increase to 25 gms per head per year in 1983-84, compared to 12.5 gms per head per year or 1,342 tonnes of cashewnuts would be required for domestic consumption. Tamil Nadu exported 296,203 kgs of cashew kernels to foreign countries during 1969-70 valued at Rs. 33,41,878.

Modern cashew processing units should be established particularly in Virudachalam and Panruti and possibilities of utilising cashewnut shell liquid in industries should be explored. At present the fruit-ephithalus are wasted without conversion into useful products for consumption. Processing units may be started to manufacture cashew syrup, other beverages, power alcohol etc. using cashew fruits as raw material.

To meet the internal demand and to maintain the present exports to foreign countries the present production should have to be doubled by increasing the area under cashew in South Arcot, Ramanathapuram, Tirunelveli, Tiruchirapalli and Madurai districts to cover 49,776

hectares resulting in an additional production of 15,000 tonnes in 1983-84. The yield per hectare of the existing cashew gardens can be increased by 40 per cent through application of fertilisers and plant protection measures, the package of practices bringing an additional production of 10,000 tonnes annually that is a total production of 25,000 tonnes in 1983-84.

(V) TURMERIC

During 1965-66 India exported 10,403.4 tonnes of turmeric valued at Rs. 137.54 lakhs. During 1969-70 Tamil Nadu exported 1,120 tonnes of turmeric to foreign countries valued at Rs. 42.89 lakhs. The area under turmeric increased from 1,984 hectares in 1952-53 to 6,410 hectares in 1970-71. In 1956-57 the area under turmeric reached the peak of 8,314 hectares due to high prices that prevailed. The production of turmeric increased from 5,711 tonnes in 1952-53 to 24,440 tonnes in 1970-71, due to increase under the crop. The productivity was stagnant around 3,500 kgs per hectare.

62.5 per cent of Tamil Nadu's production of turmeric is exported to other States and foreign countries. Consumption within the State works out to 120 gms per capita per year. Assuming that the future trend of consumption will be of the same order, the targets of production will be:

	Internal consumption tonnes	Seed tonnes	Requirement for export—tonnes	Total tonnes
1978-79	5,900	3,750	20,350	30,000
1983-84	6,400	4,500	25,100	36,000

No concerted efforts have been taken for the development of turmeric. Leaf spot disease adversely affects turmeric production in Tamil Nadu. The area under turmeric is concentrated in Bhavani, Erode and Gobichettipalayam taluks of Coimbatore district. Attur and Namakkal taluks of Salem district and Karur taluk of Trichy district. The crop requires high fertility soils having good drainage facilities. The strategy of production to raise yield levels has to consist of (1) Research to evolve varieties which are resistant to leaf spot disease and shorter in duration with potential for higher finger yields and good quality and colour. It is recommended that a research station should be set up for development. (2) Improve agronomic practices adopted in selected suitable areas to step up the yield levels (3) Better marketing facilities should be provided preferably regulated markets at Erode and Karur with assurance of minimum prices since market prices of turmeric oscillate wildly depending as they do on export demands. (4) Agro-based industries utilising turmeric should be developed.

The aim is to raise the per hectare yield from 3,500 kgs to 4,000 kgs and to extend turmeric cultivation to 9,000 hectares by the end of this Sixth Plan period for achieving the targeted level of turmeric production.

(VI) CHILLIES

India accounts for 26 per cent of the total international trade in chillies of 36,000 tonnes and almost the entire quantity is exported to Ceylon and West Asian countries. There are great variations in prices. The quantity of chillies consumed per capita per year comes to 2 kgs of chillies both dry and green. In is assumed that the per capita requirement would be of the same order despite the increased level of income. Against Ceylon's total demand of 20,000 tonnes Tamil Nadu exported 11,750 tonnes during 1964-65. The production of chillies in Tamil Nadu should be stepped up to meet the internal demand and ro regain the export markets. The targets of production would be:-

	Internal consumption 000 tonnes	Exports 000 tonnes	Total 000 tonnes
1978-79	96	12	108
1983-84	106	20	126

(VII) FLORICULTURE

In 1970-71 the area under commercial flower crops namely Rose, Jasmine, Chrysanthemum and Crossandra was estimated at 5,463 hectares grown in pockets of Coimbatore, Nilgiris, Madurai, Tirunelveli, North Arcot, Chingleput, Kanyakumari, Thanjavur, Salem and Dharmapuri districts and valued at Rs. 8 crores annually. Besides catering to the urban markets within Tamil Nadu, a sizeable quantity of the flowers is also airlifted from Madurai and Coimbatore daily during the flowering season to markets in Bombay, Delhi, Calcutta and Bangalore. 600 kgs of Crossandra and jasmine flowers are airlifted daily from Madurai airport to Bangalore, Bombay and other places during the flowering season and 300 kg to 500 kg from Coimbatore airport to Bangalore and Cochin.

The "cut flowers" which are entirely used for indoor decoration are now gaining importance in the floral trade. Flowers like roses, gladiola, dahlia and lilies are the common cut flowers raised in Tamil Nadu. Flowers grown in Coonoor, Ootacamund and Kodaikanal meet a small portion of this demand at present from Bombay, Delhi, Calcutta and Madras. There is scope for the development of cut flower cultivation. Possibilities exist for export of these cut flowers to foreign countries particularly during the winter season from December to March when in UK, France, Germany, Sweden, Switzerland and Italy the flowers could not be grown because of low temperature, snowfall, frost and other adverse seasonal conditions. USA imports annually Rs. 20 crores worth of cut flowers. Egypt and Israel grow cut flowers for export to UK, USA and other countries. Some North Indian States have taken up growing long stalked roses for export to European countries. In Tamil Nadu these flowers could be grown in Kodaikanal. Coonoor and Ootacamund and airlifted to foreign markets.

Besides stepping up the production of flowers by extending the area under cultivation and raising the productivity of existing gardens there is scope for development of industries for the production of perfumery compounds from jasmine, rose tuberose, origanum (maruvu) and arteenesia (davanum) particularly jasmine

oil. The concrete and absolute, prepared from the Indian Jasminium grandiflorum (Jathimalli) were found superior to products of Egypt and Israel. Jasminium auriculatum (Mullai) has a scent factor superior to other jasmines. Improved varieties yielding upto 12,000 kgs of flowers per hectare with a long flowering season of 8 to 10 months have been developed in Tamil Nadu.

The price of jasmine concrete in the world market in 1970-71 was Rs. 11,700 per kg for the highest grade products. With a recovery of 2.5 kg of concrete for every 1,000 kg of flowers used and with the high yielding varieties having a long flowering phase it is possible to set up a viable agro-industry based on jasmine oil in Tamil Nadu as is being attempted at Tudiyalur in Coimbatore town. The oil is extracted by solvent extraction process using petroleum ether.

Geranium oil is used in scenting of soaps and cosmetics. Scented geranium or Pelargonium gravelonsis grows as a perennial crop lasting 6 to 8 years and thrives well in porous and light soils at an altitude of 1,500 feet. 500 acres are estimated to be under this crop in the lower elevation of Gudalur taluk in Nilgiris district, Yercaud in Salem district and in Kodaikanal at elevations of 2,000 to 2,500 feet. In a well maintained plantation of geranium, the average yield of oil is estimated at 12.5 to 15 kgs per hectare. The ratio of extraction of oil is placed at 0.01 to 0.02 per cent. It is suggested that geranium could be cultivated in the Nilgiris instead of potato particularly Great Scot whose yield has been going down due to late blight and Golden nematode attack.

During the Sixth Plan period extension of area under flower crops by 2,000 acres under jasmine, 1,000 acres under rose, 2,000 acres under chrysanthemum and 750 acres under Crossandra is suggested by planting improved varieties with suitable package of practices to suit different agro-climatic regions and providing adequate credit facility to the cultivators and extension education.

(C) NEW CROPS

(1) Besides sunflower the West African Red Oil Palm (Elaeis guineensis Jacq) is a source of palm oil and palm kernel oil. The former is used for the manufacture of margarine, vegetable shortening, soap and candle making and is very rich in carotene and is a source of Vitamin A. The scope for introducing this palm in Kanyakumari district, Tirunelveli, Madurai and Nilgiris districts has to be explored.

(2) Mesta for fibre and paper making can be cultivated in a wide variety of soils. Mesta variety AMV-1 came up to 12 feet height in trials. There is scope for large scale introduction of this crop in the vicinity of paper mills in Tamil Nadu.

(3) Soyabean has great potential and can be tried again in the Coimbatore district.

(4) Sugarbeet came up well in 1971 in the Nilgiris, Shevaroys, Anamalais, Hosur, Yelagiri hills and Kodaikanal. The sucrose percentage worked out to 17.27 from the Nilgiris produce. The crop was raised under rainfed conditions. Sugarbeet opens up new vistas in sugar production in Tamil Nadu.

(5) Cacao was a new crop in which experiments have been going on in the Kodaikanal area for a long time and in the Nilgiris and the product has been

found to be superior to the Nigerian or Ghanaian crops.

(D) MULTIPLE FARMING

Limitationsof irrigation water and suitable crop varieties and availability of excess of labour in the villages render it essential that every farm unit should undertake multiple cropping and mixed farming practices to the extent possible. Wherever feasible dairying, poultry keeping, piggery, fisheries and related cottage industries should be introduced. Wherever the land is not suitable for annual crops it should be sown to economically important forest plants so that the area under farm forestry is also expanded. To meet all these requirements we have to undertake extensive research work and set up Farm Planning Advisory Centres in the State so that every farmer is able to get expert advice on how to derive the maximum benefit from his farm land through suitable single, multiple and mixed cropping programmes and other related activities. The results of research when fully utilised by the farming community will increase the present annual income of Rs. 1,000 crores from farm lands by Rs. 500 crores at the current price levels.

(E) FODDER CROPS

Increased productivity of livestock has been hampered by the shortage of feed and fodder. In 1970-71, 13.7 milliontonnes of dry fodder and 5.8 million tonnes of green fodder were available. The new cropping pattern in the Sixth Plan would result in the production of 14.7 million tonnes of dry fodder from field crops and a gap of 9.3 million tonnes could be bridged by growing short duration fodder cereals as fodder cholam or Irungu cholam and maize and exploring the forest area for fodder production.

Requirement of green fodder in 1970-71 was 60.59 million tonnes and will go up to 72.14 million tonnes during 1983-84. Production of green fodder could be increased by (1) producing them in sewage farms (2) cultivation of perennial grasses as Hybrid Napier, para grass, Guinea grass, Rhodes grass, Sudan grass etc. in large areas and (3) inclusion of fodders in crop rotations. These perennial grasses are capable of giving 200 to 250 tonnes of grass per hectare under optimum conditions. Among legumes lucerne gives 8 cuttings per year yielding 70 tonnes per hectare. It is rich in protein. By 1983-84, 4 lakh hectares of land should be brought under perennial grasses and legumes to produce 60 million tonnes of green fodder.

In Tamil Nadu so far two corporations, 12 municipalities and one township have taken up sewage utilisation schemes. By 1983-84 these schemes can be extended to 49 local bodies. The area of 300 hectares under sewage cultivation of fodder could be increased to 2,000 hectares. Development of mixed farming techniques for inclusion of fodders in crop production is necessary and optium dosage of fertilisers fixed up for fodder crops by fertiliser trials. Forest areas which are suitable for fodder production may be assessed and demarcated.

(F) RAINFED AGRICULTURE

In Tamil Nadu 56.5 per cent of cultivated area is rainfed. 25.8 lakh hectares receive less than 859 millimetres of rainfall annually and classified as drylands tracts. Adequate attention has not been paid towards developing suitable agro-techniques for the rainfed areas of Tamil Nadu creating economic and sociological imbalances due to one-sided emphasis on

development of scientific agriculture in the irrigation areas. In order to attain self-sufficiency in pulses, oilseed cotton, vegetables etc. We have to intensify our research activities in rainfed agriculture. The approach for agricultural development in these areas would be

(1) Intensive research for evolving techniques which will help to give maximum return from the available soil and moisture resources in dry areas and

(2) Practical application of results of the available knowledge on soil and moisture conservation practices, cultivation of drought tolerant, short duration varieties of crops and new techniques of fertilisation as foliar spray, plant protection on farmers' fields etc. There is an urgent need to set up four research stations in the following rainfed areas of the State :

(a) Dharmapuri/Salem;

(b) Palladam/Avanashi;

(c) Dindigul/Nilakottai;

(d) Srivaikuntam representing the dry belts.

The research stations besides evolving short duration rainfed cereals and pulses, cotton, groundnut, gingelly and sunflower should try to introduce new crops as rainfed chillies, tapioca and other vegetables and fruit plants. They will work on the various soil conservation and water harvest techniques for these areas, formulate package of agronomic practices for each of the rainfed crop and work out the pattern of mixed farming practices to cover crop production, horticulture, dairying, poultry husbandry, farm forestry and related cottage industries.

The Indian Council of Agricultural Research has sanctioned an All India Co-ordinated Research Scheme for dry areas functioning in Tamil Nadu at Koilpatti and Pudukottai. Special programme to encourage farmers to grow remunerative second crops in the dry lands after the harvest of groundut which is raised in the first season July to October may be started. Thus the area under rainfed groundnut is one lakh acres in Chingleput district and 4.7 lakh acreas in North Arcot. 20,000 acres of this could be brought under the second crop initially. Normally farmers used to grow either ragi or horsegram during the October February period with indifferent results. The long gap was thus not utilised properly because farmers could not find any crop that can withstand heavy rainfall in November followed by the dry spell in January. CSH 5 and 6 cholam of 105 days duration during October - February is ideally suited due to its drought resistant trait. It can give 800 kg of grain per acre and yield Rs. 500 compared to Rs. 200 from ragi. Instead of horegrsam T-9 blackgram can be grown coming up in 65 days—20 days earlier than horsegram. It fetches a much higher price than horsegram.

Cholam also compensates the poor harvest from the first season groundnut crop which may have failed due to inadequate rain during the critical stages of the crop. Another variety of cholam which has been tried is L.S. 3541. To raise a second crop it is necessary that the land should be got ready with the least delay to minimise loss of soil moisture. Linking these dry land farmers with Farmers' Service Societies or other

agencies hiring tractors would mean a great deal of differences in the quality of crops they raise in future. Some minor problems like plant protection could be managed by growing crops with alleys in between ten feet of crop to admit supervision and spraying.

The cropping programme involves fitting in of two short duration crops from among groundnut, millets and pulses in the place of a single long duration crop of millets or pulses. 10,000 acres of dry land in the Coimbatore district are being brought under the new double cropping strategy. As farmers in dry land tracts are poor community sets maintained through a community fund to which the beneficiaries may subscribe in proportion to the benefits accruing to them may be thought of. That effort can be supplemented by specific schemes for impounding run-offs, thereby helping to achieve more reliable regeneration of groundwater supplies. Once the main farming operations and incomes get stabilised in this matter it should be easier to enthuse farmers to take to subsidiary occupations like dairying, sheep farming, poultry keeping and piggery. Dairying requires to be accorded high priority because the pull of urban demand for milk and milk products reinforced by the increase in rural demand that may result from an improvement in rural incomes will call for more organised effort taking advantage of the refrigerated transport facilities that are already available.

THE CROPPING PATTERN IN 1970-71 AND 1983-84 in 000 hectares

	1970-71	1983-84
1. Rice	2,636	2,636
2. Wheat	1	1
3. Cholam	743	720
4. Cumbu	475	550
5. Maize	14	200
6. Ragi	283	283
7. Other cereals	466	150
8. Pulses	492	1,574
9. Chillies	83	83
10. Turmeric	11	11
11. Coriander	30	30
12. Sugarcane	114	165
13. Onions	18	36
14. Other fruits and Vegetables	218	600
15. Groundnut	984	1,398
16. Gingelly	133	150
17. Sunflower	—	300
18. Coconut	80	140
19. Cotton	296	510
20. Tobacco	11	17
21. Other food and nonfood crops including fodder	182	551
TOTAL	7,384	10,200

THE NEW AREAS FOR IMPORTANT CROP INTRODUCTIONS/EXPANSIONS IN DIFFERENT DISTRICTS OF TAMIL NADU—in hectares

District	Irri-gated	Dry	Irri-gated	Dry	Pulses	Irri-gated	Cotton Dry	Sugar-cane	Sugar beet
Chingleput	40,000	—	—	—	10,000	—	—	10,000	—
North Arcot	30,000	25,000	—	4,000	30,000	10,000	—	5,000	2,000
South Arcot	5,000	50,000	—	—	40,000	—	20,000	—	—
Thanjavur	15,000	—	—	—	150,000	60,000	—	25,000	—
Tiruchirapalli	20,000	30,000	5,000	30,000	65,000	15,000	30,000	...	...
Madurai	10,000	20,000	5,000	2,000	60,000	12,000	10,000	5,000	3,000
Ramanathapuram	...	...	5,000	...	30,000	5,000	30,000	...	...
Tirunelveli	...	...	5,000	20,000	20,000	20,000	10,000	5,000	...
Kanyakumari	...	...	...	...	5,000	...	...	...	...
Salem	5,000	30,000	10,000	4,000	150,000	8,000	10,000	5,000	...
Dharmapuri	10,000	20,000	10,000	15,000	120,000	10,000	5,000	5,000	...
Coimbatore	15,000	25,000	10,000	25,000	70,000	20,000	5,000	...	2,000
Nilgiris	...	...	...	...	...	...	...	...	3,000
TOTAL	1,50,000	2,00,000	58,000	1,00,000	7,50,000	1,60,000	1,20,000	60,000	10,000

CONCLUSION

It is clear that as regards paddy ever shorter duration varieties will have to be evolved reducing the time span from 150 days of olden times to 75 days, if not shorter. Besides fortified paddy varieties hold the key to the future. Regarding millets maize cultivation holds a great promise and the hybrids Deccan makka will give a high yield. Pulses particularly red gram, green gram and black gram are the best crops for dry lands and paddy fallows and should be extended further. Groundnut is ideally suited for irrigated lands besides being a dry crop and as a raw material for the oil mills and as a source of exports, particulary HPS nuts. Fruits and vegetables are the only crops to better the diets of the people and research is needed to evolve high yielding varieties for in or cultivation in suitable locations as in the periphery of urban areas. Soya-beans, sunflower, flowers and cotton need further research and encouragement not only to better the incomes of the rural populace but also to strengthen the country's economy.

The best planning is the grassroots type and though lip service has been paid to it, is rarely practised. The panchayat authorities alone are aware of the constraints, limitations, shortcomings and difficulties of the areas under their charge and the resources at their command and it is strange that planning process from the top to the bottom instead of the opposite. Democratic decentralisation denotes just this and needs practical implementation.

Secondly crop planning has been advocated since the 1950s but it still remains only on paper. Each area has to be studied carefully and the crops suited to each area drawn up. Crop planning Board at the Central level and boards at different local levels will answer the purpose.

It is imperative that the canons of good husbandry are followed by our farmers. A bill on the lines of the Agriculture Act of 1947 of the United Kingdom is a must and such a Bill was introduced in the Madras Legislative Assembly in 1950 but was talked out. Such a Bill alone will make the farmers realise the responsibility they bear not only to themselves but to the nation of which they are the citizens.

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Summary of Discussion

In the discussion of the paper at the Seminar held in the seminar room of the Institute on Thursday 31st March 1977, under the Chairmanship of Dr. R. Ramanujam, Professor of Economics, Vaishnava College, Madras, the chairman remarked that the development of Indian agriculture had been discussed exhaustively in the reports submitted by the Linlithgow and Sivaraman commissions. The three major perspectives were land use, extension services and improvement of R and D, enabling the Green Revolution technology to be extended to all crops.

The author presenting the paper described its approach as the best possible for development of agriculture as radical institutional and structural changes in patterns of ownership and production would be difficult to implement. The farmer is tradition bound in his approach to production decision and methods and agricultural production has not yet reached levels that would completely meet the country's requirements, deficits being covered with imports. Describing Tamil Nadu agriculture in profile from 1950-75 it was stated that the State's contribution to national income from agriculture was 8.6 per cent, the share in overall national income being 8.8 per cent. The production of the major crop, rice, increased from 19.5 lakhs tonnes to 55 lakh tonnes during the 25 years. A contributory factor to this increase has been the assured availability of Cauveri water from Mettur, supplying Thanjavur, the principal rice growing area in the State. Owing to development plans in Karnataka and Kerala, this supply is certain to be reduced in future. The resulting shortfall will have to be made up by intensive exploitation of ground water and modernisation of supply channels. In the context of the overall water management policies in the State during the Sixth Plan, the systematic repair of the 28,323 minor tanks, proper laying out and cleaning of irrigation channels long term measures such as contour bunding and vegetative cover in catchment areas and conjunctive use of ground water and rainfall would in all likelihood bring back five to six lakh acres under irrigation. According to the synergestic water-man soil relationship, seven agro-climatic regions may be identified in the State, four of which are predominantly dry farming areas. On the basis of information regarding actual conditions and the high rates of population growth, the strategy for the Perspective Plan for 1977 - 84 would comprise providing a balanced diet by diversifying the cropping pattern, ensuring an adequate supply of raw materials to argo - based industries, raising the standard of living, providing additional employment and earning and saving foreign exchange. The fulfilment of these objectives calls for an increase in the yield of per unit area of rice under irrigation utilising short duration varieties, the diversion of areas thus saved to other non-cereal food and commercial crops and intensifying rainfed agriculture with emphasis on pulses and oil seeds, in addition to scientific water management. On the basis of per capita daily requirements of calories in a model diet the estimated requirements for 1983-84 for a projected population of 532.69 lakhs are:-cereals 91.48,pulses 16.40 vegetables 38.58, sugar 13.78 lakh tonnes approximately. While policies for food crops must be geared to accepted dietary norms,

the production of commercial crops should be linked to the development of agro-industrial development. A hitherto overlooked aspect is agricultural development, specially in horticulture, in hill areas. Seven such areas within the State are Nilgiris, Kodaikanal, Elagiri, Periakalarayan, Annamalai, Kanyakumari, and miscellaneous hill ranges. The additional hectarage which could be brought under a comprehensive area development programme for the purpose would be about 68,600 which may yield an additional production of 3,811.5 thousand tonnes of fruits, flowers, vegetables etc., valued at 537.76 crores of rupees against an estimated investment of Rs. 16.30 crores. Another area which would repay attention is the development of export potential crops. A specific instance is that of groundnut wherein a liberalisation of export policies would earn sufficient foreign exchange for import of edible oils. The other items commanding a good international market are cashew, turmeric, spices, cotton goods, cut flowers, fruits, etc. From the view point of planning, the process of planning from above in agriculture has not been effective. If this is to be remedied, plans will have to be formulated at grass root levels as it is the rural panchayats who are aware of local conditions, constraints and resources. Further, crop planning boards at the central and local levels are necessary for sound crop planning. R & D and extension services must be backed up by legislation on the lines of Agricultural Act of 1947 of the United Kingdom. On the part of the cultivators the canons of good husbandry should be followed.

During the ensuring discussion it was observed that the paper presented in exhaustive detail information regarding projections on demand supply, possible modifications of cropping pattern with balanced diet as the basis and enhanced export possibilities in agricultural products. It is, however, silent on two structural aspects namely implementation of land reforms involving distribution of surplus land, estimated at 2 million acres and consolidation of holdings. The question arising in this context is that of definitive Sixth Plan targets under these two heads. A review of consolidation possibilities, not necessarily collectivisation, appears necessary. While there are a number of fruitful suggestions in the paper, production perspectives should not be export oriented as there is a large majority in need of food and whose current levels of consumption are very low. Attention was drawn to the horticultural production potential of the hill areas discussed in the paper and it was felt that, if these were feasible, there would be a notable contribution to agricultural production and income. It was pointed out that in working out long term agricultural perspectives it was necessary to establish some macro economic linkages like money supply, prices, employment, savings etc. There appears to be a fear psychosis in the rural economy owing to uncertain prices for agricultural commodities due to the absence of any long term pricing policy. Furthermore, there is sharp disparity between agricultural income and wages. It would be advisable to focus the State's agricultural strategy on a specific growth sector—paddy and groundnut for choice under the circumstances—and not on the export oriented cashew. An important component of agricultural development is a carefully worked out credit policy. Agricultural perspectives should not be limited to cropping patterns but should cover animal husbandry programmes. A disquieting feature of the agricultural economy was the decline in agricultural

income.The modern tendency for increasing mechanisation may lead to displacement of agricultural labour and further studies in this area are necessary. In practice it is not a simple process to persuade farmers to make changes in cropping patterns. Therefore a question arises regarding the allocations of the projected additional hectarage and the size of holdings to which these additions could be made. Judicious mechanisation in terms of use of tractors and pumpsets actually must be considered as time sowing and land savings.

There was general agreement that the paper drew attention to new avenues development, which would, if worked out in practice, lead to additional acreage and higher production, and were deserving of feasibility analysis.

SOME FACTS BEHIND AGRICULTURAL POLICY*

Fifth Plan Policy :

Our agricultural policies are set forth in terms of overall objectives of production expansion, restructuring of output, cropping diversification, and inter-sectoral integration as contributants to the national goals of removal of poverty and attainment of economic self-reliance. Our agricultural strategy centres around detailed assessment and exploitation of ground and surface water, new technologies, extension mechanisms, inputs supply, and special attention to vulnerable social sectors. These policies are then translated into performance targets; for the agricultural sector as a whole at 4.7 per cent for the Fifth Plan; and in terms of absolute magnitude for the sub-sectors—for foodgrains 132.9 million tonnes, for cotton 9 million bales, jute 7.7 million bales, milk 29 million tonnes, egg production 12.4 billion etc. The agricultural inputs are similarly expressed in target terms, irrigation at 13.1 million hectares, fertilisers 5 million tonnes, HYV 40 million hectares, credit Rs. 129 crores for the last 2 years of the current Plan etc.

Factors Behind Policy :

In this note, it is proposed to go behind and beyond these formulations of agricultural policy and targets which are sound and necessary, to an examination of some of the basic facts on which such policies and targets must rest.

The Dominant Sector :

To start with, the simplest and most obvious fact is that agriculture is the dominant and key sector of the economy. It is the dominant sector because 80 per cent of our people live off it, 70 per cent of our labour force (directly or indirectly) work in it, and 50 per cent of our Gross National Product is derived from it. It is the key sector because it contributes the major part of the capital formation of the country. This of course is true of all countries in the process of development, that the sacrificing of present consumption in the interest of higher rates of investment and increased future consumption will fall on the majority. The majority in our country are the poor and the majority of the poor are the small and marginal farmers and landless labourers. More specifically agricultural policy must take account of the fundamental fact that this sector despite its being peopled by the poor majority, must produce a surplus of food and fibres above its own subsistence for a one way deployment in the non-farm sector—that is without any

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* Extacts from the paper written by Dr. Malcolm S. Adiseshiah for the 'KISAN WORLD', Madras, dated 16th February, 1977.

equivalent return transfer to the agricultural sector. That is what our various targets, our levy and procurement systems *et al* are about.

The Small Scale Sector :

A second factor that agricultural policy must reflect is that this sector is essentially a family farm business sector, unlike the non-farm sector in which the factory is the unit of production and where economies of scale and other structural features lead to monopolies and oligopolies. The classical Economists, Mill and Marshall, pointed to the fact that agricultural operations unlike factory operation cannot be simultaneous but must be sequential. A machine can be produced by working simultaneously on all its varied parts and by assembling the final product simultaneously. In farming, ploughing cannot be conducted simultaneously with harvesting. This sequentiality together with spatial limitations to farm management and supervision give the edge to the small family farm organisation. This feature of the predominance of small family units in the agricultural sector is also universal. In the United States, which we associate with giant size farm holdings, only 18 per cent of family farms are large and 94 per cent of commercial farms are family farms. A similar picture is presented in Australia, Canada, Japan and Germany. This means that, unlike the manufacturing sector where a unit manager can use a technology and deny it to others, in the farm sector no farmer can keep others from exploiting fully any technology. Per contra, he himself has to keep in the forefront of its use to avoid becoming a marginal farmer or descending to the rank of a landless labourer or migrating to the city to become a slum dweller. Agricultural policy must be grounded in the atomistic competition that is characteristic of this sector and the continuing search and exploitation of the latest technology that each of its members is engaged in.

The Inputs Dependence :

A third factor that agricultural policy must take into account is that the majority of agricultural inputs are produced outside the farm—the machinery, the fertiliser, the pesticide and even the water and power, so that the farmer's production output and his income are dependent on goods and services over which he has no control. The farmer's standard of living, the objective of the removal of poverty, thus depends on the availability of these inputs and the terms on which they are available to the farmer. Agricultural policy must embrace policy with regard to the production, pricing and distribution of these off farm products.

Price vrs Yield Stabilisation :

A fourth factor that agricultural policy must address itself to is the question of price stabilisation versus yield stabilisation. In the farm sector, price stabilisation increases the farmer's risk. Farm prices and farm output are inversely correlated, so that price fluctuations stabilise incomes by countering the results of output variations. Where yields are stable, stable prices will benefit farmers. This means that in our economy where varying outputs are the rule, price stabilisation is against the interest of the farmer and adds to his risk of low income. It also means that to aim at stable income for the farmer, there should be yield stability, which means assured water supply, a plant variety with low disease risk, and a market which will purchase the output at agreed

prices. There are also indicated as our agricultural research priorities, particularly yield increasing technology.

Employment Generation :

A fifth factor that agricultural policy must take into account is employment generation. Here the rapid population growth of the last two decades has to be taken as a given fact, and the serious implication of the resulting 1,20,000 young workers entering the labour force every week worked out for the agricultural sector in terms of farms size and labour intensity. Agricultural policy which aims simply at increased production, and this is mainly what our policy is, will not create employment opportunities or improve income earning possibilities. No evidence exists that such increased production creates adequate jobs for the continuing new addition to the rural work force. In fact what evidence exists is to the contrary. Given the inputs, 4 States—Punjab, Haryana and Western UP, Tamil Nadu and Andhra Pradesh—can produce and feed the entire country. Hence policy must take account of the fact that the major part of our exploding labour force has to be employed in agriculture, and the creation of employment in the primary sector is as much an objective of agricultural policy as is increased output. The alternatives are costly. The migration of rural labour to the city and the non-farm sector is not simply a negative drain on the farm sector; it is a positive disinvesting force because that sector has been responsible for the cost of rearing the child, youth and adult that is migrating and as it is always the more enterprising and educated who migrate, has also borne the cost of educating the migrant. In this sense, the non-farm sector is a parasite on the farm sector. We have many studies about the gains to the farm sector through the reduction of underemployment of its work force consequent on the urban migration. Studies should be made to compute the capital loss to the farm sector of this urban migration. What then is the agricultural policy that can retain the labour force on the farm. Not mechanisation, evidence is all to the contrary; not only by making rural life more attractive-this is necessary, but because of our capital constraints is a long term programme and in addition any pushing up of agricultural wages leads quickly to mechanisation as seen in Punjab and in Tamil Nadu. There is one way in which labour can be retained on the farm, employment generated and rural life made attractive and that is through land tenure arrangements and consolidatd size of holdings providing the farm family a firm and stable owning and working opportunity. That also would be a means of using land not simply to so combine it with scarce capital as to maximise output, but using it as an employment generation force and developing through it the skills and expertise which the farm sector requires of its labour force. In this sense work on the farm can provide learning experience and discipline equal to, if not more than, what the school can offer its labour force.

The Final Goal :

Finally agricultural policy must be based not on the relationships between increased production, employment and accelerating incomes characteristic of the labour scarce affluent farm economies which our NSS and other farm statistics specialise in, but on the inter-relations between productivity increases on the one hand and poverty, unemployment and inequality on the other which are the

realities of our farm sector. This would also get policy away from taking the existing structures as given and unchanging, and agricultural analysis away from the various input output matrices, marginal analysis and benefit-cost ratio techniques based on such structural parameters. A change in income distribution changes the demand structure,the benefit-cost ratios of various projects, and investment priorities and strategies. This means that our agricultural policy targets should not be based on the false assumption—false in our institutional frame—that supply creates its own demand, but must on the other hand, indicate the magnitudes of the number of rural poor who are to be moved up above the poverty line, the number to be provided gainful employment and to attain all this, how far income inequalities are reduced. In other words Agricultural policy must not simply accelerate agricultural growth but change the nature of that growth.

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