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July 1968



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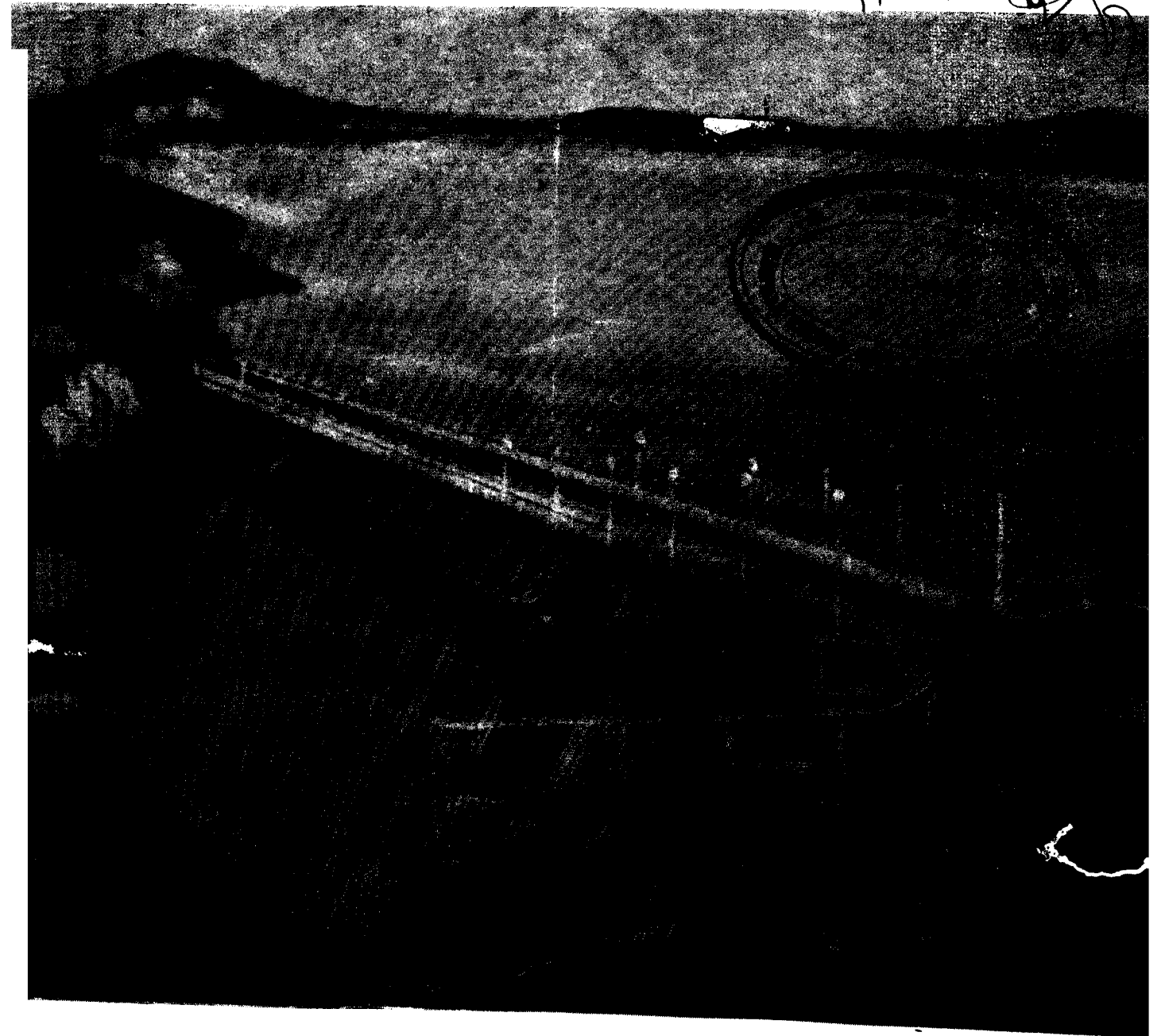
YOJANA

TWELFTH YEAR

13

JULY 7, 1968

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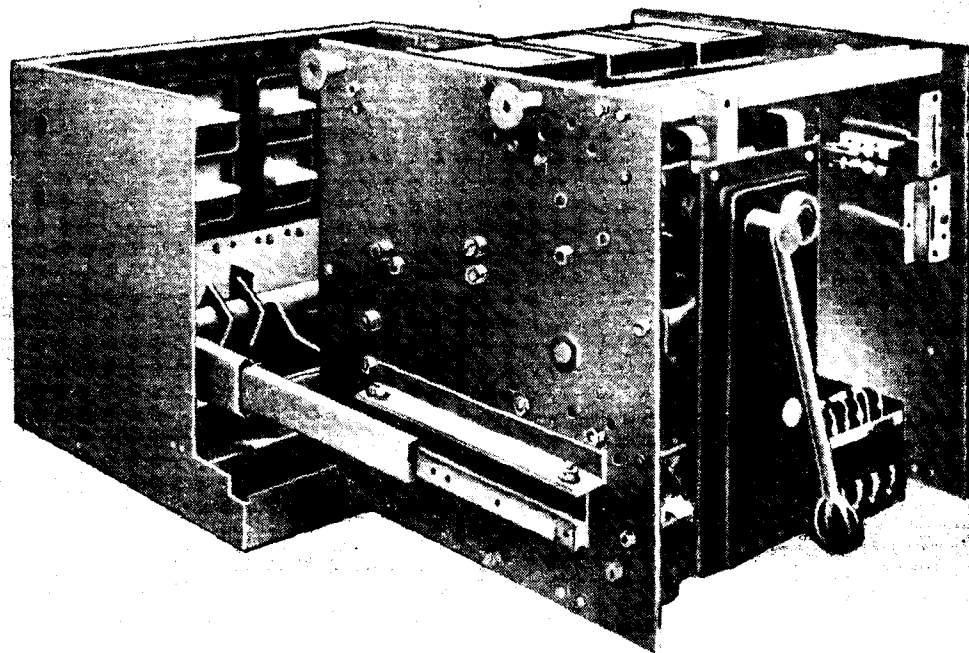


TWENTY YEARS OF D.V.C

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YOJANA

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LEST WE FORGET

The need for providing irrigation facilities to all villages cannot be emphasised too greatly. This is the foundation upon which agriculture depends for its progress, in the absence of which it remains a gamble.

Mahatma Gandhi

Cover painting by Jyotish Bhattacharjee

Yojana seeks to carry the message of the Plan, but it is not restricted to expressing the official point of view.

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THE HAPPY VALLEY

Two decades in the life of any organisation is not long enough to ensure its place in history or to determine its success. Any assessment of the work of the Damodar Valley Corporation, which is 20 years old on July 7, will, therefore, be incomplete and necessarily limited. It is perhaps too early to determine its full impact on the life of the people and the economy of the region it seeks to serve. Nevertheless, it is necessary to attempt such an estimate, if for nothing else, at least to set the record straight.

The Damodar Valley Project enjoys a double distinction. It was the first multi-purpose project in the country; and also it had intimate associations with Jawaharlal Nehru, who pioneered planned development in India. Conceived in the lofty image of Jawaharlal Nehru and at a time when the nation was enjoying the first glow of freedom, the Damodar Valley Project has suffered from an over-dose of publicity raising high hopes of bringing about the promised millenium in the unhappy valley, which so often suffered cruelly at the hands of a capricious and turbulent river. Great expectations were raised, not only among the immediate beneficiaries of the Project, but throughout the country. These expectations, which could not have been reasonably or legitimately expected, were largely unfulfilled. The consequent disillusionment, only served to magnify the so-called failures of the Project. In the process, the achievements of the DVC were not only forgotten, but very often deliberately ignored. And, yet, if its performances in the various tasks assigned to it are taken into account, little justification will be found to regard it as moribund or to suggest that it has reached a dead end. The inauguration of the third 140 MW unit of the Chandrapura thermal power station, to synchronise with the 20th anniversary of the DVC is an effective answer to such criticism.

There is, however, one direction in which the DVC Project has not succeeded to the extent that it might have done; and that is in the matter of flood control. The entire Project was conceived as an instrument for protecting vast areas in the Damodar Valley from periodical floods. For this, again, there are extenuating circumstances, which have to be taken into account before passing judgement.

The DVC Project was originally conceived in terms of eight dams, but owing to financial and other reasons the participating Governments approved the construction of only four dams. The last and largest of these was inaugurated in December, 1959. Because this part of the Project has remained incomplete, the flood cushion available is not big enough to eliminate the scourge altogether but the sting of the Damodar river has become much less and a sense of security has returned to the valley.

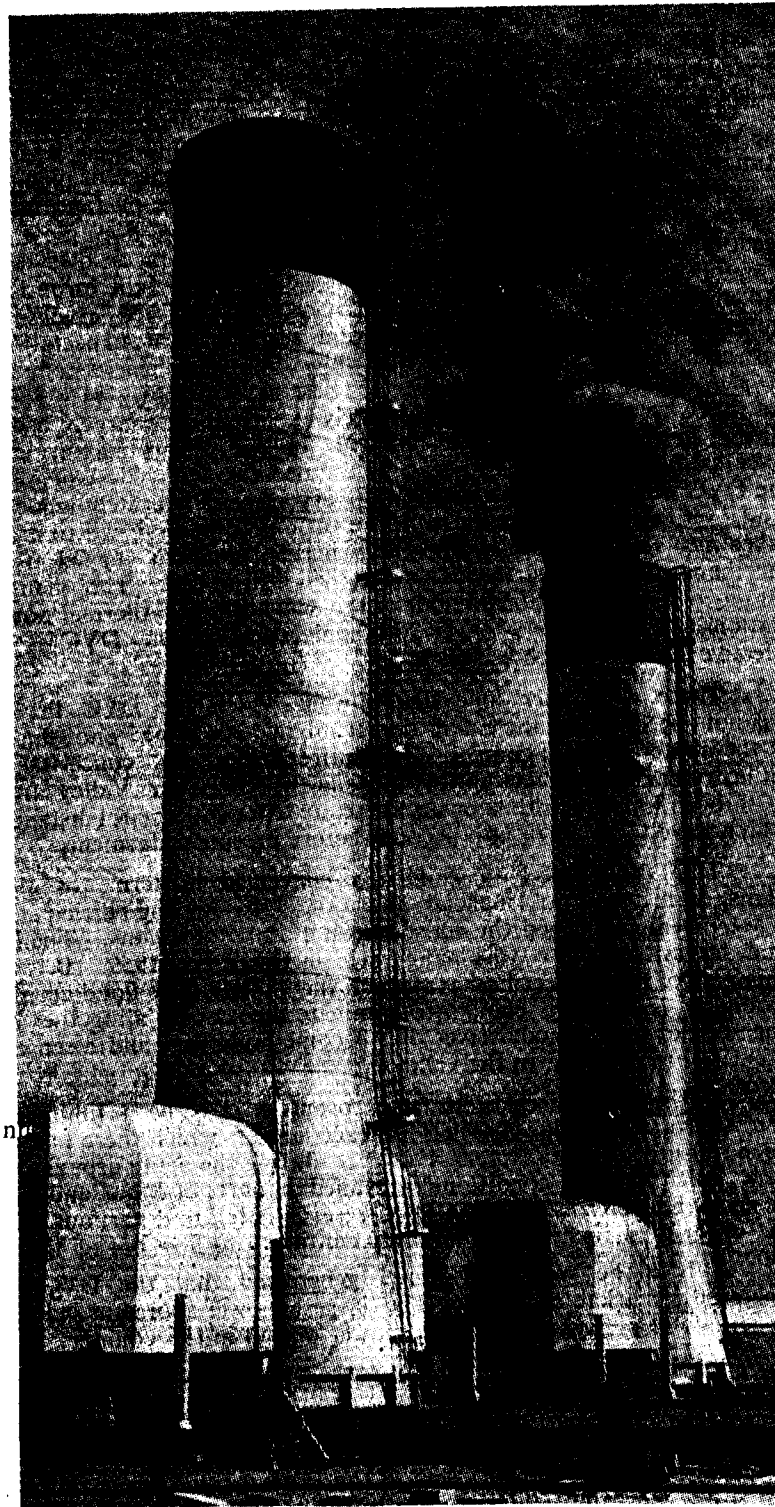
In the case of irrigation, also, progress has been limited by the shortage of field channels on account of which there has not been full utilisation of water. However, during the acute drought last year when famine conditions prevailed in parts of Bihar and West Bengal, the water level in the DVC reservoirs fell to a perilous level, yet water for irrigation and industry continued to flow out of them.

It is in the sphere of power generation that the DVC has achieved remarkable success. The largest power source in India, it generates 11 per cent of the total power output in the country.

All these are signal achievements which have amply demonstrated the vital role of the Damodar Valley Project in the economic regeneration of a part of India. On the 20th birthday of the DVC the nation should acknowledge its role in national development to inspire it to greater effort. And, if the Project could speak, it might say in the words of Othello:

"Speak of me as I am, nothing extenuate,
Nor set down aught in malice....."

TWENTY YEARS OF D.V.C.



There is something exhilarating in watching the realisation of a mighty scheme like this (the DVC) which is going to benefit generations of our people. As I have watched this great undertaking grow and complete each stage of its journey, I have felt this exhilaration. In the course of the past few years, I have visited the Damodar Valley on several occasions and seen this transformation taking place. For me this was not only a big thing in itself, but a symbol of something much bigger than we were trying to bring about in India. This will benefit primarily the people of the large area which is the Damodar Valley, but the scheme is bigger than a local scheme. It is one of our great national schemes and so we can well congratulate the nation on it.

JAWAHARLAL NEHRU

Chimneys of the Bararo thermal power station, one of the pioneering works of DVC. The power house was commissioned in 1953.

TAMING OF DAMODAR, THE TERRIBLE

P. C. ROY

TAMING "Damodar the Terrible" into "Damodar the Bountiful" has been the challenging but exhilarating task for the Damodar Valley Corporation for the last twenty years. On July 7, 1948, DVC became a corporate entity with far-reaching authority vested in it by an Act for implementing a project designed to provide bulwarks to the disasters caused by the Damodar floods, besides water for irrigation, power for industry and general development. The Bill was introduced in the Constituent Assembly (Legislative) three months and a half after India won her freedom. The wounds of Partition were fresh and deep at that time but the desire to survive and give shape to the dream of a new India inspired the legislators belonging to all sections of the House to welcome the concept of a

multi-purpose river valley project. It was widely hoped that when the concept became a reality, the valley of death and destruction straddling the States of Bihar and West Bengal would be turned into 'a valley of prosperity and happiness'.

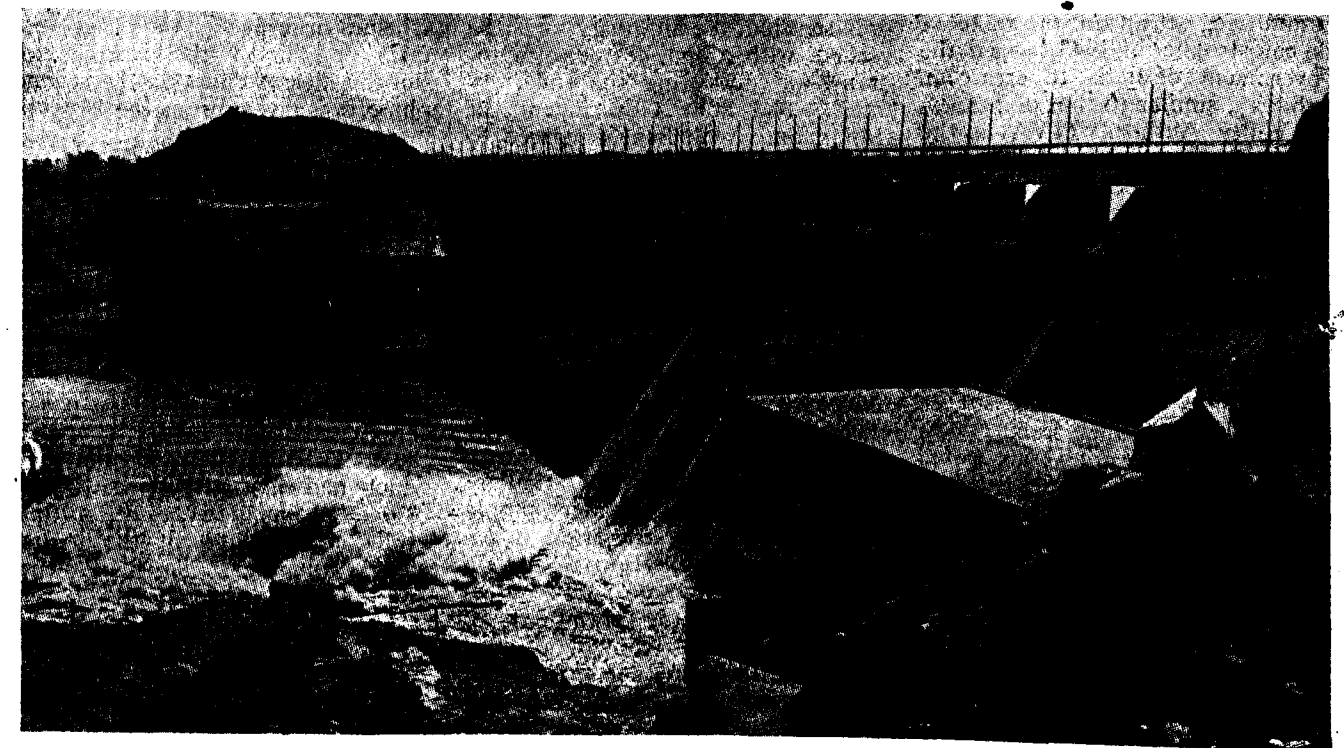
DAMODAR AND THE VALLEY

The Damodar, a wandering and capricious river, rises in the Kamarpet hill in the Chhotanagpur district of Bihar and runs a course of 338 miles. After flowing through the districts of Hazaribagh and Manbhum the river touches the border of West Bengal where it receives its principal tributary Barakar from the north. The united stream flows in a south-easterly direction through the Bankura district. In the vicinity

of Burdwan it takes a sharp turn in a southern direction and enters the river Hooghly, about 30 miles below Calcutta, after a short flow through the Hooghly and Howrah districts. Before entering the Hooghly it becomes, near Salimabad in Burdwan, a deltaic river which starts throwing off distributaries.

The Damodar commands a drainage area of 8,500 square miles, of which 6,960 miles form the catchment area just above the confluence with the Barakar. Though small in area, the Damodar Valley is rich in natural resources, having everything it needs to be prosperous: soil, water, minerals and manpower. But much of the land in the upper valley in Bihar was deteriorating rapidly because, during the monsoon, the Damodar washed away the vegetation and soil while

The Tilaiya dam and its power house. The dam was put into service early in 1953.



the lower valley in West Bengal suffered from heavy floods causing loss of life and property.

The problem of soil erosion and deforestation which the Damodar created for Bihar grew worse from year to year but it was not so painful as the floods during the monsoon months in Bengal. Describing one such flood in 1823, a Calcutta monthly wrote: "Picture to yourself a flat country completely under water, running with a force apparently irresistible and carrying with it dead bodies, palanquins and wreck of every destruction". In the present century four disastrous floods occurred in 1913, 1919, 1935 and 1943. The flood of 1943 was the worst in living memory. By midnight of July 16, the wanton Damodar was transporting 3,50,000 cubic feet of water per second past Burdwan. The water pressure swept away the Grand Trunk highway connecting Calcutta and Delhi, the adjacent main line of the East Indian Railway as well as several bridges. Seventy villages together with their resident population and live-stock were washed away and thousands of acres of fertile lands were destroyed. The untamed river had become the "river of sorrow" for West Bengal.

TVA BECKONS

The Damodar Flood Enquiry Committee, set up in the wake of the catastrophe in 1943, urged the Government of India to create an authority, similar to that of Tennessee Valley Authority (TVA) in the United States of America, to execute a multi-purpose project in the valley of Damodar. The problem posed by the Damodar had to be tackled in the same way as the Government of the United States did in the case of the Tennessee river in 1933; The 900-mile Tennessee, with its satellite river system, has a drainage of 40,000 square miles running through seven States. Twenty dams forming an equal number of lakes have succeeded in containing the torrential flow of water in the basin which used to wash away the crops, homes, schools and bridges. TVA placed a good deal of importance and emphasis on integrated development. Irrigation, power generation, electrification, re-afforestation, research, fertiliser and farm demonstrations were

designed to minister "individually to the civic education of the people in terms of their domestic economy and farm practices, and to the art of democratic self-government in the co-operatives".

The suggestion for the creation of an authority comparable to TVA made by the Damodar Flood Enquiry Committee was reinforced by the memorandum of W.L. Voorduin, Senior Engineer for TVA, who was appointed by the Central Technical Board to strengthen the position of its staff. Voorduin gave in his memo an outline of a plan for achieving flood control, irrigation, power generation and navigation, pointing out at the same time that the prime objective of the multi-purpose scheme should be that "the benefits obtained be distributed on the widest possible basis to the population of the area".

The destiny of the people living in the Damodar valley could no longer be left to the caprices of nature or to any private agency which could not command the necessary authority and requisite resources to tame the turbulent river. The makers of new India felt no time should be lost in setting up a corporation to execute the multi-purpose river valley project. In drafting the constitution for DVC, the Central Government emphasised that "for efficient administration, the authority must be vested with a high degree of autonomy for conducting the undertaking". The State Governments of Bihar and West Bengal agreed to surrender to the Corporation their power so that it could discharge its functions effectively.

DEVELOPMENT PROGRAMME

The basic feature of the Damodar valley project is that it constitutes a compact unified multiple-purpose river basin development. The statutory functions of the Corporation are: (1) flood control; (2) promotion and operation of irrigation schemes, water supply and drainage; (3) generation, transmission and distribution of electric power; (4) promotion and control of navigation; (5) promotion of afforestation and control of soil erosion in the Damodar valley; and (6) promotion of public health, agriculture, industrial, economic

and general well-being of the Damodar valley and its area of operation.

The various schemes, which the project sought to implement, were to be taken up in two phases. The first phase programme comprised: (a) four dams at Tilaiya, Konar, Maithon and Panchet Hill with hydel power stations attached to each of them, except in the case of Konar where the construction of the station was deferred on financial grounds; (b) a thermal power station at Bokaro with an ultimate capacity of 200 MW; (c) a grid covering over 800 miles of transmission lines and a number of substations and receiving stations; and (d) an irrigation barrage at Durgapur with 1,550 miles of irrigation-cum-navigation channels. In the second phase were envisaged four dams at Balpahari, Bokaro, Aiyar and Bermo, together with hydro-electric stations and corresponding extensions to the transmission system. Some subsidiary activities like afforestation, soil conservation, malaria control and fishery were also to be taken up. The activities of the Corporation were later integrated with the over-all development programme of the country and its plans and programmes were merged with the Five Year Plans.

The flood control and irrigation projects were completed by 1959. Some improvement and extension schemes in respect of the latter were taken up under the Third Plan. But the idea of dams in the second phase was given up as the Government of West Bengal, which was the main beneficiary, was of the opinion that the cost involved in the construction of additional dams was not commensurate with the benefits likely to accrue. Power generation and distribution, however, had to be steadily augmented. The growth of industries in the valley, the "Ruhr of India", made the planners to expand the power supply activity of DVC far beyond the confines of the Voorduin plan, which had envisaged the setting up of one thermal power station only at Bokaro to augment the hydro-electric plants at Tilaiya, Panchet and Maithon.

FOUR DAMS

The Tilaiya is an all-concrete dam on the river Barakar, 130 miles



The Damodar, a turbulent and capricious river, has now been tamed.

above its confluence with the Damodar. The construction work at the dam site began in January 1950 and the dam was declared open and dedicated to the people of the valley for their welfare and progress by Prime Minister Nehru on February 21, 1953. The reservoir submerges an area of 16,107 acres with a total storage capacity of 3,20,000 acre feet of water.

The site of the Konar dam is on the Konar river, a tributary of the Damodar, in the Hazaribagh district of Bihar. This dam, 160 feet high, is a composite structure with a 848 feet long concrete section and an earthen embankment on the flanks running to a total length of 11,639 feet. It was completed in September 1955. It stores 2,60,000 acre feet of water and the reservoir supplies cooling water for the Bokaro thermal power station.

The Maithon, an earthen dam on the river Barakar near the border of Bihar and West Bengal, was inaugurated on September 27, 1957. Mainly designed for flood control, it is 2,062 feet long.

The Panchet Hill dam, situated in the Dhanbad district of Bihar, stores 12,14,000 acre feet of water. It was commissioned in December 1959.

Perennial irrigation over a wide area in the lower valley is ensured

by the twin dams of Maithon and Panchet Hill. The four dams give effective control of floods up to a peak of 6,50,000 cusecs and the total area protected against floods is about 2,800 square miles.

The barrage at Durgapur in West Bengal is 2,271 feet long and 38 feet high. It receives water from the four storage dams and distributes water for irrigation through a network of canals, distributaries and drainage channels of about 1,400 miles in length. The canals and distributaries are designed to provide kharif irrigation to 9.73 lakh acres and rabi irrigation to 1 lakh acres. The target of rabi irrigation has, however, been revised to 55,000 acres to provide water for navigation and industrial consumption. In the interest of economy and efficiency, the operation and maintenance of the barrage and irrigation system was transferred to the Government of West Bengal on December 2, 1967, almost after the completion of the barrage and the canals. The State Government has been made responsible for the execution of the Third Plan schemes of irrigation on behalf of DVC.

POWER DEVELOPMENT

The Bokaro thermal power station forms an important link in the DVC power system. The cons-

truction of this steam power station, in addition to the hydro-electric stations in the valley, was considered a necessity for "firming up" or steadying the flow of hydro-power. The Damodar and its tributaries are rain-fed. Even with the water in the reservoirs at the dam sites, it is not possible to have sufficient water all the year round for producing electricity to meet the extended peak demand.

The Bokaro station was commissioned in 1953 but the demand for power increased as the valley, rich in mineral resources, became the hub of industrial expansion under the development plans. It became necessary to expand the power supply of DVC. The second thermal power station was, therefore, set up at Durgapur. It was commissioned in 1960, and was followed by Chandrapura in 1964. The efficacy of the thermal power stations was much in evidence when the serious drought of 1965-67 crippled the capacity of the hydro-electric power houses. In spite of handicaps, DVC was able to meet increased local demands for power not only from its own customers but also from the neighbouring systems of Rihand and Hirakud, which, too, had been badly affected by the drought.

The present capacity of the DVC power system is 921 MW. The power is received by 53 consumers.

DVC's substation at the Indian Iron and Steel Works, Burnpur.



through twenty-eight 132 KV sub-stations and eighteen 33 KV receiving stations. The power stations are inter-connected with the coke oven power station of the West Bengal Government, the thermal power station of the Sindri fertiliser factory and the hydro-electric station at Rihand in U.P. All these power stations, operating side by side, form the nucleus of a zonal grid system in the eastern region.

POWER MARKET

The major consumers of DVC power are the iron and steel industry, coal mining, copper mining and production, cement manufacture, locomotive manufacture, chemical and paper industries. Apart from the Tata Iron and Steel Co., the Indian Iron and Steel Co. and the A.C.C., DVC does not supply power directly to any private industrial units. Coal mining and some small industries, namely textiles, glass, cycle manufacture, engineering works, gas works, etc., receive power supply through the distributive licencees like the Sijna-Electric Supply Corporation. Some of the coal mines of West Bengal and Bihar and other industries receive power through the State Electricity Boards of West Bengal and Bihar. The electric traction of the Eastern and South-Eastern Railways depend on DVC's power resources, which have also been a factor in the location of the fourth public sector steel plant at Bokaro.

DVC sold about 79 million units of electrical energy and earned a revenue of about Rs. 41 lakh in 1953, the first year of its operation. During the year ending March 1967, it sold 3717 million kWh and earned a revenue of Rs. 21.50 crore.

The subsidiary activities of DVC cover a wide area ranging from navigation, afforestation, soil con-

servation and development of fisheries to malaria control, sanitation and rehabilitation of displaced families. The left-bank irrigation canal of the Durgapur barrage has been developed as a navigation canal to the Hooghly river, 85 miles away. Under an agreement with the Corporation, a shipping firm runs a bi-weekly service between Durgapur and Calcutta. DVC is implementing the scheme of afforestation and rehabilitation of the denuded wastes partly in its own acquired lands but mostly by inducing the State Governments of Bihar and Orissa to take up afforestation in the Damodar catchments. The research station at Deochanda has evolved techniques of soil and water conservation which are being demonstrated to the farmers.

The development of fisheries in the storage reservoirs of DVC, having a total cultivable area of about 50,000 acres for production of 800 tonnes of fish per year was taken up by a Fishery Department under a phased programme. From July 1966 the Central Fisheries Corporation has taken over the Department on lease on payment of an annual rental of Rs. 10,000. More than 20,000 families displaced from the areas acquired by DVC for its dams and power stations have been given land, house or cash compensation. The rehabilitated villages bristle with improved housing structures, community centres, wells for drinking water and irrigation tanks. The marshy and malarial tracts of the lower Damodar have been transformed into green and prosperous fields.

STORY OF FULFILMENT

It was not roses all the way for DVC's twenty years. There have been short-falls not only in achieving planned targets but also

in utilising built up targets". A tissue of compromises had to be woven on many issues between the Central and the two State Governments of Bihar and West Bengal, each jealous of its own particular interest. But all these dwindle into insignificance before the lofty peaks of achievement. Before the establishment of DVC, floods of the order of 3,50,000 cusecs brought destruction and suffering in the valley. Flood control works now give protection up to a flow of 6,50,000 cusecs. Crop failure in one year out of every three was a regular feature in the valley before DVC came into being. Today about 7 lakh acres under cultivation are assured of water supply for kharif crops and about 42 thousand acres for rabi crops.

The DVC power system is the largest in the country. It generates more than eleven per cent of the country's total power output. The navigation canal provides a direct low-cost water route from large manufacturing industries in the vicinity of Burdwan and Durgapur to world shipping lines leaving the port of Calcutta. The advent of DVC has also brought about construction of new roads, transport and communication facilities.

The health and welfare of the industrialised region are well looked after. The incidence of various diseases like malaria and black fever have virtually disappeared. Schools and vocational training centres are rapidly reducing illiteracy. Increasing contacts with the outside world and infiltration of new ideas and concepts of a better way of life are but a chain reaction of the many direct and indirect benefits accruing to the inhabitants of the valley which has become a fragment of an emerging India.

The generation of electric power and its utilisation is the barometer by which the progress of a country during the modern times is measured.

Lal Bahadur Shastri

20 YEARS OF D.V.C

OBJECTIVES AND ACHIEVEMENTS

G. P. GANGULI

THE Damodar Valley Project is a multipurpose plan designed for the development of the Damodar basin in the States of West Bengal and Bihar. Its principal objects are flood control, irrigation and generation and distribution of electric power, while its subsidiary objects include navigation, soil conservation, pisciculture, promotion of public health and agricultural, industrial, economic and general well-being of the valley.

The DVC has built a dam each at Tilaiya, Maithon, Panchet and Konar with a hydro-electric plant attached to each of the first three dams and 3 thermal power stations

at Bokaro, Durgapur and Chandrapura. Their total installed capacity is 1,061 MW as given below :

Tilaiya	4 MW
Maithon	60 "
Panchet	40 "
Bokaro	247 "
Chandrapura	420 "
Durgapur	290 "

Also a transmission and distribution system, comprising 28 sub-stations and 17 receiving stations and 981 route miles of transmission lines, has so far been built. For the purposes of irrigation and navigation a barrage across the Damodar at Durgapur and a network of canals and distributaries running to

2,500 kilometres, including an 136-km. irrigation-cum-navigation cannal on the left bank of the Damodar, has been constructed.

The Chandrapura thermal station's first unit was commissioned according to plan in October 1964. The second unit, also of 140 MW capacity, went on line in May 1965. The construction of the third unit is making good progress and is expected to be commissioned this year. The sanction for a fourth unit of 120 MW has already been received.

The following table shows the progress of power generation, sale and revenue earned by DVC:

Year	Generation (in million kWh)	Sale (in million kWh)	Revenue (in Rs. lakh)
1959-60	1458	1312	605
1960-61	1637	1624	769
1961-62	2083	2142	1039
1962-63	2622	2606	1315
1963-64	2804	2851	1510
1964-65	3000	2949	1619
1965-66	3715	3411	2031
1966-67	4134	3717	2150

(The sale includes purchase by the DVC from other sources.)

Flood Control and Irrigation

As a result of the construction of the four dams out of the 8 originally suggested, the incidence of flood has been greatly reduced in the Damodar Valley area; though it must be said that the lower valley of the trans-Damodar area, as it is called, requires separate flood protection measures.

The management and maintenance of DVC's irrigation and canal system, including the Durgapur barrage, have been transferred to the West Bengal Government on an agency basis.

The progress of irrigation in the command area is shown below:

Year	Kharif (lakh acres)	Rabi (lakh acres)
1956-57	0.11	—
1957-58	2.91	0.08
1958-59	4.37	0.08
1959-60	5.25	0.11
1960-61	5.53	0.19
1961-62	6.24	0.25
1962-63	6.25	0.24
1963-64	6.39	0.36
1964-65	6.54	0.38
1965-66	6.68	0.42
1966-67	6.90	0.40



An inside view of the hydro-electric power house at the Maithon Dam of DVC

Soil Conservation

The Soil Conservation Department of DVC was started in 1949, to prevent soil erosion in over 7,000 sq. miles of the entire upper catchment, to reduce the silting of the reservoirs and to check peak floods.

Experiments in soil and water conservation and improvement of the productivity of the land are regularly carried out by this department in a 355-acre research station at Deochanda, and the techniques evolved there are demonstrated to the farmer through the extension branch. A number of erosion-resisting structures have been built in the catchment area. Denuded forests are scientifically maintained. In course of time, the timber from the re-forested areas is expected to fetch a considerable amount of revenue. Lac culture has been started on an experimental basis. Several farms have been set up in the foreshore lands of the four reser-

voirs and a variety of kharif and rabi crops are raised there.

Experiments for the proper utilisation of irrigation water are being conducted at a research station at Panagarh in the lower Damodar valley. A rapid soil testing unit was established in 1958 as part of the United States Technical Co-operation Programme under the Government of India. The Department has also been conducting since 1954 a six-month course of training in soil conservation techniques sponsored by the Government of India. DVC's soil conservation officers are sought after by many other similar organisations at home and abroad.

A Fishery Department was started in 1950. The storage reservoirs of DVC have a total annual culturable area of about 50,000 acres with a production potential of about 800 tonnes of fish every year. DVC fisheries have now been leased to the Central Fisheries Corporation of the Government of India.

Public Health

DVC colonies and shoreline villages are now absolutely free of malaria. The Medical Department started a malaria campaign in 1950, when malaria broke out in epidemic form among the pioneer settlers of the Konar camp. By 1960 malaria was completely eradicated from the DVC area. Besides the malaria control activity in the reservoirs and in the Barrage pond at Durgapur, the organisation undertook investigations in its Malaria Research Laboratory.

Up to March 1967, DVC has drawn Rs. 209.72 crore from the participating Governments, contributions of the Centre, West Bengal and Bihar being Rs. 54.79 crore, Rs. 106.87 crore and Rs. 48.06 crore, respectively.

Foreign loans equivalent to \$101.38 million were drawn up to 31.3.67. Most of these loans were received from the International Bank for Reconstruction and Development.

20 YEARS OF D.V.C

SOIL CONSERVATION AND TERRACE FARMING

A. K. GANGULY

ACCORDING to Dr Hugh H. Bennett, distinguished U.S. soil scientist, soil conservation is "the most efficient known system of using and managing land for maximum profitable production on a sustained basis." This is being done by DVC, which has put a premium on the crop production in this programme. It has been helping the farmers to raise a crop from their eroding lands after terracing the area. In addition, it has introduced methods for raising better crops like *gora* paddy, *arhar*, maize and groundnut, in place of the low-yielding millets like *gondli*, *marua*, and an oil seed crop, *saraguja*.

The Soil Conservation Department of the Damodar Valley Corporation (DVC) was set up in Hazaribagh in 1949 to deal with the problems of soil erosion in the upper catchment area of 4.4 million acres. In this area, ruthless exploitation of forests, over-grazing, and improper land management have exposed the surface of the soil to the beating rains. It has resulted in the erosion of soil by run-off water and silting of the stream beds and has increased the danger of floods in the lower basin.

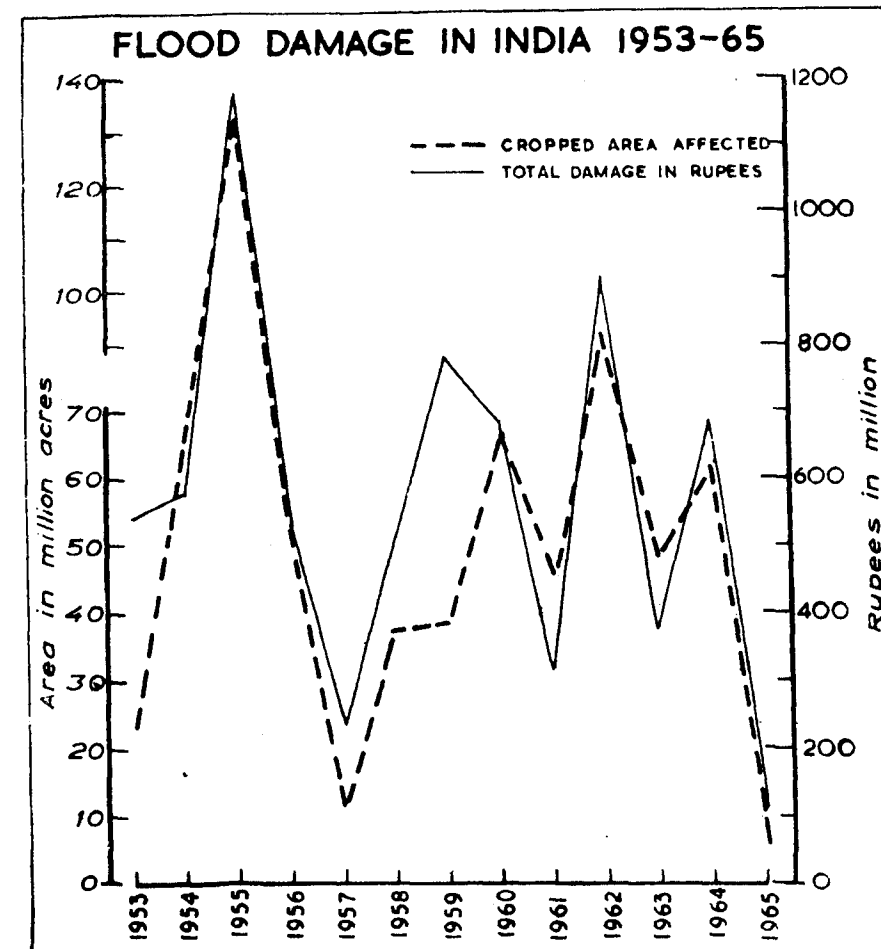
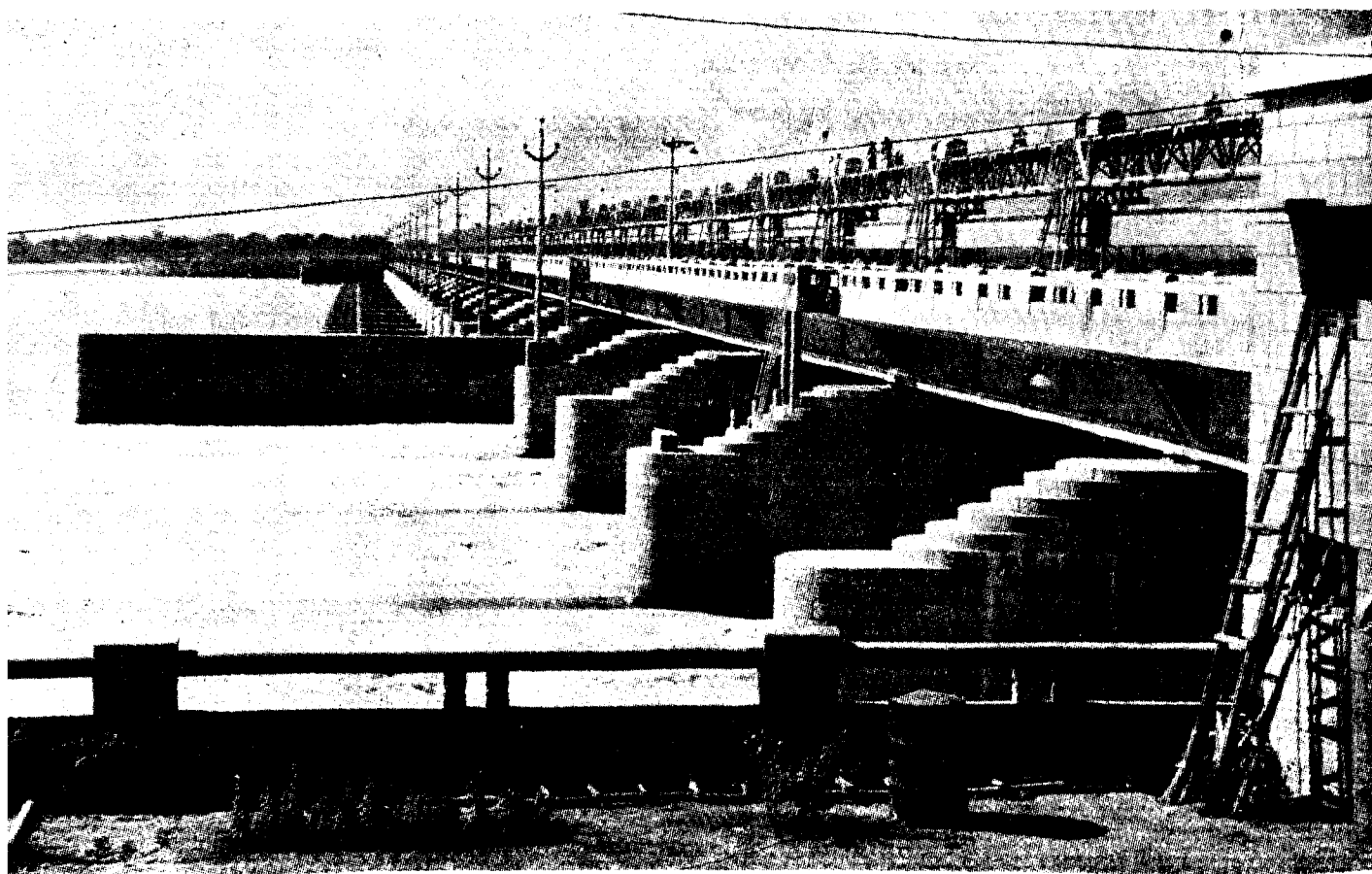
Although the four dams (Pan-chet, Maithon, Tilaiya and Konar) built across the Damodar and its tributaries have considerably reduced the flood menace for the time being, they may not be in a position to do so for long; because the silt which has been depositing in the river beds is reducing the storage capacity of the reservoirs. This is why DVC's Soil Conservation Department has been engaged in the task of reducing the silting rate of the reservoirs through soil conservation measures in the catchment area.

load brought down by flowing water, (2) increase of the wetted surface area and inducement of the underground or sub-soil storage, and (3) moderation of flash floods of the stream flow and consequent reduction of the bed and bank erosion in the downstream area.

Storing For The Future

The most important role the check dams have played is in the form of direct storage of debris load

The Durgapur barrage receives water from the four storage dams and distributes it for irrigation to 11 lakh acres of land.



The plots of land which are heavily gullied are treated by constructing earthen check dams across them to hold back the soil which is being washed down from above. These check dams impound sizable volumes of water along with the silt at places. Some 1,113 such structures have so far been built on an area of 42,000 acres. Already 70 check dams have become perennial sources of water.

The check dams help in (1) the direct storage of water and debris

and storage of water. It has proved a boon to local farmers. The capacity of these dams for retaining water has considerably helped to ease water scarcity in the surrounding areas. Constructed with the active co-operation of the villagers, these dams have also brought a portion of cultivated lands under lift irrigation and augmented the food potential of the areas.

The upper valley has but a small irrigation system. The cultivated lands have to depend largely on the

monsoon rainfall whose erratic nature has ever been a cause of despair. Much of the rain water comes down in a series of storms and moves down the stream channels. The check dams aim at storing at least a portion of the rain for future use of the farmers in times of scarcity. This activity goes a long way towards planning a better water management programme by the farmers without any prejudice to the water yield of the large reservoirs.

In addition, the check dams tend to recharge ground water so much that in the project areas most of the wells which formerly dried up in summer have now become perennial. The construction of these structures provides subsidiary employment to a large number of local farmers in times of their necessity and creates local resources for the development of the areas. The check dams have created an irrigation potential of over 3,000 acres for kharif and rabi crops. It is estimated that these acres can yield 180,000 maunds of food.

Terraced Farming

The Soil Conservation Department has also been having a pro-

gramme of conserving the foreshore land of the four major reservoirs which are submerged during the flood season and emerge when the water subsides. The planting of grass in these areas could have been ideal, but owing to the acute demand for food, the department has planned to introduce terraced farming. The total area of the foreshore land in the four reservoirs comes to 30,000 acres out of which about 27,000 acres are arable. These are being leased to neighbouring farmers who are likely to get a yield of 18 to 20 maunds of grain per acre.

The Department's farms at Panagarh, Deochanda, Sewai, Urwan, Bunlu, Konar, Maithon and Panchet are also contributing towards the country's food production programme through their continuous research programmes.

By the Third Five Year Plan, a total of 1,06,582 acres in the Upper Valley have been afforested jointly by the DVC Forestry Section and the Bihar Forest Department.

Large-scale planting is being taken up in the denuded forests which constitute about 40 per cent of the total forest area. The introduction of improved species of trees

ensures effective cover to denuded lands.

All the soil conservation measures aim at maximum and sustained production without waste from any acre of land in the entire watershed. DVC is very much alive to the waste problem and has drawn up a comprehensive scheme for the treatment of the eroded areas in the Upper Damodar watershed.

DVC has received grants of Rs. 2.5 crore for soil and water conservation from the U.S. PL-480 funds. In terms of work, the grants help in (a) bringing under reforestation 40,000 acres of denuded forest lands; (b) protecting and improving 16,000 acres of gullied area; and (c) terracing 45,000 acres of sloping uplands. In addition, PL-480 grants will also help in (i) soil survey of about 700 sq. miles of the upper catchment area for soil conservation planning; (ii) research work on the utilisation of the foreshore area for increased food production; and (iii) analysis of chemical and physical properties of soils.

These grants have also been helping to provide free soil testing facilities to farmers of the region for better and sustained production from their own lands.

20 YEARS OF D.V.C

THE Damodar valley is one of the richest areas in the country in minerals and metals. It contains a large percentage of copper reserves as well as dynamite, iron ore, coal, mica, chromite, fire-clay and china-clay. The area possesses about 80 per cent of the coal reserve of the country, which accounts for its being a traditional industrial area with the Tata Iron and Steel Works at Jamshedpur, the Indian Iron and Steel Works at Kulti and Burnpur and the Indian Copper Corporation at Mosabani, to mention only a few.

During the Second World War, serious shortage of power in the area affected the industrial installations in the valley, which prompted the Central Government to think of ways and means of providing sufficient power to keep the wheels of industry running. It was in this context that

POWER FOR INDUSTRY

P. R. ROY CHOWDHURY.

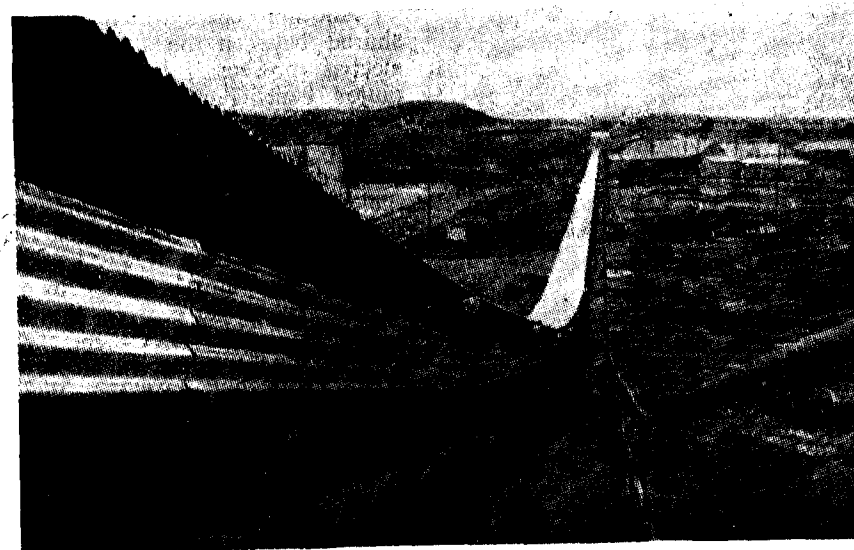
the DVC power projects were planned; and, in February 1953, the first 50 MW unit of the Bokaro Thermal Power Station was commissioned. Since then the DVC power system has grown to meet the power requirements of the industries in and outside the valley. The consumers of the DVC power include (1) private electrical supply companies and the State Electricity Boards of West Bengal and Bihar; (2) large industries which include iron and steel plants, the Chittaranjan Locomotive Works, the Hindustan Cable Factory, and other industries; and (3) railway traction.

Coal Mining

DVC does not supply power directly to any coal mines; but DVC power purchased in bulk by three

private electric supply companies is made available to coal mines in the Jharia coalfields and the western and eastern parts of the Raniganj coalfields.

The three companies also supply power to many towns and other industries. They have their own generating stations; but their capacity is limited. Before DVC came into being they used to supply power to the coal mines from their own stations. But as the coal mining industry's demand for power increased they started purchasing power from DVC for supplying to their service areas. New coal mines outside the licensed areas of the companies were opened and those inside have been modernised with DVC power. Besides, a large number of coal washeries, which have



Coal conveyor from the Chandrapura power house to the Dugda coal washery

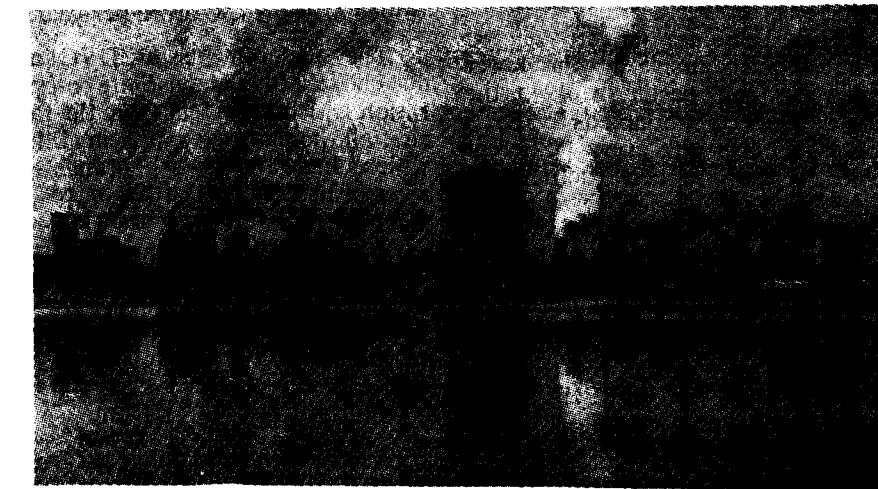
come up in the area, are receiving DVC power through the Bihar State Electricity Board.

The easy availability of electricity from DVC has replaced steam and diesel which were used in earlier days as the only source of power in the operation of coal mines. In all mining operations dependability of power supply is of paramount importance, particularly for the safety of underground workers. In the initial stages, mine owners had some doubts about the dependability of power supply from an electric utility. They had set up their own power stations for all the drives required for mining operations, but these served only the limited areas where certainty of power supply was not so important. But now-a-days most of the mining operations are carried out with electricity, both for economy as well as for efficiency. Electricity is used in the coal mines for (i) winding, (ii) pumping, (iii) ventilation, (iv) compressors, (v) coal cutting machines, (vi) loaders, (vii) haulage and (viii) lighting purposes. In case of failure of electric supply, particularly during the monsoon, coal mines are likely to be flooded. Extensive pumping with the help of electricity is then required. But in case of haulage and ventilation, standby arrangements are usually maintained. The coal mining industry also includes a number of coal washeries. DVC supplies power to the washeries through the Bihar State Electricity Board.

About 10 per cent of the total power supply from the DVC system is consumed by the coal mining industry.

Iron and Steel

Large quantities of uninterrupted power supply are essential to a modern integrated steel plant. In



The Tata Iron and Steel plant, a major consumer of DVC power

case of power failure, plants and machinery suffer damage. To meet this eventuality, steel plants usually install a captive power station. But, such a station cannot meet the needs of a modern plant. However, DVC has been able to assure the iron and steel plants with a steady supply of power at economic rates; and its major customers are the Indian Iron and Steel Works at Burnpur and

Kulti, the Tata Iron and Steel Works at Jamshedpur, the Durgapur steel plant and the alloy steel plant at Durgapur. In addition, DVC supplies power to the Bokaro steel plant under construction. No other electric utility in India covers so many iron and steel plants.

About 26 per cent of the total supply of electricity from the DVC grid is consumed by the iron and steel industry.

Railways

Electric traction of trains on DVC power was first introduced in 1958 on two sections of the Eastern Railway, primarily for suburban passenger traffic. For coping with the goods traffic which increased the coming up of the new steel plants at Durgapur, Rourkela and Bhilai and the extension of the Indian Iron and Steel Works and the Tata Iron and Steel Works, the Railway administration gave a serious thought to many alternatives and came to the conclusion that the best was to introduce electric traction. Since then the railway track between Howrah and Moghalsara and a number of other sections have been electrified. Electricity is sup-

plied to a number of feeding posts. Technical arrangements have been so made that in case of power failure at one feeding post it is made good by another one. As a result of electrification of tracks, there has been an increase in line capacity, due to a higher travelling load and greater speed. This has benefited the railways, and increased their income appreciably.

BENEFITS TO BIHAR AND WEST BENGAL

N. K. PRASAD

SINCE the DVC project was launched 20 years ago, seven similar projects have been completed; but, what makes DVC different from the others is that it was the first essay in inter-State co-operation. Notwithstanding the stresses and strains of this difficult relationship, DVC has broadly achieved its purpose. The combination of several functions, each different from the other, as well as a territorial jurisdiction as vast as a State, has made the position of DVC unique in the country.

The Damodar river caused severe flood damage in the lower valley in the past. In 1943, the loss of property amounted to Rs. 8 crore. Things are very different now. With the construction of dams, new properties have been developed and an entire township has grown up at Durgapur. In fact the loss or damage to property in a single year would have been more than the cost of the dams. It is on record that, since the construction of the dams, at least three times the valley was visited by floods of much greater magnitude, but no material damage was done. Protection from floods has been a major achievement of the DVC projects.

The benefits of flood control have gone solely to West Bengal. The same is true about the irrigation facilities. The original idea was to provide irrigation to 9.73 lakh acres of kharif crops and 55,000 acres of rabi crops in West Bengal. So far, the actual utilisation has reached 6.9 lakh acres of kharif crops and 46,000 acres of rabi crops. The latter, due to double cropping, should really be

treated to be of the order of 75,000 acres. The conversion of rural into urban or industrial lands and the consequent reduction in the potential command area is one of the reasons for the shortfall in the target. Another reason is that a number of water courses and field channels still remain to be constructed. The potential for the supply of water is already there.

However, with the present scale of irrigation the additional yield from the irrigated land has been valued at Rs. 14.98 crore per year.

The achievements of DVC are due entirely to the inter-State co-operation which is evident from the fact that all the dam sites are in Bihar which has allowed thousands of acres of its land in the State to be submerged, leading to the loss of cultivation and displacement of population. Without this sacrifice on the part of Bihar, agriculture in West Bengal could not have benefited.

Benefits to Bihar

What benefits did Bihar get from the DVC projects? It is true that flood control and irrigation benefits have gone wholly to West Bengal; but the industrial uses of water are benefiting both the States. For instance, a number of coal washeries have been set up in Bihar, because the perennial supply of water has been assured through storage of water and its controlled discharge and regulation. It may be mentioned that most of the discharge from the Konar reservoir is used up by the industries located between Konar and Panchet.

Another benefit which has been shared between the two States is electric power; Bihar being the major beneficiary. One advantage of power generation by DVC, rather than by the State Electricity Board or a departmental agency, is that the States have to meet only one-third of the cost. The other is that, in course of time, DVC has built up enough resources of its own to meet nearly 65 per cent of the cost of its projects. DVC has now reached a stage where it has become able not only to meet the running cost and interest and depreciation liabilities, but also to create reserves, and to distribute profits. These are direct benefits to the participating Governments. The benefit to the consumers is that DVC power is comparatively cheap. An industrial explosion of the Damodar valley has been made possible because of the provision of cheap power and water.



The reservoir of the Maithon dam which has been designed mainly to control floods in Bihar and West Bengal.

One benefit which Bihar enjoys in a far greater measure than West Bengal is in the matter of soil conservation. Although some areas of West Bengal, too, have been taken up for afforestation, soil conservation will, naturally, be required only in the upper valley which, almost wholly, falls in Bihar. Apart from contour bunds and terraces in the uplands, DVC has also built a number of check-dams in the low-lying areas. These check-dams, while preventing the flow of silt, have created small reservoirs of water all over the Hazaribagh and part of the Dhanbad district. DVC demonstrated the use of these reservoirs during the last drought. DVC has also been increasing the forest wealth of Bihar.

IRRIGATION and NAVIGATION

S. R. GHOSE

THE construction of a high dam, a barrage or a major canal system in record time is no doubt a great engineering feat. But the success of any irrigation project lies in utilising the potential and bringing in, as quickly as possible, the benefits of irrigation to land. In this context the small arteries of the irrigation system—the water courses and village channels—are as important as the barrage and the main canals. The usefulness of the DVC projects for irrigation depends on these channels.

The DVC network has so far covered 700,000 acres of kharif and 42,000 acres of rabi lands. The picture may not appear to be gloomy, but when we consider the fact that 220,000 acres were receiving kharif irrigation from the old Damodar canal before it was integrated with the new DVC canal system, the increase in kharif acreage is not very impressive. There is no doubt that the development of irrigation has been slow.

According to the DVC Act, the Corporation was responsible for the bulk supply of water. The project did not envisage the construction of water courses and village channels to carry water to the fields. In 1961, however, DVC decided to carry out two schemes, namely, "Water Courses" and "Improvement and Extension" schemes, at a total cost of Rs 5.25 crore to improve the distribution system. A start was made with the survey and preparation of schemes, but before these received the desired momen-



DVC for the farmer. A painting by J. Bhattacharjee.

tum, the operation and management of the canals was transferred to the Government of West Bengal. The responsibility for execution of the schemes is now that of the West Bengal Government.

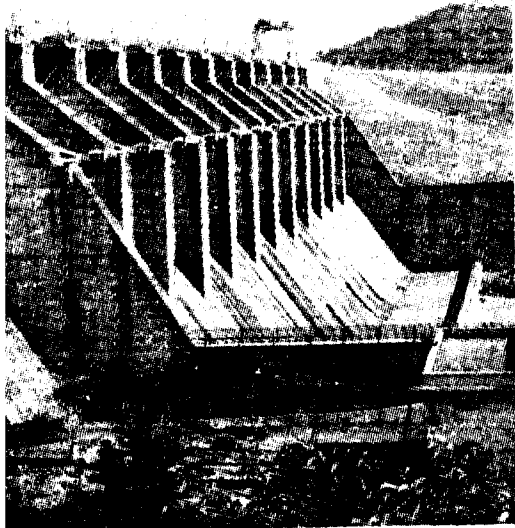
The total available storage of water in the DVC dams, after allowing for losses by evaporation, is 0.76 million acre feet. Adding to it the water available from dry season inflow and dead storage, the quantity available from November to May is 1.02 million acre feet, which allows for the following allocation: Kharif—0.40 million acre feet; Navigation—0.17 million acre feet; Industries—0.34 million acre feet; Release below Durgapur—0.04 million acre feet; and Rabi—0.07 million acre feet. The present targets of rabi and kharif have been

fixed at 9,73,000 acres and 55,000 acres respectively.

The West Bengal Government has launched a crash irrigation programme for the installation of 40,000 tubewells at a cost of Rs 20 crore. Tubewell irrigation or pump irrigation is not, however, included in the DVC system. Thanks to the efforts and enthusiasm of a few prosperous farmers, some pumps were installed on the DVC canals to supply irrigation water. But this arrangement is not very popular because of the high capital cost, the lack of an organisation for mechanical maintenance, and the danger of loss by pilferage.

For Better Use

In the interest of food production and for the benefit of the high



The Maithon dam

lands in the head reaches of the left bank and right bank main canals, the Panagarh branch canal and the Durgapur branch canal should be brought under irrigation with pumps installed by the DVC and the areas should be integrated in the DVC system and assessed at the rates of gravity irrigation. The actual cost compared to gravity irrigation will no doubt be high, but it will not substantially increase the overall capital cost or the cost of maintenance per acre. The cost can be met out of the provision for the Improvement and Extension schemes. It will also remove some of the grievances of the people whose lands have been deprived of the natural irrigation from jungle catchments without alternative means of canal irrigation. In this manner, an additional 10,000 acres of land can be immediately brought under perennial irrigation where more than two crops can be raised.

Similar action is needed in respect of some areas on the right bank bank of the Damodar, which have been deprived of the silt-carrying flood-spill following the construction of the dams. Canal irrigation is not possible in these areas, but shallow tubewells will be a success.

Although industries and navigation have been allotted a large share

of the available storage—nearly 68 per cent, the growth in the case of the former in terms of water use has been only 50 per cent of the target. The navigation canal, on the other hand, has not yet been opened to commercial traffic. Whatever water has been utilised in the canal is against evaporation and absorption losses and some amount for flushing the Kunti.

Surplus Water

Industry may take some more time to develop and by 1971 it is expected that the full allotment will be utilised. This is reassuring. But the prospect of navigation is still not very bright and it is high time that this aspect was seriously considered. More than Rs 9 lakh is being spent every year on its maintenance without any cargo moving. If the canal is abandoned as a utility created for navigation, a substantial volume of water—0.17 million acre feet—can be diverted to rabi land. It may raise the rabi target to 200,000 acres. At present it is also being partly used as an escape and partly as an irrigation canal. These functions may continue. Whether it can be turned into a fishery may

also be explored.

The available data for the period from 1960-61 to 1964-65 shows that the quantity of water available in the reservoirs on November 1, each year, was much more than 0.58 million acre feet, which represents the minimum needed (allowing for losses) after meeting demands of kharif irrigation. A large volume was available even on the first day of June every year. The quantity which flowed through the barrage after generation of power has also been substantial.

Such surplus water may be available in most of the years as the water availability has been worked out on the basis of 90 per cent in bad years. This surplus water, for which no forecast is possible, can be readily used for generation of electricity. It can also be used to irrigate crops such as Boro paddy, or any other crop for which much advance planning is not necessary. What is needed is to plan the annual maintenance of the head reaches of the main canals in such a manner that the period of closure of some canals is brought down to a minimum.

Navigation in a DVC Canal



20 YEARS OF D.V.C

CHANDRAPURA

On July 7, 1968, the Prime Minister, Mrs. Indira Gandhi will commission the third 140 MW unit of the Chandrapura Thermal Power Station. This will mark the 20th anniversary of DVC.



A view of the Chandrapura Thermal Power Station

A pin-point on the map of India and a vast jungle area which sheltered a few scattered villages where men and women toiled for a bare living. The Damodar river, lazily flowing by, was more a thing of terror as it swelled during the monsoon and spelt danger and destruction for those who lived along its banks. There was neither hope nor prospect for better things for the people of the villages in the area. This was Chandrapura, 50 kilometres from the coal city of Dhanbad in Bihar State, less than seven years ago. Today the picture is entirely changed as a new industrial township is taking shape.

The transformation began when DVC decided to locate its third thermal power station there. Chandrapura was chosen because of the various advantages available there. For example, there is a railway station at Chandrapura and the Dugda coal washery nearby.

The Chandrapura power station has been constructed with commendable speed. For the power station, an area of nearly 400 acres was cleared. The first bucket of

concrete for the mat foundation of the power-house was poured in January 1962, and the first unit of 140 MW was commissioned in October 1964. In May 1965, the second 140 MW unit was put into operation. The third unit, also of 140 MW capacity, is to be commissioned on July 7, 1968. With this, the total installed capacity of the Chandrapura power station has been raised to 420 MW.

NEW FEATURES

The Chandrapura power station incorporates many technical advances over other power stations in the country. For example, the turbine works on a reheat cycle, which reheats the exhaust of the high-pressure turbine by passing it through the boiler, thus gaining in efficiency. Again, at Chandrapura one chimney serves two units as against the common practice of having one chimney for one unit. Also, a system has been designed by fixing electric precipitators to guard against contamination of the atmosphere by coal dust.

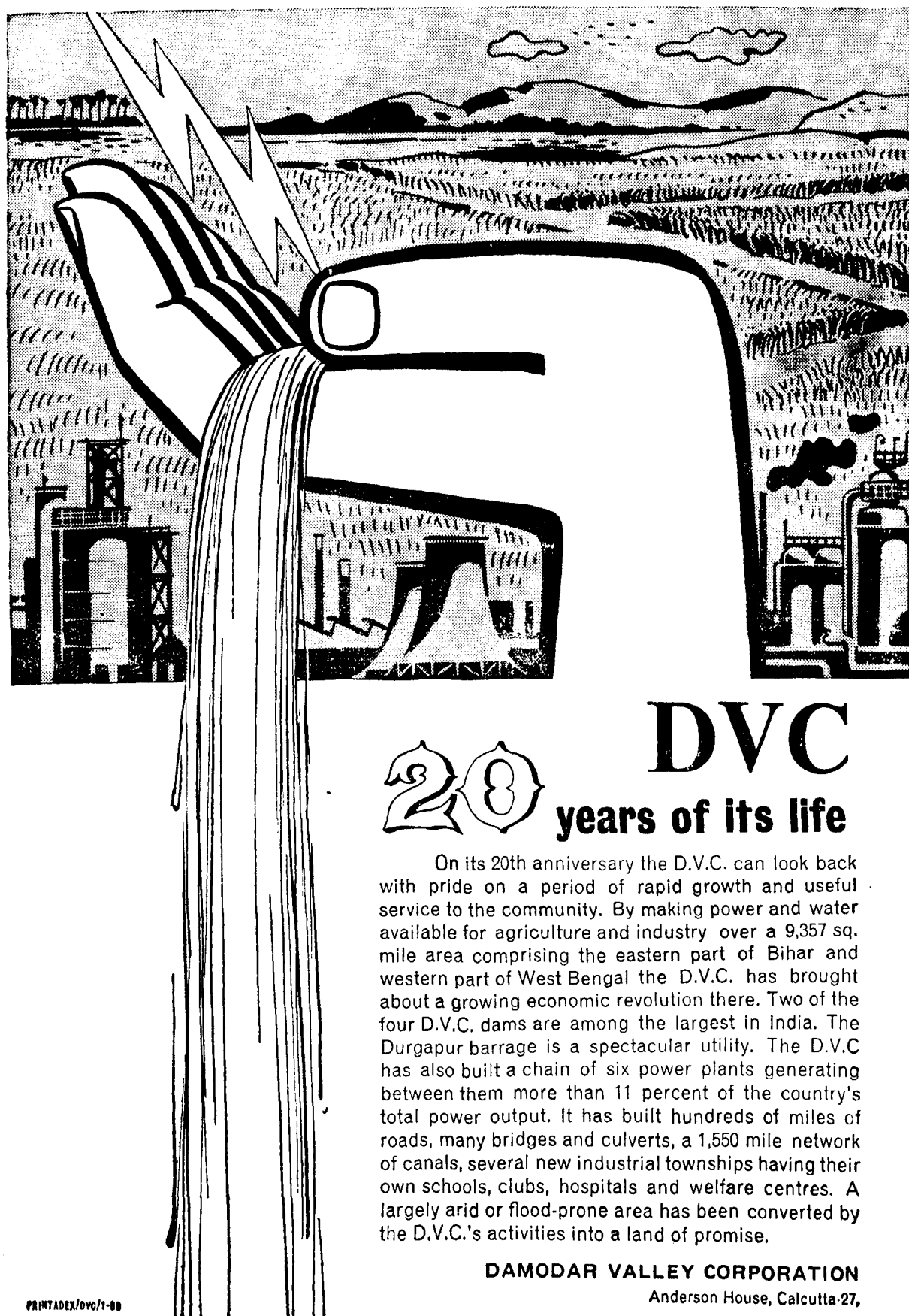
Another interesting feature of the Chandrapura station is that its

boilers have been so designed as to burn middlings of as high an ash-content as 43 per cent. These middlings have no other use and by utilising them DVC is making an important contribution to the national economy.

The unit size, 140 MW, is the largest so far in the country. This is only in character with DVC's pioneering enterprise in power generation. For, DVC was also the first in the country to instal 50 MW units at Bokaro and 75 MW units at Bokaro and Durgapur. The Chandrapura machines work with steam at 1800 p.s.i. which is the highest steam pressure in this country.

The Chandrapura power station has an imposing look with its taller-than-the-Kutb-Minar masonry chimney and a 10,000 feet long conveyor belt for mechanical feeding of coal from the Dugda washery. The shining white chimney stands 265 feet high.

Chandrapura is at present a fast growing township with a Higher Secondary school and a 30-bed hospital to serve the people of the locality.



DVC

20 years of its life

On its 20th anniversary the D.V.C. can look back with pride on a period of rapid growth and useful service to the community. By making power and water available for agriculture and industry over a 9,357 sq. mile area comprising the eastern part of Bihar and western part of West Bengal the D.V.C. has brought about a growing economic revolution there. Two of the four D.V.C. dams are among the largest in India. The Durgapur barrage is a spectacular utility. The D.V.C. has also built a chain of six power plants generating between them more than 11 percent of the country's total power output. It has built hundreds of miles of roads, many bridges and culverts, a 1,550 mile network of canals, several new industrial townships having their own schools, clubs, hospitals and welfare centres. A largely arid or flood-prone area has been converted by the D.V.C.'s activities into a land of promise.

DAMODAR VALLEY CORPORATION
Anderson House, Calcutta-27,

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POWER GENERATION : GROWING DEMAND

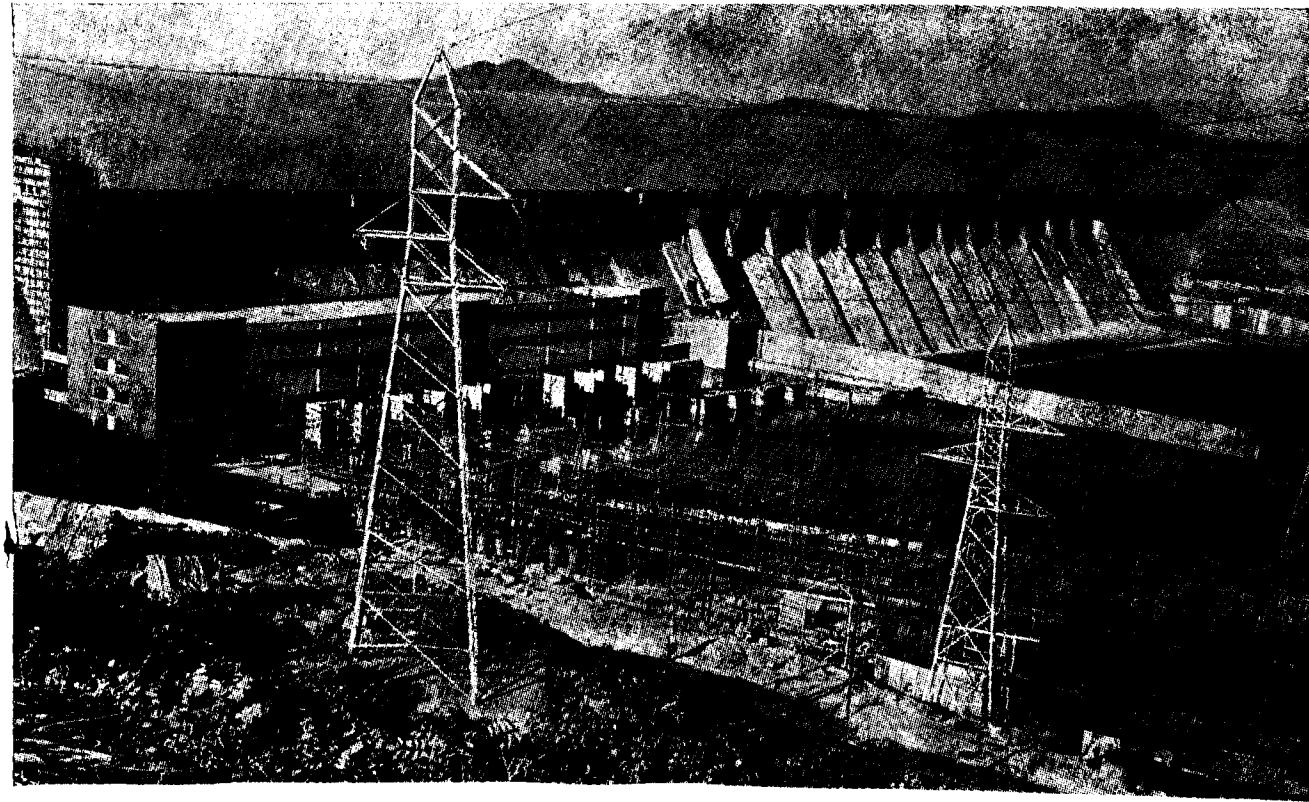
SIDDHESHWAR PRASAD

ELECTRICITY is a concurrent subject under the Indian Constitution with both the Centre and the States having responsibilities towards its development and supply. Its development in the country was marked with small, yet impressive, beginnings at the turn of the century, and its pace was accelerated after Independence. The total installed generating capacity today is expected to have reached 13.5 million kilowatts (5.7 million kw hydro-electric and 7.8 million kw

thermal) and the production this year is likely to be 45,000 million kilowatt-hours. By the end of this year there will be about 263,000 kilometres of transmission and distribution lines of voltages varying from 230 to 220,000. The number of consumers of all categories would be 9.5 million. Out of 566,878 villages in the country, about 58,000 are expected to be electrified and about 8 lakh agricultural pumpsets are likely to be energised. The per

capita power consumption for the whole country would be about 70 kwh. About 70 per cent of the energy output is being utilised by the industrial sector, 11 per cent by the domestic, 7 per cent by the agricultural and the balance in other sectors. The investment on the power supply industry up to the end of 1967-68 exceeded Rs. 3,200 crore. Eighty-five per cent of the production is today controlled by the public and the rest by the private sector.

The power house at the Hirakud dam



Progress During Plans

The First Five Year Plan was drawn up in 1951 at the time when the total installed power generating capacity in the country was 2.3 million kW. Only about 3,500 villages had been electrified by then. The First Plan provided for large hydro-electric power houses in a number of important multi-purpose projects, such as, Bhakra, Hirakud, Chambal and Tungabhadra, as well as purely hydro-electric projects like Machkund, Jog, Neriamangalam and Umtru, and a large thermal power house at Bokaro in the Damodar Valley Corporation area. Besides, several medium sized thermal power stations were planned all over the country.

The outlay on power during the First Plan was Rs. 302 crore, representing about 13 per cent of the total Plan outlay. This raised the installed capacity of the country to 3.4 million kW at the end of the First Plan. Progress was also made in the construction of transmission lines for expanding the grid systems. About 30,400 km of transmission and sub-transmission and distribution lines were constructed.

By the end of the First Plan, 6,000 more villages and towns were electrified. The per capita consumption of electricity in the country rose from 14 kWh in 1950-51 to 25 kWh in 1955-56.

The Second Plan envisaged considerable increase in power development in view of the emphasis on industrial development and provided for an investment of Rs. 427 crore to raise the total installed capacity to 5.6 million kW. A large number of hydro-electric schemes, such as Kundah in Madras; Pamba, Sholayar and Panniar in Kerala; Sharavati in Mysore; Koyna in Maharashtra; Sileru in Andhra Pradesh; Uiam in Assam, were taken up. On the thermal side, work was taken up on several stations, such as Durgapur in West Bengal, Korba in Madhya Pradesh, Trombay in Maharashtra and Neyveli in Madras. The actual achievement during the Plan was, however, only 2.2 million kWh while the actual investment on power amounted to Rs. 525 crore. About 57,600 km of transmission lines of 11 kW

and higher voltage were completed against a target of 56,000 km. The number of villages electrified in this period increased from about 9,600 to 26,000. The per capita electricity consumption rose to 38 kWh.

Regional Grids

The concept of planning power development on regional basis, with a view to deriving the maximum benefits from the various power projects, was brought to bear in the Second Plan. The importance of coordinated operation of adjacent power systems by suitable interconnections was realised and a detailed study of regional grid systems was taken up.

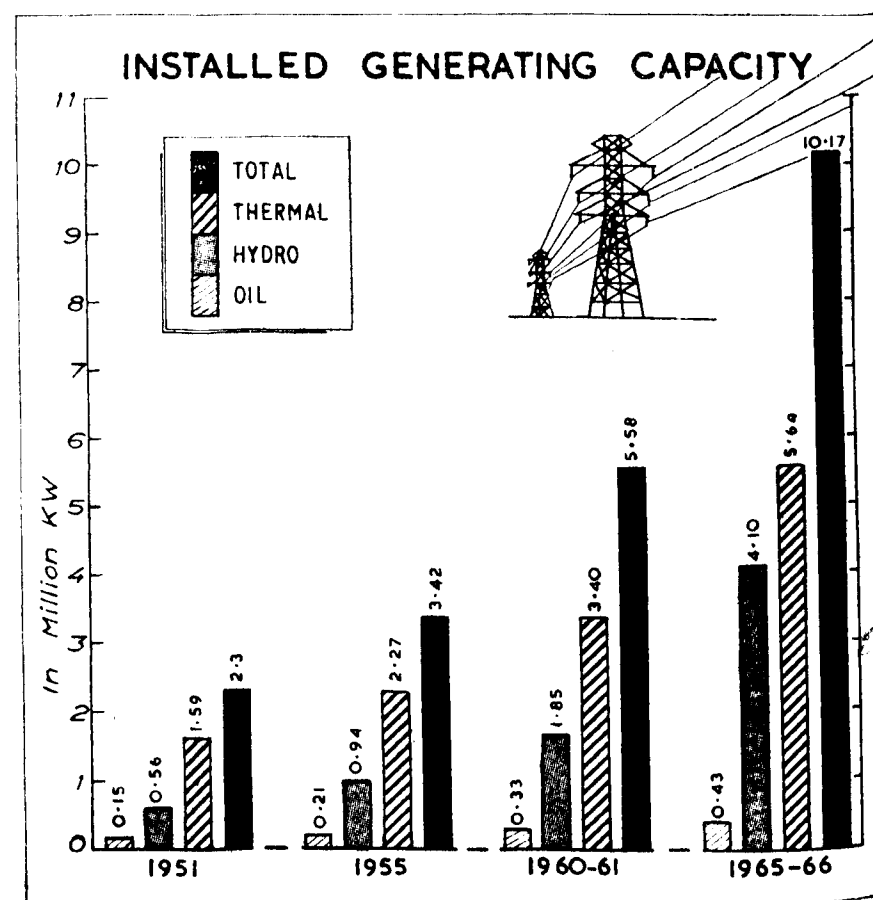
The work of systematic assessment of hydro-electric potential, started in 1953, was continued. An investigation unit was set up at the Centre for reconnaissance of power potential of hill torrents with a view to setting up small power stations for serving isolated areas.

A scheme was sanctioned for setting up two power research

centres—one at Bangalore for undertaking research on problems connected with general electrical engineering and high voltage techniques, and the other at Bhopal for switchgear testing and development.

Detailed power load surveys on a country-wide basis were undertaken by the Centre in collaboration with the State Governments and State Electricity Boards for assessing the likely load demands on the different power systems for every five-year period up to 1980-81. Such data, it was felt, would help to plan the installation of generating capacity to meet the demands well in time.

The Third Plan provided for making up the shortfall in achievements of the Second Plan, and for raising the total plant capacity to about 13 million kW. The Plan also envisaged the necessary transmission system and interconnecting the power systems of some States. About 20,000 more villages were proposed to be electrified. A total provision of Rs. 1,089 crore was made for power development.



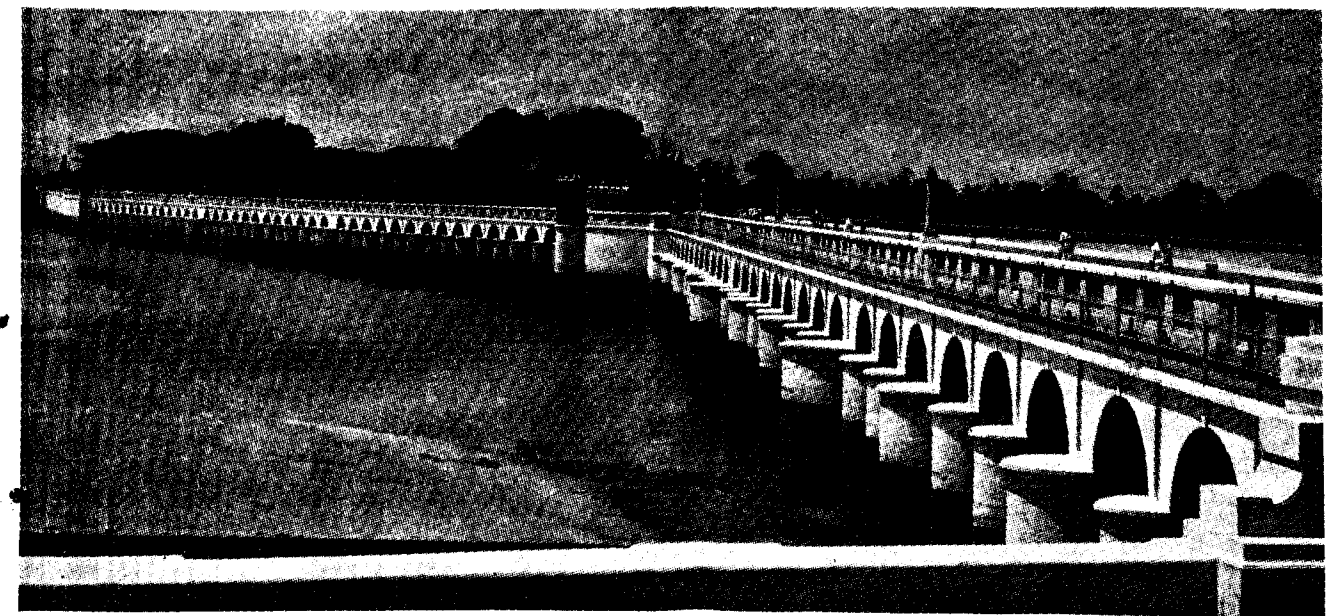
Most of the projects initiated during the First and the Second Plans were completed or were nearing completion at the end of the Third Plan. Several new projects taken up during this Plan are making good progress. The country also embarked on a programme of nuclear power generation. The generating capacity reached 10.2 million kW. The actual expenditure on power development schemes during the Plan was Rs. 1,383 crore. The per capita consumption by 1965-66 reached 61 kWh, or on an average a little over 39,000 million kWh a year. The number of villages electrified rose to 48,000 and the number of agricultural pumpsets energised to 511,000.

8.5 lakh pump sets and electrification of additional 50,000 villages. For the first time in the country, a 300-kilometre long transmission line of 400,000 volts has been sanctioned for the eastern region.

It has also been decided to pay more attention to the schemes of rural electrification which are intended for augmenting food production rather than those which would merely provide electricity for lighting and ventilation purposes in rural areas. It is proposed to remove, as far as possible, the imbalance between States by concentrating development intensively in those States where it is inadequate, while, at the same time, not neglecting the requirements of the other

expected to rise to 19.2 million kW by the end of 1973-74 and to 24.2 million kW by 1975-76. The total installed capacity, taking into account the benefits accruing from schemes already sanctioned or at various stages of construction, would reach 22.4 million kW by 1973-74 and 23.7 million kW by 1975-76. However, the firm capacity available from the plants would be only 16.1 million kW by 1973-74. An additional installed capacity of 4.4 million kW, to give a firm capacity of 3.1 million kW, will, therefore, have to be commissioned by 1973-74 to meet the demand.

During the period, some of the existing plants would have outlived their useful life and would need



The grand anicut at Tiruchinapally

To avoid shortfalls as suffered by the earlier Plans, advance action was initiated on 19 new projects which will create an additional capacity of 3.5 million kW by the end of 1970-71. Annual reviews of power demands were also taken up.

Targets and Programme

The proposals for the period 1966-67 to 1970-71 have set a target of 20 million kW of generating capacity (including replacement of plants) to meet an expected load demand of 14.7 million kW, necessary transmission lines to distribute power over wider areas than hitherto, energisation of additional

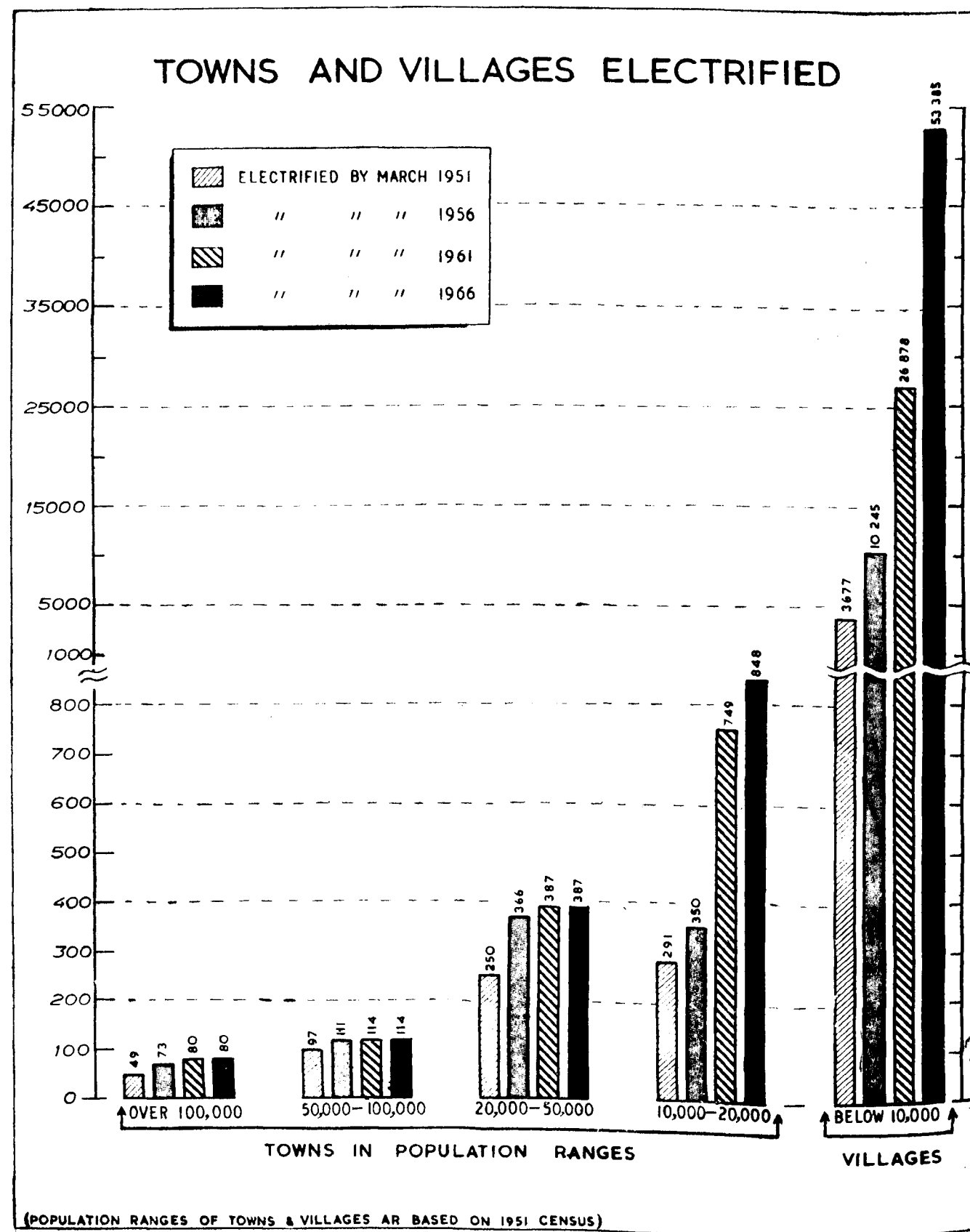
States.

The power programme during the period 1966-67 to 1970-71 is expected to cost about Rs. 2,210 crore (Rs. 1,315 crore for generation schemes, Rs. 591 crore for transmission and distribution, and Rs. 304 crore for rural electrification). The per capita consumption is expected to rise to 120 kwh. The actual expenditure during 1966-67 was Rs. 395 crore, and Rs. 410 crore are estimated to have been spent in 1967-68.

Based on projections in respect of development of commercial, industrial and agricultural loads, the load demand in the country is

replacement. The replacements are estimated at 0.5 million kW. In all, an additional capacity of about 5 million kW would have to be installed. Thus an installed capacity of 27.5 million kW is required by 1973-74.

To meet the load demand by 1975-76, advance action has to be initiated on a few power schemes, as normally the gestation period for hydroelectric and thermal projects varies between four and six years. To ensure sufficient generating capacity by 1975-76, it is necessary to take up the construction of a few more power schemes before 1973-74 so that these schemes begin production by 1975-76.



Power Potential and Its Utilisation

D. M. SAXENA

THOUGH the use of water as a means of large-scale power development is of recent origin, it is difficult to say when the first hydro-electric plant in the world was constructed. It was perhaps in the U.S.A. in 1882. The pioneer public utility hydro-electric undertaking in India, however, was the small municipal town lighting plant at Darjeeling, which was set up in 1897-98.

Some major hydro-electric projects were also undertaken later by private companies. The first was by the Tata Hydro-Electric Company in 1915 followed by the Andhra Valley Power Supply Company in 1922 and the Tata Power Company in 1927. During the late twenties, schemes for the development of power were also launched by the Government. The major state-managed hydro-electric works were the Pykara hydro-electric scheme, Madras, the Mandi hydro-electric scheme in Punjab (1937), the Mettur hydro-electric scheme, Madras (1937), the Pallivassal-Travancore (1940)-Papanassam-Madras (1943), and the Ganga hydro-electric grid system, U.P. (1930-1947).

With the initiation of planned economic development, in the country, power development received the necessary impetus. Both the Central and the State Governments embarked on several ambitious multi-purpose projects to surmount the acute shortage of food in the country and to meet the accumulated power demands of the earlier years. Amongst these were the Damodar Valley Corporation, the Bhakra-Nangal Project in the erstwhile State of Punjab with benefits exten-

ding to neighbouring States of Rajasthan and Delhi, the Hirakud Dam Project in Orissa, the Chambal Valley Development Scheme in Madhya Pradesh and Rajasthan and the Tungabhadra Project in Mysore and Andhra Pradesh. A number of single-purpose hydro-electric development projects were also undertaken in various parts of the country.

The development of hydro-electric power in the country has made steady progress since then, as may be noted from the table below:

	Instal- led power capacity (million kW)	Hydro- compo- nent	% of hydro- power in the total capacity
1950	2.3	0.56	24.3
1955-56	3.42	0.94	27.6

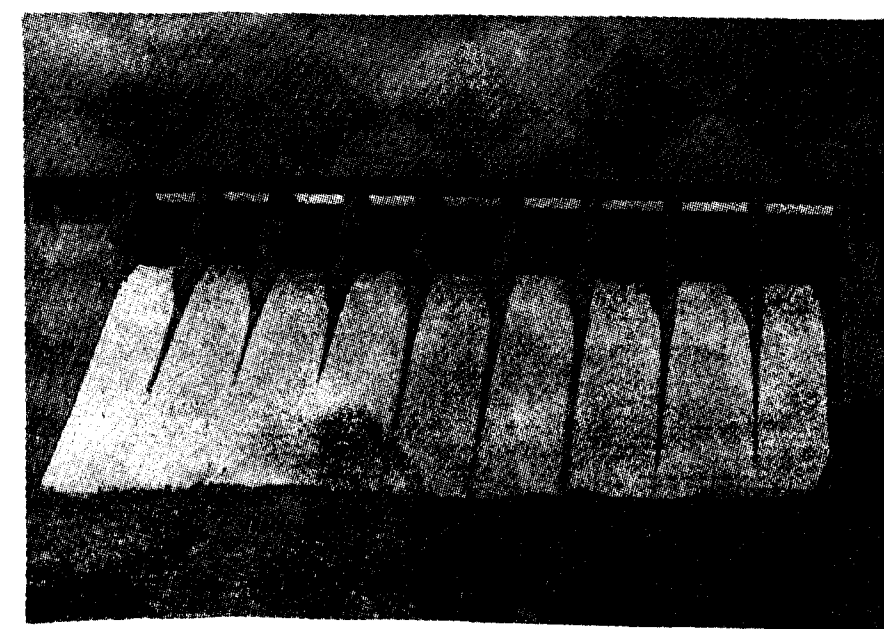
1960-61	5.58	1.85	33.1
1965-66	10.17	4.10	40.7

The total installed capacity in the country by the end of 1968-69 is estimated at 15.4 million kW of which the hydro component is estimated at 6.1 million kW or 39.6 per cent.

Hydro-electric Potential

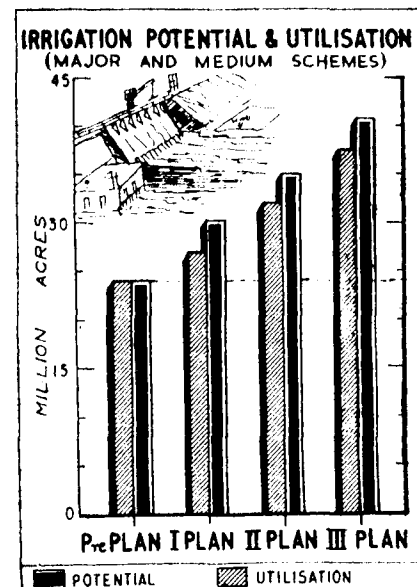
In 1953, the Central Water and Power Commission, initiated a systematic survey of the hydro potential of the entire country, based on specific schemes of development. According to it, the country's total hydro-power potential at 60 per cent load factor is 50,346 million kW (264Twh annual energy production). Of this the economically utilisable potential is 41,155 million kW (216 Twh annual output).

The Konar Dam of DVC



State-wise distribution of power potential is given below :

State	Potential (in thousand kW)
Andhra	2,478
Assam	11,599
Bihar	610
Gujarat	677
Jammu and Kashmir	3,590
Kerala	1,539
Madhya Pradesh	4,582
Madras	708
Maharashtra	1,910
Mysore	3,373
Orissa	2,062
Punjab and Haryana	1,360
Rajasthan	149
Uttar Pradesh	3,764
West Bengal	22
Himachal Pradesh	1,867
Manipur	865
Total	41,155



The Papanassam dam in Madras

Out of this, about 10.3 million kW (54 Twh) represents potential of simple "run-of the river type projects" in the Himalayan ranges and the rest of "storage projects".

A large number of hydro-electric and multipurpose schemes are currently under execution in the country on the completion of which, the total hydro-electric installed capacity is expected to rise to about 11.2 million kW.

Economics of Hydro Power

A common feature of the most Indian rivers is the seasonal variation of their flow from going almost dry in the summer to overflowing during the monsoon. Since power development requires more or less a uniform flow throughout the year, dams are constructed across the rivers for storing water

to be utilised during lean periods. In most Indian hydro-electric projects, such ancillary civil works form a substantial part of the capital outlay.

Another special feature in regard to Indian hydro-electric schemes is the necessity of co-ordinating power projects with the needs of irrigation. India is essentially an agricultural country which has to depend, for irrigation, on rivers fed by monsoon rains. Irrigation requirements are seasonal and if the needs of irrigation in any particular area make it imperative to restrict the release of stored water for irrigation, obviously that site cannot be developed, to the fullest extent for generating firm power. In most cases, therefore, where a project is undertaken for the joint purpose of irrigation and power, a certain amount of compromise has to be made.

Another feature affecting satisfactory operation of hydro stations is the scant rainfall in a particular year, as during 1965-66 and 1966-67. The solution to such difficulties lies in providing suitable transmission lines or inter-connections between adjoining large power systems, so that through interchange of power between the systems, the overall power output is maintained throughout the year. This has led to the formation of regional grids.

The capital cost of hydel development varies from site to site. However, in respect of schemes recently completed, it varies between Rs. 1000 and Rs.1 500 per kW installed; the cost of generation being in the range of 2 to 3.25 paise per unit.

Taking into account the price rise in materials, equipment and labour, the capital cost of hydro schemes to be taken up in future may be estimated at about Rs. 1800 per kW installed, which is comparable with that of thermal power. The distinct advantage of hydro electric power is that it has the lowest cost per unit when compared with other sources of energy.

While the actual time required for the construction of a hydro project takes about 5-6 years, a thermal project normally takes 4-5 years. However a hydro electric scheme involves a much longer period for investiga-

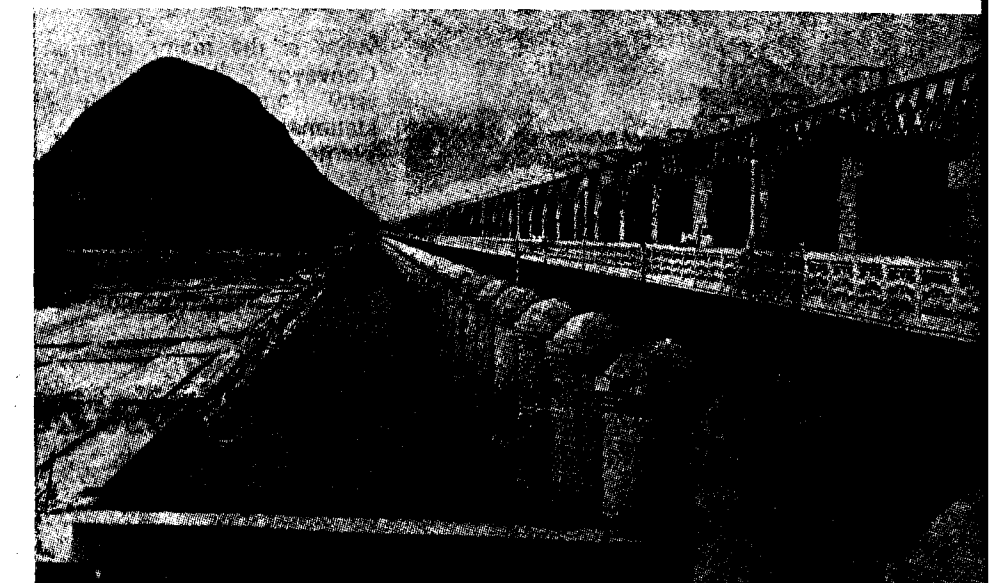


The Nagarjunasagar dam under construction

tions which must be curtailed. While it is important that only such hydro-schemes which represent the best methods of harnessing the potentialities of the rivers are taken up for construction, it is equally important that investigations which ultimately form the basis for selection of schemes are carried out in a satisfactory manner, both in respect of content and time. In this connection, the Central Water and

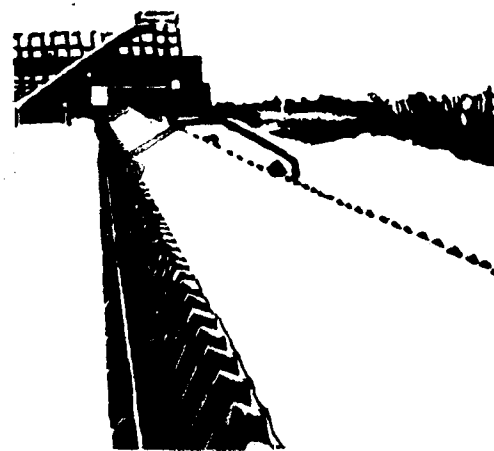
Power Commission had initiated a countrywide programme of investigation of 62 hydro schemes. The programme was launched in 1958, with assistance from the UN Special Fund, and was expected to be completed by 1968. But the progress made so far on investigations is much behind schedule. Some mechanism will have to be evolved for ensuring timely completion of investigations.

The Prakasam barrage at Vijayanada





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DUNLOP LEADS THE WAY

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MULTI-PURPOSE PROJECTS

Role in India's Development

OUT of a total land potential of over 800 million acres nearly half is cultivable and almost all of this is being cultivated at present. About one fourth of this sown area is getting irrigation at present. Preliminary investigations and studies have revealed that the ultimate irrigation potential of the country is of the order of 200 million acres i.e. about half of the cultivated area. This irrigation will be by all types of works: major, medium and minor and exploiting both surface and ground water resources. Considering our population, food habits and food requirements and, taking into account the diversity of climate and rainfall in different parts of the country, this irrigation potential is not high and any plan for development should take note of and make provision for the full exploitation of this potential at the earliest.

The rainfall in India is confined to practically the four monsoon months. Bulk of the surface water resources occur at this period and to exploit it, storage reservoirs become necessary. Once the storages are built and water is released gradually over the year, it offers a good opportunity for hydro-power generation. The reservoirs, some of them of substantial capacity, also offer flood control and moderation. There are other benefits like navigation, fish culture, recreation etc. Thus, these storage works acquire and offer multi benefits and have come to be known as "Multi-purpose projects."

The mention of the word multi-purpose project reminds one immediately of the Bhakra-Nangal, the Damodar Valley Project, the Hirakud Project, the Tungabhadra Project and a host of others. Thanks to the vision of successive eminent engineers, administrators and statesmen a number of these projects had been conceived and investigated even before the country attained indepen-

dence. In fact, work on a few projects like Tungabhadra and Bhadra had been started even before independence and active consideration was being given to a few others like Bhakra-Nangal, DVC and Hirakud.

Achievements So Far

The dawn of independence and the great encouragement given to irrigation development by our illustrious leader Panditji gave a fillip to a rapid stride in this field of national development. DVC,

were overcome with courage, fortitude and vision. It is a happy thing to note that the 20th anniversary of DVC is being celebrated on the 7th July, 1968.

Apart from these three giant projects the country also embarked upon numerous other multi-purpose projects during the last 20 years. Nine of them have been completed (or substantially completed) so far. The benefits derived from them are indicated below:

	(thousand acres)
Bhakra-Nangal	3,600
DVC	880
Hirakud	630
Chambal	700
Kosi	1,410
Matatila	410
Mayurakshi	610
Tungabhadra	1,270
Bhadra	240
Total	9,750

One noteworthy feature of these multi-purpose projects is that the benefits to be derived from them are large and substantial. Out of the 500 major and medium irrigation projects taken up so far, whose total benefit is 44 million acres irrigation, 67 major projects account for providing 36 million acre irrigation. Apart from the immensity of benefit to be provided by these projects, the irrigation provided by them is assured, as has been proved during the recent droughts.

Works in Hand

Among the works in hand at present mention may be made of Nagarjunasagar in Andhra Pradesh and Gandak in Bihar-UP. These two projects would provide irrigation to nearly five million acres. Names of projects, and the benefits anticipated from them are given on the next page.

	(Thousand acres)
Beas	2,350
Nagarjunasagar	2,200
Gandak	2,850
Kangsabati	950
Pochampad	570
Ukai	400
Kadana	400
Tawa	700
Parambikulam	240
Aliyar	
Purna	150
Girna	160
Mula	160
Bhima	470
Jayakwadi	350
(Stage I)	
Krishna	260
Warna	240
Ghataprabha	500
(Stage I & II)	
Malaprabha	300
Upper Krishna	600
Ramganga	1,710
Total	15,360

It is expected that a number of these projects would be completed or substantially near completion, during the Fourth Plan period.

The Future

The foregoing only narrates about a task half-done. In order to meet our food and fibre requirements and also of other agricultural products, it is inescapable that the balance irrigation potential is also developed as rapidly as feasible and in any case within the next 20 years. This calls for a sustained effort in this field and great determination. The drought during the last 3 years has emphasised the urgency and the need for reliable storage works. There is abundant opportunity for development, especially in certain States like Madhya Pradesh, Maharashtra, Mysore and Andhra Pradesh. Opportunities exist in other States also for further development and improvement and modernisation of works completed and/or now being undertaken. The projects so far built store less than one tenth of our average annual river flows. It should be doubled in the next ten years if any substantial relief is to be had from the vagaries of the Indian monsoon. Multi-purpose projects are the answer to that.

There is one other big advantage in Multi-purpose projects. It is hydro-power development. For a balanced growth of our energy requirements hydro-power exploitation is essential. Moreover, it is most often less expensive than other forms of power generation. In some parts of the country it is quite attractive in investment and per unit cost. With the development of inter-State transmission lines and the All India grid and feasibility in the none too distant future, hydro power acquires great importance.

Fish culture and recreation have not made much headway in our multi-purpose projects. With the growth of the economy and diversification of food and recreation habits of people there will be a great impetus for these uses also in the coming years.

Developments of natural resources offer a great hope and a challenge in developing countries. Amongst the natural resources, water is the most important. This is a self-renewing wealth and has to be collected and used. Multi-purpose projects are the key for such storage and development.

SPOTLIGHT ON

Irrigation And Power Projects

J. BATRA

Large-scale development of irrigation and power is vital, both for the rapid growth of agriculture as well as industry. Fortunately we are quite rich in our water resources. There are about 110 rivers in the country—some big and perennial, others small and seasonal—capable of irrigating 187 million acres of land out of a total cultivated area of 390 million acres, and producing 41 million kilowatts of electric power.

Besides these, river valley projects have provided substantial and long-term protection against floods to 13 million acres of land.

A statement showing the progress of irrigation, power and flood control during the last fifteen years of planning is given below :

	(in million acres)	
IRRIGATION	1951	1967
Area irrigated from major and medium works.	24	40
Gross irrigated area from all sources.	56	88
POWER	(in million kW)	
Installed capacity	2.3	10.2
	(in numbers)	
Villages and towns electrified	3,677	61,230
FLOOD CONTROL	(in miles)	
Embankments	3,000	7,500

Some of the important multi-purpose projects are :

NAGARJUNASAGAR PROJECT (ANDHRA PRADESH)

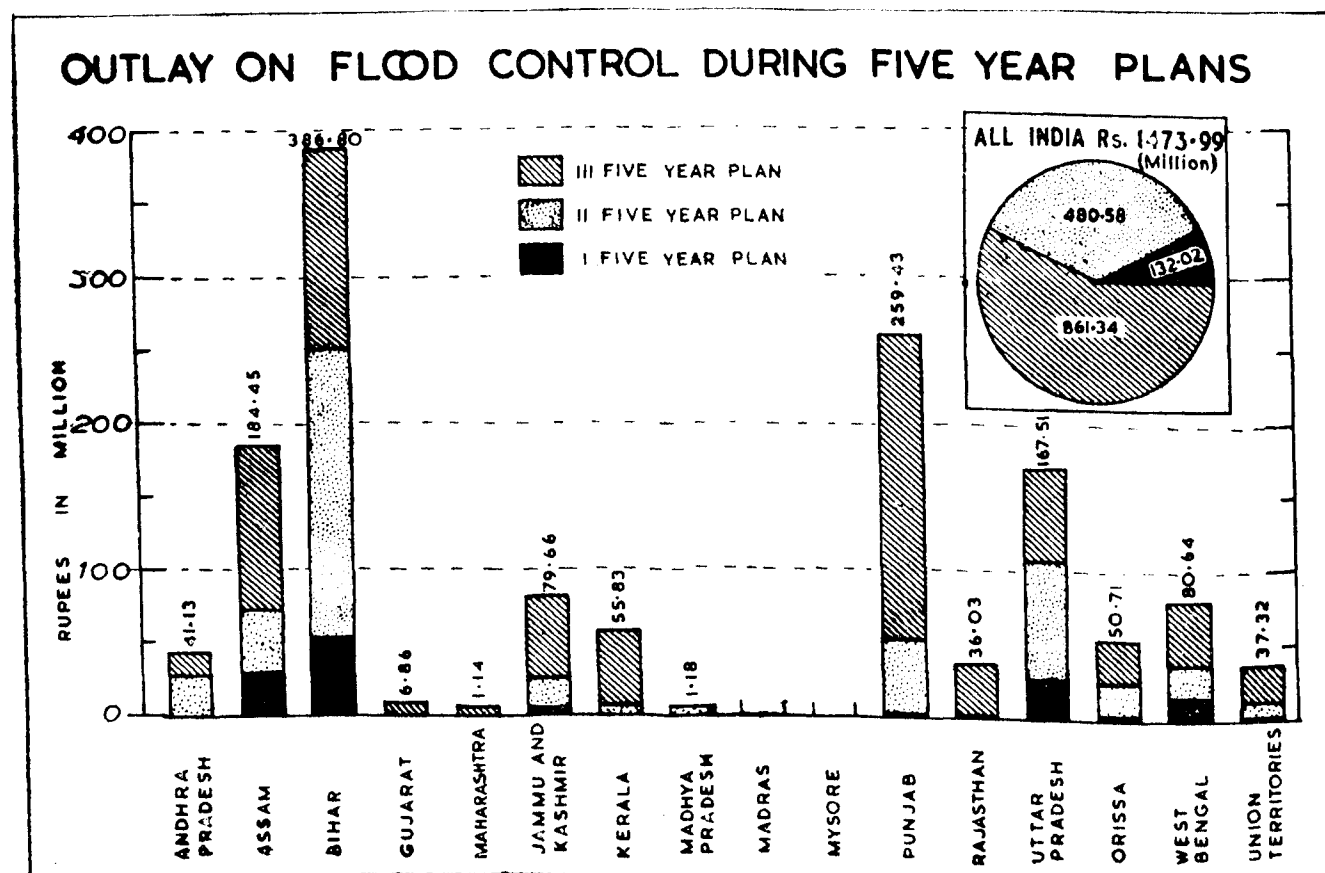
The project comprises a 1450-metre long and 125-metre high straight gravity dam across the river Krishna in Nalgonda district. Launched in

1956 and estimated to cost Rs. 164.5 crore, the project on completion, by the end of the Fourth Plan, will provide irrigation to 8.30 lakh hectares. In the final stage 8 penstocks will be provided on the dam for power generation.

The dam has been almost completed and irrigation potential of 2.45 lakh hectares has already been created.

TUNGABHADRA PROJECT (ANDHRA PRADESH AND MYSORE)

A joint undertaking of the Governments of Andhra Pradesh and Mysore, the project comprises 2441-metre long straight gravity dam—one of the longest in the world—across the River Tungabhadra at Mallapur in the Bellary district of Mysore. It has a 3-canal system—the left bank canal with a power house having three generators of 9,000 kW each (another power house of the same capacity will be added later); the low level canal with two power houses, each having 4 units of 9,000 kW each; and a high level canal on the right side. On completion the project will irrigate 6 lakh hectares of land and generate



126 MW of power. The total irrigation potential created so far is 3.57 lakh hectares; while the total installed generating capacity is 99 MW.

Work on the dam, the low level canal, the left bank canal and bulk of the work on the high level canal (Stage I) has been completed. Work on H.L.C. Stage II will be completed during the Fifth Plan. The cost of the project both for power and irrigation, is likely to be Rs. 86 crore.

GANDAK PROJECT (BIHAR)

An Indo-Nepal venture with a 743 metre-long and 9.76-metre high barrage, across the River Gandak at Bhaisalotam in Bihar, the project has a five-canal system which will irrigate 14.31 lakh hectares in Bihar

and Uttar Pradesh and 50,000 hectares in Nepal. Started in 1960, the project will be completed during the Fifth Plan at a cost of Rs. 137.21 crore. When completed it will provide 15,000 kW of power to Nepal. At present the excavation of canals is in progress.

KOSI PROJECT (BIHAR)

The scheme is divided into three parts (a) A 1,149-metre barrage near Hanumannagar on the Indo-Nepal border (already completed); (b) 270.36 km long flood control embankments on each side of the Kosi river which, on completion in 1959, give flood protection to 2.02 lakh hectares of cultivable land in Bihar and 0.61 lakh hectares in Nepal and (c) three-canal system, which on completion is expected to irrigate 10.28 lakh

hectares. Work on the Eastern Kosi canal and the Rajpur canal is in progress. A power house with an installed capacity of 20 MW is also under construction on the Eastern Kosi canal. When commissioned, half of the power generated will be supplied to Nepal. Work on the Western Kosi canal has yet to be started. The total cost of the project is estimated to be Rs. 94.30 crore.

KAKRAPARA PROJECT (GUJARAT)

It consists of a 621-metre long and 14-metre high pick-up weir across the River Tapi near Kakrapara in Gujarat, which has been completed, and a canal system—the earth work on which has already been completed—which will provide

irrigation to 2.27 lakh hectares in Surat district. Estimated to cost Rs. 18.57 crore the project will be completed during the Fourth Plan.

UKAI PROJECT (GUJARAT)

Started in 1960 and estimated to cost Rs. 96.33 crore, the project consists of an earth-cum masonry dam, 928-metre long and 68.6-metre high, across River Tapi near Ukai in Surat district. The project, likely to be completed during the Fifth Plan, will provide direct irrigation to 1.6 lakh hectares and generate 160 MW of power. Besides this, it will give irrigational support to areas covered by the Kakrapara project.

PERIYAR VALLEY PROJECT (KERALA)

Launched in 1956, the scheme includes a 210.9-metre long dam across the River Periyar near Alwaye in Kerala. The construction of the head works, main canal and the major part of its distributaries has already been completed. Estimated to cost Rs. 6.4 crore, the project will irrigate 41,000 hectares and will be completed by the end of Fourth Plan.

CHAMBAL PROJECT (MADHYA PRADESH AND RAJASTHAN)

The project envisages construction of three dams—Gandhi Sagar dam at Chaurasigarh in Madhya Pradesh, Rana Pratap Sagar dam and the Kotah dam in Rajasthan—and a barrage at Kotah. Begun in 1954, the first stage of the project—comprising the construction of Gandhi Sagar dam, a power station with 5 units of 23,000 kW and the Kotah barrage—has already been completed. The work of power generation has also commenced and water has been released for irrigation. Work has started on the second and third stage of the project. This includes construction of Rana Pratap Sagar dam with a power house below it having 4 generators of 43,000 kW; and the Jawahar Sagar (Kotah) dam, with a power house having 3 units of 33,000 kW each besides capacity for installation of a fourth unit. Estimated to cost Rs. 83.80 crore the project on completion, during the Fourth Plan, will provide irrigation to 5.66 lakh hectares of land in Madhya Pradesh and

Rajasthan and have an installed capacity of 386 MW of power.

HIRAKUD PROJECT (ORISSA)

The 4,801-metre long and 61 metre high Hirakud dam, built across the River Mahanadi in Orissa, is the longest dam in the world. Stage I of the project has been fully completed at a cost of Rs. 67.81 crore, providing perennial irrigation to 1.43 lakh hectares of land in Orissa. Stage II of the project, estimated to cost Rs. 14.95 crore is nearly complete. The total installed capacity of the full project is 270 MW. Power is already being supplied to various industrial and metallurgical units at Hirakud, Rourkela, Rajgangpur and other places in Orissa. With the construction of Lahanda Minor by the end of Fourth Plan, 2.63 lakh hectares of additional land will be brought under irrigation.

MAHANADI DELTA IRRIGATION PROJECT (ORISSA)

Executed as an adjunct to Stage I of the Hirakud Project, the Mahanadi Project envisages the construction of a diversion weir across the river Mahanadi at Mundali to pick up the regulated release from Hirakud and the remodelling of the canal system and weirs on the Mundali and Birupa rivers. Mundali weir and the canals have been completed and an irrigation potential of 2.29 lakh hectares has already been created. Estimated to cost Rs. 34.34 crore, it will provide irrigation to 6.50 lakh hectares, on completion during the Fourth Plan.

BHAKRA-NANGAL PROJECT (PUNJAB, HARYANA AND RAJASTHAN)

India's biggest multi-purpose project, the Bhakra-Nangal consists of five parts (1) a 518-metre long and 226-metre high dam at Bhakra the world's highest straight gravity dam—across the River Sutlej; (2) a 305-metre long and 29-metre high Nangal barrage; (3) the Nangal Hydel Channel; (4) three power houses at Bhakra left-bank, Ganguwal and Kotla, which have already been commissioned and have a total generating capacity of 604 MW (firm capacity: 337 MW); a fourth power house, which is being constructed as a separate project on the Bhakra

right bank at a cost of Rs. 59.32 crore is nearing completion. Its four units of 120 MW have already been commissioned and the fifth unit having the same capacity will be commissioned towards the end of 1968; and (5) a number of canals and distributaries.

Started in 1948, the project has been practically completed at a cost of Rs. 175.60 crore. When fully utilised, the project will irrigate 14.60 lakh hectares annually while another 14.60 lakh hectares in the three States will get increased water supply.

BEAS PROJECT (PUNJAB, HARYANA AND RAJASTHAN)

A joint venture of the three States it comprises: (I) Beas-Sutlej link with a dam across the River Beas at Pondoh, a combination of tunnels, an open hydel channel at Sundranagar and a power plant with an installed capacity of 990 MW. When completed it will provide irrigation to 5.3 lakh hectares in Punjab and Haryana (firm irrigation capacity: 3.2 lakh hectares).

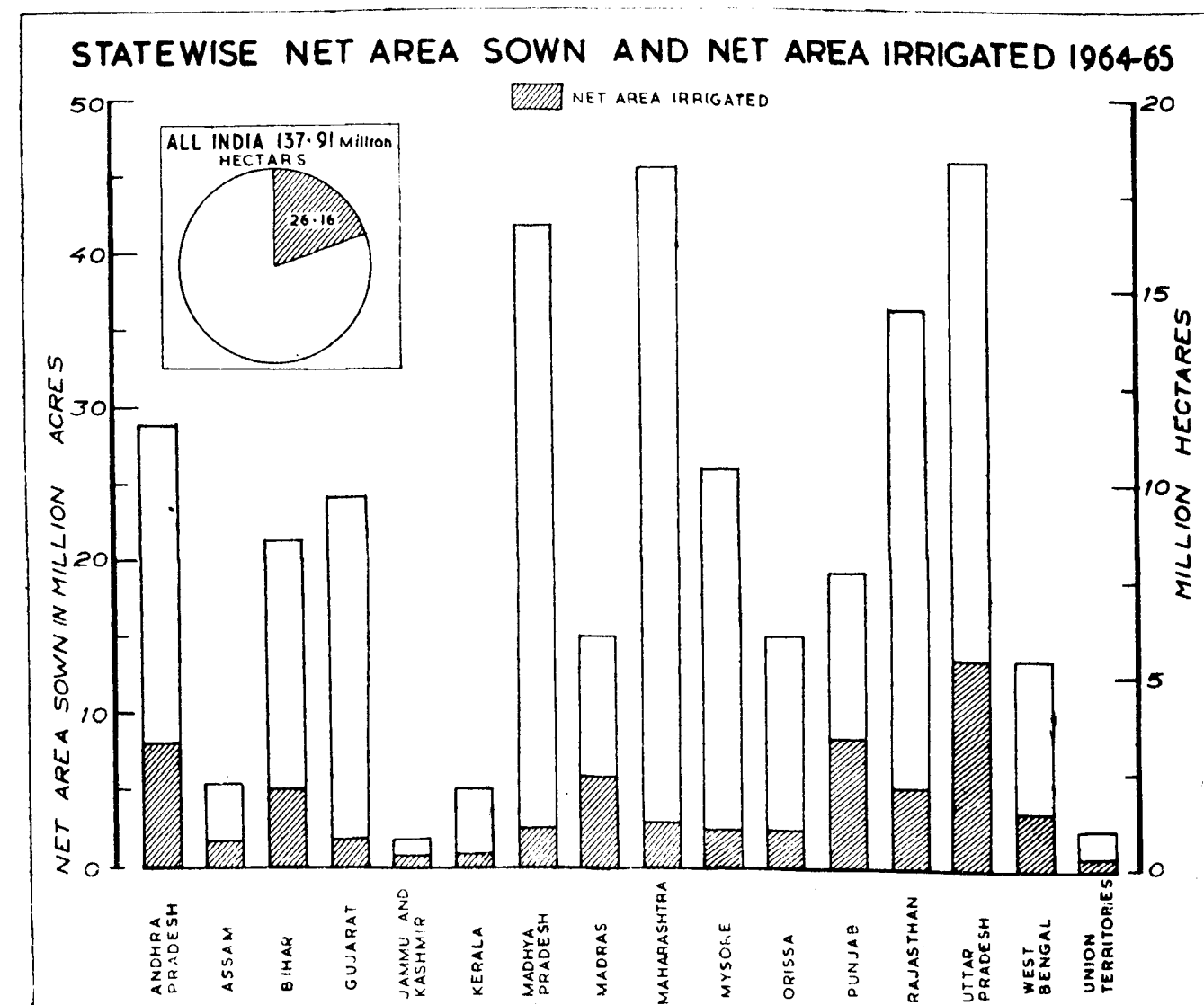
(II) Beas dam at Pong, mainly an irrigation scheme, will provide perennial irrigation to 20.24 lakh hectares in Punjab and Rajasthan. It provides for a power house with an installed capacity for 240 MW and a future capacity of 120 MW. Launched in 1961, both the phases of the Beas complex will be completed during the Fifth Plan at a total cost of Rs. 240.50 crore.

PARAMBIKULAM ALIYAR PROJECT (MADRAS AND KERALA)

An inter-State venture the project envisages the integration of eight rivers (including two major rivers: Parambikulam and Aliyar) by constructing reservoirs across them and linking them through tunnels. Commenced in 1958, the project will be completed during the Fourth Plan at a total cost of Rs. 58.85 crore (Irrigation: Rs. 37 crore; Power: Rs. 21.85 crore). On completion it will provide irrigation to 97,128 hectares of land through a number of canals and produce 185 MW of power.

RAJASTHAN CANAL PROJECT (RAJASTHAN)

It provides for the construction of a canal which takes off from



Harika Barrage across the River Sutlej in Punjab. Started in 1958 at a cost of Rs. 184 crore the project has been divided into two stages: Stage I comprises a 215.65 km-long Rajasthan Feeder and the first 196 kms of the Rajasthan Main canal. Stage II envisages the completion of the remaining 273.9 kms. of the Rajasthan canal along with its branches and distributaries. While State I will provide irrigation to 5.26 lakh hectares and will be completed by the end of Fourth Plan, Stage II will irrigate 6.37 lakh hectares and is likely to be completed after the Fifth Plan.

MAYURAKSHI PROJECT (WEST BENGAL)

Completed in 1957, at a cost of Rs. 20.46 crore, the project comprises a 308.8-metre long barrage at Tilpara in West Bengal; 47.3 metre high and 64-metres long Massanjore (or Canada) dam across the Mayurakshi river in Bihar; and a power house with an installed capacity of 4 MW built at the foot of the dam. It provides irrigation to 2.47 lakh hectares annually. The Canada dam also provides additional irrigation to 20,235 hectares of rabi crop.

IDDIKI HYDRO-ELECTRIC SCHEME (KERALA)

The project, started in 1963, at an estimated cost of Rs 62.65 crore, envisages a common storage reservoir—formed by the construction of two dams across the Rivers Periyar and Cheruthani in Kottayam district—and a power house at Moolamattom in Ernakulam district with 3 units of 130 MW capacity each. On completion during the Fifth Plan the whole State will benefit by the scheme.

KOYNA PROJECT (MAHARASHTRA)

Inaugurated in 1954, the first stage of the project including construction of 85.3 metre high dam across the river Koyna near Helwak, about 150 miles from Bombay, and an underground power house, with 4 units of 60 MW, was completed in 1963 at a cost of Rs. 38.27 crore. Its power supply is being used in the Bombay-Poona area and the adjoining districts. Stage II of the project envisaged increasing the

storage capacity of the reservoir and installation of 4 generating units of 75 MW. Out of these, 3 units have already been commissioned. The estimated cost of Stage II is Rs. 18.16 crore. Stage III provides for the construction of a gravity dam, an underground power house with 4 generating units of 80 MW and some tunnels at a cost of Rs. 31.88 crore. The whole project will be completed during the Fourth Plan.

SHARAVATI HYDRO-ELECTRIC PROJECT (MYSORE)

The Sharavati valley project is divided into three stages. Stage one, which was completed in 1965 at a cost of Rs. 56.08 crore consists of a 61.28 metre high dam at Linganamakki in Mysore and 2 power units with generating capacity of

178 MW. The second and the third stage envisages installation of 8 generating units of 89.1 MW each (6 in stage II and 2 in stage III) during the Fourth Plan at a total cost of Rs. 50.69 crore.

RIHAND DAM PROJECT

Started in 1952-53 and completed in 1966 at a cost of Rs. 46.11 crore, the project consists of a 934-metre long and 91.4-metre high straight gravity dam across the River Rihand near Pipli in U.P. Its power house has 6 generators which produce 300,000 kW of power. It supplies power to industries and pumping sets (for irrigation) in the area. Though essentially a hydro-electric scheme, the Rihand project has reduced the extent of floods in the area.

QUOTATION BOX

If anybody in the world wants to learn how not to develop the automobile industry he can come to India.

—Indian Express

The Gill Ministry has the cat's proverbial nine lives. It is "going—going—not gone" game played over and over again in Punjab.

—Biji in Now

Our national approach to prices is that of the fire-brigade; bells are clanked and fire engines rush in to douse leaping prices; only it is all too erratically done, without proper analysis of the situation.

—P.L. Tandon in *The Statesman*

What happens next does not depend on the artificially inflated frogs of the Syndicate nor on the turkeys in the backyard of the Prime Minister's kitchen cabinet.

—Frank Moraes in *The Indian Express*

There is no doubt that the drug industry is different from most other industries in that it involves playing with the lives of the people—and the pockets of the increasing numbers who survive.

—The Economic and Political Weekly

We are a great nation of book borrowers and stealers—but not of book buyers.

—Peter Owen, a British publisher

When I told my wife that I was going to write a column in the *Daily Express*, she said, "I wish you'd do one in the *Mail* as well". "Why?" I asked.

"Well, then we might get our mail by express delivery", she replied.

I thought that was rather good.

—G.J. Blundell in *New Statesman*

They (the protesting students) took their tactics from Gandhi, their idealism from philosophy classes and their money from Daddy.

—The Michigan University Daily

I will never allow the kidnappers back into the Congress, but will definitely take back the kidnapped.

—D.P. Mishra

Mr. Chavan is said to be extremely fond of classical music which he must hear for at least two hours a day. He also sings, although some leaders in Assam probably think that he sings too many tunes.

—From *The Statesman*

Worldwide, this has been the year of student power.

—Time

Nothing is known about what the austere Mr. Morarji Desai may do in his presumably rare moments of leisure. One guess could be that it is riding hobby-horses.

—The Statesman

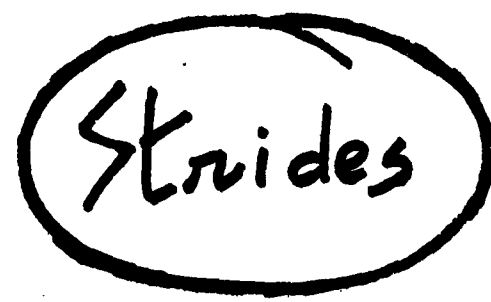
Whether or not history repeats itself, the fear that it may do so is obsessive.

—L.S. Pressnell in *The Financial Express*

No country can prosper by behaving like a weathercock.

The Financial Express

power and



irrigation

Every year we are installing as much electricity-producing capacity in the country as we did during the last fifty years of British rule.

The per capita consumption of electricity in India (total quantity of electricity consumed divided by the size of the population) was 13 kilowatt-hours in 1951. It is nearly 50 kilowatt-hours today.

The aggregate installed capacity, which was 2.3 million kW at the beginning of the First Plan, rose to 12.57 million kW in November 1967. The 1967-68 target for installation of additional generating capacity of 2 million kW has already been achieved.

The anticipated installed generating capacity of 13.5 million kW by the end of 1967-68 would create 54,000 million kW of energy potential in the country.

The total investment on Power Development Schemes at the end of the Third Plan was about Rs. 2,400 crore.

Thirty major power projects have been completed so far and their construction costs range from 5 to 50 crores of rupees each. Another 50 are under construction.

There is no area in the country which is without a major project for generation of electric power. We have Bhakra-Nangal supplying electricity to Punjab, Delhi and Rajasthan; for Uttar Pradesh there is the Rihand; Hirakud serves the needs of Orissa; three power stations have been set up under the Damodar Valley Corporation to provide electricity to large areas in West Bengal and Bihar; Madhya Pradesh has the Chambal Project; and the

states in Southern India are served by several major and minor projects, notably the Tungabhadra, Sharavati, Kundah and Machkund projects.

Electric power is being produced not only from the high dams of great multi-purpose projects but also from special schemes to generate electricity either through thermal (based on coal); Diesel Stations—like the one at Bokaro or from specially constructed dams like the Koyna Dam in Maharashtra. Three Nuclear Power Stations are also being set up—one each in Maharashtra, Rajasthan and Madras. These will use thorium and uranium as fuel.

A power research institute consisting of two units, one at Bangalore and the other at Bhopal, are doing power research engineering. The Bangalore unit, constructed with assistance from the United Nations Development Programme, has been completed at a cost from Rs. 333.6 lakhs. The unit has seven laboratories and research work on a number of problems connected with generation, transmission and distribution of power has been taken in hand.

The Bhopal unit, to be commissioned in 1968-69, will make available the results of research and investigations to switchgear manufacturers in the country.

Engineers from Ceylon, Thailand and Burma are receiving training in River Valley Planning, Design of Dams and Hydraulic research at the Technical Training Centre at Nangal. Also 22 engineers are being trained in the various aspects of power engineering under the Colombo Plan and Special Commonwealth African Assistance Plan.

Since the beginning of the Five Year Plans, over 200 dams of more than 50 feet high have been built and many more are under construction.

About 500 major and medium irrigation projects were taken up at the beginning of the First Plan. Of these, 250 schemes were completed by the end of the Third Plan, to provide irrigation to an additional 19 million acres.

The outlay on irrigation since the First Five Year Plan has been as follows: First Plan Rs. 300 crore; Second Plan Rs. 380 crore; Third Plan Rs. 572 crore; 1966-67 Rs. 132 crore; and 1967-68 (anticipated) Rs. 135 crore.

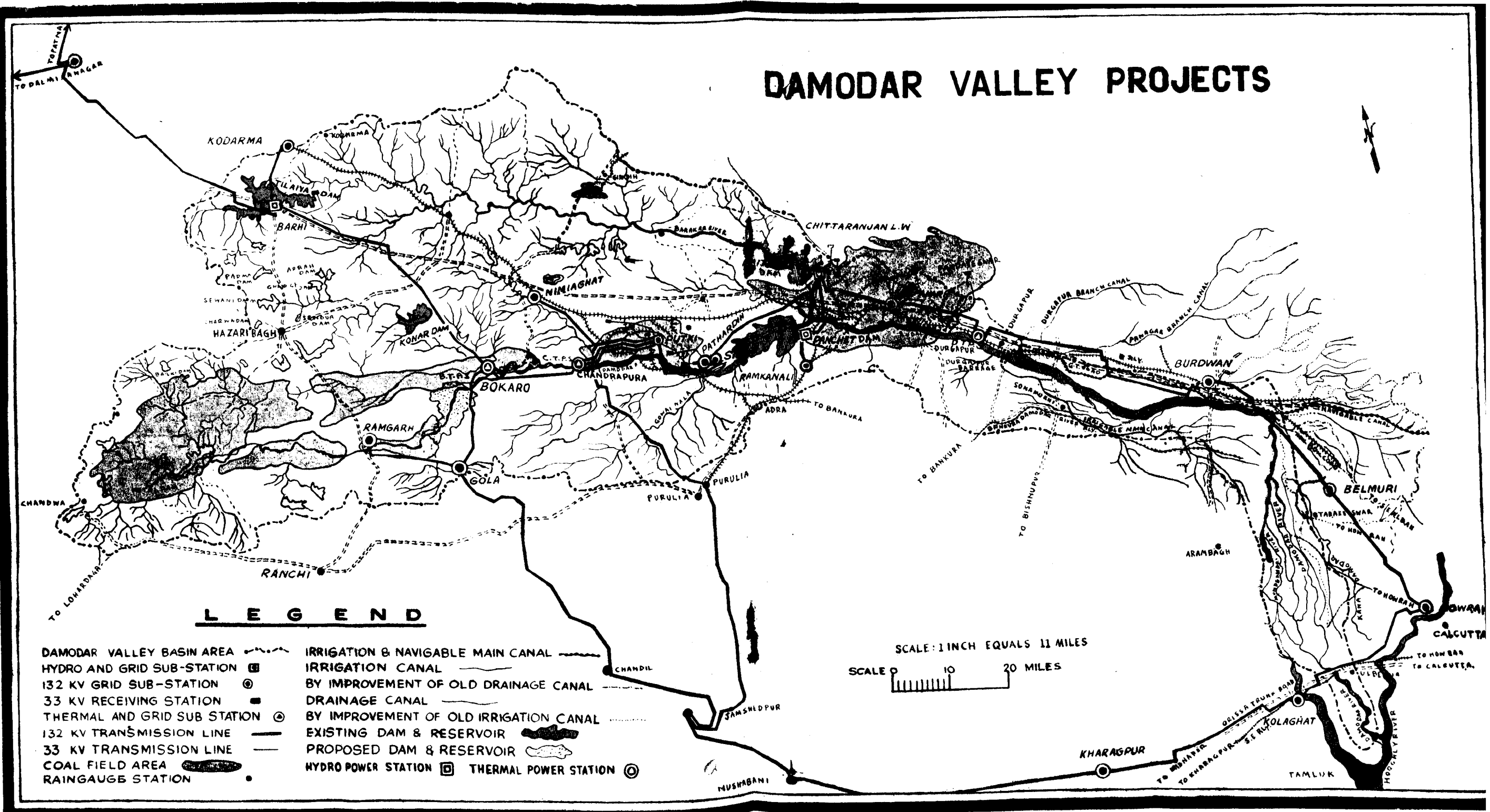
An area of about 130 lakh acres has benefited from flood control measures involving an expenditure of Rs. 177 crore.

Additional irrigation potential of about 2.3 million acres has been created in 1967-68, which also marked the formal inauguration of the Nagarjunasagar Project last August.

From 1966-67, rural electrification schemes have been reoriented with a bias towards energising pumping sets and tubewells for irrigation. By March 1966, about 48,000 villages had been electrified and 5.1 lakh pumping sets/tubewells energised. In 1966-67, another 1.4 lakh pumping sets/tubewells were energised, representing an increase of 27.5 per cent over the previous year. An additional 1.4 lakh pumping sets/tubewells are expected to be put into operation in 1967-68.

—V. M. SOORMA

DAMODAR VALLEY PROJECTS



I look upon these works as temples and places of pilgrimage and I feel more religious-minded when I visit them.

Jawaharlal Nehru

There is no doubt that in later years bigger things will be undertaken and completed in India. But the great deeds that are being done are sure to become part of the stories and fables of the new India in the making.

Jawaharlal Nehru

SERVICE TO THE COUNTRY
THE POWER BEHIND INDUSTRY

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Other Boiler Auxiliaries like Ball Mills, Mechanical Separators, Electro-static Precipitators, Heavy Duty Fans like Axial and Radial Fans, Desuperheaters, etc.

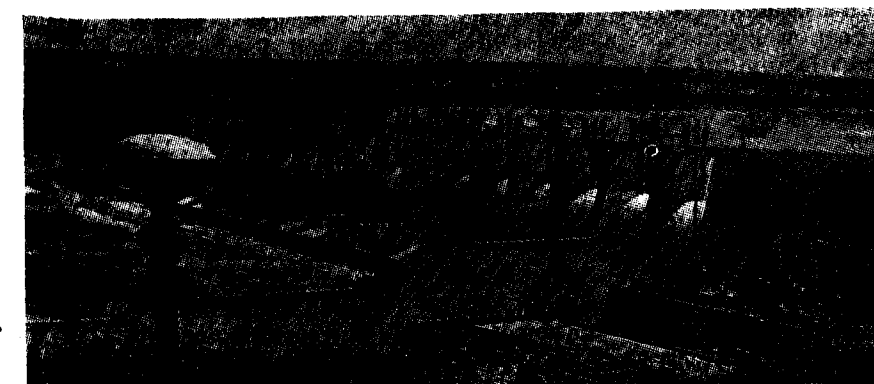
High Pressure Steam and Feed Piping including station piping.

Pressure Vessels for various Industries, etc.

REPORT FROM STATES

**RAJASTHAN :
Poor Resources
But Grand
Achievements**

RAM PRASAD LADDHA



The Rana Pratap Sagar dam near Kota

RAJASTHAN has a total culturable area of 662 lakh acres, which is 13.8 per cent of the country's culturable area. Out of this some 375 lakh acres are actually under cultivation. The remaining 43.5 per cent has not come under the plough due to scanty rains and absence of irrigation facilities.

Before the advent of the Five Year Plans, 9 lakh acres were being irrigated by surface water resources and 21 lakh acres by well irrigation. Out of this, 6 lakh acres received irrigation water from Punjab through the Gang canals. The development of irrigation potential in Rajasthan has been as follows :

	By Canals & Tanks	By wells	(lakh acres) Total
1950	9.0	21.0	30.0
1955-56	11.59	24.0	35.59
1960-61	14.60	27.0	41.60
1965-66	20.32	30.0	50.32
1966-67	22.20	30.50	52.70
1967-68	25.18	31.00	56.18

Since independence a sum of Rs. 133 crore has been spent on development of irrigation in Rajasthan and now irrigation facilities exist for 14.9 per cent of the cultivated land, as compared to 23.3 per cent for the whole country.

The total surface water potential of the State is only 181 lakh acre feet, which is only 1.35 per cent of the country's resources. This means that whereas the State has 13.8 per cent of the culturable area of the country, its surface water potential is just one-hundredth of the country's resources.

A rough estimate shows that all the surface and underground water resources of the State, when fully harnessed, can irrigate at the most 87 lakh acres of land, which will be only 23 per cent of the cultivated area. Nearly 63 per cent of the surface water resources have already been exploited.

To augment its meagre resources,

INDIA'S massive planning effort is a joint endeavour of the Centre and the States.

This is reflected in multi-purpose projects, some of which have been jointly sponsored and are benefiting more than one State.

In the following pages, an attempt has been made to present the development of irrigation and power in some States.

Rajasthan has been sharing resources with the neighbouring States. The State has entered into agreements and is negotiating in some cases for sharing inter-State waters. The sharing arrangements are given below :

	Rajasthan's share (lakh acres)	Partner State
Bhakra and Gang canals	16	Punjab
Rajasthan canal	30	"
Sidhmukh and Nohar schemes	3	"
Chambal project	7	M.P.
Gurgaon canal and Bharatpur Feeder	1.5	Haryana
Yamuna scheme	5.0	U.P.
Mahi and Narmada schemes	9.0	M.P. and Gujarat.

After completion of all these projects, the total irrigation potential in Rajasthan will be about 158 lakh acres which will be 42 per cent of the cultivated land in the State. For creating more potential, the State will need nearly Rs. 600 crore in the near future.

All minor irrigation projects in the State mainly aim at storing the surplus water during rains for utilisation in subsequent lean period of the year.* Only major schemes have some carry-over factor from a good year to a bad year.

The main features of the various irrigation projects undertaken during the three Plans are :

Major Projects

Among the important major projects, Jawai, Bhakra canals and Chambal Project Stage-I have been completed. The work on the Chambal Valley Development Scheme Stage-I has nearly been completed and irrigation started from 1960. Some protective works on lining of canals and masonry works are to be completed. A sum of Rs. 5 crore has been proposed to be spent on these works. Up to 1967-68, the major schemes provided irrigation to 2,69,000 acres.

Work on the Gurgaon canal in Rajasthan is in progress. This is a joint scheme of Rajasthan and Haryana and envisages utilisation of monsoon flows of the Jamuna river to provide irrigation to 67,000 acres in Rajasthan. The scheme is likely to be completed by the next year. The channel will be made perennial on the completion of storage dams on the Jamuna near the Tajewala Head Works.

The work on the Chambal Project Stage-II and III, the Rajasthan Canal, the Mahi Project and the Gurgaon Canal is in progress. Of these the Chambal and the Mahi are multi-purpose projects. The Narmada scheme, and the Sidhmukh and Nohar schemes are under consideration.

Medium Schemes

By the end of 1967-68, a sum of Rs. 17.75 crore had been spent on 44 medium projects and irrigation facilities created for 3.33 lakh acres. The schemes of Jetpura, Jakham, Angore, Gopalpura and Lasadia have already been approved; they will benefit 53,000 acres. The proposals for Meja Feeder and Sei Diversion are under scrutiny.

Besides these, nearly 30 medium schemes have been prepared after survey to irrigate 3.44 lakh acres.

Minor Schemes

Nearly 400 minor works have so far been completed and work on another 80 schemes is in progress. By the end of 1967-68 a sum of

Rs. 8 crore had been spent and irrigation facilities extended to 2 lakh acres. Besides, another 68 schemes have been prepared to irrigate 55,500 acres.

In view of the decreasing availability of funds for irrigation development, greater stress is now being laid on "less expenditure and quicker results". The old breached tanks are being repaired, and the performance of many irrigation tanks is proposed to be improved by constructing feeders. Lift irrigation schemes are being proposed for areas where flow irrigation by other sources is not possible.

A Directorate of Design and Research has been set up for standardising the specifications and designs, and preparing manuals for irrigation projects. Soil and concrete laboratories have been set up under this Directorate for giving guidance to the field executive staff.

A Master Plan for the whole State is being prepared which will show the total available water resources, up-to-date utilisation, balance available and the feasibility of economic utilisation of the remaining water resources.

Rajasthan Canal

The Rajasthan canal is being constructed to irrigate 30 lakh acres of desert land in the north-west of Rajasthan. Besides providing irrigation facilities, the project is expected to transform the vast desert tract in the districts of Ganganagar, Bikaner and Jaisalmer into a prosperous region.

The total length of the Rajasthan canal system will be nearly 4,500 miles. The main canal, including the feeder line of 134 miles in the head reach, will be 426 miles long.

This canal is proposed to be constructed in two stages. Stage I comprises the main canal and its distribution system up to the first 122 miles. The main canal below mile 122 and all the off-taking channels down below will be taken up in the second stage.

The total production of various crops on the full development of the Rajasthan Canal Project (Stage I and II) is estimated to be as follows:

Crop	Total produce (lakh tonnes)
Sugarcane	12.00
Cotton	1.34
Other crops (Kharif)	2.76
Wheat	5.73
Other crops (Rabi)	1.68
Oilseeds	0.76
Fodder	2.88
	27.15

The Rajasthan canal (including the feeder in its entire length) has been completed in a length of 182 miles and work is in progress for another 22 miles below.

The distributaries at Naurangdesar, Rawatsar, Zorawarpura and Khetawali have been completed. The Suratgarh branch system is also largely completed. Work is in progress on the Anupgarh branch system, and Sardarpura, Khodaa, Chuli and Jesabhati distributaries.

The first phase of the project is likely to be completed by 1971-72.

A master Plan for the development of the area served by the Rajasthan canal has been prepared for a total expenditure of Rs. 213 crore.

Rajasthan also has a big share both of irrigation and power in the Beas Project under construction.

Development of Power

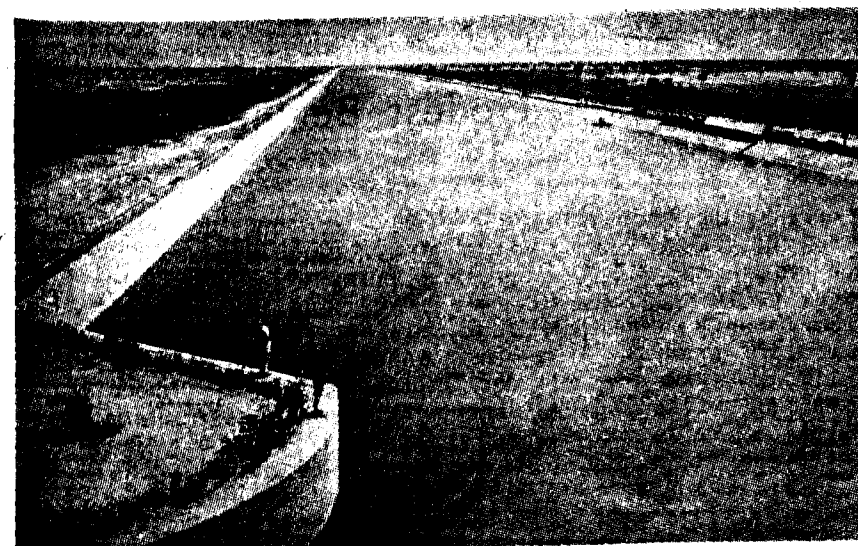
Power production in Rajasthan is at present 163 MW, whereas it was 7.48 MW before 1950. The production capacity will increase five-fold by 1971 and Rajasthan is likely to become a surplus State in power.

It has been estimated that the per capita consumption of power rose from 3.59 kWh in 1955-56 to 15.9 kWh in 1965-66.

The percentage of electrified localities in the State now stands at about six per cent, with 1946 villages electrified and 14,549 wells energised.

There has been a substantial increase in the quantum of power consumed for agricultural purposes during the past few years; it was 8.8 per cent in 1966-67 as against 1.9 per cent in 1963-64.

In spite of the fact that there was shortage of power, about 10,000 additional connections were given for agricultural purpose during the last three years which is nearly three times the number connected up to 1964-65.



The Rajasthan Canal, a blessing to the desert

Rajasthan does not have its own power projects so far, but it has shares in several inter-State power projects under construction. Work on the various power stations in which Rajasthan is a partner is in progress. The first unit of the Rana Pratap Sagar power house of the Chambal project was commissioned two months ago. Other units are likely to be completed this year. Rajasthan's share in its installed capacity is 86 MW. The Jawahar Sagar is another inter-State project of M.P. and Rajasthan. The first two units of this project are expected to be commissioned next year. Rajasthan's share in its installed capacity is 49.5 MW.

The Satpura power station is designed to have five units of 62.5 MW and Rajasthan's share is 125 MW. The first unit of the Satpura was commissioned in November last year; the second and third units could be commissioned this year.

The Bhakra right bank power project will have five units of 120 MW each, of which four units have already been commissioned. Rajasthan's share is 91.32 MW.

Rajasthan has been receiving, since February last, 9.5 lakh units of power from the Chambal and Satpura projects which have an availability of 12.40 lakh units. In addition it has been drawing 4 to 6 lakh units per day from the Bhakra power house.

The first unit of 200 MW of the Rana Pratap Sagar nuclear power

house is likely to be completed in 1970-71.

The following transmission lines have been commissioned : Gandhisagar to Kota; Kota to Sawaimadhopur; Sawaimadhopur to Jaipur; Jaipur to Ajmer; Ratangarh to Jaipur; Neemuch to Bhilwara; Pali to Jodhpur; Jaipur to Alwar

and Pali to Falna.

The following transmission lines under the Chambal project are under construction : Rana Pratap Sagar to Bhilwara; Alwar to Bharatpur; Bhilwara to Pali; Rana Pratap Sagar to Udaipur; Bhilwara to Ajmer and Kota to Sangod.

Priority has been accorded to the construction of lines from Rana Pratap Sagar to Jaipur via Kota and from Sirsa to Hanumangarh.

On account of improvement in the water level of the Gandhisagar reservoir and the commissioning of the first unit of Rana Pratap Sagar project, all restrictions on the various categories of consumers both in Kota and Bhakra regions, except for large industries in Kota, have been removed. In addition, the demands of important national projects like the zinc smelter, the Zawar mines, the Khetri project and the Precision Instruments Factory were also met to the extent necessary. It is further hoped that the remaining restrictions on large-scale industries will also be removed when Rajasthan starts receiving its share of power from the second unit at Satpura.

PUNJAB : Irrigation Has Been the Mainstay of the Economy

SARDAR NATHA SINGH

CANAL irrigation has been the mainstay of the Punjab's economy. In the pre-partition period, the State with vast areas of level fertile lands had developed a magnificent canal system but it was located mainly in the West Punjab now in Pakistan. East Punjab till 1947 had a very inadequate and undeveloped system of canals. The area under irrigation in East Punjab at that time was only 28 lakh acres. With the completion of some of the irrigation schemes, the irrigated area has now gone up to 52.58 lakh acres.

After partition the State Government, with the help of the Central Government, made an all-out effort to bring as much area as possible under canal irrigation. The gigantic multi-purpose scheme, the Bhakra Nangal Project, was taken in hand jointly with some other States to

store up the river supplies for irrigation and power. The Gobind Sagar reservoir of the project irrigates 13.64 lakh acres in Punjab besides generating cheap hydro-electric power. Similarly, a number of other irrigation schemes such as the Harike barrage, the Madhopur-Beas link, the Sirhind feeder extension of non-perennial irrigation to areas in Upper Bari Doab Canal and tube-well irrigation schemes were undertaken.

Besides, two major multi-purpose irrigation and power projects, for storing the Beas waters at the Pong dam and diverting part of the supplies to Bhakra to make up the shortage in the Gobind Sagar lake, are under construction. They are the Sutlej Beas Link Unit No. I and the Pong Dam Unit No. II, both part of the Beas Project.

At present, out of a total run off of 13.6 million acre feet of water of the Beas, about 11.4 million acre feet go waste. The vast deserts of Rajasthan, on the other hand are in dire need of water. The developing industry in Punjab is also crying for more power. With the completion of the Beas Project, power for industry and water for the parched areas will be available to Rajasthan and Punjab.

The construction of the Thein Dam across the river Ravi is expected to be taken up during the Fourth Plan.

All these multi-purpose projects will enable the maximum use of the waters of the three rivers, Sutlej, Beas and Ravi.

A sum of Rs. 3 crore was provided for advancing loans to the cultivators for percolation wells, tubewells and pumping sets, in 1967-68. In view of the importance of this programme and timely utilisation of the loan amount, the provision was raised to Rs 3.85 crore. The programme brought additional 96,000 acres under irrigation through the installation of 1,375 wells and 8,400 tubewells and pumping sets. Last year, 16,000 tubewells were energised as against about 5,000 in the previous year. In the current year, Rs 2.13 crore have been allocated for implementation of this programme.

In addition, minor irrigation schemes costing about Rs. 2.75 crore are likely to be implemented out of the funds to be obtained through the Agricultural Finance Corporation. The programme is expected to bring additional 1,12,000 acres under irrigation.

In Punjab the maximum simultaneous demand for power in 1967 was 1,83,700 kW. It has since risen to 2,19,460 kW. The connected load during the same period has increased from 8,47,000 kW to 9,70,000 kW and the number of tubewells from 32,000 to over 50,000. Twenty thousand tubewells are to be electrified during the current year.

The demand for threshers in the State during the current harvesting season has gone up 20 times to that of the last year.

There are in all 12,041 villages in Punjab, of which 3,728 had been electrified up to March 1968. About 1,000 villages are to be electrified every year.

HARYANA : A Modest Beginning

HARYANA, the seventeenth State of the Indian Union, which came into existence only 18 months ago, is yet too young to have any large-scale development apart from what it has inherited. As regards irrigation potential, the State does not have any perennial rivers. The Ghaggar, which is not perennial, touches only the northern parts of the area and is more of a menace than a blessing. The Jamuna, however, provides irrigation for large tracts in Haryana. The rain is scanty and there is paucity of sub-soil water and in a large number of tracts it is brackish. The south-eastern part of the State has a higher elevation making flow irrigation difficult except by executing costlier 'lift' schemes.

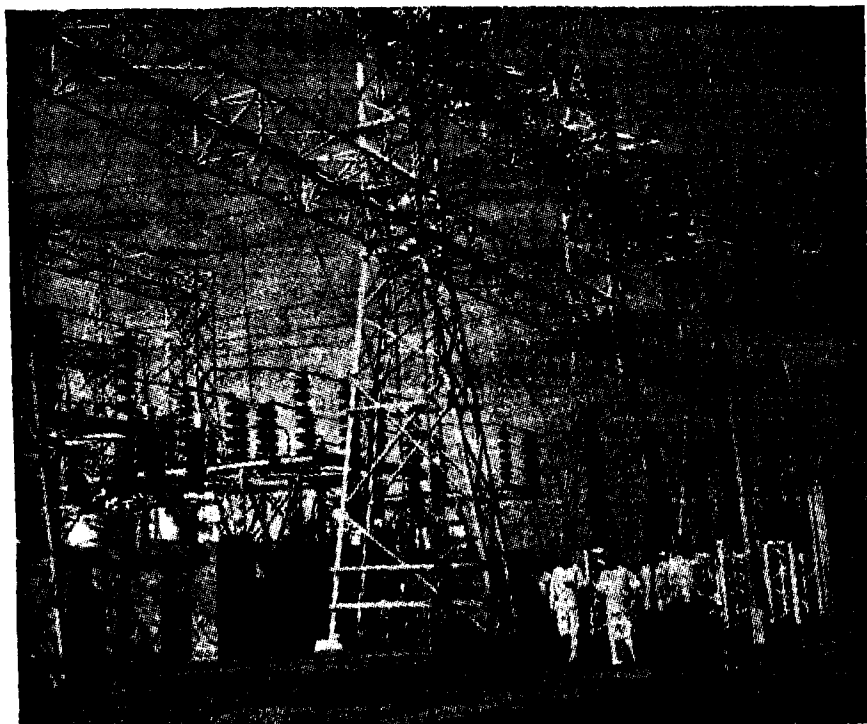
Out of the total net sown area of 34.23 lakh hectares the net area under irrigation was 12.93 lakh hectares. Besides, large tracts of land are being affected by floods

every year and the problem of water-logging is assuming serious proportions. However, the State has taken up the task of development in the various fields. The Annual Plans of Haryana are so formulated as to provide higher allocations for agriculture, irrigation and power. The Annual Plan for 1968-69 has allocated Rs 10.4 crore for irrigation and Rs 2.4 crore for power development in the total outlay of Rs 23.43 crore.

The main canal systems which are serving some of the districts of the State at present are the Western Jumna Canal and the Gurgaon canal. For remodelling the Western Jamuna Canal and the completion of the Gurgaon canal Rs 33 lakh and Rs 24 lakh respectively have been provided in the current year's plan. On completion both these canals would provide irrigation facilities to nearly 4.2 lakh acres of land.

Another important scheme of

The grid station at Dhulkot



the State is the 'Western Jumna Canal Feeder Project', to interlink the Bhakra system with the Western Jumna Canal system so that water from Bhakra reservoir, in the first instance, and from the Ravi Beas complex, latter on, could be transferred to the Western Jumna canal tract. The other important schemes are the Rewari lift irrigation scheme and 'Installation of tubewells in the Western Jumna canal tract'.

With the utilisation of finances available from the State as well as from institutional credit agencies, it is envisaged that an additional area of 1,65,000 acre will be brought under minor irrigation.

In order to check devastation caused by floods and monsoon torrents, the State proposes to construct tanks and bunds in Gurgaon and Mahendragarh districts where irrigation facilities to 3,500 acres of land will also be provided. Lift irrigation is already being provided to the drought affected areas of Hissar. A scheme of 'Exploratory Tubewells' has also been undertaken to assess the underground potential of water.

Haryana is a partner in the Bhakra and Beas projects along with Punjab and Rajasthan. Under

the State's power programme for 1968-69 15,000 tubewells will be energised, 1,600 industrial connections and 40,000 general service connections will be given and 200

villages will be electrified.

With these programmes, the new State of Haryana has made a modest beginning for the development of irrigation and power.

Irrigation by tubewell at Shamspur in Gurgaon



BIHAR : Big Projects, Big Problems

APART from the Damodar Valley Corporation, Bihar has four main irrigation projects namely the Kosi project, the Gandak project, the Sone Barrage project and the Tenughat dam project. Of these irrigation benefits have already started flowing from the Kosi and the Sone projects, although neither of them has been fully completed.

Kosi Project

The Kosi project, which was taken up during the First Plan, originally consisted of a barrage at Hanumannagar, 150 miles of flood embankments on either side of the river and the Eastern Kosi Canal

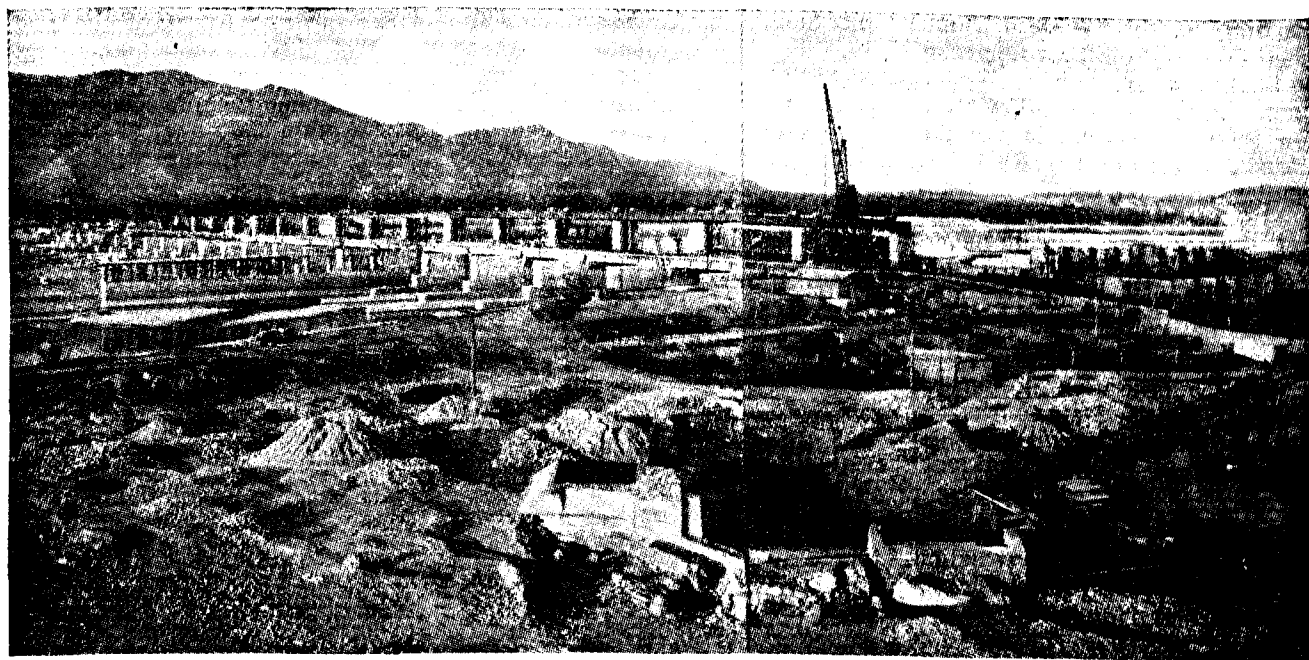
system to irrigate about 14.05 lakh acres of land in the districts of Purnea and Saharsa. A few extension schemes were added in the Third Plan. These were : (i) Rajpur Canal, which is an extension of the Eastern Kosi canal system, for irrigating the area between the eastern embankment and the western limits of the command of the eastern Kosi canals, (ii) Western Kosi canal, and (iii) further extension of the two embankments on either side of the river.

Work on the western Kosi canal could not be taken up so far. The proposal for alignment of this canal for the first 22 miles, which passes

through Nepal, is before the Government of Nepal.

The construction of flood embankments was taken up in 1955 and was completed in 1959. The barrage, 3770 feet long, with an earth dam and an afflux Bundh, was completed by 1963. Nearly 99 per cent of the eastern Kosi canal system has been completed.

Normally, irrigation channels below 5 cusec capacity have to be constructed by the beneficiaries themselves. But for developing irrigation as quickly as possible, the Government has decided to take up the construction of channels down to 1 cusec capacity at Project cost.



A panoramic view of the Gandak barrage under construction

Out of 7272 channels to be constructed, 4404 have already been completed.

Out of about 5,682 miles of field channels to be constructed, cultivators have already constructed about 1874 miles of field channels at their own cost.

With the completion of the Kosi barrage in 1963, an area of about 6,000 acres could be irrigated in 1964, the first year when its water was released for irrigation. About 52,000 acres were irrigated in the Kharif season and 2,000 acres in the Rabi season in 1965, and about 2 lakh acres during Kharif and another 2 lakh acres during the Rabi season of 1966. The original programme was to irrigate only 1 lakh acres of rabi crops in 1966. But in the context of the acute food shortage in the State, a "Rabi Drive" was organised doubling the irrigation target.

An area of 3.50 lakh acres of Kharif crops could receive irrigation in 1967. As for Rabi crops, 3 lakh acres were irrigated. In 1968, 4.50 lakh acres of Kharif crops are proposed to be irrigated.

The entire command of 14 lakh acres under the Kosi project is expected to receive irrigation from the next year.

The Rajpur Branch Canal has an irrigation potential of 3.97 lakh

acres in the Saharsa district. The work on this canal is in progress. However, irrigation started in 1967 with 15,000 acres of Kharif crop. Full development of irrigation from this canal would begin from 1970.

Gandak Project

The Gandak project includes the construction of a barrage at Valmikinagar in Nepal, canal systems on the eastern and western sides of the river to irrigate about 28 lakh acres in North Bihar and a hydro-electric power house with installed capacity of 15,000 KW in Nepal to be given to them as a gift.

Work on the barrage started in December 1963, and is expected to be completed by March 1969.

Work on the canal systems is going on. However, efforts are being made to obtain the benefit of irrigation as early as possible before the completion of works. Accordingly, the Tirhut canal will start irrigation in the small stretch of its Sugauli branch to cover 1.80 lakh acres of Kharif land this year. The Don branch canal has been accorded priority and is expected to be completed next year.

Sone Project

The barrage on the river Sone at Indrapuri, about 5 miles of upstream of Dehri, has almost been completed,

providing irrigation to about 10.5 lakh acres of land in the districts of Patna, Gaya and Shahabad. The eastern and western link canals, which connect this new barrage with the main canals, taking off from the anicut, have also been completed, and the water for irrigation is now available from the barrage through these link canals.

The High Level Canals of the Sone project will be taken up soon.

Tenughat Dam Project

The Tenughat Dam project has been conceived as a storage dam on the river Damodar to supply industrial and domestic water for use in the Bokaro-Sindri region. The dam will be the only source of supply of industrial water for the Bokaro steel plant. The work on the dam was started in 1965. Water is to be supplied to Bokaro from 1970.

A 22-mile long canal will connect the Tenughat reservoir with the cooling pond of Bokaro. The canal will also feed water to other industries likely to be set up in the area. Incidentally, the canal will irrigate 6,000 acres of land.

Power

UP to 1950, the development of electric power in Bihar was

confined to isolated urban areas by private electric supply undertakings. Besides, some industries like the Tata Iron and Steel Company and the Rohtas Industries had their own generating stations.

In 1944-45, the Electricity Department of the Government of Bihar had launched the first scheme of electric supply in the Dehri-Sasaram area primarily for running the State tubewells. A similar scheme was introduced in 1946 in Patna - Bihar Sharif - Bihta area. This was the beginning of rural and urban electrification through State agency. In 1948, the Electricity Department of Bihar was organised to take up the generation, transmission and distribution of power in the State. By March 1951, the Department had taken over some of the private undertakings, and had constructed 3200 kilometres of sub-transmission lines and 80 kilometres of low tension line for serving 10 villages and towns and 110 tubewells. The per capita consumption of electricity then was 17.29 units.

Since the beginning of the planning era in 1951, the Damodar Valley Corporation has been the main agency for the development of power and irrigation in Bihar (and West Bengal). However, the State Government has taken up some projects on its own.

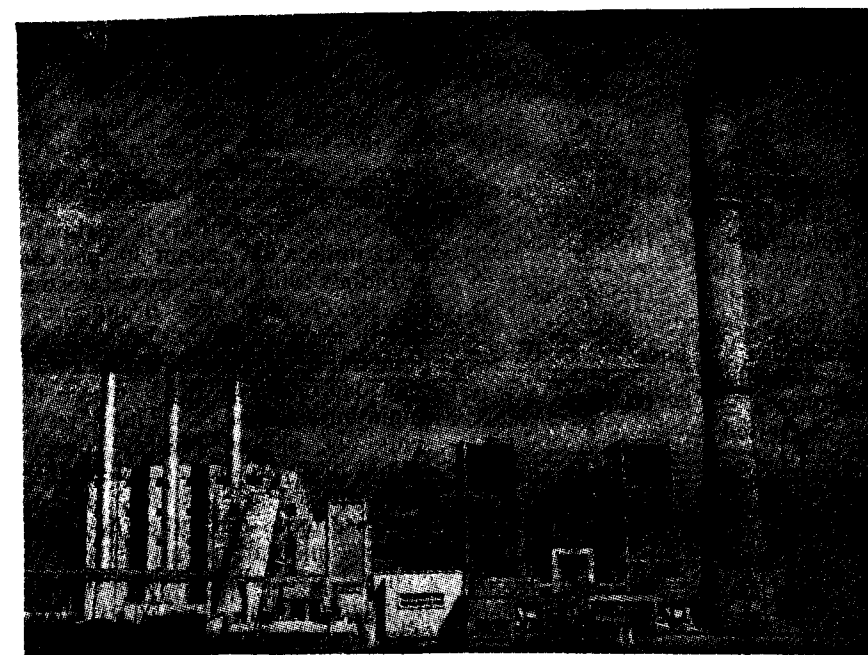
During the First Plan the State Electricity Department spent Rs. 8.27 crore on power development schemes, including U.S. Technical Co-operation aid for tubewell schemes. At the end of the period, the Government controlled installed capacity rose to 7 MW (diesel station) and 6000 kilometres of sub-transmission lines were laid; 364 more villages were electrified and 1253 pumpsets were energised.

Considerable progress was also made by DVC by installing the Tilaiya hydro-electric power station and the Bokaro thermal power station which was linked with the Maithon station and the grid sub-station at Jamshedpur. The work on 132 KW, transmission line to connect Bokaro with Tilaiya, Gaya, Patna, Barauni and Jamshedpur was started.

The per capita consumption of electricity rose to 29.77 units by 1955-56.

The Second Plan provided for a thermal power station of 30 MW at Barauni in North Bihar, and for taking over derelict electric supply undertakings, developing them and also advancing loan to licensees. In the middle of the Second Plan period, the Union Government decided to electrify the railway line from Asansol to Mogalsarai via Gaya and from Asansol to Rourkela and Noamundi. The Bihar State Electricity Board, which was formed in 1958, took up the execution of 132 kW transmission lines and 132/25 KV grid sub-stations for supplying power to the railway.

Towards the end of the Second



The Barauni thermal power station

Plan, the State Electricity Board launched a thermal power station of 100 MW at Patratu primarily to cater to the needs of the Heavy Engineering Corporation, Hatia.

The Board also undertook the construction of a 132 KV single circuit line from Maithon to Sultanganj via Deoghar with grid sub-stations at Deoghar and Sultanganj.

The total expenditure on power development schemes during the Second Plan was Rs. 19.04 crore.

At the end of the Plan, the aggregate demand on the Bihar State Electricity Board's system

had risen to 110 MW from 20 MW at the end of the First Plan. This was partly met from the Board's own stations (from diesel stations) and partly by purchase from DVC, Orissa and others. The per capita consumption rose to 41.09 units.

The following generation schemes were included in the Third Plan proposals:—

(1) A third set of 15 MW at Barauni thermal power station for meeting the requirement of the Barauni Refinery. Work on the two sets already sanctioned during the Second Plan was in progress. Two more sets of 50 MW each were approved.

(2) An hydro-electric power

station of 20 MW on the Eastern Kosi Canal.

(3) An hydro-electric power Station of 15 MW on the Western Canal (in Nepal) of the barrage across the river Gandak at Bhaisalotan.

(4) Expansion of Patratu to a total capacity of 300 MW for meeting the loads outside DVC.

During the Plan period, three units of 15 MW each were commissioned at Barauni. The first unit of 50 MW at Patratu was almost complete.

The Board constructed a 132 KW

double circuit line from Barauni to Muzaffarpur via Samastipur. Work on 132 KV line from Barauni to Purnea and Samastipur to Chapra was also started.

A 132 KV double circuit line was laid from Patraru to Hatia for supplying power to the H.E.C. Another 132 KV double circuit line was extended to Ramgarh for linking Patraru with the DVC grid.

At the end of the Third Plan the aggregate demand on the Board's system had increased to 243 MW. The Board met 31 MW from its own resources and the balance by purchasing power from DVC, U.P. State Electricity Board, etc. The per capita consumption rose to 60 units.

The progress made till the end of March 1966 is given below:

Installed capacity	59 MW
Transmission line (132KV)	964 kms
Sub-transmission line	18,855 kms
Low-Tension line	11,545 kms
Villages electrified	3,990
Pumps energised	10,556

In 1966-67, the demand for pump connections for agricultural purposes rose considerably due to the severe drought conditions in the State; applications for 40,000 additional pump connections were received.

However, during the year 14,012 pump connections were given against a total number of 10,556 up to the end of the Third Plan.

In South Bihar the capacity of Kendposi 132/33 KV sub-station was augmented by installing a 12.5 MVA transformer. Work on augmentation of Patna 132/33 KV sub-station by installing a 20 MVA 132/33 KV transformer was completed. Installation of 132/33 KV transformer (12.5 MVA) at Karmnasa was nearing completion. Work on Hatia, Adityapur and Bihar Sharif 132/33 KV sub-station was in progress. Work on 220 KV line from Patraru to Chandil and Patraru to Gaya 132 KV line from Chandil to Adityapur and Gaya to Bihar Sharif was also in progress.

And last year 15,807 pumps were energised against a target of 15,000.

By the end of March 1968, the total demand on the State Board's system had increased to 300 MW, of which 117 MW were met from the Board's sources and the rest by purchase from other sources. Two units of the Patraru power house have been commissioned. The progress made by the Board is given below:

Installed capacity	153 MW
Transmission line (132 KV)	1379 kms (including Barauni-Purnea)
Sub-transmission lines	24,800 kms
Low tension lines	20,878 kms
Villages electrified	6,626
Pumps energised	40,375

ASSAM : Rich Resources and Slow Development

ASSAM is potentially rich in natural resources. The State has the highest power potential in the country based on water, natural gas, coal and oil resources. The hydro-power potential is estimated at 12 million kW, about 30 per cent of India's total hydro-power resources, excluding the Brahmaputra which itself accounts for a power potential of 30 million kW at 60 per cent load factor on the basis of the minimum discharge. This represents one of the biggest concentrations of hydro-power potential in the world. The State also has an immense industrial potential based on large mineral resources such as coal, oil, natural gas, limestone and sillimanite. The forest resources offer substantial scope for industrial exploitation. In spite of such natural bounties, the State is industrially the least developed. The shortage of power has been a major limiting factor in the industrial development of the State.

During the First Plan, the development of power in Assam was the lowest in India. The Umtru Hydro-Electric Project, with an installed capacity of 8400 kW, was the first modest venture. The project was completed in 1957, raising the total installed capacity in the State to 14 MW.

The per capita consumption of electricity in the State in 1957-58 was only 1.61 kW, against an all-India average of 32.97 kW. Emphasis was therefore laid on accelerated



Grid lines of the Namrup thermal power house

development of power during the Third Plan. The State Electricity Board, which was constituted in 1958, undertook schemes for power development to the tune of 170 MW. The main schemes were:

Umiam Hydro-Electric Project (Stages I and II)	... 54 MW
Namrup Thermal Project	... 69 MW
Gauhati Thermal Power Project based on oil	... 42.5 MW
Garo Hills Steam Power Project based on coal	... 5 MW

Total: 170.5 MW

The Umiam project, which envisaged the storing of water of the Umiam river through a concrete gravity dam, has been located in ideal surroundings at Barapani,

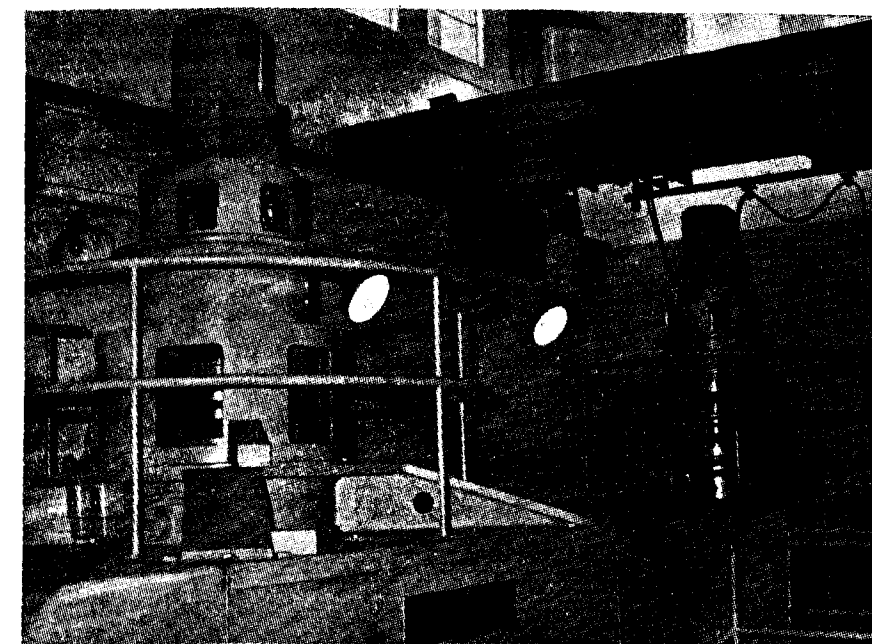
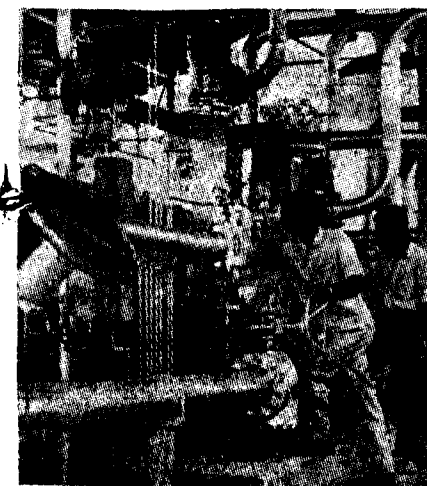
about 10 miles from Shillong. A 7000 feet long tunnel carries water to the power house. The first stage of the project, with a generation capacity of 36 MW, was commissioned in 1965. The second stage, with an installed capacity of 18 MW, is expected to be completed by the end of 1969. This system will supply power to the districts of Khasi and Jaintia Hills, Kamrup, Nowgong, Darrang, Goalpara and Cachar through high transmission lines covering practically the whole of lower Assam.

During the last decade large oil deposits have been discovered in Naharkatiya, Hoogrija and Moran areas of upper Assam. Two public sector refineries have been set up at Gauhati and Barauni respectively to refine the crude oil from these fields. In order to utilise the natural gas from these oil fields economically, it has been planned to set up several petrochemical industries in the Naharkatiya area, including the Namrup Fertiliser Project.

The Namrup thermal project is intended mainly to meet the power needs of these industries. Its first stage, with an installed capacity of 69 MW in the first stage, was commissioned in April 1965. It also supplies electricity for domestic use to the whole of upper Assam from Ledo to Bokajan.

The 12500-kW thermal plant at Gauhati is based on low speed diesel oil available from the Noonmati refinery. It was commissioned

Inside the Namrup power house



Turbines of the Umtru power house

in December 1964. Provision has also been made to expand this station by a 30 MW plant based on furnace oil. The station will be eventually connected with the Umiam-Umtru grid.

The growing demand for power in the Garo Hills district has been proposed to be met by a 5-MW steam turbine power house at Nangal-Bibra on the Bank of the Simsang, about 60 miles from Dudhnoi. The project was taken up in the Third Plan and is nearing completion. Besides these projects, small and medium diesel sets are being installed to generate additional 13 MW of power to meet the defence need of the region.

As a result of the schemes completed so far, the generating capacity of the State by the end of the Third Plan reached the target of 154 MW. The installed capacity has thus increased 11 times. During this decade, electricity has reached nearly 400 villages. By 1967-68 the per capita consumption of electricity in Assam would have reached 34 kW as against 45 kW for all India.

It is proposed to cover additional 1500 villages under rural electrification in the Fourth Plan. With the completion of the 5 MW Garo Hills thermal project, 18 MW Umiam-II, installation of the fourth

set of turbines at the Namrup station and another 30 MW thermal project at Gauhati by 1970, the total installed capacity will go up to 230 MW.

A number of small and medium industries and the two big plants, namely the cement factory at Cherrapunjee and the fertiliser factory at Namrup in the public sector, has been receiving power. The tea industry, which is a major foreign exchange earner in the country, is also taking to power. Besides, Assam has agreed to supply power to the neighbouring areas, namely Tripura, Nagaland, Manipur, NEFA and West Bengal. Power is also needed for irrigation and other agricultural purposes. An experimental irrigation scheme has been started at Mayang (Nowgong). The demand for power may thus very soon outweigh the rate of generation.





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MAHARASHTRA : Rapid Rural Electrification

AN important objective of the Five Year Plans is to increase agricultural production and to develop small industries in the rural areas. This will not only increase employment opportunities, but raise the standard of living of the rural population. One of the most effective means of achieving this objective is the extension of electricity to the rural areas. In Maharashtra, where more than 70 per cent of the people in the State live in rural areas, until 1948, the generation and supply of electricity was mostly in the hands of private enterprise under a system of licences granted by the State Government. Most of the development was, therefore, confined to the urban areas, which were remunerative to them because the density of load in the urban area is far higher than in the rural areas. With the passing of the Electricity (Supply) Act, 1948, and constitution of an Electricity Board, the situation changed. The Board is responsible for promoting rural electrification and rationalising the generation, supply and distribution of electricity in the State.

Progress was very rapid after this, and, up to March 31, 1968, a total of 7,377 villages were provided with electricity. During the financial year 1967-68, which ended on March 31, as many as 911 villages were electrified. Of the 7,377 villages electrified so far, more than 3/4th have been electrified after the formation of Maharashtra State on 1st May, 1960. The region-wise break-up of the villages electrified is, Western Maharashtra—3,344, Vidarbha—2,662 and Marathwada—1,371.

In addition, the Board has so far supplied power to 90,002 agricultural pumps. During the years 1967-68, as many as 25,419 pumps were connected. The region-wise break-up of the pumps connected is, Western Maharashtra—4,5094, Vidarbha—28,901 and Marathwada—16,007.

For the year 1968-69, there is a provision of Rs. 15 crore on rural electrification schemes. The Board is particular that this amount is fully and properly utilised. The Board has, therefore, taken measures to remove all bottlenecks and procedural delays by taking decisions in respect of every district at conferences of the respective Regional Officers. A special feature of these meetings is a detailed discussion of every scheme and on the spot decisions on them.

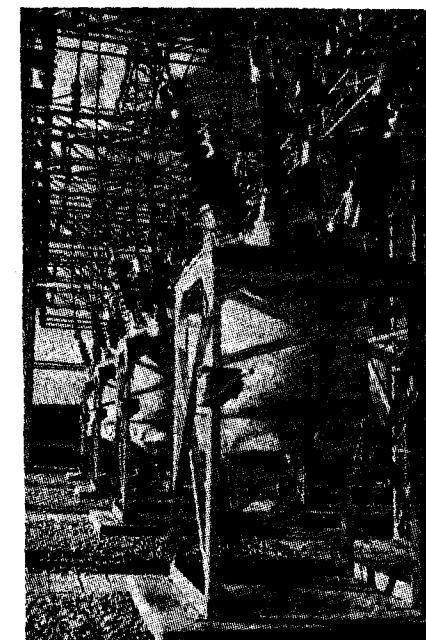
As in the case of other development programmes, on matters connected with rural electrification schemes the Maharashtra State Electricity Board has taken into consideration the special needs of under-developed areas, like Kokan, and has designed special schemes for these districts. The special needs of Adivasi areas have also been taken into account and, the programmes suitably drawn up for them.

Despite the progress so far made, the number of villages electrified so far constitute hardly 20 per cent of the total.

COMPLEX PROBLEM

Rural electrification is a complex problem, and finance is the greatest hurdle. In comparison with urban areas, rural areas have a poor load density. The capital and maintenance charges are, therefore, high. In Maharashtra, there are about 30,000 villages. The electrification of a village with a population of 2,000 entails a capital expenditure ranging roughly from Rs. 60,000 to Rs. 80,000, therefore, the magnitude of the capital resources required for electrifying the remaining 33,500 villages in the State can well be imagined.

The use of electricity in rural areas is limited to limited purposes, such as lighting, lifting water for irrigation and for operating small machinery for cottage and small-



The khaparkheda thermal power house near Nagpur electrifies the rural areas of Vidarbha

scale industries. The use of electricity in agriculture on the pattern of the Western countries cannot be expected in the near future as holdings are small and methods of farming differ. The yardstick for electrification of a village adopted by the Board is that a return of 13 per cent should be available on the capital investment, if electricity supplied to a village is from a grid line, and 20 per cent, if it is from an isolated diesel station. The increase of load in some rural areas is very slow and experience has shown that it takes about five years or more to build up sufficient load to earn this much return.

PHASED PROGRAMME

Because of the enormous outlay and low return, and the limited financial resources available to the Board, the programme of rural electrification has necessarily to be phased on a long-term basis, priority being given to villages which are economically promising and where the cost of the scheme is low. The most practical approach to the problem, and one which the Board has adopted, has been to extend electricity to villages lying along the routes of grid lines and to villages which are in the proximity of towns served by diesel stations. Along

with making electricity available to villages, it is also essential that the price at which it is supplied is as low as possible. The possibility of achieving this depends largely on the extent to which the cost of producing and distributing electricity can be reduced and rural consumers, both present and future, take advantage of the facility made available to them. The adoption of large units for power generation and development of grid system contributes substantially towards reduction of cost of power generation and distribution. Special techniques have further been developed to make rural lines as less expensive as practicable.

INCENTIVES TO CONSUMERS

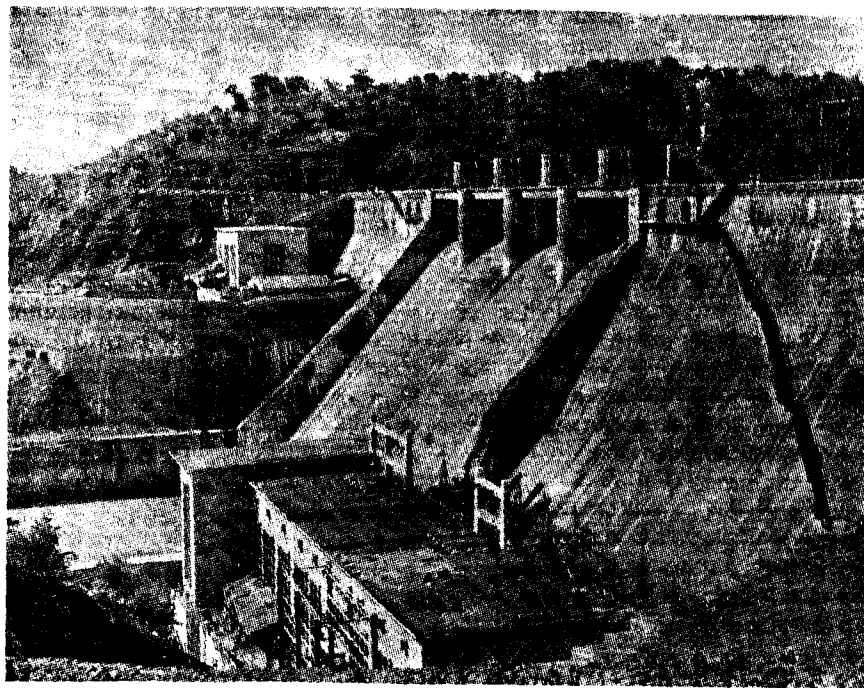
In order to encourage the use of electricity in rural areas, financial assistance is granted by the State Government to agriculturists for purchase of electric motors and pumps for irrigation of crops. Uniform and progressively decreasing rates are charged by the Board for irrigation pumping and cottage and small scale industries, whatever may be the source of generation (hydro, steam or diesel) of power supplied to them.

For low tension consumers, the Board provides an overhead service line free of charge upto 30 metres from its nearest distribution point. For agricultural consumers the Board lays 300 metres of service line free of cost. For the agriculturist who is not in a position to pay for the additional length of service line beyond 300 metres, the Board constructs the entire service line at its own cost, on condition that he guarantees a minimum revenue per year.

To enable cottage and small scale industries to improve their competitive position, subsidy is given by the State Government to consumers in areas where the rate is higher than 9 paise per unit.

What is important is the spirit of enterprise on the part of villagers and their leaders. The incentives offered by the Board to consumers and opportunities of expansion offered by the various development schemes of the successive Five Year Plans are encouraging enough to agriculturists and artisans to make increasing use of electricity in their trades.

MYSORE : Power Famine—A Thing of the Past



The Bhadra dam

It is a paradox that Mysore, which pioneered the development of hydro-electric power in India, had to suffer from a severe power famine until the Sharavati Project was commissioned. As a result of power shortage, prospective industrialists shied away and agriculture, the sector in which a generous supply of power for irrigation could have brought about a revolution, lagged behind. This is now a thing of the past. With two of the proposed ten generating units of the Sharavati Project, each with a capacity of 89,100 kW, in operation, the State has not only become self-sufficient in power, at least for the present, but is able to spare some power to the neighbouring States.

The story of power production in Mysore goes back to 1902, when the waters of the Cauvery were harnessed to feed the then British-owned Kolar Gold Mining Company from the Shivasamudram power Station. In the initial stages, the installed capacity at Shivasamudram was 4500 kW, which was gradually increased to 42,000 kW. Another station, Shimsha, with a capacity of

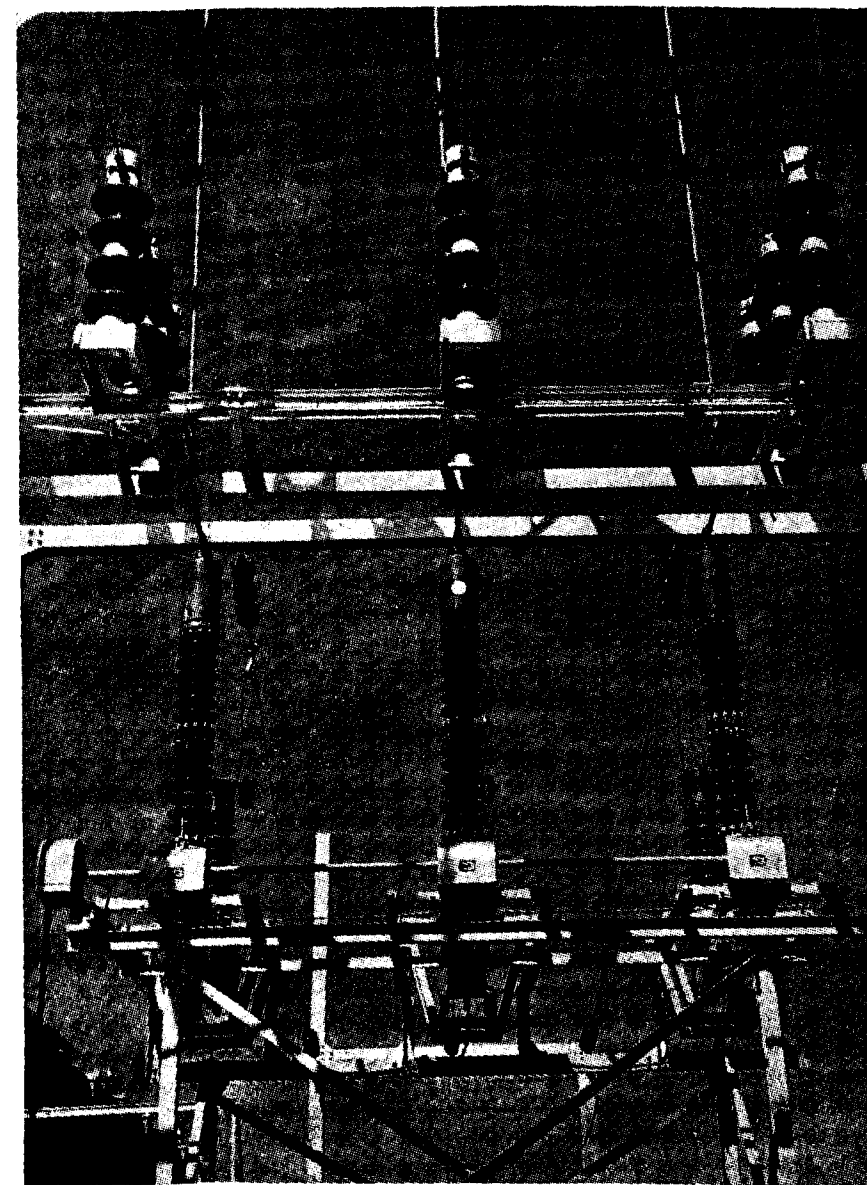
17,200 kW, was set up in 1940. The Mahatma Gandhi Hydro-Electric Works in the Sharavati Valley with a total installed capacity of 1,20,000 kW was completed in 1952. The 33,200 kW. Bhadra Hydro-Electric Project later considerably increased Mysore's power resources. Following the re-organisation of States and the consequent cut in the State's power resources Mysore suffered from a severe power famine during the Second Plan period.

The installed capacity of the Mysore power system at the end of the Second Plan was 208 MW. With a firm capacity of 159.8 MW. As against this, the peak load was 169 MW. The demand for power in excess of the firm capacity was met by encroaching upon the spare capacity of the system with the result that it was not possible to take up normal maintenance work without reducing supply to essential industries and consumers. There was no significant increase in generating capacity, while the load demand increased steadily. Even existing industries were unable to get adequate supplies; and the question of

meeting the needs of new industries just did not arise. Power shortage also affected agriculture, because the needs of the lift irrigation scheme could only be partially met. Power was supplied to irrigation pump-sets only during the night. The power famine forced the Mysore Government to resort to a process of staggering the supply on an extensive scale even to major industries and to enforce a thirty per cent cut during the peak load hours. A load survey conducted by the Central Water and Power Commission placed the load demand at 575 MW by 1965-66. Then, almost overnight, the picture changed when the Sharavati Hydro-Electric Project was commissioned early in 1965 by Shri Lal Bahadur Shastri. It was a New Year gift, not only to Mysore, but to the entire country.

The Sharavati Project, located about 230 miles to the north-west of Bangalore, has been planned, designed and supervised by Indian engineers and executed by Indian labourers. More than 40,000 workers and several hundred engineers toiled for several years to give shape and substance to the project. Financed largely by the United States—Rs. 14.2 crore from the U.S. Development Loan Fund and the U.S. Agency for International Development and Rs. 34.5 crore under P.L. 480—the Sharavati Project is a striking symbol of Indo-American friendship.

The 82-mile Sharavati river is one of the shortest rivers in the country, but at Jog, near the dam site, the river plunges down 830 feet to create India's highest water fall. The project includes two dams—the larger one on the main river at Linganamakki, and the other at Talakalale. Linganamakki is a stone masonry and earthfill dam, 1.7 miles long and 203 feet high, with a storage capacity of 36,00,000 acre feet. The dam has a 650-foot long overflow spillway, outlet gates for feeding water into the power channel, sluices for discharging water into the river to maintain a flow over Jog Falls during the dry weather, and penstock pipes for a future base of dam generating station. The 205-foot high Talakalale dam across the Talakalale river, a tributary of the Sharavati, forms a balancing reservoir. An interesting



Transmission lines of the Tungabhadra project

feature adopted in the construction of these two dams is the use of "surki", a compound of burnt brick powder and lime, which has resulted in a saving in construction costs, because it is 20 per cent cheaper than cement. It is estimated that the total cost of the project, when all its ten generating units are installed, will be about Rs. 85 crore. This will work out to less than Rs. 1000 per kilowatt of installed capacity, making Sharavati one of the most economical power projects in India.

The State's generating capacity during the Third Plan rose from 208 MW to 430 MW of which the first two generating units at

Sharavati contributed 1,78,200 kW. Six more units, also with a capacity of 89,100 kW each, will form the second phase of development of the project. Two more units are to be installed in the final stage. Even with these additions, the generating capacity of the State will fall below the demand of the fast-expanding industrial sector.

To make power available to important load centres a chain of receiving stations have been set up or are in the process of construction. To attract large-scale use of electric power, several novel features have been introduced. These include, special rates for tourist hotels, railways, film studios and

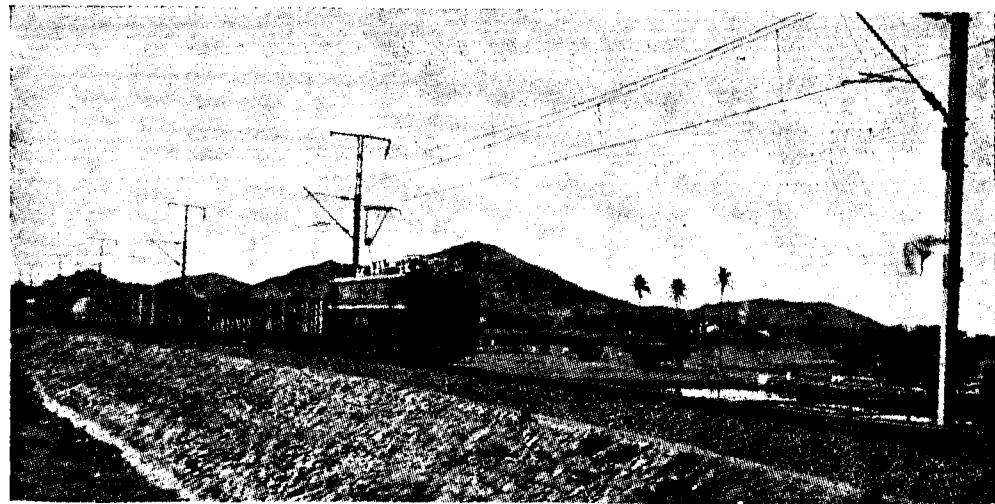
educational institutions; concessional charges for national research institutions; rebates for new industries or industries implementing expansion schemes; attractive rates for mixed loads for lighting, heating and other domestic appliances; and facilities for utilising power supplied for irrigation pumps for cottage industries, wherever possible.

An extensive network of transmission lines have been laid to carry hydel power to the remotest corners of the State. Thus, a vast power complex has come into being in the underdeveloped regions. During the first three Plans, 2,500 villages were electrified, bringing the total number to 5,516. During the Fourth Plan, the target set for rural electrification is 4,000 villages. More than 42,000 irrigation pump-sets have been serviced in the past 15 years, and one lakh pump sets are proposed to be electrified during the Fourth Plan period, at an estimated cost of Rs 40 crore. It is expected that the area covered by pump-sets by the end of the Fourth Plan will be 5.5 lakh acres, yielding about five lakh tons of additional foodgrains.

The per capita consumption of power in the State has increased from 34 units, when the present State of Mysore came into being in 1956, to 60 units by the end of the Third Plan. This figure is expected to go up to about 176 units at the end of the Fourth Plan, as against the estimated all-India average of 90 units.

Mysore is supplying considerable amounts of energy to the neighbouring States. A 220 kW line has been constructed from Bangalore to Hosur on the Mysore-Madras border. Power supply to Andhra Pradesh is being made from Hindupur and Tungabhadra Dam. Some five hundred million kW hours of energy flow from Mysore to Madras and Andhra Pradesh. Power is also being supplied to Goa, which receives 500 kW for the present. Another 5,000 kW will begin to flow from Mysore to Kerala as soon as the necessary transmission lines have been laid.

A feature of the Mysore power system is that the generation of hydel power depends on the demands of



The Sharavati project supplies power for railway traction

irrigation. Excepting the Sharavati Project, all other hydel units are linked with major irrigation schemes. Out of the total geographical area of about 480 lakh acres, about 350 lakh acres are cultivable. Even after all the schemes included in the first three Plans have been completed, the total area under irrigation will be about 8.4 per cent of the cultivable land, which is nearly double the irrigated area before planned development of the State was undertaken.

Three major and eight medium irrigation projects were in progress during the First Five Year Plan. These were the Tungabhadra Project at Hospet, the Ghataprabha Project (Stage I) in Belgaum district, the Bhadra Reservoir Project in Chickmagalur district, the Tunga Anicut Project in Shimoga district and Nugu Reservoir in Mysore district. Many of the projects could not be completed in time owing chiefly to shortage of funds. But a good start had been made. During the Second Plan period, fourteen new projects were taken up, of which three were major and eleven medium. The estimated cost of all the projects, including the spill-over from the First Plan, amounted to Rs 144.66 crore, but the total outlay available was only Rs 63.97 crore. The gross potential created by the first two plans was 14.64 lakh acres. That there has been a wide gap between the potential created and its utilisation is proved by the fact that irrigation covered only 2.91 lakh

acres, as against a potential of 4.63 lakh acres in the Second Plan.

Seven new schemes, three major and four medium, were undertaken in the Third Plan besides continuing the incomplete works of the previous Plans. The cost of the new schemes was Rs 96.40 crore, but a provision of only Rs 40.66 crore was made. The potential created was 4.95 lakh acres and the actual utilisation was about 3.90 lakh acres.

While the progress under the major and medium irrigation projects may not look spectacular, it is in the field of minor irrigation that Mysore has made rapid strides. The Third Plan provision for minor irrigation in the P.W.D. sector was Rs 8.5 crore. This was outstripped as early as 1964-65, by which time Rs 12.08 crore had been spent.

The Third Plan did not provide fully for the completion of the major, medium and minor irrigation schemes included in it.

In any discussion of Mysore's irrigational efforts, the proposed Upper Krishna Project and the already completed Tungabhadra Project need prominent mention, because Mysore's hope rests primarily on them. The districts of Bijapur, Gulbarga and Raichur are in the heart of, what is known as, the famine zone of South India where the average annual rainfall is about twenty inches. Consequently, famine stalks this track of land approximately once every four years. The scope for minor irrigation is

extremely limited in view of the arid climate. The only lasting and effective solution is to utilise the vast water resources of the Krishna by providing major storage resources and irrigation channels. After the creation of the present Mysore State, the blue-print of the Upper Krishna Project was prepared to irrigate 12 lakh acres in Bijapur, Gulbarga and Raichur districts. The Project, which is in the initial stages of execution, however, belongs to the future. The Tungabhadra Project, on the other hand, holds out the promise of turning Mysore into the granary of the South. The Tungabhadra project has its genesis in the early 14th century, when first attempts were made to harness the waters of Tungabhadra for irrigation. The Vijayanagar Kings built, what are known even today as 'rayar canals'; evidence of which can still be seen in some places. The East India Company built anicut near Sunkesala; but it was Sir Arthur Cotton, the irrigation wizard of the South, who first drew up a comprehensive irrigation scheme. Since the beginning of the 20th century, various alternative schemes were considered and, after protracted negotiations, the then Governments of Madras and Hyderabad agreed in 1944 to construct the present storage dam near Hospet. The Project was inaugurated in 1945, and water for irrigation was let out for the first time in July 1953.

Tungabhadra Project

The Tungabhadra project is a multi-purpose one. It is envisaged to command over 12 lakh acres of which 8 lakh acres are in Mysore State and 4 lakh acres in Andhra Pradesh. The Project is estimated to cost over Rs. 100 crore. There will be altogether three main canals, taking off from the dam with a network of distributaries extending over about 4,000 miles in length. Basically a "protective" project, so that the benefits can be spread to as wide an area as possible, it makes for a system of light irrigation. Nearly 80 per cent of the project area consists of black soil and the remaining 20 per cent of red and mixed soils.

The project consists of a straight gravity type masonry dam across

the river to form the reservoir; two canals on the right bank and two on the left for irrigating lands both in Mysore and Andhra Pradesh and hydro-electric power plants at the head-works and at the falls in the canals.

Three main canals take off from the dam—two on the right side and one on the left bank of the river. Besides, a small channel takes off on the left side. One of the right bank canals covers a length of about 217 miles of which the first 156 miles is the common portion serving both Mysore and Andhra Pradesh. Beyond this the canal only serves Andhra Pradesh. The total cultivable command area of the canal is about 7.5 lakh acres, out of which only 2.41 lakh will get the benefit of irrigation (92,345 acres in Mysore State and 1,48,725 acres in Andhra Pradesh). The Second canal on the right bank which is 122 miles long, also serves both the States. It runs for a length of about 69 miles in Mysore State and the rest of the 53 miles in Andhra Pradesh. About 1.99 lakh acres in Mysore State and 2.5 lakh acres in Andhra Pradesh will benefit from this canal. The left bank canal serves only Mysore. It has a total length of 141 miles and irrigates about 6 lakh acres.

Irrigated dry crops or light irrigation has been introduced as a special feature of this project over a major portion of its ayacut. Only small areas have been earmarked for heavy irrigation to grow rice, sugarcane, fruits and tobacco. This is intended to obtain the maximum benefit from irrigation and to enable farmers to continue to grow the same dry crops to which they were accustomed before, with the guarantee of water supply in case of failure of rains. At the same time, it has made it possible to reserve a certain portion of water for heavy irrigation. Recently a scheme has been launched for the intensive cultivation of hybrid food crops on an area of 10,000 acres. About 4,75,000 acres is to come under light irrigation, and half of this area is normally under cotton as a rotation crop. The Department of Agriculture has undertaken a package scheme to introduce improved varieties of cotton, particularly the strains which can be grown under irrigated conditions. Another 30,000

acres have been earmarked for garden crops on the left bank alone. Water has been provided to 10,982 acres so far out of which 7,106 acres have been effectively covered. A number of nurseries have been established to guide garden cultivators in planning and planting fruit trees and vegetables. Good varieties of fish have been stocked in the reservoirs of the project.

The major problem is to show to the farmer how he should make use of the water for light irrigation, how he should level his land, what crops he should grow profitably and how he should manure his crops. Many demonstrations have been carried out in the project area to persuade the farmers to adopt new methods of cultivation. The success of these demonstrations and various other attempts is proved by the fact that 83 per cent of the potential created by irrigation has so far been utilised.

The irrigation potential in Mysore has shown steady increase since 1953. As the left bank canal, commanding 5.80 lakh acres, is now complete, a Rs 7 crore scheme for advancing loans for reclamation and development, spread over a period of 10 years is proposed to be established in Raichur district. Under the scheme, loans advanced to farmers will have to be repaid with interest at 8½ per cent per annum, within ten years. Even if 50 per cent of the ayacut area in Raichur district is developed fully by the end of Fourth Plan, production of good crops like jowar, paddy and maize will increase from 30.50 lakh tons to 46.70 lakh tons. Groundnut production will go up from 2.5 lakh to 5 lakh tons, cotton from 1.65 lakh to 3.30 lakh tons, and sugarcane from 12 lakh to 16 lakh tons. The total value of commodities received at the regulated markets between 1956 and 1965 increased approximately from Rs 18 lakh to Rs 150 lakh at Gangavati and from Rs 246 lakh to Rs 740 lakh at Raichur. According to a sample survey this turn-over may increase three-fold during the next five years.

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COMMENTS ON "THE APPROACH"—3

Prelude to a Realistic Plan

K. RANGACHARI

THE Planning Commission's paper on the "Approach to the Fourth Plan" has been subjected to severe criticism from various angles and ideological standpoints. But the criteria adopted by most critics for judging it seem to be based on those applied to the earlier Plans regarding possible size of outlay or specific targets of growth; many of these have in practice proved irrelevant. Our experience has proved that ambitious financial outlays larger than visible resources designed to accelerate the growth rate do not necessarily achieve that objective; nor has the achievement of targets of capacity in particular sectors—such as Railways' carrying capacity or steel production—resulted in full use of that capacity to promote a rapid increase of national income. The tendency to fulfil targets of financial outlays even with inflation reduced the real investment content of Plans to what would have been justified or practicable on the basis of visible financial and real resources; wrong priorities and wasteful uses of capital have only helped to create unused, and in some cases unusable, capacity.

The "Approach" document tries to steer clear of these pitfalls by formulating a set of policies which can help an effective and fuller use of the capacity already created in the earlier Plan periods, diversion of new investment to the priority sectors determined afresh on more realistic estimates of immediate and long term needs, and the introduction for the first time of the idea of planning by the market in the place of paternalistic guidance and control which hitherto distorted the functioning of the private sector.

All these objectives and the consequent changes in planning strategy could perhaps have been expressed more positively and forcefully than the "Approach" document has done. Its poor drafting is its greatest weakness; even the severest critics of the priorities and strategy of the Second and Third Plans would give full credit for the excellence of their presentation (which partly covered up some of the defects, miscalculations and unrealistic assumptions common to both). So long as this defect is not remedied the Planning Commission may remain incapable of carrying conviction to

the public on the intrinsic merits of its realistic approach to the main issues of development strategy.

Indeed it could be said that if the Fourth Plan had not been postponed, the Commission could have simplified some of its problems of persuasion of persons in authority or those with influence over public opinion, who still have only an imperfect understanding of the deeper economic issues underlying all exercises in planning. For many politicians and journalists, the proposed size of outlay has become the touchstone of the Government's interest in rapid growth and of its devotion to "progressive" policies. Other, equally irrelevant or misconceived criteria generally adopted are the relative proportions of investment in the public and private sectors or in the heavy and light industries (capital and consumer goods) and the number or the severity of the radical measures envisaged for raising resources or allegedly for controlling real and imaginary ill effects. No new yardsticks have taken the place of the old. The sober men at the helm in Yojana Bhavan now engaged in undoing past harm and cautiously striking new paths cannot obviously please such men, at least until their articulation of the new approach ceases to be pedestrian.

If the Fourth Plan had included the three Annual Plans since the end of the Third Plan, with their objectives limited to the tasks of consolidation of past investments and counteracting the recession, the Planning Commission might have succeeded in introducing the proposed changes in strategy it now proposes, so that they became accomplished facts and were generally understood and accepted for the formulation of the Fifth Plan. At least for another two years the major public sector projects will remain in the red; prospects for foreign aid are still clouded by uncertainty; the agricultural break-through cannot be yet taken for granted or truly assessed for its potentialities until 1970. The present availability of indigenous capital goods and machinery, liberalisation of industrial licensing and the prospect of a growing market in the rural sector can help the private sector to free itself of the apron strings of the Government and determine its own targets and future destiny under planning. The Fourth Plan covering the period 1966-1971 would then have had the important role of bringing about a smooth transition to new development policies and given time to the new team at Yojana Bhavan to gain confidence in evolving new policies. That opportunity has however been lost by the postponement of the Plan to 1969.

SLOW CAPITAL FORMATION

The critics who have been quick to dub the Planning Commission as being timid in its approach only betray their ignorance of the basic factors which should govern all realistic planning, and their failure to profit by a decade of experience which has taught many lessons. The truth is that the proportion of saving in the economy has declined from over 10 per cent of the national income during the Third Plan to about 8 per

cent now. This was inevitable when population increased at a steady rate while national income barely matched it. The improvement in standards of living of some sections of the population both in urban and rural areas has also increased private consumption; to this has to be added the larger outlays of governments, Central and State, on non-productive expenditure such as defence, internal security and relief measures. Plan investment can be substantially stepped up only when the rate of increase in national income rise is at least twice the rate of population expansion, and restraint is possible on both private and public consumption expenditure. The Planning Commission has been bold enough to say that even defence should not remain outside the purview of scrutiny for possible cuts. But for a substantial expansion of investment, marginal savings in non-development expenditure will not be sufficient. The Centre has not set a good example and politically unstable State Governments are not in a position to take the hard and unpopular decisions needed to curb their expenditure. Nor are the States prepared to raise more resources by way of taxation; on the other hand, several States have decided to forego land revenue even while they are paying out more by way of DA to their employees, subsidising food or undertaking relief works for drought or floods.

The total real resources in the economy being limited by the slow rate of development of the last few years, and demands on them for current consumption having increased for both private and public consumption, an increase in capital formation is bound to be a slow process. The old remedy of meeting the deficiency in domestic saving by foreign saving channelled through aid and private investment can no longer be firmly relied upon. Anyone who in these circumstances wants a "bold" plan of investment and firm short term deadlines to reach the "national minimum" or other equally ambitious goals cannot be regarded as speaking with a due sense of responsibility.

MARKET PLANNING

The Planning Commission has taken the next best course of planning to achieve the highest practicable rates of growth through effective use of existing capacity and a revised set of priorities which will help to make effective use of available new capital. Hence the importance it has given to making the public sector industrial undertakings commercially viable before investing more in industry in that sector; hence also its overpitched target of expansion of exports at a rate of 7 per cent per annum to achieve self reliance and to reduce foreign aid by half by 1974. It is arguable that these targets are also over optimistic but the Commission cannot certainly be described as being "timid". It has rightly focussed attention on the most neglected aspects of planning. When Prof. Libermann's theory of the necessity for profits in public sector enterprises holds sway in the Soviet Union as the best test of their working efficiency, apologists of the public sector here cannot argue that progress towards socialism is being slowed down by the reduction of investment in public sector industry. Similarly, the liberalising trends in Eastern Europe have resulted in emphasising the importance of planning on the basis of demand and market prices; surely this aspect is of

far greater importance in a mixed economy such as India's than in a centralised planning system. With the proven over-investment in heavy industry and capital goods in the earlier Plans, the potential expansion of the market for consumer goods and a possible source of new savings for investment capital in the rural areas, when the agricultural breakthrough is stabilised, the time is opportune for "indicative" planning and adoption of minimum controls as the governing principles for the private sector except perhaps in basic or key industries.

These are the outstanding merits of the Commission's "Approach" paper and only sterile dogmatists who learn nothing and forget nothing will cavil at its assumptions. With sustained results from new inputs and introduction of hybrid strains in agriculture, an average rate of growth of 4 to 5 per cent can be expected. Indian industry had achieved a rate of expansion of between 8 to 10 per cent in the early years of planning in spite of bottlenecks in power and transport; without such shortages now, and with the substantial unused capacity in both, awaiting full and profitable use, a similar rate of increase in industrial production is again within our reach. What the Ministry of Co-ordination helped to achieve between 1963 and 1964 in these fields can again be attempted

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if there is equal determination and imaginative co-ordination of policies.

Higher incentive prices for farmers and more rural credit have increased the monetisation of the rural economy. Conditions are propitious, therefore, for the growth of many small and medium scale industries and expansion of services. The backlog of unemployment makes it urgent that all available job opportunities should be quickly expanded to promote social stability; the public sector already groaning under the weight of surplus labour cannot by any stretch of imagination be regarded as the instrument of a rapid expansion of employment.

To sum up, the size of the Fourth Plan, viewed in terms of outlay alone, cannot be large because of the decline in the rate of saving. Investment levels in excess of real saving are inflationary as they exert pressure on real resources and defeat their purpose as the last two Plans have shown. Domestic saving cannot increase significantly until national income grows at a rate of over 4 per cent a year. A larger proportion of the investment than before will have to be made in the private sector in agriculture and industry; the public sector will have to concentrate on continuing schemes in irrigation and more investment in power while contenting itself with balancing investments in its sick industrial undertakings and in rail-

ways. Thus, whatever the size, the old slogan in the Plans that the public sector must expand "relatively and in absolute terms" is no longer meaningful or tenable.

Since the Government is most susceptible to criticism from the doctrinaire left which has distinguished itself only by its total disregard of all economic concepts (in particular of the need to reconcile unlimited wants with limited resources), the Planning Commission has indeed a hard task of obtaining political support for its eminently sensible plan strategy. There are of course many gaps in it to be filled; and harder still is the task of convincing State Governments that the Centre does not have a bottomless coffer from which to satisfy all their demands for money to accomplish the good things they wish for the sake of their people. The only way by which the Commission can get out of this awkward predicament is to prepare a resource budget for the economy—covering both financial and real resources; this should be more realistic than the old Materials Balances of the Perspective Planning Division which like all the numerous other statistical exercises of this Division was governed by wishful thinking and extravagant assumptions. Such a budget can show both the limitations and the areas in which diversions can or should be made from current consumption to exports and productive investment.

THIS THEY THINK

YOJANA invited readers to express their views on the "Approach to the Fourth Five Year Plan". The response has been encouraging, which has enabled us to present this feature for readers, by the readers.

ENCOURAGING

THE general condition of the Indian economy despite efforts towards planned development remains depressing. Each Plan set for itself a specific strategy; for instance, the First Plan talked about 'self-sufficiency' in foodgrains, the Second Plan advocated 'socialist society' and the Third Plan favoured creating a 'self-generating economy'. The 'Approach' paper to the Fourth Plan now advocates a move towards self-reliance.

Even after 15 years of planning, we are nowhere near the goal of providing a "good life" for every citizen. The yardstick of the common man to judge the success of planning is simple enough. He is interested in results and judges progress by the production of goods

he needs and the price he has to pay for them. It is encouraging that the 'Approach' paper desires to achieve stability in the economy by preventing large fluctuations in agricultural production and by countering strong inflationary pressures.

The paper appropriately gives the highest priority to agriculture and family planning. It is often figured out that a country whose population is increasing at 2.5 per cent per annum, must invest 7.5 to 12.5 per cent of the National income in order to keep a constant average amount of equipment per worker. For India, this seems to be a herculean task; hence the need for concerted efforts to check the growing population.

New Delhi

A.N. MEHRA

A DRAB ESSAY

THE "Approach" paper provides, to say the least, docile reading. In the present times, when we are amidst a near economic crisis with poverty and unemployment all around, I wish that the "Approach" should have provided more vigorous solutions to the problems that we are faced with.

To my mind we should wage an all-out war to achieve the following three objectives:

- (a) Self-sufficiency in food
- (b) Control on increase in population
- (c) Eradication of unemployment.

No doubt these objectives do appear in the "Approach" document, but in a manner that lacks force, fails to highlight them and

leaves them in a morass of words. It is like the imparting of instructions by a dry drab lecturer who keeps on blurting out at the same even pitch all that he has crammed over-night.

The section on 'industry' in this respect does provide a relief, in that it gives some food for thought, for instance, the need for substitution of sulphur in sugar-refining by an indigenous material.

It might sound a little odd, but the "Approach" should be re-cast and then circulated to the Chief Ministers for their acceptance, and to the people in general. Only then the people will be able to re-orient themselves to the radical demands of the day.

•Delhi (Mrs.) USHA BISHNOI

NEW IDEAS

THERE is a great deal of new ideas in the "Approach". First and foremost is the objective 'growth with stability'. While discussing the 'instruments' to be employed to raise the additional resources, a more effective drive in the field of small savings, particularly in the rural areas, is necessary. This is because, during the last three Plans, the rural people have benefited to a great extent from the various development schemes. Income from agriculture is assured. For instance, in Maharashtra the sugarcane growers are making high profits. A stream of money is flowing in the rural areas which, unless siphoned off by way of small savings may be wasted in luxuries and non-productive activities. Agricultural income tax is another measure to put the surplus income of farmer to constructive uses.

'Planning from below' is also emphasised in the "Approach". To realise it, self-reliance should become the watchword at the district level. If the Zilla Parishads go on depending on grants, their plans would remain only on paper. The district plans should not only depict the 'felt needs' of the society, but also should spell out the efforts made for the mobilisation of resources in the district.

Dhulia S.R. HAWALDAR

OLD STORY

WHEN the Fourth Plan is to come after a good deal of delay we should expect a lot of fresh things being in it. If it cannot show any novel features it will not do any credit to the Planning Commission. And it is seen from the "Approach" that there is nothing so new in it. Like the previous Plans, the Fourth Plan also envisages an overall growth rate of 5-6 per cent per annum, attempts at self-sufficiency by reducing dependence on foreign aid and increasing the volume and value of exports, and so on. But the measures so far taken for achieving these, do not seem to have made much impact.

The "Approach" has rightly placed emphasis on agriculture, as in the Third Plan. But who knows if more natural calamities than those during the Third Plan period will not thwart the programmes! Is the Fourth Plan taking any new and strong measures to combat unforeseen difficulties? Again, regarding the question of mobilisation of resources from the agricultural sector, we find no clear-cut strategy.

PARIMAL CHAKRAVARTI
Calcutta

MEANINGFUL

THE "Approach" is a meaningful document. One is glad to note that emphasis has been laid on two points, "Growth with Stability" and "Self-reliance with Speed".

It is reasonable to expect 5 per cent annual increase in agricultural production over the next decade, if the High-Yielding Varieties Programme (H.V.P.) keeps the present pace and we get timely monsoons. Emphasis laid on agricultural research is commendable, but one cannot understand what exactly non-irrigated agriculture means.

Whether the annual increase envisaged in industrial production can be realised is still a question mark, because one has to take into consideration sit-ins, lay-offs and other labour problems. It is too much to expect such a performance from our industry.

On Irrigation, Power, Transport and Education, what the "Approach" says is quite correct. The idea

to set up more primary health centres and give more impetus to family planning is understandable. It is well and good that the need to end regional imbalance has been recognised.

It is no exaggeration that the "Approach" contains some novel ideas. But one is confused as to whether we can tide over our difficulties. The fact remains that there is no panacea for our country's ills.

K. JAVANTHEESWARAN
Madras

PLATITUDES

THE Planning Commission's plea to convert the existing system of fair price shops into consumer co-operative stores at an early date is based on sound reasoning. The prosperity of the nation will certainly not result in the prosperity of the old system. The "Approach" rightly observes that "the system is apt to be dismantled as soon as adverse conditions disappear". This is alright so far as it goes; but what is the guarantee that the same fate does not await the consumer co-operative shops also. Three distinct attempts to create a system of co-operatives shops were made in this country in the past. But all failed because of a variety of reasons, chief among them being: too much dependence on controlled commodities, lack of trained personnel, weak organisation and inadequate internal resources.

The Planning Commission rightly recognises this fact and observes "this is wasteful, and therefore deliberate attempts must be made to establish viable co-operative shops at all points," but contents itself by repeating pious platitudes of the past, as if reiteration of a well recognised cause can ensure its success. The malady from which co-operative retailing suffers is to be found in its loose organisational structure, blurred objectives and misconceptions about its role. Unless it is conceded that co-operative retailing should ultimately emerge as an effective alternative distributive agency in the country, and that the economic realities cannot be subordinated to doubtful social gains, the hardships of the average consumer will never be mitigated.

Poona K.K. TAIMNI

Side Track

"READING FEVER" IN JAPAN

THE reading habits of a nation are generally a reliable yardstick for determining the extent of literacy and the prosperity of the people. It is the same in the case of Japan, whose phenomenal recovery and rapid economic growth after four years of War has astounded the world. One has the same feeling of wonder when one sees the fantastic dimensions to which the country's publishing industry has grown in the last two decades.

The reading population of Japan today is estimated at 70 million, mostly young men and women in their teens and 20's.

Last August, more than 19 million copies of 1,420 new titles and 1,601 titles in second and later editions, were printed. In the same month, 1,348 monthly magazines were published with a total circulation of 53,730,000 copies. There were 44 weeklies, with total sales of 80,240,000.

Bookstores across the country are stocked with a wide assortment of books on the philosophy of life. The ethics magazine "PHP" (Peace, Happiness and Prosperity) today boasts of a circulation of 3,60,000 copies. Inaugurated in 1947, the small-size magazine had a circulation of only 10,000 until about 1964.

Second on the list of popular categories come collections of poetry. Most surprised at the poetry boom are the poets themselves, who had never dreamt of commercialisation of their works. Newspapers now-a-days carry full-page ads on books containing collections of poems, including complete works of noted poets. Another notable trend is the tremendous popularity of war memoirs; some of them are best sellers, selling 200,000 to 300,000 copies.

Seventeen kinds of encyclopaedias are now available in the market.

Whereas only five or six years ago publishing an encyclopaedia was a risky undertaking for any publishing house, today it is one of the biggest money makers. One of these has already sold 1,200,000 sets.

Children's Films

THE role of films as a means of entertainment is well-established in India, which enjoys the distinction of being the second largest film-producing country in the world. But, the scope of utilising this medium for the benefit of children has so far remained a mere formality; with the Children's Film Society holding the baby (figuratively, of course). Things are, however, likely to improve if some of the major recommendations of a five-member Study Team set up to enquire into the working of the Society are implemented.

The Study Team has suggested the establishment of a Children's Film Foundation Fund for the promotion of a children's film movement in the country. Representatives of the film industry, including producers, distributors, exhibitors and others, are to contribute to this fund which may be used for giving incentives to producers to make suitable films for children and to construct a network of cinemas and entertainment centres for the exclusive use of children.

The Study Team has recommended the production of at least 12 children's films by the Children's Film Society every year, with provision for making films in regional languages as well as cross-dubbing into various languages. Every year a number of short films, including cartoons and puppets, should be produced in colour. Also, the Children's Film Society may produce one or two full length films suitable for children as well as for adults. Besides this, private producers may be induced to produce films for children on a commercial basis. For this purpose, the Study Team has recommended that the Society may give a subsidy to private producers to make full length films suitable for children.



IGNORAMAN
Wants to Know

If
the distribution of Power
in rural areas
could be related to
the decentralisation of power

The Study Team has suggested the formation of district libraries of children's films by charging film fees from school-going children. Cinema owners should be persuaded to allot at least one show every month on Sundays and holidays for screening children's films on a commercial basis.

The establishment of mobile units at various important centres to show children's films in rural areas, building children's theatres and Bal Bhavans for showing children's films are some other suggestions made by the Study Team.

CALLING ALL READERS

With this issue we begin a new series of "Readers' Comments on the Approach to the Fourth Plan". Every contribution published will be paid for at the rate of Rs. 10. For the time being our regular feature "This India" will remain suspended.

—Editor



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Books

STATISTICS OF ECONOMY

Statistical Outline of Indian Economy, Compiled by V. G. Kulkarni. Publishers Vora and Co., Bombay. 200 pages. Rs 30.

M.K. Dharma Raja

THIS is a compilation in objective form of information on the country's economic growth since 1947. All segments of economic life—national income, population, agriculture, industry, labour and other facets find a place here. The author, who is Chief Statistician of the *Financial Express*, Bombay, has adjusted all the index number series relating to prices, production and profits to the latest base year, and has also given the comparable series for the previous years. Mr. Kulkarni, indeed, has anticipated the impending replacement of the current official index of industrial production with 1956 as base by a new series based on 1960.

In the section on national income for example, it is explained that the valuation was, until recently, based on 1948-49 prices, but in the Fourth Plan Draft (now being reprocessed) the series had been computed at 1960-61 prices. A sectoral valuation is given of various commodities and services and changes in the pattern of constituents in the national income are shown. This provides basic data for formulation of policies based on broad conclusions. They depict a picture of the real growth and can serve as a basis for decisions regarding fiscal adjustments.

Of particular interest are the sections on share prices of selected companies and future commodity prices, as also on corporate statistics buttressed by a whole series of well-seized and analysed figures. Information on world trade, gold and foreign exchange reserves, par values of foreign currencies and other useful material help the reader to have a look at the Indian economy in the

world perspective. Our economic administrators and the business community alike can profit from the neatly prepared synopsis of the economies of the countries with which we have trade relations. These can be scanned along with a record of the commodities exported by India to these countries. Coming as this does in the context of UNCTAD-II this compendium of statistics on international commerce can be made use of by Indian exporters to gain access to foreign markets, especially for manufactures and semi-manufactures. The sections on external assistance, read with that on foreign trade, highlight the need for a comprehensive approach to enable India to get on to a self-sustaining plane of development. Our exports, for instance, are currently running at the rate of Rs. 1,200 crore a year, while imports are of the order of Rs. 2,000 crore. Debt servicing obligations amount to nearly Rs. 300 crore while invisible earnings are not more than Rs 175 crore. The problem is formidable when it is considered that we have not been able to achieve the growth rate even of 5 per cent in our exports. The author has had to contend with insufficient data, but he has made an effort to correlate them, leading to the implicit conclusion, that export promotion will be fruitful to the extent that the private and public sectors and government, industry and trade forge a co-operative effort.

Deficiencies and Delays

It is truism that for effective implementation of planned programmes, correlation between financial and physical accomplishments will have to be reflected at all the stages of the budgetary process. This is evident from the budgets of the Union and State Governments. Performance budgeting has already been introduced at the Centre as a possible basis on which

financial control should be reformulated. This should help Mr Kulkarni in bringing out the next edition suitably recast with figures of actual performances of the various sectors.

The deficiencies and delays involved in the publication of statistics are well known. This has been overcome by incorporating new data while the publication was actually in the press, in the tables wherever possible. Also, an appendix on the latest data gives up-to-date statistics which could not be incorporated in the tables.

The book under review is a pioneering attempt and is bound to be valuable to our planners, the business community and those engaged in economics and statistical research.

Books Received

Sarvodaya by Adi H. Doctor, Published by Asia Publishing House, Bombay-1. 229 pages.

Report on the Roads Programme in Mysore State. Published by Directorate of Evaluation and Manpower, Bangalore. 207 pages.

Pay on the First by Meenakshi Puri, Published by Siddhartha Publishing (P) Ltd., Delhi-6. 95 pages.

District Planning—Moradabad. Published by National Council of Applied Economic Research, New Delhi. 217 pages.

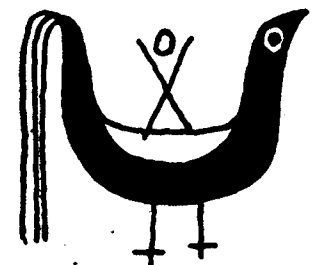
The Problem of National Education in India by Lajpat Rai, Published by the Publications Division, Delhi-6. 122 pages.

Economic Relations between India and Pakistan by C.N. Vakil and G. Raghava Rao. Published by Vora and Co. Publishers Private Ltd., Bombay-2. 214 pages.

Foreign Aid—A Symposium, a Survey and an Appraisal. Published by the Indian Council on Current Affairs, Calcutta.

A Case Study of the Minor Irrigation Tank Work at Kamarahally Village, Gundlupet Taluk, Mysore District. Published by Directorate of Evaluation and Manpower, Planning and Social Welfare Department, Bangalore.

Bandini by B. S. Nirody. *Railways Deliver the Nation's Goods. Centre-State Relations. Why Export?* All published by the Publications Division, New Delhi.



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Development Diary

- Canada has given further aid of \$ 20 million to India to purchase 2.5 lakh tonnes of Canadian wheat. The wheat will be utilised for building up buffer stocks.
- A 50-mile long rock phosphate belt has been discovered in the Mussoorie-Dehradun area in U.P.
- The Indian Agricultural Research Institute has developed a new chemical process for the production of bone-meal for which there is a great demand abroad, particularly for the preparation of phosphatic fertiliser mixture and animal feed.
- The Union Government has sanctioned five micro-hydel projects for NEFA, involving an expenditure of Rs. 41.25 lakh. The projects will produce 560 kW of power and supply power to the interior areas in NEFA.
- The State Trading Corporation will be exporting 500 covered four-wheeler wagons worth Rs 2 crore to Poland.
- The Oil Refinery at Noonmati in Assam has started work on a liquified petroleum gas plant. Designed by the personnel of the Oil Refinery the gas can be used as a cheap medium for cooking.
- Himachal Pradesh Small Industries Corporation has received orders from abroad for the supply of nearly 500 tonnes of 'Kuth' worth Rs 13 lakh in foreign exchange. Kuth is a herb used in the manufacture of perfumes and toilet products.
- 14.5 million acres are being brought under the high-yielding varieties programme during the current Kharif season. Besides, multi-cropping will be done on 4 million acres, which will add substantially to the yield.
- The Rajasthan Government has finalised a Rs 6 crore lift irrigation scheme at the Rajasthan Canal Project. This will provide irrigation facilities to one lakh acres near Lunkar and Bikaner and drinking water to the parched areas along its route.
- A second Co-operative Spinning Mill with 25,000 spindles has been opened in Broach in Gujarat.
- The United Nations Development Programme will provide \$ 1,35,000 for the operation of a Central Government Project for farmer training centres and farm radio units. The aid will supplement the Government's efforts to provide information on seeds, fertilisers and insecticides. The project, begun last year in five districts, is proposed to be extended to 100 districts in 15 States by 1971. UNDP will also provide some consultants for preliminary operations.
- About one lakh acres have started receiving irrigation facilities from the Chandan Project in Bihar which is being constructed at a cost of Rs 10.7 crore.
- An Indian firm has signed an agreement with a Columbian Corporation in South America for setting up a small tools plant in Columbia. Under the agreement, the Indian firm will provide technical know-how and training, supply machinery and jointly administer the plant. The first consignment of machinery has already been sent by the firm.
- India will receive about \$ 9 million aid from UNICEF for five projects in the spheres of health, nutrition, education, family planning and child welfare.
- The Soviet Government has agreed to gift equipment for five Central State Farms to be set up in Haryana, Punjab, Mysore and Orissa. The location of the fifth farm has yet to be decided.
- Rs. 20-lakh worth machinery will be provided to small units in Uttar Pradesh during the next two months in order to encourage small-scale industries in the State.
- About one lakh acres of land under the Nagarjunasagar Project will be developed in Andhra Pradesh this year at a cost of Rs. 3.50 crore. A scheme has already been drawn to help the farmers in the reclamation of land. Each farmer will be given Rs 200 per acre for reclaiming dry land and Rs 300 per acre for wet land.
- The Indian Spinner—a new, all-count, general purpose ring frame—manufactured by a Bombay firm with British collaboration has been commissioned at a spinning and weaving mill in Bombay. The first of its kind in the country, the spinner incorporates the latest mechanical and technological features.
- Oil has again been struck in the Cambay region of Gujarat near Kahi and Bakrol.
- Nearly three lakh acres of land had been brought under irrigation in 1966-67, in Gujarat, by small irrigation schemes.
- A new unit for purifying and marketing carbon dioxide, a by-product of the Trombay Fertiliser Factory, has been inaugurated. Having succeeded in using carbon dioxide for commercial and industrial purposes, the unit plans to manufacture dry ice, carbonates and other industrial chemicals from the by-products of the fertiliser factory.
- A leather tanning unit is to be set up at Tonk in Rajasthan with Yugoslav collaboration. Estimated to cost Rs. 1 crore the factory will tan approximately 900 hides and skins a days. Half its production will be exported to Yugoslavia by way of payments for the machinery imported from that country.
- Indian Telephone Industries, Bangalore, had increased their exports nine-fold in 1966-67. Goods worth Rs. 81 lakh were exported in 1966-67 as against Rs. 9 lakh in 1965-66.
- The Triveni Structural Factory at Naini near Allahabad will shortly go into production. A joint venture of the Indian Government and an Austrian firm, the factory will manufacture heavy steel structurals for civil and defence purposes.
- An all-weather airport built with Indian assistance has been inaugurated at Biratnagar in Nepal. This is one of the six airports built with Indian co-operation in Nepal, at a cost of Rs. 28 lakh.

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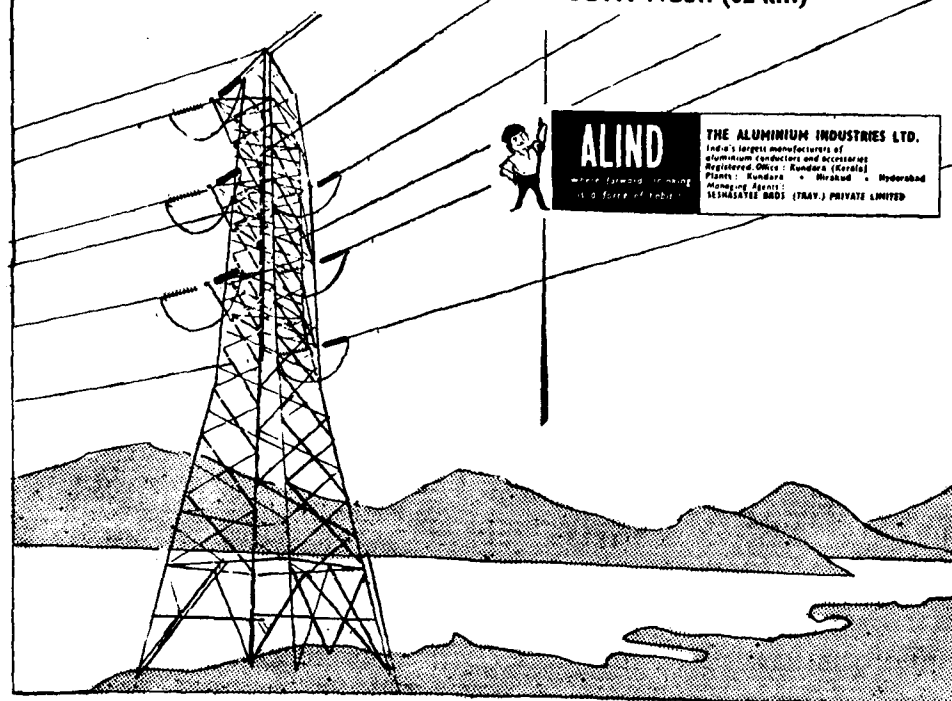
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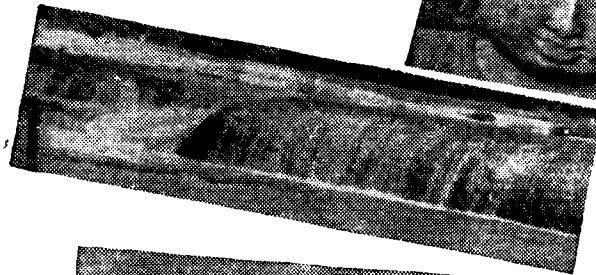
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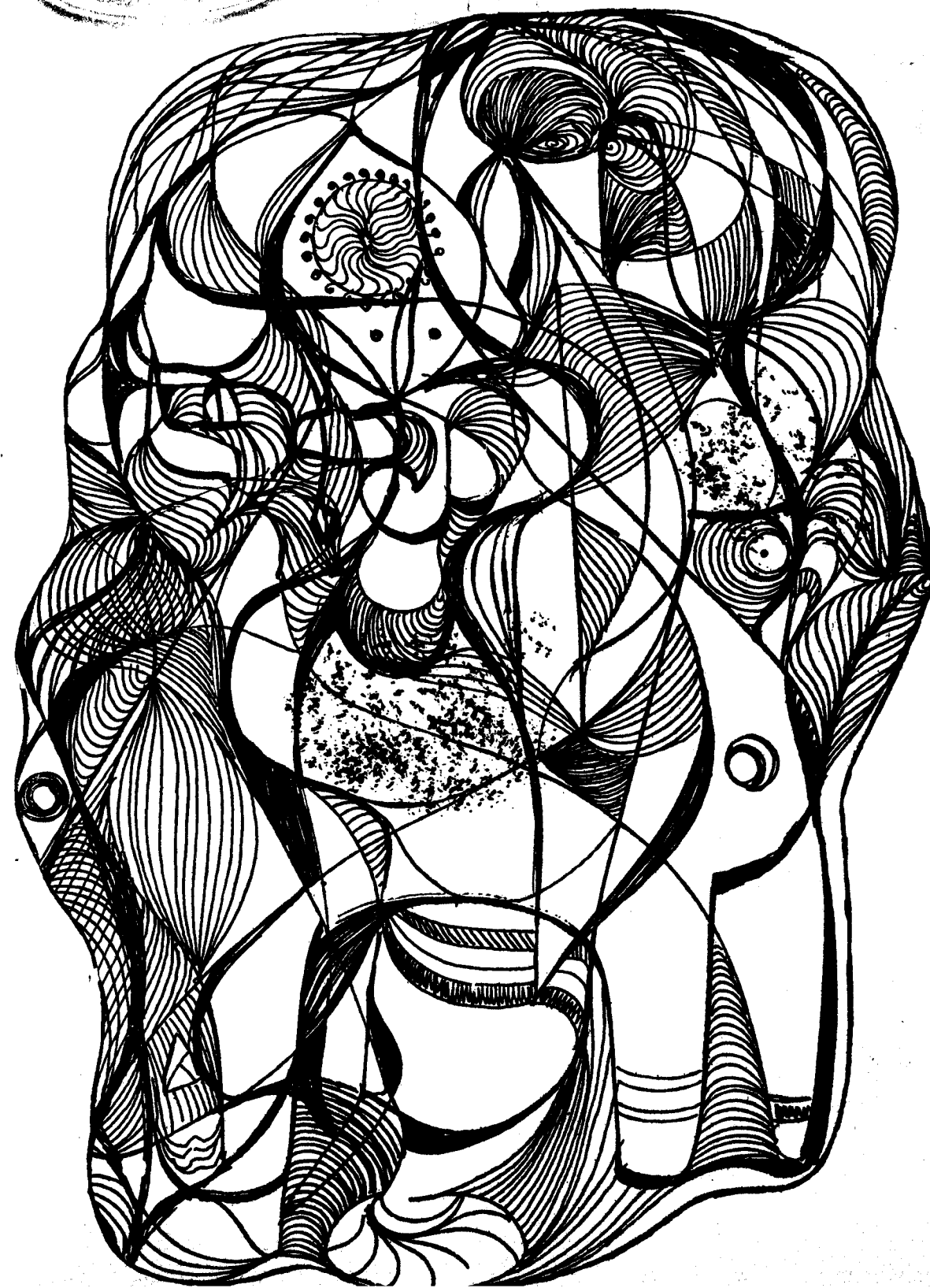
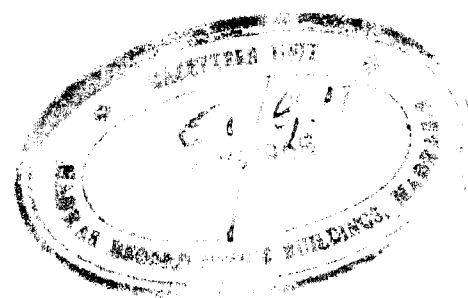
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From a modest beginning of Rs. 9.2 crore in 1956-57, the Corporation's direct trade turnover shot up to Rs. 101.5 crore, in 1966-67. This includes an increase of Rs 58.5 crore over the previous year.

The total volume of direct trade—external and internal—during the 12-year period would amount to Rs. 770 crore.

Exports by the Corporation were valued at Rs. 8.9 crore in 1963-64. They rose to Rs. 13.1 crore in 1965-66, an increase of 47 per cent in two years. In 1966-67, the exports were valued at Rs. 31 crore, far exceeding the original export target of Rs. 19 crore.

STC's export programme for 1968-69 envisages a further increase by about Rs. 20-25 crore over the 1967-68 figure. This year the exports would amount to Rs. 55-60 crore.

STC has concluded a preliminary contract for the supply of 500 covered railway wagons, costing Rs. 12 crore, to Poland.

STC has already in hand contracts for the export of railway rolling stock to several countries. An initial supply of 500 flat four-wheeler wagons valued at Rs. 2.5 crore to Hungary is nearing completion.

The U.S.S.R., Burma and Thailand are also buyers of Indian wagons and passenger coaches. STC has recently won a global tender for the supply of 1,050 railway wagons valued at Rs. 7.8 crore to Korean National Railways. A protocol has been signed with the U.S.S.R. for the supply of 2,000 wagons by 1969-70.

STC has boosted leather footwear industry by raising exports and creating markets in foreign countries. Starting with a small export of Rs. 70 lakh in 1956-57, it has stepped up the figure to Rs. 3.4 crore in 1967-68. Indian shoes are now worn in Russia, Bulgaria, Poland, the United States and Hungary.

New markets have been found for woollen knitwear and ready-made garments in the U.S.S.R. Hungary, Czechoslovakia and some other East European countries. In 1962-63, STC exported such items worth Rs. 1.2 crore. In 1967-68, the exports were worth Rs. 3.8 crore.

STC has collaborated with private trade and industry to set up joint sales teams and has procured business to the tune of Rs. 6.2 crore. These joint arrangements have set a pattern for others sectors of the Indian economy which are in need of institutional assistance. In the last four months, STC has finalised contracts for about 58,000 tonnes of cement valued at Rs. 64 lakh for export to Ceylon.

STC also seeks to promote exports by investment or participation in the capital of the export-oriented corporations. It is the largest shareholder in the Indian Motion Pictures Export Corporation.

Import of newsprint is another significant example. STC has brought down the prices of standard newsprint from the average of 200 U.S. dollars per tonne in 1960-61 to 145 dollars.

STC has been helping in stabilising domestic prices of sensitive commodities like sulphur and rock phosphate. It has made arrangements with some producers in Canada and the U.S.A. whereby sulphur would be imported at internationally competitive prices. It has also diversified imports of these commodities which will help an assured supply for industrial and fertiliser production.

V.M. SOORMA

YOJANA

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LEST WE FORGET

"Planning by itself has little meaning and need not necessarily lead to good results. Everything depends on the objectives of the plan and on the controlling authority, as well as, of course, the government behind it."

Jawaharlal Nehru

Cover designed by R. Sarangan

Yojana seeks to carry the message of the Plan, but it is not restricted to expressing the official point of view.

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A PEOPLE'S PLAN

THE process of economic planning within the framework of democracy inevitably postulates the involvement of the people to a much greater extent than would be the case if it was imposed from above. This is obviously necessary because the successful working of any such plan would largely depend, not only on its willing acceptance by the people, but on their understanding of it. As far as India is concerned, the people's role in the formulation of the plans for economic development so far executed have been only indirect. That is, through their elected representatives in Parliament and in the State Legislatures. The National Development Council, which is the highest policy making body as far as planning is concerned, also, in a way, reflects the views of the people through the Chief Ministers of States. The planners have also been influenced in their task by the views publicly expressed by economists, industrialists and others.

A major departure has been made by the Planning Commission in the preparation of the Fourth Five Year Plan, which is now on the anvil. With the publication of the "Approach" document last May, the matter has been thrown open to public debate more directly than ever before. And, what is more important, this has been done even before the Plan has reached the drafting stage. The Planning Commission has also taken the unprecedented step of inviting the political parties and heads of Universities and institutions of higher education to express their views on the "Approach" document. In a personal letter to leaders of political parties, the Deputy Chairman of the Planning Commission has invited them to have informal discussions with the Commission on the Fourth Plan. The discussions, he points out, "should assist in the emergence of broad agreement" and "prove useful in securing co-operation in its implementation." Prof. Gadgil has also expressed the hope that academicians and student members of College Planning Forums would study and discuss the problems relating to the preparation of the Plan. This exercise, which is a massive effort towards assessing public opinion, is intended to ensure that the Fourth Plan becomes, in every sense of the word, an instrument forged by the people for the economic betterment of the nation. This gesture has lifted planning out of exclusiveness, into a truly national effort.

The Yojana, too, is playing a role in throwing open the "Approach" document to a national debate. Many of our readers from all parts of the country have sent us their views on a matter of vital importance to the country's future. The comments on the "Approach" document are not always favourable, nor are they expected to be so. There is bound to be divergence of views on every matter, and, in this particular instance, opinions are more divided because of the serious implications of the decisions that will be ultimately taken. Neither the planners nor the people finally responsible for giving shape and substance to the Plan would have it otherwise. For, out of all the discussion and debate, argument and counter-arguments that will precede the Plan being given final shape, will emerge the blue-print for the nation's future and of ensuring the lasting happiness of our people.

The Fourth Plan, it is essential, should not only have the advantage of being formulated on the basis of a consensus, but should give every citizen the feeling that he has had a hand in shaping it. It is only then that the country can go forward, with united endeavour, towards the goals that we set for ourselves on the morrow of freedom.

AMONG the problems that confronted Planners in India in 1951 or 1956, when the major planning strategies were formulated, the basic problem was poverty, which made economic progress difficult. Planning was undertaken because, in conditions of dire poverty, only an intelligent, properly directed effort could enable us to make progress at all. A signal feature was the low rate of savings in the economy, which is the direct result of poverty, and the actual effort in savings in 1951 or 1956 was pretty low. Another factor was the structure of our economy. Basically we were primary producers and, being a rather old country, there was not much of virgin land or unutilised, unexploited natural resource. Therefore, the man-land ratio or the man-natural resources ratio was somewhat adverse. We also had to face the problem of a relatively underdeveloped industrial structure. Our resources had not been exploited in order to build up the kind of industrial structure on the basis of which it could grow and diversify. Then, there was the problem of employment. There was also inequality in the distribution of wealth among regions and classes.

These were the major problems when planning was thought of in 1951 and 1956. In the 1951 Plan there was hardly a strategy, but in 1956, the strategy was to increase agricultural production, not in terms of certain institutional changes, such as land reforms and co-operatives; but by emphasising such things as irrigation for increasing agricultural production.

The other strategy, if it can be described as such, was to develop basic industries. In the 1956 Plan we quite clearly said that the employment problem was not going to be solved very early, but that if all else happened, a great deal could be done to ensure future progress.

Today, we have to see to what extent the problems are still there. I should like to draw attention to one or two basic points here. One is that the increase in agricultural production, which was then thought would be sufficient, did not prove to be so. It is important to remember that in 1954-55 foodgrain imports were the lowest in a decade. Despite the increase in agricultural production, the food problem from 1956-57 to 1966-67 was the worst that we have had to face. As far as the institutional aspect is concerned, the basic land reforms for the abolition of intermediaries were fairly quickly completed. But, land reforms which affected the producer at the bottom and the position of the tenant and the share cropper, were found to be very much more difficult to implement than had been thought earlier. In this respect, I believe, very largely we are more or less still in the same position.

Excerpts from the speech delivered by the Deputy Chairman, Planning Commission, at the University College Hall, Trivandrum.

Problems of Planning

D.R. GADGIL

In the co-operative field, we find that in some States the programme launched in 1956-57 has paid dividends, and there has been a real change, almost a revolutionary change, in basic rural conditions for the middling and substantial farmers. But for the larger part of the country the change has been slight, in some areas, almost nothing.

As far as industry is concerned, two things have happened. One is that the initial programme in the public sector succeeded up to a point. In the private sector, especially after massive import restriction quotas were imposed, a diversified, though high cost, economy was built up. This has happened especially during the past five or six years. Thus, two definite changes have come about; a fairly high investment in the public sector with some extremely important units being established, and a fairly diversified, though a high cost structure, coming up in the private sector.

The question is, to what extent have we solved the problems mentioned earlier. Taking agriculture first, it may be said, at least after last September, that a solution is in sight. It is so, largely because of the good response that the production of cereals, rice, wheat and millets, has shown. This is due to the use of new seed varieties. It must, however, be noted that this has taken a number of years. The important thing is that, without these highly responsive seeds, all other things would have availed nothing. This is a significant commentary, in a sense, on the chance element in some development processes.

The main thing is, are we close to a solution of the problem of agricultural production? As a matter of fact, one may say that so far as this year's Plan and the Fourth Five Year Plan are concerned, we are able to put something around a frame entirely on the assumption that we are near a breakthrough. It is because of this that we are really able to look forward to something happening in the next five years. Most experts seem to be agreed that we are near a breakthrough, in the sense of being able to achieve each

year a 5 per cent increase in agricultural production for the next five years. I should like to make a reservation here. When we talk of development over a long period, anything like a 5 per cent growth in agricultural production for five years is not sufficient. Apart from the problem of agricultural productivity, there is the problem of agricultural organisation, which is not being broken into yet. The middling and substantial producers will most probably go through with the new seeds, and the marginal producers may move into the middling class; but the uneconomic holders and small producers will still be left behind unless their specific organisational problems have been solved. It is, therefore, necessary to look into their problems quite seriously in the future. The breakthrough may serve as a breather, a period during which these problems can be tackled.

In industry, the diversified and broad structure that has been built up is the result of the planning effort that has brought about a change in the structure of our economy. Roughly five years ago, any major industrial project had to depend very largely on the World Bank or some donor country. Today, to a very considerable extent, we no longer need do that. Whatever the new type of industry, a considerable part of the plant and machinery components are being produced or are capable of being produced by the engineering industry in our own country. Also, we have a fair amount of consultancy and design engineering talent available. This is an extremely important step forward, and is partly a justification of the strategy that was adopted in 1956.

On the other hand, an examination of some other aspects of the problem will show that these problems have not been solved at all satisfactorily. This applies particularly to the transformation of traditional industry and the dispersal of small-scale industry. Are there any other problems which we have solved even partly? There is the problem of population. Can we say that we have even partly solved the problem? Are we at all on the way to a solution of the problem? There have been announcements made so often in the past that we are at the end of the road, or that we are about to reach our goal. This is a little doubtful. At the same time, it does appear that in some areas, with intensive effort, a fairly rapid change in the net decrease in population can come about. There are other areas where indications are that the programme can succeed. But I would be very chary of saying at this stage that, on a mass or countrywide scale, we are anywhere near a solution of the problem. Another direction in which part of our problems have been solved concerns the infrastructure. The larger infrastructure has been built-up to a considerable extent with investments during the last ten years.

When you have said all that, you still have to admit that the problems listed earlier still remain. Take the tenants problem: it is not purely a tenancy problem or a problem of tenancy rights. It is a problem of tenancy rights and economic organisation. What does one do with really small-scale organisation? The logical reply was given a number of years ago—co-operative farming. But the logical reply, everybody understands now, is merely logical in the

sense that it is not feasible. Nothing really is happening in that direction. Can anything be done by way of consolidation, or bringing people together so that the land can be fully exploited? The problem is not a big problem in terms of land surface; but our failure has been more on the human side. Whatever has been done has been in those directions where a fairly small number of people engaged in agriculture, with large resources, can go ahead.

So far as the basic problems are concerned, employment or regional imbalances—we have not been able to tackle these. In fact, we have to admit that, in a sense, we have not even begun to tackle them. There has been so much emphasis, so to say, on the production aspect that so far no serious thought has been given to these problems.

The next important question is, what new problems have cropped up since 1951, or those that were not there in 1951-56? Take for example the problems of the metropolitan cities of Calcutta, Bombay and others. For cities like Calcutta or Bombay, the task of management and the need to provide the necessities of life, is an extremely difficult problem. For instance, the cost of maintaining roads in Bombay city alone is almost as much as for the whole of Maharashtra. It is the same as far as the provision of electricity, water and housing is concerned.

Then, there is the question of foreign debt. That is entirely a new problem. In 1956 we had no such problem. Today, we have a fairly large and growing problem of foreign debt. We have built up the industrial structure largely with foreign aid. It has now become so important that whatever may be the feelings of any individual regarding the desirability or otherwise of foreign aid, almost everybody realises that we must begin to reduce the extent of foreign aid. The servicing and repayment of foreign debts are problems with which we have to live, in terms of our own balance of payment, in future years. Our import and export policies have to be very considerably oriented towards the meeting of the special balance of payment difficulties that have been created.

There is the question of nationalisation. I believe that, for the time being at least, we have played out this card. We took two very important decisions—nationalisation of the Imperial Bank and Life Insurance. In retrospect, one can say these were wise decisions. But, both these decisions have exhibited the limitations of nationalisation. When it was nationalised, the State Bank opened a large number of branches so that the framework of national remittance facilities has now come into being. The State has in its hand an extremely important commercial bank, but if one examines the extent to which a nationalised bank can really serve certain needs, the limitations will become obvious. To put it differently, our experience of the public sector shows that the nationalisation card has been played out. A great deal of emphasis was naturally and rightly laid on developing the public sector. The steel and machine manufacturing units that have been built, are extremely important national assets. At the same time, it has brought home to us that this is not an easy way of making progress. If the public sector had been giving

anything like a modest return of five and six per cent on the investment there would be a strong case for extending the public sector. As things are today, this has not happened, and it is in this very peculiar context that we have to look into the future.

So far as the Approach to the Fourth Five-Year Plan is concerned, all that we have done is merely to highlight the problems. Nothing more. All that we have said in the "Approach" is that there are the problems of the small holder, the rural landless labourer and the weaker sections. It has been pointed out that, in a sense, providing more employment is the only kind of insurance that you can give to people in general. Beyond highlighting problems, we are suggesting solutions. Or rather, we are suggesting pilot or experimental efforts so that solutions can be found.

What are our prospects? As far as I can see, the prospects are good. If we can carry through with anything like a 5 per cent growth rate. I think this is not beyond our capacity. If the industrial structure is activated this is fairly easy, because the capacity is already there. If the demand is there and we can get a little more export-oriented then production should go along.

But, the basic problems that I have mentioned will remain. For tackling these a careful experimental attitude and the will to solve them are needed. These problems, I may add, are not the sort which can be

pushed under the mat. These are problems which have to be looked into. I would like to emphasise that in the matter of economic development, there is no magic at all. There are no short-cuts. It is hard work, self-discipline, a great deal of inputs and intelligence which alone can ensure the progress of the country. Quite a number of people in the world are surprised that we are where we are. That we have survived all these years is a matter of amazement to a lot of people. We have to take comfort from the fact that with all these difficulties we have achieved what we have. Nevertheless, it is necessary to remember that, neither in terms of self-discipline nor in terms of hard work or intellectual effort in depth to solve our problems, have our inputs been very remarkable. There is no national solution to our problems. It is not possible to plan for the country from Delhi alone. This was possible when we were building a few irrigation works or setting up a few steel plants and solving the problems of industrial diversification or merely experimenting with hybrid seeds. But, if one is solving local problems they must be looked at locally by local people. To plan the solutions of these problems is more difficult than planning at the top. That is why I think it is only when people everywhere participate in the process of planning in a more meaningful manner, they begin to understand the problems and bring their minds to bear on their solution that the country can go somewhere. I am confident that if there is proper response we will go somewhere.

CENTRAL ASSISTANCE TO STATES IN FOURTH PLAN

THE Committee of the National Development Council has decided that the general criteria governing the distribution of Central assistance to the States should be: (i) population, (ii) per capita income, (iii) tax effort related to per capita income, and (iv) continuing major irrigation and power schemes in the Fourth Plan. Special requirements of individual States should also be taken into account in determining the allocation of Central assistance to them.

The Committee agreed that a block grant for Assam, Jammu and Kashmir, and Nagaland should be set aside from the total quantum of Central assistance for the Fourth Plan.

The weightage for each of the general and special criteria, however, could not be decided upon,

CRITERIA EVOLVED BY N.D.C. COMMITTEE

because of differences of opinion among the State Chief Ministers.

It was also agreed that while the total ceiling for Central assistance should be adhered to for the five-year period, flexibility might be introduced in allocations for the Annual Plans of the States in the light of their requirements from year to year.

The Committee also resolved that a special meeting of the Committee should be convened to discuss the role of Central financing agencies, including banks, industrial licensing and grant-in-aid policies of the Government and location of projects since 1951, in order to devise measures for subserving the

The N.D.C. Committee met in New Delhi on July 11 and 12 under the presidency of Dr. D. R. Gadgil, Deputy Chairman, Planning Commission. The Committee was set up by the National Development Council in May 1968, to examine issues relating to the Fourth Plan. Prof. D. R. Gadgil is the Chairman of the Committee and State Chief Ministers and Members of the Planning Commission are its members.

goal of doing away with regional imbalances and disparities in the Fourth Plan. It requested the Prime Minister, Mrs. Indira Gandhi, Chairman of the National Development Council, to authorise the Deputy Chairman of the Planning Commission, to arrange such a meeting at an early date.

This was in line with the resolution of the National Integration Council, adopted recently at Srinagar.

The Committee reviewed in general the existing patterns of

Central assistance to the States for Centrally-aided and Centrally-sponsored schemes

Prof. D. R. Gadgil, suggested to the Committee to take into account the recommendations made by the Study Teams appointed by the Administrative Reforms Commission in this regard. After discussion, the Committee agreed that the recommendations made by the A.R.C. should be accepted in principle and loans and grants to the States should be given in blocks instead of in accordance with the detailed schematic pattern, as at present.

To ensure priority to certain programmes, it was decided that Central assistance-loans and grants-could be tied to some of the schemes.

With regard to the criteria for the selection of Centrally-sponsored schemes, it was suggested that they should relate to research, surveys, pilot projects or demonstrations. Such schemes should have overall significance at the all-India level or should be of a regional or inter-State character. It was also agreed that the number of such schemes should be kept to the minimum. These suggestions generally followed the recommendations of the A.R.C. Report on "Machinery for Planning".

The Committee also felt that details regarding Centrally-sponsored schemes should be examined by the officers of the Planning Commission, in consultation with officers of States and Central Ministries concerned.

BACKGROUND OF THE ISSUE

THE Planning Commission had prepared a background note for consideration by the N.D.C. Committee. A summary of the note is given below:

The practice of giving Central assistance to the States for financing development schemes had been in vogue even before the advent of Five Year Plans. On the termination of World War II, the Central and the Provincial Governments had embar-

ked on certain development projects which received Central assistance in the form of what were known as post-war development grants. Though some of these grants had stopped by 1950-51, grants for "grow more food" schemes and certain other schemes continued.

With the introduction of the Five Year Plans in 1951, a system was evolved for distribution of Central assistance to the States. Under the system, the quantum of Central assistance was fixed for the Plan period as a whole (except during the Second Plan), and State Governments were informed about their respective shares before the commencement of the Plan. For Annual Plans, Central assistance was fixed at the time of the Annual Plan discussions, keeping in view the amount available to States for the five-year period.

This agreed quantum of Central assistance was made available for the State Plans in the form of loans and grants, according to schematic patterns of assistance. These patterns varied for different schemes, as also in the successive Plans (1951-66) and the three Annual Plans (1966-69).

In addition, there were the Centrally-sponsored schemes for which Central assistance was given to the States in the form of loans and grants in varying proportions and, in many cases, with matching contributions from the States, the latter forming part of the State Plans.

During the first three Plans, stress was laid on the principles governing the determination of the Plan outlays, rather than on quantum of Central assistance. For the Fourth Plan, a few criteria were formulated in 1966 for determining the quantum of Central assistance.

With regard to the pattern of Central assistance for Centrally-aided scheme, which formed part of the State Plans, and for Centrally-sponsored schemes, attempts to rationalise them were made since the Second Plan.

In the reformulation of the Fourth Plan (1969-74), it is now proposed: (i) to review the principles governing the distribution of Cen-

tral assistance for the States' Fourth Plans, as envisaged in 1966, (ii) to rationalise further the patterns of Central assistance for Centrally-aided schemes, and (iii) to evolve an agreed list of Centrally-sponsored schemes in consultation with the Union Ministers and the State Chief Ministers.

Assistance in 1951-1969

In the First Plan, the Central assistance to States, as originally suggested, was Rs. 193 crore, but the actual amount distributed added up to Rs 332 crore. In addition, a sum of Rs 548 crore was distributed to the States for schemes included in the Central sector which should have been part of the State sector. In the Second Plan, the Central assistance amounted to Rs 1058 crore, against the State Plan outlay of Rs 2083 crore. In the Third Plan, the Central assistance was Rs 2515 crore against the State outlay of Rs 4069 crore.

During the first three Plans, the quantum of Central aid was determined mainly in the light of the gap between the resources and the Plan outlay of each State.

The desirability of evolving objective principles for allocating Central assistance was emphasised by several Chief Ministers during discussions in July 1965 on the Memorandum on the Fourth Plan. Views of the State Governments on this subject were thereupon invited and incorporated in a paper placed before the National Development Council in August 1966. Diverse opinions were expressed by the Chief Ministers, who suggested different priorities, and no agreed set of principles could be evolved. Accordingly, the Planning Commission drew up the following guidelines for determining the quantum of Central assistance for each State for the Fourth Plan as then envisaged:—

(i) Every State should receive first the quantum of 70 per cent of the total amount to be distributed in proportion to its population;

(ii) The balance should be distributed after taking into account (a) special needs of Assam, Jammu and Kashmir and Nagaland; (b) commitments of some of the States

required to spend large amounts on continuing schemes of irrigation and power which are of national importance; and (c) the requirements for ensuring accelerated development of certain backward regions, hilly areas, etc.

For financing the States' Plan outlay of Rs. 7,073 crore indicated in the Draft Outline of the Fourth Plan, the Central assistance was envisaged at Rs. 3,500 crore. On the basis of these guidelines, the Planning Commission finalised the amount of Central assistance and outlays after detailed discussions with the Chief Ministers in October-November 1966. The total assistance indicated to the States as a result of these discussions aggregated Rs. 3,571 crore.

Annual Plans

Under the Annual Plans for 1966-67 and 1967-68, certain States had to be given accelerated assistance to meet the situation created by external aggression, drought, and their commitments. The quantum of assistance to them for the two years was, therefore, decided on an *ad hoc* basis. The effect of the *ad hoc* distribution over the first two years deprived some other States of their share in the Central assistance. These States were pressing for making up the entire shortfall in 1968-69 only.

Notionally, all the States had to be given the agreed assistance over a period of five years. For determining the amounts of Central assistance for 1968-69, therefore, calculations were made in the proportion of the Central assistance indicated to the States to the overall assistance for all States estimated earlier, and a corrective was applied to the amount so calculated to the extent of one-third of the difference between the assistance that was due to a State and the amount that was actually received by it during the two years, 1966-68.

Main Issues

While formulating the new Fourth Plan, the State Governments were requested to express their views in this regard.

After considering the views expressed by the States, the follow-

ing main issues emerged in determining the principles for distribution of Central assistance:

(i) Should the Central assistance to individual States be pre-determined for the Plan period as a whole? Should the allocations in the annual Plan of a State be necessarily in proportion to the pre-determined five-year assistance? If not, what should be the considerations governing variations from year to year? How should adjustments be made to ensure correspondence with the pre-determined amount of assistance for the whole Plan?

(ii) If the assistance to individual States is not to be pre-determined for a five-year period, what should be the principles governing the distribution of Annual Plan assistance?

(iii) Should special consideration be given to the requirements of border States like Jammu and Kashmir, Assam and Nagaland, as hitherto?

(iv) Should population constitute one of the main criteria for determining Central assistance and, if so, what should be the weightage given to it?

(v) What weightage should be given to the following facts in determining the quantum of Central assistance to individual States? (a) Economic backwardness of the State as determined by per capita income, concentration of tribal population, markedly backward and hill areas, chronically drought affected areas, and desert areas; (b) Commitments on account of continuing schemes; (c) Potential for raising resources and the performance of the individual States in mobilising them; (d) Central sector investment in individual States; (e) The quantum of assistance received by each State over the last 18 years; (f) Special features, such as density of population, rehabilitation of displaced persons, etc.

BHEL's New Products



The Bharat Heavy Electricals, Hyderabad, is diversifying its activities to include the manufacture of turbo-compressors and blowers for steel plants, industrial motors, and other items of industrial utility. It has also undertaken outside jobs to enable fuller utilisation of its capacity.

The hundredth Air Blast Circuit Breaker (220-245 KV), manufactured indigenously by the Unit will shortly roll out of the plant to be delivered to the U.P. State Electricity Board.

The first Air Blast Circuit Breaker was delivered last year to the Shapurnagar Sub-station of the Andhra Pradesh State Electricity Board.

A distinctive feature of the Air Blast Circuit Breakers manufactured by BHEL is the unit construction; they can be assembled for different voltages and ratings by suitably combining different numbers of insulators and interrupters thus simplifying manufacture, testing, maintenance and stocking of spares.

This young state-owned undertaking will shortly introduce Minimum Oil Circuit Breakers. It has also plans to manufacture Current and Potential Transformers.

FOURTH PLAN APPROACH 4 COMMENTS

"SINCE education is the main instrument of social change, opportunities for secondary and higher education must become increasingly available to all classes". In these words the "Approach" document envisages its educational policy. Economic growth is indeed a major form of social change in a country like India and one hopes that the Commission had this in mind when it wrote about education as the main instrument of social change. Of course, it is becoming increasingly clear that what the developing countries want is not merely economic growth but economic growth which is growth plus change and, therefore, the concept of education as an instrument of social change is certainly welcome.

But can we say that by making available opportunities for secondary and higher education increasingly to all the classes education can be used as a major instrument of social change? Is there not a need for priority between secondary and higher education? Can it not be said that secondary education with a vocational bias should be made available to a large number of people and admission to higher education must be selective? Of course, ability to profit by education is spread over all classes of people and economic circumstances of any section of people should not deprive them of the opportunity to have higher education. This can be taken care of by providing a number of scholarships, but this is a different from laying down a policy of spreading secondary and higher education.

What about opportunities for all classes of people to become literate

EDUCATION AS A MEANS OF SOCIAL CHANGE

C. B. PADMANABHAN

The object of educational planning is not only to provide trained manpower, where it is in short supply, but also to broaden the range of opportunities of gainful employment.

and what about primary education? Of course, the Commission has envisaged the fulfilment of hundred per cent primary education to the boys and girls in the relevant age groups and it has also envisaged functional literacy.

It is true that education is a great leveller and the availability of education to all the classes of people is one of the ways in which the concept of equality of opportunity to all classes can be translated into action. But within education it is necessary to have a priority as between literacy, primary education, secondary education and higher education. When the problem is viewed in this larger perspective, it will become necessary to make a choice regarding the first thing to be accomplished.

In the context of scarcity of resources and the need for rapid development of an economy like India, if education is to act as a means of bringing about equality, then the whole concept of education for the elite will have to be replaced by the concept of education for the masses to enable them to acquire some skills with which they can improve their position and also contribute to the growth of the economy. The mere possession of education as the hallmark will be replaced by the concept of educated

and technologically sound elite.

Linking with Industry

The Commission further adds, "at the same time restraint of resources—financial and personnel—emphasises the need to economise in and rationalise the process of institutional spread and to make strenuous efforts at maintaining minimum standards of quality." When the restraint of resources is taken into account along with the growing number of educated unemployed, the need for priority in the expansion of the different levels of education commencing from literacy to higher education assumes importance. Such limitation of resources would also emphasise the need for improving the quantitative and qualitative performance of the educational system. In quantitative terms it would mean the increase in the retention capacity at all levels and in particular at the primary level where the wastage is known to be very high, and also the elimination of wastage at the higher levels of technical education. Further, it would imply that the responsibility for giving certain kinds of training and education must be shared with industry and business. The Commission has emphasised the need for such co-operation.

The co-operation between formal educational system and other agencies like industry, commerce and agriculture has to be extended to many spheres. First of all it has to be determined whether a certain course can be introduced profitably in the formal educational system or as on-the-job training in industries or agriculture. Secondly, even the kinds of courses that have to be offered in addition to the traditional ones will have to be decided after taking into account the needs of industries, agriculture, as well as services. The intention is to establish the closest possible correlation between occupations and the educational levels. In fact, this area is a highly neglected one at present. In India one does not know enough about the present situation in the matter of educational levels and occupational structures in different enterprises. Undoubtedly, the levels of education of the persons in different occupations must enable them to have the highest productivity.

But what is the present position? For this purpose, surveys of occupational structure and educational level in various enterprises will have to be carried out and enterprises classified by the levels of technology that they have. Such a classification of industries on the basis of their productivities, levels of technology and the structure of the educated labour force will make educational planning more realistic by taking into account the needs for productivity changes in the different sectors of the economy.

More Job Opportunities

This brings us to the quality of education. Arthur Lewis speaks of the quality and aptness of education. The educational system may be turning out brilliant nuclear scientists, but it should also produce equally good technicians who are able to participate effectively in the productive tasks of the economy. The "Approach" document speaks of linking education with the demands of manpower, but in the context of growing unemployment in the country, where is the demand for trained manpower to originate from? The "Approach" rightly points out that the estimate of future demand can be made only on the basis of a commitment to

a certain pattern of long-term development. Meanwhile, it is necessary to get rid of the notion that manpower planning consists in providing trained manpower wherever it is in short supply.

In fact, it would be much better to speak in terms of the development of human resource as Prof Harbison has been arguing. The general development has been taking place in such a way that all sections of the population and all aspects of human resources have not been receiving adequate attention. There are certain parts of India where per capita income might be increasing, but, at the same time, the inequality in the distribution of income also has been growing to such an extent that the per capita availability of nutrition for some members of the population might have gone down. The advantage of an approach based on human resource development is that it enables the planners to take into account simultaneously all the higher levels of nutrition, better education and better living conditions. However, this kind of approach can be adopted only for planning at the grassroot level because of the variations from one part of the country to the other. In fact, there are even variations from one district to the other. District planning is, therefore, desirable and the development of all facets of human resources in the district should be the objective of district plans.

In planning for manpower development usually more attention is given to the manpower which requires higher levels of education. The manpower required for performing jobs of relatively lower orders of skills generally does not receive enough attention. This defect has to be rectified. For this purpose the problem of manpower will have to be considered from the point of view of skills that are required for the development of the economy. It is in this context that the concept of intermediate technology laid down in the "Approach" paper assumes importance. A lower order of technology has been purposefully adopted, so that employment opportunities could be created on the basis of this kind of technology. An obvious advantage is that it does not call for large physical capital.

It will also enable mobilisation of the manpower that is already available in plenty, particularly in the rural areas.

On the basis of this analysis, the role of educational planning in India will be not merely one of providing trained manpower where it is in short supply, but one of broadening the range of opportunities of profitable employment. As Thomas Bologh observes, "It can never be stressed strongly enough that the education process and the development process must be taken as an organic whole and not divided into little compartments independent of one another. Educational methods should accelerate the development process and the development process should result in broadening educational methods."

CORRECTIVE APPROACH

K.T. KUNHIRAMAN

THE National Development Council has been rather wise in throwing the Fourth Plan to the Planning Commission for working out the details after a considerable debate on the broad objectives. The Fourth Plan is a corrective Plan, inasmuch as it has been receptive of the creative criticism levelled against the conduct of planning during the past so many years. We cannot but pay for the past omissions and commissions and the earlier we recognise our failures, the better for our future.

One of the major objectives of the Fourth Plan, which is on every man's lip, is growth with stability. Spiralling prices and galloping inflation form the basic ingredients of the economic malady of the nation today. The hydra-headed monster of inflation was rather allowed to multiply its heads, than actually being fought with all might to chop off its heads. During the First Plan, the economists summarily believed

that the model will work in this economy and deficit financing and cheap money policy are definite tools for economic development. Stability of prices was at discount throughout the Plan period. Thus mild doses of inflation, which were expected to give a tonic effect to the buoyancy of the economy, resulted in total ailment. This trend continued in the Third Plan also. Added to this, the Government's decision to devalue the rupee has acted as an inflationary force. The fiscal policy of the Government could not hold the price line, even though policy declarations were made time and again regarding this objective. Thus rise in prices, which was regarded as a 'strategy of development' to begin with, ended up as an anathema for the economy. The general public practically lost faith in planning; planners required substantial time to think over issues; non-conformist group wanted a switch back to free enterprise, middlelists wanted plan-holiday and extremists clamoured for total socialisation of economic activities in the country.

The Key Reason

The key reason of our failure lies in our inability to bring about an agricultural breakthrough. Productivity in agriculture did not increase, beating up time and beating up population growth. Even though the First Plan results were promising, they were not so good as to generate smugness and complacency. This state of mind betrayed both the people at the helm and the general public. The planners brought about a shift of emphasis from agriculture to industries which did not reveal a clear sense of economic history of developed nations. The growth rate in agriculture faced a dip. The general economic atmosphere went from bad to worse in the Third Plan when we had major droughts in some parts of the country and a clear fall in the agricultural output. This situation thwarted the stability of the economy.

The 'Approach to the Fourth Plan' has revealed that now at least our planners have begun to think in terms of putting a ceiling to price rise. Deficit financing, though for historic and operational reasons could not be completely done away with, could be kept at the

minimum. As a monetary measure this is to be most welcome. There should also be a positive effort to bring down the prevailing prices to a considerable degree. Taxation policy should be so contrived as to bring about equity in all the sectors alike. One could note that, though it is not wise to tax the rural sector very much, the advantages of the price spiral were mostly reaped by this sector. The income of this sector has increased in money terms, mostly not because of real increase in productivity, but because of price rise. The strategy of taxation should take note of this factor very much in evolving a new tax policy.

The importance placed on agriculture and allied industries is perhaps the best corrective approach the Plan has devised. While there has been a progressive decline of good

availability even during the Second Plan, the real importance of food self-sufficiency was clear to us only when aids were tightened and defence needs were far more important than ever, consequent on the two foreign invasions. To strengthen the economy to enable it face the foreign threats and to infuse in the minds of the people strong confidence, the real requirement is self-sufficiency. This way, agricultural growth is the basic goal which the Fourth Plan aims at. And the annual growth rate envisaged could not be otherwise achieved.

Like a mirage, the 'take off' in our economy was betraying us. If we are active and an assiduous care is bestowed to the execution part of the Plan, the preconditions to this 'take off' could be prepared during the five years to come.

ONLY A SCRATCH ON THE SURFACE

S.C. JHA

THE reconstituted Planning Commission has by now spent several months on generating thoughts for the Fourth Plan. And if the "Approach" represents the basic thoughts generated by the Commission, I consider it most unfortunate. The Approach reflects nothing better than what had repeatedly been emphasised in the first three Plans. Growth with stability has been the primary objective of the Five Year Plans.

The Approach should have gone to examine the factors responsible for unstable growth during the previous Plans and how best the major obstacles could be handled. It is obvious that some of the basic postulates, on which the entire planning approach (starting from the First Plan) was based, went wrong. Mahalanobis planning model proved completely erroneous and the task of the new Commission should have

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been to give a complete new look to the entire approach of planning and to indicate alternative courses of planning action and the consequences thereof. This could have provided stronger background for public discussion.

No attempt has been made to show if balanced inter-sectoral growth rate is necessary in the early stage of India's economic development. If the experiences of a few developing countries are to be taken into account, it becomes questionable whether India really needs a balanced inter-sectoral growth rate which is conceptually different from a stable growth rate. Even in terms of stable growth rate, it is not clear as to what rate of growth can be called stable at the present stage of development in India.

Encouraging Note

It is encouraging to note that there has been greater realisation on the role of agricultural development. But the question that does not seem to have occurred to the planners is, whether agricultural development provides a necessary or sufficient condition for overall development of the economy. On the basis of past experience and the available statistics, it can be hypothesised

that in the Indian context, agricultural development provides only a necessary, but not sufficient, condition for faster economic growth. If this is proved empirically, the foundation of the entire new approach in the Fourth Plan may become shaky. Therefore, the Approach should have tried to determine the true nature of relationship between agriculture and other sectors, and to develop the resource planning framework under which a particular sector would have direct impact on other sectors of the economy.

While examining the role and function of agriculture in a national economic growth, one needs an analytical scheme by which to trace logically, systematically and casually the effects of changes in either the agricultural or the other sectors on the whole economic and social system. The research group in the Planning Commission has failed to develop such an analytical framework. Ideally, one would want a scheme (model) to analyse the rela-

tionship which exists between agriculture and the other sectors. This analytical framework would allow us, furthermore, to explore alternative consequences of different policies. Our past experience shows that the various sectors of the economy operate in isolation and there is no direct link between them for proper development of the economy. This is the reason why the economic opportunities and developmental forces generated in a few sectors have not been fully exploited by other sectors of the national economy. The obvious implication has been an unstable growth and wastage of the national resources.

The basic resources of a developing country like India are land and manpower. Non-agricultural sectors being weak, if these two resources are not fully used in the farming sector, they would not have much alternative use. If land is not used intensively, it would not make its maximum contribution to economic development. Similarly, measures

must be taken to absorb the maximum labour force. If not, the growth of rural manpower would swell even more rapidly than before, adding to the heavy backlog of unemployment. To neglect these basic resources, which has been the case so far, is an economic folly. If now they contribute less than they might to economic growth, it is largely because of economic and institutional impediments. The Approach should have tried to indicate the lines of action in order to overcome these impediments.

The Approach seems to have scratched just the surface of the ground. Had the ground been ploughed a little deeper, there would have been a clear insight into the major economic problems that the country has been facing during recent years. If these problems are not tackled well in time, chances are that India will have a serious economic and political upheaval. The task would be much harder to maintain the democratic institution.

**THIS
THEY
THINK**

YOJANA invited readers to express their views on the "Approach to the Fourth Five Year Plan". The response has been encouraging, which has enabled us to present this feature for readers, by the readers. This is the second instalment of readers' comments.

Two Priorities

THE objectives and the strategies of the Fourth Plan are not at all new. The same old strategies and objectives of the previous three Plans have been given a new look, a new approach and greater importance. But most of these strategies are vague.

The strategy on self-reliance is conditional, because dependence on foreign aid could be reduced only if exports could be raised and imports cut down. The question of cutting imports is rather formidable, especially when India is facing acute food shortage. Every year, we have to import large quantities of food. Under these circumstances, first emphasis goes to agriculture and next to industry. If we can solve the food problem then, no

doubt, the problem of self-reliance would be solved automatically. But, we cannot overlook the other two strategies, on industry and defence. They are equally important. The experience of the recent two aggressions has brought home the necessity of strengthening our defences. And for better defence, the country needs a sound, industrial structure. Emphasis on industry is therefore timely.

UPENDRA NATH KONWAR
Barbaruah (Assam)

Quick Action

IT has now been realised that the country cannot withhold any longer an intensive promotional programme for agriculture. This does not mean that greater priority should be given at the cost of other

sectors, but it means not only more outlay on agriculture but that bulk of the outlay on sectors other than agriculture must be so made that agriculture receives all that it should receive from other sectors.

Coming to the strategy of self-reliance, the following facts indicate that it may not be possible at the present juncture to rely on our own resources, because about 7 per cent of our annual food requirements are met by imports and 31.4 per cent of our Plan outlays come from external assistance.

The foreign assistance helps to improve our general economic conditions which will, in turn, go to develop agriculture. But, with such heavy dependence on foreign aid, it may not be so easy to speed up self-reliance as it has its own limitations, such as difficulties in

increasing rural savings, in reducing the loans, in levying additional taxes on industry and agriculture and the uncertainty of profits particularly in agriculture.

The present dynamics of the economic situation is such that the timelag between preparation and execution should not be too long on account of official inertia inherent in the administrative system even to realise the estimated targets.

Dharwar J.V. VENKATARAM

Food and Housing

THE aim of stopping imports of foodgrains under P.L. 480 by 1972 is inevitable due to uncertainties of foreign aid. There is to be a 5 per cent annual increase in agricultural production. But it is not clear as to how we can become self-sufficient in foodgrains in three years. We hope, when the draft is prepared a realistic assessment with details of expected growth in food production under different schemes will be made. Further the Commission should constantly review the progress made under these schemes and see that remedial measures are carried out whenever there is a setback. Buffer stocks can have relevance only after reaching self-sufficiency in a normal year. At present our stocks merely enable a precarious continuance of rationing in selected areas.

While the urgency of housing is recognised in the "Approach", I feel that if sufficient encouragement is given to urban housing co-operatives and adequate funds are provided in the initial stages, a self-financing system of house construction can be developed. Such a scheme will absorb the surplus incomes of the urban middle classes, control inflation and increase employment opportunities. Taxation of unearned increment in land values can be utilised exclusively for this programme.

Nagercoil (Madras) C. JOHN

Exports Are Crucial

THE 'Approach' underlines two significant aspects of India's

foreign trade: first, a balanced approach to the export promotion of 'traditional' and 'new' merchandise and, secondly, increased marketable surplus at most competitive prices.

It would be erroneous to presume that the world demand for our traditional exports is inelastic. Had this been the case, Ceylon (in tea) and Japan, China and Hong Kong (in textiles) would not have been able to make such heavy inroads into our exports. The emphasis on 'new' exports, particularly in the field of synthetic fibres, steel-based manufactures and drugs and pharmaceuticals, also seem to connive at the export promotion strategy. Similarly, the new 'need-based production-oriented' import policy calls for the necessity of higher marketable surplus at competitive prices as a pre-requisite for export promotion.

Granting these pre-requisites, exports can make a breakthrough in terms of their proportion to the value of national commodity output. If we want to increase the ratio of exports to national income to 7 per cent, as envisaged in the 'Approach', from the existing 4.5 per cent, there has to be an almost revolutionary increase in the value and volume of exports.

New Delhi J.R. CHAWLA

Family Planning

THE "Approach" to the Fourth Plan is different from those to the previous three Plans in more than one respect. Research, education and extension have been given equal emphasis in agricultural programmes. In the Section on Agriculture, due attention is given to development at the district level.

Chapter on Health gives some new suggestions for promoting Health and Family Planning Programmes. To sustain "existing health schemes and extending them where necessary", the "Approach" suggests, "a small fee on persons attending the out-patients' departments of hospitals and dispensaries and a charge per diem for stay of the patients in the hospitals". This is a good suggestion. It should be extended to the field of family plan-

ning also. Men and women taking advantage of the Family Planning Centres should pay a token fee. No monetary incentives should be given. This will create among the people a sense of participation in the National Family Planning Programme and the habit of paying for the services accepted. This will ultimately give the Family Planning Programme a new status. Motivation, the crux of the programme, has been given a rightful place in achieving enduring results.

Bombay MEENAKSHI APTE

People's Duty

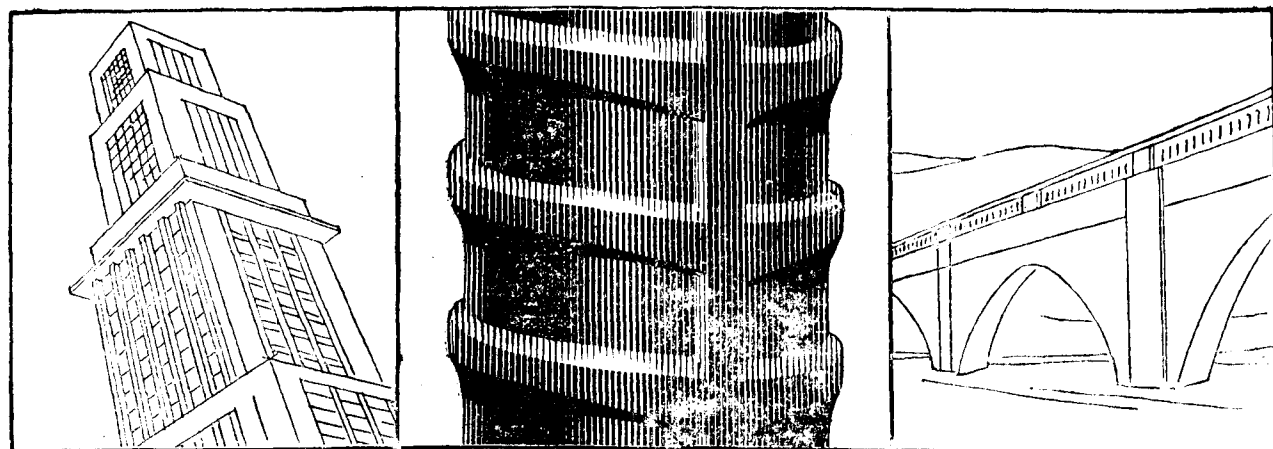
BEFORE we started with our Five Year Plans, a number of other plans, like the Bombay Plan, the Peoples' Plan, the Gandhian Plan and the Plan for Post-War development, had been formulated in the country. However, none of them was fully representative or comprehensive as to cover all facets of the economy. Planned development, as represented by the three Five Year Plans, is actually a gift of Independence.

Regarding our Annual Plans, the Deputy Chairman of the Planning Commission had said, "In 1968 we shall know to what extent our economy would stabilise and to what extent the prices have been checked." Now the question is, to what extent the Planning Commission has been able to detect the defects in our Plans and to what extent the "Approach to the Fourth Plan" will be able to remove them. As all of us know, after 17 years of planning we are still dependent on the monsoon for agriculture.

Our economy has reached a stage where everyone has become critical of planning. But one should not only criticise. One should also realise one's duty. On doing so, we may find that there is nothing wrong with the "Approach". It is a well-thought out paper for our benefit and its success depends, not only on the planners, but also on the millions whom it seeks to benefit.

ASHOK KUMAR MOHANTY
Khurda (Orissa)

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Co-operative Credit

Its Faults and Failures

Cooperative credit is often misused by both the poor as well as rich beneficiaries.

The shortfall in the recovery of loans has been increasing to alarming proportions reducing the credit-worthiness of the credit societies.

One of the factors that lead to the misuse of loans is that the loans are disbursed too late to meet the farmers' urgent agricultural needs.

Treating the credit society as a bank is one of the measures to remove the defects in the cooperative credit system.

V.V. SHETTY

THE non-availability of credit to cultivators in sufficient quantity and at low rates for interest is considered to be one of the main reasons of the poor state of agriculture in India. Supply of agricultural credit of short and medium term through organised channels has been practically the monopoly of the co-operative agency since the beginning of the co-operative movement in our country about 60 years ago. But for various reasons the agricultural credit co-operatives have had a tardy growth.

The inability of the co-operative agency to meet the credit needs of cultivators was highlighted first by the Rural Credit Survey of the Reserve Bank, which pointed out that in 1951-52 the credit co-operatives had supplied only about 3 per cent of the total annual borrowings of cultivators. Since then various efforts have been made to revitalise the co-operative agency so as to enable it to increase the supply of agricultural credit. The improvement brought about in this regard can be seen from the fact that by 1961-62 the proportion of credit provided by the agricultural co-operatives had increased to 26 per cent of the total borrowings of cultivators. The actual amount advanced was Rs 244 crore.

There has been a steady growth in the volume of credit supplied by the rural co-operative societies in recent years. Last year (1967-68), Rs 460 crore were disbursed as short and medium term loans, apart from Rs 75 crore as long term loans. The target for 1968-69 is about Rs 700 crore.

MISUSE OF LOANS

Whereas it cannot be denied that the co-operatives supplying credit at subsidised rates of interest and in an increasing volume have been rendering useful service to cultivators, it must, however, be admitted that all has not been well

with the working of the co-operative credit system. Almost all the field surveys conducted in recent years have revealed that the loans given by the co-operatives for the specific purpose of meeting the current needs of agriculture or for carrying out land improvements are not always used for the intended purposes. Diversion of co-operative credit to unproductive purposes is a malady which it has not been possible to remedy over the years. A study conducted by the Programme Evaluation Organisation of the Planning Commission has revealed that among 946 borrowers of short-term loans in 1960-61, about 40 per cent had diverted the loans to unproductive purposes—17 per cent wholly and 23 per cent partly. As for the medium-term loans, the percentage of those who had diverted their loans was 47 per cent, of which 25 per cent had diverted loans wholly and the rest partly. It was found that 23 per cent of the amount of short-term loans and 35 per cent of medium-term loans were diverted to purposes other than intended.

The practice of diverting co-operative credit to unauthorised purposes is not confined to any particular class of borrowers. Both rich and poor cultivators are at fault. The only, and perhaps vital, difference is that, whereas the poor cultivators misuse the loans for unproductive purposes—mostly to meet pressing domestic needs, the well-to-do cultivators borrow from the co-operative society although they have enough money with them, only because the co-operatives charge low rates of interest. The needs of smaller cultivators for the purchase of current inputs such as fertilisers and seeds are limited, because they use fertilisers rarely and the seeds are mostly their own. Richer cultivators, on the other hand, use fertilisers and also buy

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new and improved seeds occasionally, but in fact they do not need money for such short-term purposes.

One of the measures taken in recent years to curb the tendency of misusing co-operative credit is the introduction of loan in kind—a borrower is given a portion of the loan in the form of fertilisers. Starting with a nominal 10 per cent of the total loan amount, the proportion in kind has been raised to 20 per cent. The loan amount is divided into three parts—A, B and C—of which B is the kind component. Part A (60 per cent given in cash) is given first; and Part C (20 per cent in cash) is given after some interval only if Part B (20 per cent in kind) is taken by the borrower.

After an initial resistance, the cultivators are slowly adjusting to this new system. With the introduction of high-yielding crops, it may not be difficult to raise the proportion of the kind component in the coming years especially in irrigated areas. In this connection, an experiment started by a commercial bank in the South Kanara district of Mysore State deserves to be emulated. The bank issues what are known as 'agri-cards' to those who need short-term credit, after enrolling them as members of the agricultural association sponsored by the bank. On producing the agri-card, a member can get all his requirements of agricultural inputs such as fertilisers, pesticides, seeds and implements up to a specified sum from any dealer recognised by the bank. This way the bank hopes to serve the cultivators at the same time reducing the chances of misuse of its credit to the minimum.

DELAY IN REPAYMENT

Another serious problem faced by the credit co-operatives is the delay in repayment of loans. Every year large amounts remain over-due to co-operative societies. A primary co-operative society cannot disburse fresh loans without recovering a substantial portion of the loans already advanced (up to 60 per cent in Mysore State). As a result of heavy overdues, many societies become defaulters, thus undermining the confidence of those members who have faith in the co-operative movement. Let us take the case of the Shimoga District

Co-operative Central Bank in Mysore State. Established in 1953, the bank has, at present, 9 branches and 359 credit co-operative societies affiliated to it. With a membership of 513 and a paid-up share capital of Rs 26,34,800, the bank earned a net profit of Rs.150,000 in 1965-66. The extent of overdues of short-term loans advanced by this bank during the past 5 years shows that, although demand for short-term loans has risen from Rs 63 lakh in 1962-63 to Rs 90 lakh in 1966-67, the overdues, too, have risen from 22 per cent in 1962-63 to 44 per cent in 1966-67; and for medium-term loans, the overdues increased from 60 per cent to 83 per cent.

What is more disconcerting is that the extent of overdues has been continuously rising in spite of all the emphasis on revitalisation of the co-operative structure. For the country as a whole, overdues increased from 26 per cent in 1964-65 to 30 per cent in 1965-66. With the increased supply of credit to the cultivators, more money gets locked up in the form of overdues.

However, it is not always the smaller or poorer cultivators who fail to repay the loans in time. Recently the Reserve Bank of India sponsored a scheme for the supply of additional credit to the cultivators of high-yielding crops. Accordingly the DCC Bank, Shimoga, received a special sum of Rs 8 lakh in 1966-67 of which the bank was able to disburse only about Rs 2 lakh, because that being the first year of the scheme in this district, not many cultivators had grown the high-yielding varieties of crops. And those who had grown the high-yielding varieties were well-to-do and progressive cultivators, and they took the special loans. But, out of Rs 2 lakh disbursed as special loans, only Rs 25,000 were recovered at the end of the year. The obvious inference is that overdues are the result of wrong attitudes of some of the borrowers rather than their incapacity to repay.

This is one side of the picture. The other side, namely the viewpoint of the agriculturists, is equally important. After all it is not only the size of amount disbursed that really counts, but the extent and the manner in which the cultivators' demands are met. A common com-

plaint from the members of co-operative societies is that they do not get loans in time and the delay affects the farmers in more than one way. Having applied for loan from a co-operative society and waited sufficiently long, the borrower may be tempted to go to the local moneylender to meet his immediate needs. Later, when the co-operative loan is sanctioned finally, he does not refuse it, but takes it and utilises it for other purposes.

The delay in disbursing fresh loans is caused partly by the borrowers who fail to repay the old loans promptly. Those members who do not repay their loans in time not only cannot receive fresh loans themselves but they also spoil the chances of others who are not defaulters.

The insistence on a certain percentage of recovery on the part of a primary credit society to become eligible for fresh loans from the district bank has also given room to malpractices. Some societies manipulate the accounts with or without the knowledge of higher authorities and show recovery up to the required extent; though in reality there may be heavy overdues. There are also cases of office-bearers of co-operatives borrowing money from private sources to effect necessary book adjustments at the nick of time.

How to rectify this unhealthy situation? Perhaps an intensive scheme of co-operative education may help in the long run, but can it produce immediate results? One way out is to enable the primary co-operative credit society to function like a bank. That is to say, instead of treating the borrowers as a group, each borrower should be treated separately, and on merit. Under this arrangement, those who seek loans for the first time and those who clear off their old loans in time should receive loans promptly without being tied to the defaulters and without any minimum percentage of prior recovery for the society as a whole. Needless to say that the time taken for the preparation and verification of loan records should be reduced to the minimum. This will surely act as an incentive to repay the loans in time.

Mechanisation of Farming

L. L. SARIN

THE progress of Indian agriculture is inexorably linked with the use of the latest and most efficient technological processes, which alone can bring about a change-over to modern methods of production. Unfortunately, production methods in Indian agriculture have not yet reached a high degree of intensification. Based mainly on animal and human power, the inputs utilised are extremely inadequate for maximum production. A reliable index of intensification in agriculture is the power input per unit of area. Compared to 9.10 h.p. per acre in West Germany and 6.10 h.p. per acre in Japan, power input in India is only 0.14 h.p., which is, perhaps, the lowest in the world. A substantial increase in input, apart from better seeds, fertilisers, and plant protection measures etc., is possible only through the use of improved implements and power machinery. Studies made in Punjab show that the expenses incurred by an average farmer on tools and agricultural implements is less than 2 per cent of the total expenditure, and an additional one per cent paid as wages to village artisans for repair, maintenance and manufacture.

During the last 15 years some progress has been made in this field. These include the establishment of 16 Research-cum-Testing Training Centres, 15 Agricultural Implement Workshops in selected I.A.D.P. districts, 40 Workshop Wings at the Gram Sewak Training Centres, 2 Tractor Testing and Training Centres and a Board for agricultural machinery and implements. By the end of the Third Plan, capacity for the manufacture of 30,000 tractors per year was created, and production during 1967-68 is estimated at about 11,400. Also, licenses were issued for the manufacture of 26,000 power-tillers per year; but production last year was insignificant (585). Licenses were also issued for the production of 550 crawler tractors of 50.90 h.p.

An important development has been the exemption of the tractor and power-tiller industry from the licensing provisions of the Industries (Development and Regulations) Act, 1959.

To stimulate the growth of agro-industries, Agro-Industries Corporations have been set up in 11 States with a total authorised capital of Rs 27 crore. These Corporations are distributing agricultural machinery and implements as well as equipment pertaining to processing, dairy, poultry, fishery and the industries connected with agriculture, on a hire-purchase basis. In addition, the establishment of machine service centres on a pilot basis and Departmental agricultural machinery hiring centres to provide tractor services to small cultivators is being considered.

Despite all the steps so far taken and the results actually achieved, the programme of increasing the availability of improved agricultural implements has not made satisfactory progress. This has been underlined in the Draft Outline of the Fourth Five Year Plan, which pointed out that the programme had "seriously lagged behind in the first three Plans." It was pointed out that this was "largely due to the shortage of iron and steel, lack of suitable designs of implements, high cost of manufacture, lack of adequate and timely credit at reasonable rates to farmers for purchase of implements, lack of repair and maintenance facilities, difficulty in obtaining spare parts and lack of competent extension machinery to demonstrate the effectiveness of improved implements."

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The most important single reason why the programme has languished is that the manufacture of agricultural implements is not being undertaken on a mass scale, which alone can reduce its cost and improve quality. The margin of profit in agricultural implements at present is much less than in other consumer goods industries. Therefore, not many manufacturers are attracted to this line. Moreover, the quantity of steel required for the manufacture of implements is much more than in the case of, say, a bicycle, a fan or a sewing machine. Some concessions and incentives are, therefore, absolutely necessary to encourage manufacturers.

A second reason is that Indian farmers are not using improved agricultural implements because of lack of repair and maintenance facilities. About 40 workshops have been established with the help of the Ford Foundation to train VLWs in the use of implements and, village artisans in repair and manufacture work. Since last year, the training in these workshops has been reoriented to machines such as, oil engines, pumps, seed-cum-fertiliser drills, threshers, etc. The staff has been strengthened and production of implements to a limited extent undertaken at selected workshop wings. In order to improve the standard of training, a scheme of 'Uniform Study Aids' is being implemented in preparing uniform and standard lessons and giving refresher courses to trainees.

Standardisation, which is important in any industry, applies to agricultural implements. In India, of late, random manufacture of implements has been undertaken, with the result that the farmers have suffered. For example, there are more than 100 different types and sizes of small mould-board ploughs. Every manufacturer gives a new name to a plough with the result that the farmers are confused. In Ghaziabad

(Uttar Pradesh) alone 80 different types of diesel engines are believed to be manufactured. The Indian Standards Institution has done some useful work in material standardisation but a great deal remains to be done. Also, there is no quality control on agricultural implements, either in regard to the correctness of the design of proto-types or the material used in their manufacture. This has given rise to unhealthy practices causing considerable loss to the cultivator and undermining his confidence in improved agricultural implements. Not only there are great variations in the designs, specifications, efficiency and prices of implements but the cultivator is confronted with serious difficulties in getting repairs done owing to want of standard designs and non-interchangeability of parts.

Indigenous farm implements in India are generally manufactured by village blacksmiths and carpenters. However, this is slowly changing, and organised industries, which manufacture improved agricultural implements on a mass scale are coming up.

There is need to carry out a survey of indigenous agricultural implements in use in different regions of the country for centuries. Some of these, which are popular in certain areas, have not found their way to other parts of the country, where they can be used with good effect.

Two Views

On the question of farm mechanisation two extreme views are invariably put forth. One is that we should go in for very simple implements, more or less of the traditional type, because we have a very large cattle population, our holdings are very small and the purchasing capacity the farmer is very low. The second view is that we should go in only for big power-driven implements as is done in most of the advanced countries. It is, however, necessary to strike a new equation between the traditions handed down to us from the past and the necessities of the present.

In a country like India where the vast majority of agriculturists have only two to three-acre farms, mechanisation on a large scale is hardly

a paying proposition. The financial resources of farmers and their capacity to pay for and maintain farm machinery are important factors. The unsophisticated farmer is not machine-minded and any attempt to force rapid mechanisation in agriculture is certain to evoke strong resistance. It is important to recognise that the traditional agriculturist does not change by fits and starts. Any change, has to come from within the totality of rural life. This by itself is a guarantee, at least in a democratic country, against over-hasty mechanisation. Wherever new agricultural implements and machinery have found large-scale acceptance, we may legitimately infer that the prevailing conditions have warranted the change.

While our approach should, therefore, be cautious, we cannot rule out the utility of mechanisation under all conditions. It is apparent that where there are large holdings, shortage of labour and limitation of time, mechanisation has its own place. Agriculture is so diversified and elastic that abundant production can be secured by adopting a variety of systems. The mechanisation of agriculture will, therefore, not render man-powered methods superfluous; there is scope for the development of both. The question is how far should mechanisation be promoted under any given set of farming conditions. In certain heavy operations like land reclamation, soil conservation and the like, which require considerable labour, mechanisation appears to be inescapable.

Use of Tractors

There are, at present, 53,200 tractors in the country. The availability per year is on the increase, largely due to increase in indigenous production. As against 4,030 tractors (35 per cent indigenous) available during 1962-63, more than 15,000 tractors (76 per cent indigenous) were made available during 1967-68. The number of tractors in relation to cultivated land is an index, though a very rough one, of the degree of mechanisation. In India, the average works up to, 1 tractor for 10,000 hectares of cultivated land, as against 330 in the Netherlands, 470 in West Germany, 200 in Belgium, 170 in France, 50 in

U.S.A. and 5 in Japan. The index is very low for India, but it is important to remember that other measures for increasing productivity will have priority here.

Role of Public Sector

Most of the developing countries, anxious to promote mechanisation as a means to increase farm production and raise the standard of living of the people, have found from experience that this is no easy task. There are both social and technical difficulties which tend to inhibit rapid advances in this field. For example, the farms are mostly small and may be divided into several separate and scattered plots. The roads may be poor or non-existent and the only possible access to a field may be across a number of plots belonging to different farmers. Imported machines may be designed for the peculiar conditions prevailing in the country of manufacture. Another obstacle frequently is the lack of knowledge of the correct use of farm machines and the special problems that are likely to arise. Suitable facilities for repair, maintenance and servicing may be lacking, while the supply of spare parts may be inadequate.

In developing countries, farm machinery is often made available by Government agencies on hire. Gradually contractors on a full-time basis appear and, as farmers obtain machines of their own they show growing interest in carrying out contract work for their neighbours as an additional occupation. Also, governments try to develop co-operative societies and encourage them to take over the government farm machinery hire services. In most cases, the government is finally responsible for the service, with the co-operative society acting as an agent.

One of the fundamental things about the mechanisation of farming is that it should not be undertaken without an accompanying programme for training and extension. Wherever the introduction of farm machinery has been successful, it has been co-ordinated with an intensive training scheme and the dissemination of information to

turn to PAGE 18 :

India's food problem is, in fact, the problem of shortage in subsidiary foods. The planning for food should, therefore, aim at producing subsidiary foods in the long run, along with self-sufficiency in foodgrain production as an immediate objective.

Shortage of Subsidiary Foods

G. VISWANATHAN PILLAI

INDIA's food problem is in fact the problem of shortage in subsidiary foods. It is true that the effective demand for foodgrains in the country exceeds internal supplies. The deficit in supplies fluctuates widely over years in consonance with the variation in internal production. Easy imports of foodgrains under PL-480 in the past coupled with the casual approach to development of subsidiary foods has landed the country in a food crisis. Despite all this, the level of foodgrain production in India is sufficient to meet her dietary requirements by any standard. The effective demand for foodgrains is much higher than the actual requirements mainly on account of the shortage of subsidiary foods, which are being absurdly substituted by foodgrains.

The Nutrition Advisory Committee has recommended for a daily intake of 17 oz. of foodgrains (14 oz. cereals and 3 oz. pulses) per adult. The requirement at this rate for the present population in India is 77.8 million tonnes per annum. As against this the production of foodgrains in 1967-68 is estimated to be over 95 million tonnes. This should leave a considerable surplus over consumption even after allowing for seed, animal feed and wastage. There is, therefore, no shortage in the supply of foodgrains. The shortage actually experienced is but a manifestation of the dearth of subsidiary foods in the country.

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Unbalanced Diet

The standard of 14 oz. (398 gm.) of cereals per day fixed for India is itself too high compared to the actual availability and consumption of cereals in most of the advanced countries. The following figures will substantiate this:

Country	Daily per capita net availability of cereals* (gm)
India	404
France	248
U.K.	213
Germany	201
Italy	358
Netherlands	195
Norway	202
Canada	185
U.S.A.	182
Japan	394

*The figures refer to the period 1964-65 in most cases. Source : F.A.O. Production Year Book, 1966.

A close scrutiny of the statistics regarding availability of cereals in various countries would show that the consumption of cereals bears an inverse ratio to economic development. It is, therefore, only reasonable to expect that, as India progresses on the path of development, the per capita consumption of cereals will go on falling, and, as a corollary, the consumption and hence the demand for subsidiary food materials will go on rising. The country is now fully alive to the urgent need for stepping up the production of foodgrains, and it

can be hoped that the output of foodgrains will increase substantially in the coming years. In the mean time (say, within the next 5 to 10 years), the real problem, namely the scarcity of subsidiary foods, will come to the fore. It is, therefore, necessary that the country now adopts a far-sighted policy of developing subsidiary foods side by side with foodgrains.

In an underdeveloped country like India suffering from food shortage, it is only natural that the supply of foodgrains attracts exclusive attention. But the importance of subsidiary foods, supplying essential nutrients, is much more than that of foodgrains for maintaining dietary standard. In physical quantity also the share of subsidiary foods is more than double that of foodgrains.

Importance of Milk

The most important item among subsidiary foods is milk, which is accepted as a complete food. It has a high protein content and is acceptable to both vegetarians and non-vegetarians. Meat, fish and eggs are also rich in nutritive value. Other subsidiary foods are vegetables, fruits, vegetable oil and sugar.

In a balanced diet, out of the 48 ounces of food needed per day, foodgrains account for only 17 ounces, and the rest are subsidiary foods. The foodgrains, however, provide more than 50 per cent of the calorie requirements.

The most important among the nutrients is protein which is necessary for growth as well as replacement of the body tissues. Protein is obtained from both vegetable and

animal sources. Animal protein is considered to be superior to vegetable protein. All foods of animal origin such as milk, meat, fish and eggs are rich in protein. Other major nutrients are the minerals like calcium and iron and various vitamins. Cereals supply a substantial part of energy requirements and pulses a substantial part of protein. The rest of the energy and protein requirements as well as all the other nutrients like minerals and vitamins are provided by the subsidiary foods.

The country produces more cereals than required for a balanced diet. In regard to pulses the deficit is only nominal. In contrast to this, the country's position in regard to subsidiary foods is not very satisfactory. The supply is adequate only in respect of sugar and jaggery which, incidentally, are the least important among the nourishing foods. The supply of fruits and nuts is comparatively satisfactory. The availability of all the other items is far below requirements. The result is that while 80 per cent of the energy requirements are met with, large deficiencies exist in the essential nutrients like protein and calcium, particularly in animal protein.

A nutritious diet should contain 100 grammes of protein, of which 33 to 50 per cent should be in the form of animal protein. The availability of animal protein in India is less than 10 grammes per adult per day. The main problem that calls for urgent solution is the correction of this protein deficiency. Once this is done, the deficiencies in other nutrients will either vanish or be reduced to a safe minimum.

The only possible way of removing the animal protein deficiency is to consume more milk, meat, fish and eggs. If the prescribed standard of 10 ounces of milk and 4 ounces of meat, fish or eggs is reached, it will ensure a more or less adequate supply of animal proteins. Infants, mothers and growing children require much larger intake of protein and hence much greater consumption of milk than adults.

Rich Sources

A large proportion of the Indian population is vegetarian. To balance the diet of these people in the matter of protein intake, they

will have to consume about 30 ounces of milk per day instead of 10 ounces. The non-vegetarians might substitute meat, fish and eggs for milk. However, in view of the large number of vegetarians and the shortage of meat, fish and eggs, demand on milk will increase greatly, at least in the short run.

Milk production in the country will have to be doubled if the per capita availability of milk is to be raised to 10 ounces a day. The deficit is much larger in the case of meat, fish and eggs. Another area of shortage is ghee and vegetable oils. All these shortages can be made up to a large extent by developing animal husbandry and fisheries. The supply of vegetables also is unsatisfactory, only 40 per cent of the demand.

India had 207 lakh cows and 126 lakh she-buffaloes in productive stage in 1961. Together they produced 207 lakh tonnes of milk in the year. India is the only country with such a large population of buffaloes in the world, but their milk producing capacity is very low compared to world standards. There is vast scope for stepping up productivity by improving the breed and better feeding of the cattle. If we can achieve an average yield rate of 2000 kg. per year for our cows and she-buffaloes taken together, the production of milk, based on the cattle population of 1961, would be 666 lakh tonnes a year, which is more than sufficient to feed India's population in 1975 at the rate of 10 ounces per head per day.

There is also unlimited scope for the development of poultry and fisheries.

India has some of the richest fishing grounds in the world which remain largely untapped. We have made only a beginning in deep-sea fishing. With mechanisation of fishing operations and the introduction of large trawlers, the fish production of the country can be increased several times.

The development plans so far lacked in a co-ordinated and comprehensive approach to the food problem, and emphasis has been given only on foodgrains. A food development plan should be formulated on the basis of specified short-term and long-term objectives. The

short-term objective should obviously be to make the country self-sufficient in foodgrain production and the long-term objective should be to ensure a balanced diet for the people. It is time to launch a plan to achieve this long-term objective. The plan should concentrate on the following points:

- 1) Selective upgrading of the existing cattle breeds with a view to developing a highly productive milch stock.
- 2) Development of animal husbandry by encouraging mixed farming and devoting a large part of the newly reclaimed land to grazing and fodder production;
- 3) Priority to production of milk, meat and eggs;
- 4) A programme based on purely economic considerations to limit the cattle population and eliminate the unwanted cattle heads. It would help to increase the production of meat, hides and bonemeal.
- 5) Emphasis on poultry development.

MECHANISED FARMING

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farmers, operators, mechanics and managers of hire services by intensive public relations and extension. The best method of approach may often be a pilot scheme, which can be expanded at a rate within the capabilities of the people who manage and operate it. Moreover, it is no use telling the cultivators about modern scientific agriculture unless supplies can be made available to them.

Generally speaking, the more expensive machines, such as threshers and certain types of tractors, utilised on a collective basis, is the only solution for the small farmer. Apart from being able to use many types of equipment, which he would not otherwise be able to afford, this will ensure the maximum use of their working capacity. There is, therefore, need for the promotion of collective use of machinery. Other promotional measures include an abatement of fuel prices for agriculture and exemption from the tax on tractors for agricultural use.

Side Track

INVISIBLE TEACHER

How many of us, during the course of our school life, have pined for the day when we would arrive in school to find that the teacher was magically absent? And, how often we have been disappointed; because, teachers being dependable individuals, rarely obliged. But, for 36 children of an elementary school in West Berlin, this student daydream has come true. One day when they trooped into the classroom they found that the miracle had happened—the teacher was not there. Little did they realise that this was only a mirage, because the teacher had left a substitute—not a person of flesh and blood, but an electronic computer!

At the push of a button, the mechanical teacher automatically played a pre-recorded tape concerning the adventures of Hansel and Gretel while, at the same time, projecting slides on to a movie screen to illustrate the various points in the tale. After 20 minutes of instruction, the computer questioned each pupil about what he had learned, via a small, desktop console, with which each one was equipped. And, almost immediately after receiving their electric 'yes' or 'no' answers, it flashed either the 'correct' or 'incorrect' lights on the panels of their consoles.

Although the whole process sounds relatively simple, it is really comparatively complicated. And, it is also extremely expensive, having cost the school authorities almost \$ 250,000 for the classroom and its computer equipment. But this ultra-modern instruction system is well worth the expenses. For, as tests have shown, pupils retain 80 per cent of the material presented to them via the computer as compared to only 22 per cent of that taught by a "live" teacher.

The school's computerised classroom is the first of its kind in

Europe and the second of its type in the world, the other being located in Santa Monica, California.

Population Explosion

ACCORDING to the Bible, God created Adam and Eve; and that is as far as He went. But, the human capacity for procreation, limited only by the effects of poverty, disease and wars, far surpasses those of his Creator. This is the obvious conclusion that one can draw from the staggering, almost astronomical, figures of world population growth in the past fifteen years.

Now let us look at the cold statistics of the population "explosion".

In 1953, the world population was 2,500 million; by January 1, 1969 the population will be 3,500 million. Another 1,000 million gain is expected by 1983. About 7,000 million people will be crowded into the world by the year 2000.

In 1968 approximately 118 million babies will be born, 324,000 a day or 225 every minute. Also, in 1968 almost 49 million people will die, 133,000 each day or 93 per minute. About one-third of the people now living are under 15 years of age. In the developing countries, the figure approaches one-half.

The world's highest population growth rates are in El Salvador (3.7 per cent), Dominican Republic (3.6 per cent), and Venezuela (3.6 per cent). About 85 per cent of all births today are occurring in the less-developed countries, where food is insufficient, illiteracy widespread and personal incomes extremely low.

Some experts foresee millions of people in overcrowded urban centres suffering from the effects of malnutrition or hunger, other millions dying from famine. They



IGNORAMAN

Wants to Know

why

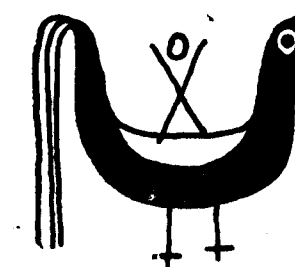
State insistence

should become

a criterion for

Central assistance

anticipate hunger riots as well as political and economic upheavals in some countries. Other experts however, take a more optimistic view of the situation. They are now heartened by the progress being made in birth control and in food production. Pessimists and optimists alike concede that time is the crucial factor—how rapidly nations can bring populations and food supplies into closer balance. Dozens of countries already have largescale family planning programmes under way, and agriculture is being intensified. Pessimism is yielding to optimism. An American demographer, Dr Donald J. Bogue, of Chicago University, believes the population explosion is turning out to be a myth. The rising global birth rate, he is confident, will be brought under control by the year 2000.



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TEC. G.I. 68

AN OCEAN OF FOOD

G. DE SABATINO



WORLD SPOTLIGHT

A vast, natural food reserve that has barely been touched awaits exploitation by a hungry world. It is the Indian Ocean.

Third largest ocean, the Indian Ocean comprises one-fifth of the world's watered surface. Its 28 million square miles range from above the equator to the Antarctic and from western Australia to eastern Africa. Historically it was the first commercial seaway from Europe to India and the Orient. Magellan's ships crossed it during the first circumnavigation of the globe. Yet, only in recent times, with growing populations and food needs, has its importance to feeding been recognised.

The Indian Ocean has the attributes of a good, fertile ocean. Its deep, warmish waters, swept by powerful currents and twice-yearly monsoons, contain encouraging amounts of phytoplankton and zooplankton, the tiny organisms which are the fish fodder of the sea. Tests held in the Arabian Sea to determine its rate of productivity compare favourably with the most fertile spots in the Atlantic and Pacific. Tunas and billfishes abound throughout the Ocean while its bays and seas are rich in other varieties of fish, including bottom species.

The Arabian Sea, one of the Ocean's most fertile areas, may have a potential yield of some 10 million tons of fish a year. The Bay of Bengal could produce two and one-half times its present yield of 260,000 tons of open water fish. The Persian Gulf, generally shallower and good for bottom species, has attractive shrimp deposits. Other fertile areas lie in the regions off Indonesia and Australia, and along the African coast.

Unfortunately, the Ocean gener-

Mr. G. De Sabatino is an F.A.O. Expert.

ally has a narrow continental shelf. It also lacks the temperate areas that in other oceans support large fisheries. But it has various zones of upwelling, where upward current action enriches the water with nutrients for a greater sustenance of life. This is the same phenomenon that occurs off Peru and makes the South American nations the world's No. 1 fish catching countries. Zones of upwelling exist in the Arabian Sea, Bay of Bengal, south of Java and off the north-west coast of Australia.

Yet, despite its size and potential, the Indian Ocean remains

*The rich reserves
of natural food in
the Indian Ocean
still await exploita-
tion to meet the
hunger needs of the
world.*

lightly harvested. The yearly catch amounts to about 2 million metric tons, based on a 1964 estimate by the UN Food and Agriculture Organisation. By contrast, the Atlantic Ocean yielded that same year more than 18 million tons and the Pacific 25 million tons. Considering that the world marine take from the Indian Ocean corresponds to only one-twenty-fifth of the whole, is a poor showing for such a large ocean. One explanation is that so little is known about its potential. The FAO, in fact, warns that more and better data are need-

ed on fish stocks and other resources for the proper assessment of its value and possibilities. Such data must include statistics on catches and landings.

A second explanation is the under developed state of fisheries along the coasts. The nations bordering on the Ocean take very little from it. Much of the fishing remains coastal and traditional: virtually shorebound. Small, un-motorised boats of limited operating range and simple gear are largely used and catches are subsequently small. Development is hindered by the general lack or scarcity of refrigeration, storage, distribution and other shore-based facilities without which no modern fishing industry can operate. Marketing practices remain antiquated. India has made progress in modernising and expanding its fisheries, but other nations, especially along the African coast, have to build up theirs.

Still another reason is the Ocean's remoteness from traditional fishing grounds elsewhere. Only in recent years have the developed fishing nations—Japan and the Soviet Union among others—ventured into the Indian Ocean from the Pacific and Atlantic. Speeding them there were increased food demands at home which led to development of modern fishing fleets capable of journeying far and for long periods. All major pelagic (open ocean) fishing is now done by these countries, including Formosa and Korea. Their fast, electronically equipped fleets range over the Ocean where they catch among others, tunas and billfishes of which the Ocean abounds.

Despite its prospects, the Ocean's

potential was slow to be recognised. In 1930, the Japanese exploratory vessel, *Shirotaka Maru*, fished with longline gear in the Bay of Bengal and off the Maldiv Islands. She was followed by the research ship, *Haruna Maru*, which conducted fishing operations off Java and Sumatra. Their catches showed for the first time that yellowfin tuna and billfishes were to be found in good commercial quantities in the Indian Ocean.

Pelagic fishing got underway only after World War II. In 1952, the Japanese returned to fish primarily for yellowfin tuna in the eastern Indian Ocean. Fishing was stepped up the following year, when the pelagic fishery was launched. By 1956 operations had extended westward to the African coast and by 1960 Japanese vessels were operating north and south of the equator. Peak catches were reported in 1956 and in subsequent years. Other nations followed, the latest one being Korea.

OCEAN COMMISSION

The increased fishing has served to make the problem of proper assessment and controls urgent. Some of the Ocean's tuna stocks are already being heavily exploited, as occurred in both the Pacific and Atlantic where international action was found necessary. To promote international action and co-operation for the proper exploitation and management of the Ocean's Fisheries, the FAO last year established the Indian Ocean Fishery Commission. Formation of the Commission was first approved in June by the 31-nation Council and ratified in November by the Conference, representing all FAO member-states. To date, more than 22 nations, including India, have applied for membership, which is open to all FAO member nations and associate members. The Commission will hold its first session on September 16-21, at FAO Headquarters in Rome.

The new Commission will co-operate with the Indo-Pacific Fisheries Council, established in 1948 and the oldest of FAO fishery bodies. The 18-nation Council, of which India is a member, interests itself in fishery matters of the Pacific-Indian Ocean region and has established an advisory group for the programming and co-ordination of high

seas fishery investigations in the Indian Ocean. Consolidation of efforts in this and other areas of joint interest is expected.

Meanwhile, FAO continues to assist India and other countries bordering on the Ocean in developing their fisheries. Such projects are generally financed under the United Nations Development Program and thus carry the weight of international support. At present the Organisation is assisting the Indian Government with two such projects. The first is a three-year, \$2,400,000 project for a Fisheries Training Institute in Bombay to train fishery officers. Enacted in September 1964, it was extended for one year until 31 August, 1968.

The other is a five-year \$1,200,000 project begun last year, for a pre-investment survey of fishing harbours. Based in Bangalore, its purpose is to study and select sites for possible fishing harbours along the Indian coast. Also envisaged is the drafting of complete preliminary plans for construction of such harbours with all supporting facilities.

Past FAO aid, in addition to technical assistance in many fishery disciplines, includes the mechanising of small fishing boats in India, Pakistan, Ceylon and other Asian and African countries, with out-board motors to increase their range and efficiency. It was a small, but important boost toward fishery development in what has become a growingly important ocean.

QUOTATION BOX

We should speak not of our civil servants but of one civil masters.

—Ronald Butt in the *Sunday Times*

Family Planning posters invariably show one boy and one girl making a happy family. So even according to the Government every family must have a son! Will such a poster motivate a couple with two daughters to take to family planning?

—Ashish Bose in the *Statesman*

One does not know for certain whether an election is a love affair or a war of sorts but whether it is one or the other, politicians are convinced that nothing is unfair in it.

—The *Sunday Hindustan Standard*

The central problem of the Wilson Government is Mr. Wilson.

—Ian Trethowan

The Ministry of Communication is an outstanding example of an organisation that has its head in the clouds and its feet in the mud.

—The *Hindustan Times*

'Democratic Socialism' is the name given to central planning when it fails to secure adequate funds.

—C.R. in *Swarajya*

Worry, headache and suspicion (W.H. & S) is his Ministry.

—Jagannath Rao
Union Minister for Works,
Housing & Supply

God indeed has the devil in a chain, but has horribly lengthened out the chain.

—Cotton Mather in
New Statesman

It is often said that the House of Lords is the only legislative assembly in the world which is made efficient by the persistent absenteeism of the greater part of its members.

—*Weekend Review*

Whereas nuclear power can only reduce us and our world to a cinder, the camera grinds us down to a spiritual dust so fine that a puff of wind scatters it, leaving nothing behind.

—Malcolm Muggeridge
in *New Statesman*

If I earn, I have to pay income-tax;
If I save, I have to pay wealth tax;
If I spend, I have to pay

expenditure-tax;

If I die, I have to pay death-duty;
What do I live for?

—R.R. Morarka said in
Parliament, quoted
from *Swarajya*

Proverbs which express the laws of commonsense:

"What goes up must come down;

You can't get something for nothing;

What goes in must come out."

—*Weekend Review*

"First registration, then discrimination, and finally confiscation."

—*Time*

The Radicals seek the source of all social ills in defective laws and institutions, and look to the State to set them right. In contrast, the Conservatives seek to find the source of these ills in defective human nature.

—Niranjan Dhar in *Swarajya*

SIX CROPS ROUND THE YEAR

EXPERIMENTS BY A BIHARI FARMER

THESE days 'Bihar' has become a synonym for drought and scarcity conditions. Its agriculture is backward and unyielding and the farmers poor and unenthusiastic. But there are also industrious and progressive farmers like Satrugna Prasad of Hazaribagh whose ingenuity and planned effort can make the useless land yield rich crops in the face of unfavourable conditions.

Satrugna Prasad has two farms—one a 10-acre plot at Petarbar, about 75 miles from Hazaribagh, and the other a 10-acre piece near the town itself. The land is undulating and the soil red laterite sandy type, considered unsuitable for cultivation. There were no irrigation facilities except a few wells when he started work here. Now he reaps bumper crops from the unyielding lands. His paddy yield exceeds 50 maunds per acre and he raises as many as six crops from a piece of land in a year.

It is remarkable that he did not use chemical fertiliser to increase the yield. His success depends mainly on hard work on a three-faceted strategy—correct dose of manure, adequate irrigation and proper husbanding of the land.

Satrugna Prasad uses only compost manure. Several pucca pits have been dug where cow dung, urine, etc. of the 16 heads of cattle are dumped daily. Every year about 4,000 maunds, or 12-13 truck-loads of manure, valued at about Rs. 5,500, are produced and all used in his own fields. The exhaust of the septic tank at his house and drain water is also used for manure.

For irrigation, he has constructed a dam across the Petarbar farm to collect the seepage water which used to flow, through his low-lying

fields. The water is lifted with the help of a 5 H.P. diesel pump and stored in an overhead tank. Another tank has been built at a higher level where water is carried by means of a pipeline from the main tank as and when required.

At the other farm, water is lifted from a nearby rivulet by a pumping set. The water stored in the main overhead tank is enough to irrigate the entire holding of 10 acres. The cost of installing the pumping set, the construction of the two tanks and the pipelines amounted to Rs. 26,000. He thinks that the

BIG DEEDS, HUMBLE MEN

In this new feature *Yojana* seeks to present the outstanding achievements of some of the many millions of obscure farmers who are fighting the nation's battle for food.

cost of irrigation at the Petarbar farm can be further reduced by constructing a few more tanks at higher terraces and interconnecting them with the main tank. The storage device has facilitated the maximum use of the water resources which was wasted so far. It has also benefited other fields by raising the level of subsoil water in the surrounding area.

The field is situated at a fairly high altitude with uneven levels. It has therefore been divided into even terraces at different levels and soil conservation methods have been adopted all over the 30-acre plot under cultivation.

The result of all these measures is the blooming of the wasteland. Multiple cropping is being successfully practised for the past few years. Three crops in a year are grown in a six-acre plot. A mixed

wed by chillies. After harvesting potatoes, maize is grown.

In another piece of one-fifth of an acre, he raises six crops in a year. Potatoes and wheat are sown side by side with proper spacing. Potato is harvested in January and maize is sown in the beginning of April and is harvested at the end of May or the beginning of June. A second crop of maize follows before sowing paddy in July.

Satrugna Prasad hopes to increase the yield and reduce the cost of cultivation if he can get better irrigation facilities. A 15 H. P. pumping set can work wonders, he says; but he needs power supply to run it.

His Hazaribagh farm gave a yield of 41 maunds per acre of local improved variety of paddy in the Kharif of 1967. Under the National Demonstration Programme, he sowed Taichung-Native-I in a plot of half an acre in the last Kharif. Here he used chemical fertilisers but only to the extent of half the recommended doses and for the other half he used the compost. The yield was 90 maunds per acre, one of the highest for the district. The same plot has again been selected by him for sowing the S-227 variety of wheat. He expects to get an yield of 35 maunds per acre from this plot.

A.K. Chakravorthy

New Method of Irrigation

MADHAVAN Nair of Ottapalam in Palghat district of Kerala has developed a system of irrigation which has attracted several visitors, Indian and foreign. He has tapped subsoil water through an ingenious underground damming method. He has constructed underground walls down reaching to the rocky substratum to check the horizontal flow of subsoil water and store it for irrigating his 15-acre plot.

He now takes three crops a year in the cement troughs, using high-yielding paddy varieties like IR-8 and Taichung Native-I. In the remaining plot, he takes two crops.

Madhavan Nair is not a traditional farmer. He took to farming only three years ago with the advent of the Tainan-3 programme. Even since, he has experimented with different high-yielding varieties of paddy seeds and the use of different cultural practices. He has found that IR-255 is better than the officially recognised IR-8, as it requires less fertilisers, and yields more grains as well as hay. All this experimentation on his own initiative has raised Nair's per acre yield to 5,200 kg of paddy, which is five times the yield of ordinary varieties.

Another important innovation of Nair is the daily-harvesting scheme. He has so adjusted the schedule of cultivation on his plot that on all the 365 days of the year, while one patch is being sowed, another is harvested. This has reduced his cultivation cost to such an extent that he can manage with only a few labourers round the year.

Nair has been approached by several people for new ideas in farming.

Hybrid Town in Kurnool

YEMMIGANUR, in Kurnool district famous for its handloom fabrics, is now passing through revolution. It began with the extensive use of high-yielding varieties of paddy, jowar, bajra and maize, which were first introduced in the area in the 1965-66 kharif season. A National Demonstration Seed Farm for jowar was set up which gave a record yield of 6,380 kgs per hectare. This stimulated the interest of farmers so much that soon there was a regular run on the seed farm. An experiment was made on a plot of 150 acres of barren alkaline land in Banavasi village. It was put under hybrid jowar and to everybody's surprise it yielded 15 to 20 bags of grain per acre.

In the wake of hybrid jowar came hybrid maize and bajra and IR-8 paddy. Now, there is no farmer in the village who is not using one or the other hybrid variety of grain.

The farmers never had it so good in the past. Poor farmers like Nabi

Saheb and Guntappa of Yemmiganur have greatly benefited by adopting the high-yielding varieties. Within a short span of three years both of them have added a few more acres to their ancestral lands. Nabi Saheb stood third in the All-India Paddy Competition, with 2,160 kg of G.B. 24 paddy per acre.

There are several farmers in Yemmiganur and the neighbouring villages who are now exploring new avenues of prosperity opened to them by hybrid varieties and the assured supply of water from the Tungabhadra project.

Hirana—Home of Bumper Producers

THE little village of Hirana in Amreli district of Gujarat has achieved outstanding success in groundnut production. This has attracted a lot of attention as Hirana land is of very poor quality. Out of about 1630 acres of land under cultivation only 56 acres are under irrigation. Groundnut is widely grown and covers three-fourths of the cultivated land.

An extensive programme of sinking wells has been taken up by farmers following the results of cropping in irrigated and non-irrigated areas. While non-irrigated farms gave a return of 400 to 500 kg of groundnut per acre, the irrigated farms yielded as much as 1,200 to 1,500 kg per acre. Dahyabhai Bhimbhai Patel obtained 2428 kg. per acre, which is ten times the average production in the district. He won the first prize in the district-level groundnut crop competition of 1967-68.

The second prize was won by his fellow villager, Vithalbai Khedabhai Patel whose per acre yield was 2415 kg. Khedabhai's per acre profit more than doubled when he harvested the wheat crop on the same land during the rabi season.

Asked about the reason for his success, Vithalbai said, "I have been cultivating groundnut for the past fifteen years and the average yield was about 200 kg per acre. But I have since learnt by experience that with timely preparation of

field, adequate dosages of fertilisers, right type of seed, proper irrigation and crop protection measures, bumper crop is within the reach of every farmer".

Orissa Takes to New Methods

THE farmers of Orissa, by adopting new farming techniques, have demonstrated their ability to forge a breakthrough in agricultural output. There are visible signs of prosperity even in the remote backward areas where agriculture was regarded as an uneconomic proposition.

Sisupalgarh near Bhubaneswar is one such village where a few years ago people earned their living by stone-cutting and working as labourers. A decade of education and training by extension workers of Krishi Mahavidyalaya acquainted them with the new methods of cultivation. They now get five to ten times more price for their paddy than what they earned as labourers. They grow now hybrid maize, vegetables and high-yielding Taichung.

Middle-aged Raghunath Jena, started growing high-yielding Taichung last year. This Rabi season he hopes to get an yield of nearly 65 maunds per acre from his 10-acre plot—four acres of Taichung and six acres of hybrid maize. Jena says that he has been growing maize for the last six years which brought him good income.

In a 12-acre plot in Ujanipada village in Pipli block, hybrid maize was grown by 25 farmers. The net income from this was about Rs. 600 per acre. Multiple cropping of maize and paddy is the common pattern in most of the villages in this block.

In another six villages in the Puri district, high-yielding varieties of Taichung native-I and I-R-8 were grown in 120 acres during the current Rabi season. An yield of 80 to 90 maunds of paddy per acre is expected. Two years ago, the hilly and forest land produced only one-sixth of the present yield. The indigenous Tenda method of lifting water from tank by manual labour is still followed for irrigating the fields.

Planning Forum

THEY SPEND MORE THAN THEY EARN

SURVEY OF MALKHERA (M.P.)

A socio-economic survey of village Malkhera in Madhya Pradesh by the Planning Forum, Government Degree College, Neemuch (M.P.), has highlighted the lack of enthusiasm and optimism of the residents or bettering their lot. A small village, only 3 miles from Neemuch, Malkhera has about 150 families out of which only 4 live in pucca houses.

Though the nearest railway station is only 4 miles away and there is an arrangement with Neemuch Post Office for weekly clearance and delivery of mail, yet some of the villagers find the communication facilities inadequate.

The village does not have its own Gram Panchayat, Co-operative Society or Marketing Society. However, its interests in this direction are served by a Panchayat, which covers an area of 4 to 5 villages, and the Co-operative and the Marketing Societies of Neemuch. Some of the villagers are also members of these institutions. The National Extension Block at Neemuch also serves Malkhera.

Though agriculture is the primary occupation of 75 per cent of the villagers they do not look upon it as a profitable or desirable profession. This is perhaps due to low productivity for which there are several reasons.

Taking into consideration the requirements of the cultivators the, irrigation facilities available in Malkhera are inadequate, and they have not improved much during the past five years. There are only about 60 wells in the village out of which only 16 are pucca.

Wheat, opium, groundnuts and urad are the main crops grown in

the village. Every year some fertilisers and better quality seeds are distributed to the villagers which have improved to some extent the productivity of some crops. Plant protection both by machine and by hands is undertaken by the cultivators. Under the Package Programme of oil seeds some equipment had been provided to the farmers for this purpose. In 1964-65, however, only 6 acres of land had been protected under this method. Soil conservation is mainly done by contour and field-bunding. In 1962-63 contour bunding had been done on 70 acres of land.

Fragmentation of holdings is common and no attempt has been made so far to consolidate the holdings in the village. Besides there is great disparity in the size of land-holdings.

Castration of bulls and animal vaccination is done every year. In 1964-65 about 500 animals were vaccinated at Neemuch.

Though the village has its own carpenter, blacksmith and a cobbler, there is no organised smallscale or cottage industry in the village. And there are no avenues of employment for the villagers in the off-season.

The per capita income of the village is Rs. 178 which is very low as compared to the all-India per capita income of Rs. 334.

While the monthly income of a family is Rs. 99, its expenditure per month is Rs. 117, which means that each family runs into a yearly debt of about Rs. 216.

The income distribution of the households is uneven and there is great disparity between the minimum and the maximum income.

The average wage of labourers is very low, about Re 1 per day; there are some workers who even get about 50 paise a day.

The standard of living of the people is very low. Living in the vicinity of Neemuch town does not

seem to have made any impact on the lives of the people as regards dress, eating habits, house-construction, roads and lanes etc. This is again due to their extreme poverty which does allow any scope for advancement.

The only satisfactory thing here is that about 75 per cent of the residents own their lands and implements of production. Most of them also own the houses they live in.

The village has its own primary school, with one teacher and 50 students. However, there is no provision for adult education in the village.

There are no medical facilities in the village, and in case of illness the villagers have to go to Neemuch.

The message of family planning has not reached the village. Though family planning week was observed in Neemuch, not a single man or woman could be induced to undergo an operation in the village.

BHAGORA IS HALF LITERATE

AGRICULTURE is the primary occupation of the people in village Bhagora. The main crops grown are wheat, gram, jowar, cotton, maize and groundnut. Situated four miles away from Mhow, a tehsil in Madhya Pradesh, the village has a population of about 1,450. A socio-economic survey of the village conducted by the students of the Government Degree College, Mhow, has revealed that nearly half the population of this village is literate. The village has its own middle school, a girls primary school and an adult education centre. Quite a few of its students go to nearby towns for higher education.

There is an Agricultural Development Co-operative Society in the village which provides good quality manure and seeds, taccavi, short and long-term credit to the cultivators for the installation of pumps and wells. Most of the cultivators, however, were dissatisfied with the method of distribution of seeds which was not according to the size of the holdings. Well irrigation is common and there are about 60

kacha and *pacca* wells in the village. About half of these have been constructed by the Government or with the loans extended by the co-operative societies. Holdings are so fragmented that there cannot be any profitable utilisation of modern agricultural machinery.

There are no first-aid health centres in the village. A family planning camp organised in the village proved only a partial success. Very few people have taken to small and cottage industries in this village. Chief reason for this is the non-availability of funds and training. During the agricultural slack season some villagers earn extra money by selling straw, leaves, fuel, etc.

There is a village level worker to help the villagers.

THEY DO NOT KNOW PLANS

SURVEY OF A RAJASTHAN VILLAGE

DARRAH, a famous lion sanctuary of Rajasthan and nearly 50 km from Kota city, is an attractive picnic spot, visited by many tourists. An important traffic centre of the area, the village has its own railway station and a big bus stop. But in spite of all this, its people have never heard of our national Five Year Plans, and are practically ignorant of the big development efforts taking place in the country. This interesting fact came into light when the students of the Government College, Kota, made a socio-economic sample survey of Darrah and its neighbouring village Amzar.

Twenty-seven households were selected for this purpose from the two villages. The average size of the household was five, and not a single household had a joint family system. Though agriculture was the mainstay of the people in these villages, it was found to be a depressed industry. The economic condition of the people was very poor. Sixty per cent of the cultivated land was un-irrigated. Wells were the only source of irrigation. Though River Amzar flows very near these villages, surprisingly its water has not yet been used for irrigation. Cow-dung is commonly used as

manure though some of the farmers also use chemical fertilisers.

The place is known for its *khoya* and *khoya* sweets. Though milk is the chief industry in the area, it is not a very profitable one. The villagers do not have much surplus milk to sell, and most of the *khoya* is made of skimmed milk, which

accounts for the low price of the commodity in the area.

There is no school in the village and even the children of primary standard have to go to adjoining villages for schooling. Awareness of family planning is also completely lacking. Probably the people never heard about it.

RECORDS IN FAMILY PLANNING

The Union Government has taken a number of measures to ensure free distribution of condoms (Nirodh) through Government dispensaries, family welfare planning clinics, depot-holders and commercial channels.

Of the 25 million pieces, nearly 17.4 million have already been supplied to the States, Union Territories and the Ministries of Defence and Railways for distribution.

The Swedish Government has agreed to make a gift of 1 million gross condoms, besides printing units, offset paper and glazed newsprint and eight vehicles for family planning propaganda.

U.P. MAKES HEADWAY

As against the target of 1200, a total of 1,709 sterilisation were performed in the Pithorgarh district of U.P. last year, placing the district at the top in the State.

Puran Chandra Pandey, a village level worker at Dharchula, motivated 111 cases for sterilisation and was declared the best family planning worker in the district. The Medical Officer at Didihat performed 545 vasectomy operations, the highest by any one in the district.

The targets for 1968-69 are 1,887 sterilisations and 1,258 loop insertions in the district.

PUNJAB TOPS THE LIST

Punjab has reached a high mark of 26.1 loop insertions per 1000 persons, thus taking a lead over other States. Haryana was second with 12.2 and Delhi third with 10.4 insertions per 1,000 persons.

In the field of sterilisation, Madras was at the lead with 17.4 sterilisations per 1,000 persons. Maharashtra comes next with 14.2,

followed by Orissa 11.0, Kerala 10.8 and Punjab 10.1.

MAHARASHTRA'S RECORD

In Maharashtra one of the biggest sterilisation camps was organised in May last at the village Aainpur in Jalgaon district. In a single day, 210 tubectomy operations were performed, establishing a world record. Six doctors worked continuously for 29 hours.

Dr Subhash Munja, a young Civil Surgeon, performed 63 operations in a day.

Earlier at a camp organised at Chandwad in the Nasik district of Maharashtra, 207 tubectomy operations had been carried out in one day.

A CAMP IN KERALA

The mass vasectomy operation-cum-I.U.C.D. camp organised by the Junior Chamber at Balaramapuram near Trivandrum in Kerala in May last created an All-India record in vasectomy operations. The camp succeeded in performing 330 vasectomy operations and 90 I. U. C. D. insertions in a single day. Thirty experienced doctors worked round the clock.

Preliminary work was started much in advance with mass publicity. The campaign was mainly concentrated in Athiyanoor, Nemon and Perumkadavila Blocks. The Block authorities and the Panchayats of these places gave their services free in propagating the benefits of planned parenthood.

As an additional incentive, the Chamber gave Rs. 7 to 17 in each case. A lottery was conducted from among the beneficiaries and a special prize of Rs. 50 was given.

BOOKS

HAVE WE NEGLECTED AGRICULTURE?

Relative Rates of Growth—Agriculture and Industry by Dr. Ashok Rudra. Published by University of Bombay. 1967. Pages 91. Rs. 8.

M. R. Kulkarni

A controversy has been raging in this country for quite some time past on the issue of relative priority given to agricultural development in our Plans. Against this background Dr. Rudra's study has great value in providing a proper lead to the discussion on the precise pattern of priorities to be adopted in the future plans of development.

There are two schools of thought holding opposite views in regard to precedence to agriculture over industry in the scheme of economic development. One contends that there is a natural order of development which assumes that unless agriculture is transformed first, development of heavy industry is just not possible. The other point of view is that technological revolution in agriculture will only follow industrial development. The controversy cannot be settled *a priori*. The exercise of the kind Dr. Rudra has undertaken may not conclusively establish or demolish any particular point of view, but it should press home the futility of taking rigid predetermined positions.

Dr. Rudra does not directly address himself to the question whether agriculture was relatively neglected in the last two Plans. His object is to examine the degree of interdependence of agriculture and industry in our economy. He primarily seeks to enquire if it is possible in Indian conditions to industrialise without any specific expansion in the agricultural sector.

Dr. Rudra conceives the following pressures to emerge if agriculture does not expand adequately rapidly, namely shortage of agricultural raw materials impeding industrial development; shortage of agricultural

products for exports, thus creating a balance of payments problem and adversely affecting the inflow of capital goods and raw materials for industry; and shortage of foodgrains etc. leading to rise in prices and wages. If the shortage is sought to be met by imports, other imports, such as industrial raw materials, may have to be reduced. If general price level is sought to be stabilised through taxes, prices of industrial end products would be depressed which would discourage industrial investment.

Dr. Rudra has used the inter-industry table for 1960-61 prepared by the Indian Statistical Institute for his simple—but, in his view, plausible econometric model. This table distinguishes 30 defined sectors and one residual sector. Of the 25 industrial (not "non-industrial" which is apparently a misprint on page 13), sectors, 14 do not take any inputs at all from the sectors belonging to the agriculture group. It is also found that the part of the economy more or less independent of the agriculture group from input point of view accounts for about 60 per cent of the total output and 69 per cent of total value added in the 30 identified sectors. Thus the table brings out the insignificant extent of the dependence of the rest of the economy on agricultural inputs.

As far as the dependence of agriculture on industry is concerned, in 1960-61 inputs from industry amounted to not more than 1.1 per cent of total production of agriculture proper. It is, of course, true that the demand of agriculture for industrial inputs like fertilisers, pesticides and implements has been rapidly increasing in recent years and the 1960-61 position cannot be representative of 1967-68. It is, however, a universal phenomenon that the first order effects of relatively slow agricultural growth would not significantly affect indus-

trial development. In a free economy, however, indirect effects can be very important which have not been considered in this study.

The lack of vital and considerable interdependence of agriculture and industry does not, however, mean that unbalanced growth would not subject the economy to various pressures. The major pressures would be balance of payments difficulties, inflation and price-distortions. One must, therefore, look out for balanced combinations of rates of growth of industry and agriculture. Dr Rudra finds that 5 per cent in agriculture and about 10 per cent in industry will be the best possible combination. Incidentally, these are the growth rates being envisaged for the Fourth Plan.

As for the foreign exchange repercussions, the study comes to the conclusion that the balanced combination—5 per cent and 10 per cent—would again give an optimum result. Any other combination would either give a negative export surplus, or the surplus, if positive, would be less than optimum.

The author has attempted to corroborate his findings by past observations. He has found that during 1955-60, there was a fairly balanced growth of agriculture and industry and, if anything, the growth rate was unbalanced in favour of agriculture. Consequently, agricultural prices were stable and general price level steady. But during 1960-63 the position had somewhat reversed, the growth rate being unbalanced in favour of industry.

Any way, this sort of corroboration has limited significance in view of many reservations with which it is conducted. In spite of the inadequacies of Indian statistics and the fact that the 1960-61 inter-industry table no more correctly reflects the Indian economy today, the study, on the whole, serves to under-score two important conclusions: (1) that there is no predetermined course of development where agriculture has a necessary precedence over industry, though this does not mean that agriculture can be neglected with impunity; and (2) that the criticism, that agriculture has all along been neglected, is not quite borne out by facts.

TRAINING FOR C.D. PERSONNEL

Training For Community Development Personnel in India by M.R. Akhija. Published by the Indian Institute of Public Administration, New Delhi, 1968. 165 pages. Rs. 10.

L.L. Sarin

THE Community Development Programme now covers almost the entire country but it is at a low ebb. There is growing evidence to suggest that it has lost its glamour and here has been loss of confidence in its objectives, achievements and potential.

An important pre-requisite for making this programme successful was to have trained personnel to run it. What did we do in this regard? The present study traces the history of the training programme of C.D. personnel and brings out aptly 'how growing maturity came slowly and steadily upon this programme.' Training for C.D. was given the pride of place so much so that the success or failure of the entire C.D. programme was stated to be dependent, not on the availability of funds which were scarce in any case, but on the availability of trained personnel. The precise language, the compact presentation of the origin and growth of the training programme during the last decade and a half, in the first chapter, makes lively reading. It draws freely from the findings of the Study Groups, Teams and Committees set up earlier. The related statistical data, if included, would, however, have enhanced the value of the book.

Parts II and III of the study pose candidly the various problems encountered and the steps evolved by way of solution through the process of 'trial and error', and the efforts made in the quest for excellence. 'The endless quest for perfection keeps alive the spirit of experimentation', says the author.

The evaluation of what has actually been achieved in relation to what had been hoped for, which is the real contribution of the author based on a random sampling survey, reveals some interesting analysis. The Block Development

Officer is the chief of C.D. at the block level. According to the survey, 'They (B.D.O.'s) make the smallest percentage of those who regard the syllabus (of training) as pertinent to their needs.' Again 'The largest number among those who did not find field-work adequate was that of B.D.O.s.' A large majority of the staff included in the sample, however, looked upon the training as an aid to better relations with their colleagues and with village people. The analysis also reveals that most of the important circulars do not reach the Training Centres from their parent departments. These findings could prove useful to those responsible for the formulation of the training programmes. On the whole, the author concludes that 'the Training Centres have taken strong roots and are firmly established.'

PLANNING IN A DISTRICT

District Planning — Moradabad. Published by the National Council of Applied Economic Research, New Delhi. 217 pages. Rs. 25.

Jayanta Sarkar

THE book has been published at an appropriate time. Now that the Fourth Plan is being prepared, such a publication can be of great importance.

The book suggests a new approach to Indian planning. In a few pages at the beginning it demolishes the case of the present pattern of planning which, it thinks lays stress on schemes rather than on areas, and which tends to plan from the top rather than from the bottom.

But the basic strategy for the Fourth Plan has already been laid down, and it hardly makes any departure from the previous pattern. It would not be easy to graft at this rather late stage a completely new approach on the one already accepted.

The book then goes on to enumerate some of the basic advantages of district planning. It says that planning at the State level suffers from many limitations, and

In the concluding pages the author has made an attempt to visualise the shape the training programme should take in future. Some useful suggestions are made. With the growing emphasis on agricultural development, the B.D.O. and the village level worker (V.L.W.) should have sound knowledge, experience, and time to devote to agricultural extension, for, otherwise they might tend to become mere supply agents of the Government for agricultural inputs. In fact, in practice, a V.L.W. is found ignorant of what even an illiterate farmer knows. The author has, therefore, rightly pointed out that 'the demand on and expectation from V.L.W.s are on the increase' and that there is a need for giving adequate training to V.L.W.s to enable them to keep pace with the changes in technology and mechanics of the economics and social tasks handled by them. Different and higher kinds of expertise will be called into play.

adds: "It would be more useful if district resources and potentialities are studied first and then a plan prepared to develop them for the five year period. For instance, one district may plan a larger output through bringing more land under plough, while another district may plan intensive irrigation through wells, and a third district may give high priority to the development of pastures, depending on the resources of individual districts".

The book has also discussed if the block could be made the primary unit for planning. However, it concludes that "though the basic unit for plan implementation should be a block, the actual plans may be feasible to be prepared only at the district level".

In advocating district planning, the book has, however, not overlooked the obvious difficulties in such an approach. To get statistics at the district level has always been a difficult problem, and to get the men to process the statistics, do the sums and work out projections with imagination is still more difficult. Though the book has not dealt with these problems at length, it concedes that they are serious handicaps to district planning.

INDIA'S NEW FOOD STRATEGY

India's New Food Strategy by Rajeshwar Dayal. Published by Metropolitan Book Co., Delhi-6. 208 pages. Rs. 15.

D. P. Bhattacharjee

Food is the biggest problem India is faced with today. And efforts to fight it out have been ceaseless. Various schemes and plans had been launched in the past to boost food production, which had, to be sure, registered an encouraging rise. Nevertheless, we are nowhere near solving the problem. In the mean time, it is acquiring menacing dimensions. The crisis is mainly due to the alarming rate of population growth.

The Government has swung into action for meeting this challenge and initiated a two-pronged assault on the problem: constant care to increase food yield and an all-out drive to curb population explosion. In addition to augment food supply, the Government undertook a number of projects, such as the Intensive Agricultural District Programme (1960-65) and Intensive Agricultural Area Programme (1964-65). But the failure of the monsoon during the third Plan made it clear that a more determined drive was needed.

Consequently, the Government came out with a new programme known as the New Food Strategy or the High Yielding Variety Programme. The driving force behind the idea is to achieve self-sufficiency in food by the end of the Fourth Plan.

One of the salient features of the strategy is that it tends to be more selective regarding the area of operation with a view to eliminating as much risk as possible. It is, therefore, proposed to select within the existing IADP and IAAP a few blocks with assured water supply, satisfactory drainage and conservation system and well-developed village institutions like co-operatives and village panchayats. Farmers of those areas, which offer maximum food potentialities, will be given all possible help so that they can reap a harvest three to four times larger than the present.

Another noteworthy aspect of the new approach is the introduc-

tion of short duration crops. This will make it possible for the same land to produce more.

Divergent views have already been aired on the new food strategy. The author has detailed the points of criticism with meticulous care. Like many other critics, he has also cast doubt on the success of the new approach.

The book is indeed a sincere and laborious attempt to analyse India's food problem. Its pages are interspersed with a plethora of figures. Like a true academician, the author has left no stone unturned to adduce evidence in support of his statement.

Challenge of Famine

Challenge of Famine by B. B. Chatterjee and Hanuman Prasad. Published by Amitabh Prakashan, Varanasi-2. 39 pages. Rs. 4.

G. Mukherjee

A famine is not a very pleasant thing, but it is unfortunately very often an inescapable reality. This is unhappily true of India, where a monsoon-bound agriculture has so often been the cause. There is, therefore, no dearth of literature on the subject; but the slim book under review does not belong to the normal run of such publications. It is not a record of happenings nor is it a scientific treatise on the phenomenon of famines; but an inspiring saga of community effort to combat the unprecedented drought and scarcity that swept over a dozen districts in south-east Uttar Pradesh in 1966-67.

The authors—a psychologist and an economist—tell their story in simple language, but with deep understanding and sympathy. Out of the cold statement of facts and figures emerge a moving story of life, untiring in its struggle against death. The severe drought of 1966-67, which hit large parts of Bihar, attracted global attention, as a result of which much of what was happening in neighbouring Uttar Pradesh was not even heard of. The present publication seeks to complete the record.

The organisational set up responsible for relief operations in U.P. consisted of various voluntary organisations and the Government. The authors chose the Naugarh Block in the Varanasi district for their case study, and observed the main aspects of relief work, namely, feeding the hungry. Their observation and analysis have helped them to formulate a number of do's and don'ts for relief workers. They have stated the bare facts without frills, and some of their observations are startling. For instance, the average cost per meal for an adult varies from 21.9 to 30.8 paise, which comes to less than Rs 9 per month. They substantiate their estimate, which sounds unbelievable on the face of it, on the basis of the price range, actual cost and other relevant data. There are about 12 tables and three graphs in the book to help the reader understand the different aspects of relief operations at a glance.

The book, though slender, is a mine of information, which can serve as a useful guide for relief workers.

OTHER BOOKS RECEIVED

Weapons—Old and New—by Mr. Nabajit Ail. Published by the National Council of Educational Research and Training, New Delhi-14. 198 pages. Rs. 7.50.

For a United India—Speeches of Sardar Patel 1947-1950. Published by the Publications Division, Patiala House, New Delhi-1. 76 pages. Rs. 2.25.

Papers in the Sociology of Education in India—Edited by M.S. Gore, I.P. Desai and Suma Chitnis. Published by the National Council of Educational Research and Training, New Delhi. 363 pages. Rs. 8.75.

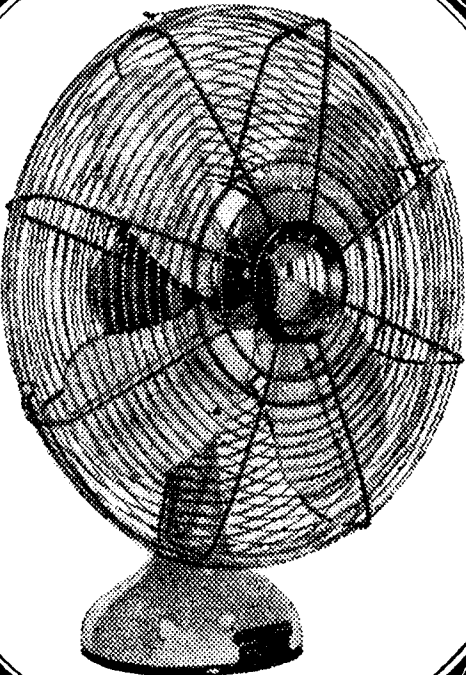
Economic Planning—Theory and Practice by B.C. Tandon. Published by Chaitanya Publishing House, Allahabad. 546 pages. Rs. 13.50.

The Constitution of India—a comparative study by S.C. Dash. Published by Chaitanya Publishing House, Allahabad-2. 621 pages. Rs. 16.

Physics—A textbook for Secondary Schools. Published by the National Council of Educational Research and Training, New Delhi. 239 pages. Rs. 5.20.

Report of the Fertiliser Credit Committee—issued by the Fertiliser Association of India, New Delhi-11. 341 pages. Rs. 15.

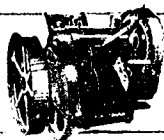
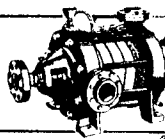
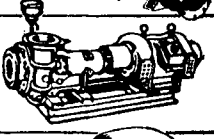
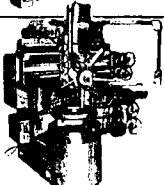
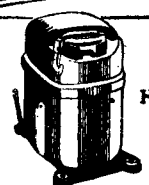
The Universe by P. L. Bhatnagar. Published by the National Council of Educational Research and Training, New Delhi-14. 200 pages. Rs. 6.50.



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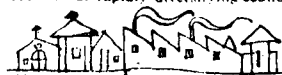
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YOJANA July 21, 1968 Page 30

Development Diary

The foundation of the Rs. 16 crore Hemavathy project in the Cauvery basin has been laid at Gorur in Mysore. The project, when completed, will provide irrigation to one lakh acres in the droughtstricken parts of Hassan and Mandya districts.

The Soviet Union and India have agreed to bring the pattern of exports and imports in line with requirements of their respective economies. Their mutual deliveries this year will amount to Rs. 300 crore as against Rs. 280 crore in 1967.

Trade exchanges between India and the United Arab Republic during 1968-69 will be of the order of Rs. 64 crore as against Rs. 55 crore in 1967-68. Under the new agreement India proposes to buy certain new items like petroleum products and nitrocellulose from the U.A.R.

India has signed two agreements with Sweden under which Sweden will provide two development credits totalling Rs. 10.8 crore to India. The credits are untied and will be repayable over 25 years. They will be utilised mainly for making payments in foreign exchange for the import of industrial and capital equipment needed for the development of industries, power and mining operations.

As a part of the non-project aid, including debt relief, recommended by the Aid India Consortium, Britain has signed two loan agreements with India for £16 million (Rs. 28.8 crore). Britain is the first country to sign such loans, and the amount forms part of the £35 million (Rs. 63 crore) of aid pledged by this country for 1968-69. Including this loan, the total amount for debt relief given by Britain so far amounts to over \$27 million.

An agreement for a loan of \$60 million to Air India for the purchase

of two Boeing 747 "Jumbo Jet" aircraft with spares has been signed between India and a syndicate of 13 U.S. commercial banks. Of this the Export Import Bank shares \$25 million. The two jumbo jets are scheduled for delivery in 1970-71.

The Government of Bihar has provided a sum of Rs 45 lakh, in its current annual plan, for the development of industrial areas at Adityapur, Barauni, Bokaro, Ranchi and Patratu.

India and Yugoslavia have signed a protocol on economic, scientific and technical co-operation.

Huge copper seams of good quality have been struck in the Hazaribagh district in Bihar.

A new paddy strain, known as culture-28, has been evolved at the Pattambi Rice Research Station. The new variety has proved excellent for cultivation in all areas including the water logged fields in Kerala. The crop is ready in 90 days and three crops can be sown in a year.

Two modern rice mills from the complex of 24 such mills are being set up at Haryana and Punjab by the Food Corporation of India.

India and Czechoslovakia have signed an agreement for co-operation in the fields of science, education and culture.

Phosphate deposits have been found in the Garo Hills district of Assam.

One hundred and seventy tube-wells have been successfully sunk in the desert districts of Rajasthan at a cost of Rs. 1.50 crore, bringing relief to places which had no water for ages.

A Rs. 40-crore Titanium complex will be set up in Kerala to process huge deposits of ilmenite sands, available in the State, for the

manufacture of various by-products of Titanium.

India and Nepal have signed an agreement to introduce a 5 KW radio-telephone link between the two countries. The cost estimated at Rs. 12 lakh, will be borne by India as part of its aid to Nepal.

The first co-operative spinning mill of Rajasthan has been set up at Gulabpura, in Bhilwara district, at an estimated cost of Rs. 1.50 crore.

The Heavy Engineering Corporation, Ranchi, has manufactured 1,500 tonnes of machines, both mechanical and structural, for the Bokaro Steel Project.

A skelp mill built in co-operation with a British firm at a cost of Rs. 6 crore has been opened at the Durgapur Steel Plant. As part of the 1.6 million tonne expansion programme, the mill would greatly augment the production of steel skelp—a basic raw material required for the manufacture of steel pipes and tubes. The first all hydrocyclone coal washery, built with Czech co-operation at a cost of Rs. 4.50, crore, has also been inaugurated at the Durgapur Project. Both the mill and the washery incorporate some of the latest techniques.

India has agreed to give Rs. 2-crore as loan to Tunisia.

The U.S. embassy has announced a loan of \$36.9 million (Rs. 27.7 crore) for the four-field expansion of the Trombay Fertiliser Plant. The Trombay Plant will become India's largest fertiliser plant when the expansion work, partially financed by the loan, is completed by 1971.

The Gujarat State Fertiliser factory has signed contracts with a Japanese and a German firm for technical assistance for setting up a Caprolectum Plant near Baroda at a cost of Rs. 22 crore.

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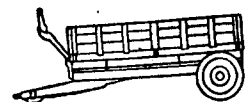
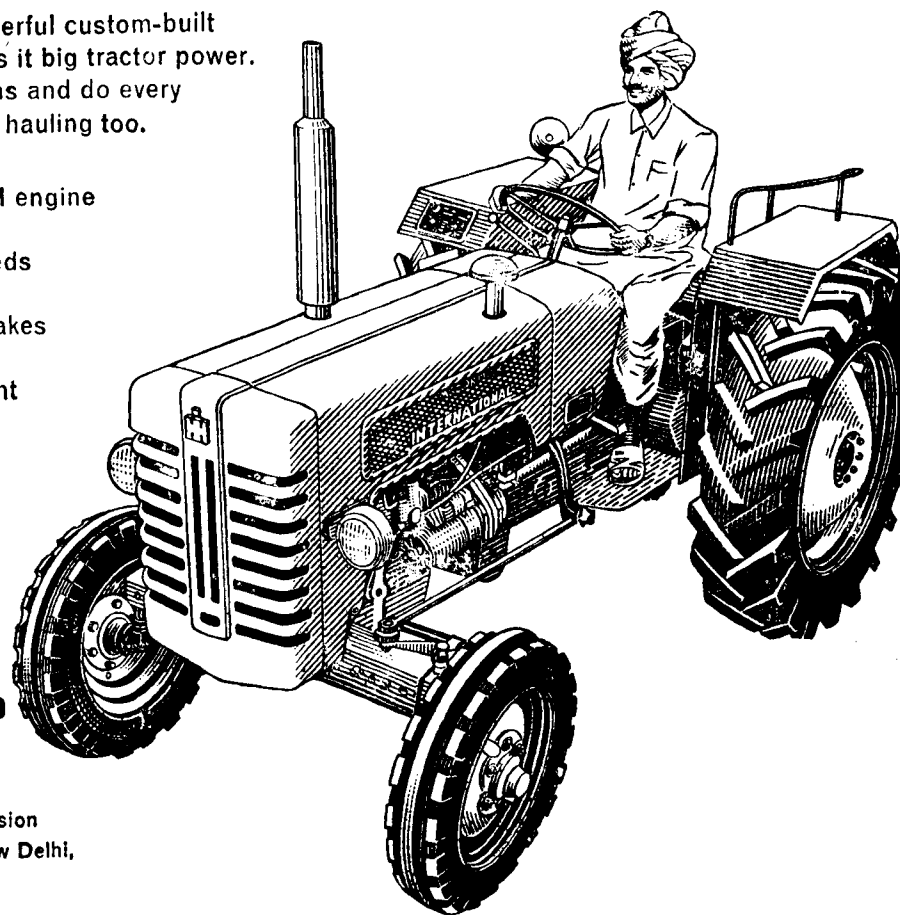
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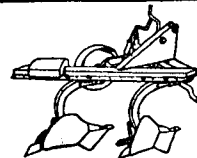
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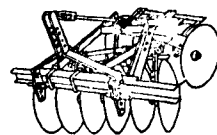
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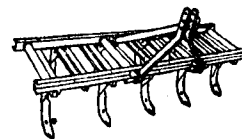
2-Wheel Trailer



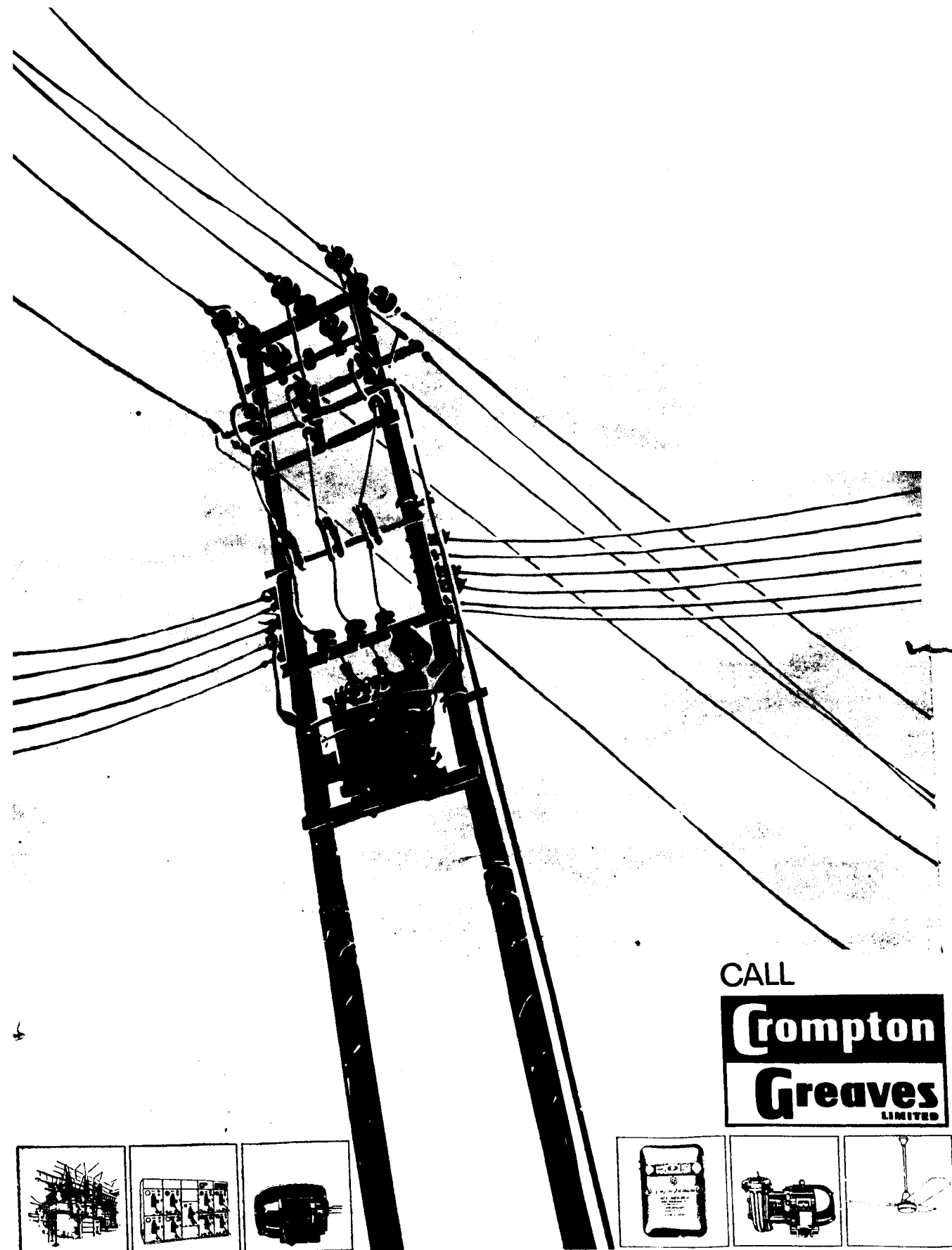
Bar-point Mould-board Plough



Offset Disc Harrow

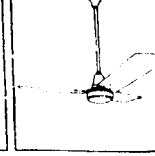
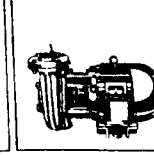
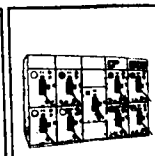
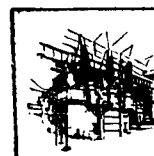


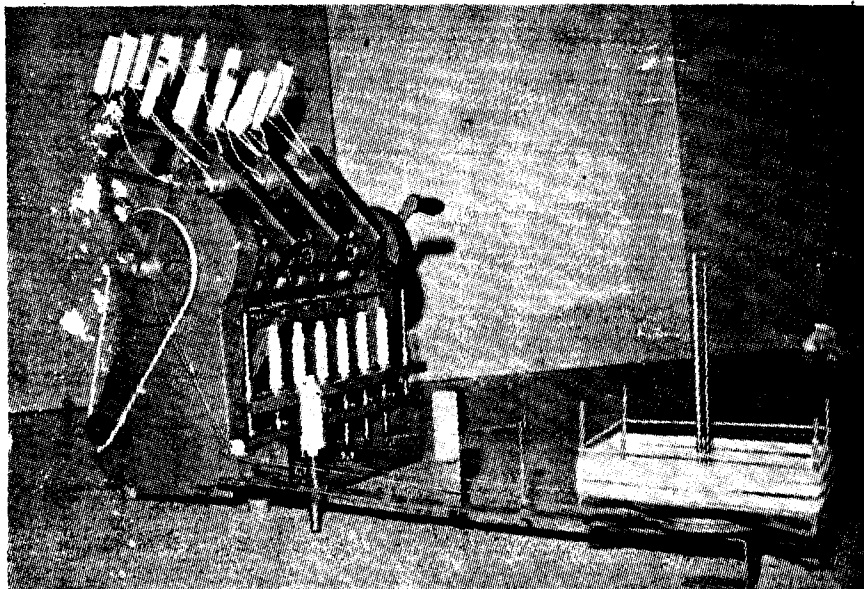
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More than 6,000 improved "ambar" charkhas, developed by the Khadi and Village Industries Commission, are in use in 70 centres in Madras and Kerala. The new charkha is an improved spinning unit for the processing of cotton and spinning. This has been developed after a good deal of research and experiments conducted by the Khadi Gramodyog Samiti of the Sarva Seva Sangh and the research organisation of a firm manufacturing textile machinery.

The new model, which is an all-metal six spindle charkha, includes in its design and construction some of the modern principles of spinning and its preparatory processes. It also incorporates all advantages of the previous Ambar charka, besides having greater durability.

The main advantage of the new model charkha is that *all its processes are streamlined* from the opening of cotton to the spinning of yarn. Other important features are that it is much easier to operate and does not require long initial training. It also ensures increased production of yarn of uniform quality. Being light in operation, its wear and tear is also negligible.

Under laboratory conditions this charkha has given an average production of 20 hanks (0.74 kilogram) of yarn of 27's. Its operation has also reduced the cost of hank from 46 paise in the case of old Ambar charkha to 35 paise. When introduced in weaving mills it is expected to reduce the cost further, making it possible to sell khadi at about Rs 2.20 per sq. metre.

According to the report of an expert committee of the Planning Commission, which made a study of the economics of the working of this charkha, the use of the new model would give substantially higher earnings to the artisans. The introduction of separate implements for different processes of operations in the new model would also lead to increased efficiency. The use of electricity for carding would reduce the physical strain on the artisan. Its smooth working coupled with the potentiality of higher wage earnings would offer more employment opportunities, thus attracting more people to take to spinning.

Courtesy : Khadi and Village Industries Commission, Bombay

DESERT PLAGUE

Some 40 countries extending from India to West Africa are preparing to meet the menace of desert locusts, which have been in recession for the last five years. A 285,000 dollar emergency plan is being launched by the UN Development Programme. The campaign is being mounted by FAO in Saudi Arabia, Yemen and South Yemen, Ethiopia and the Somali Republic. Unless the plague is controlled, the north-western states of India are also likely to be affected.

Gurdas Singh, FAO locust expert in charge of the drive, is moving in trained technicians from other West Asian countries and from India and Pakistan to the Arabian peninsula to carry out large-scale control measures.

A ton of locusts eats as much food in one day as 250 people. Already a swarm of about 46,000 tons has been sighted, as many as 23,000 million locusts spread over 230 square miles.

Once on the move, swarms of the desert locust may invade a total area of 11 million square miles, equal to more than 20 per cent of the world's land surface. Their depredations can affect, directly or indirectly, one-tenth of the world's population spread from the Himalayas to the Atlantic. Much of India, Pakistan and Africa and all the countries of West Asia are liable to suffer if the plague reaches major dimensions.

When such swarms break out of the desert and semi-desert breeding areas into cultivated lands their effect is calamitous not only to farmers, but to whole populations. At least 167,000 tons of grains—enough to feed 1 million people for a year—were destroyed by locusts in Ethiopia in 1958.

To prevent such havoc the desert locust must be looked for and controlled where it breeds in the deserts. The area involved, some 6 million square miles, is a measure of the immensity of the task.

—FAO Feature