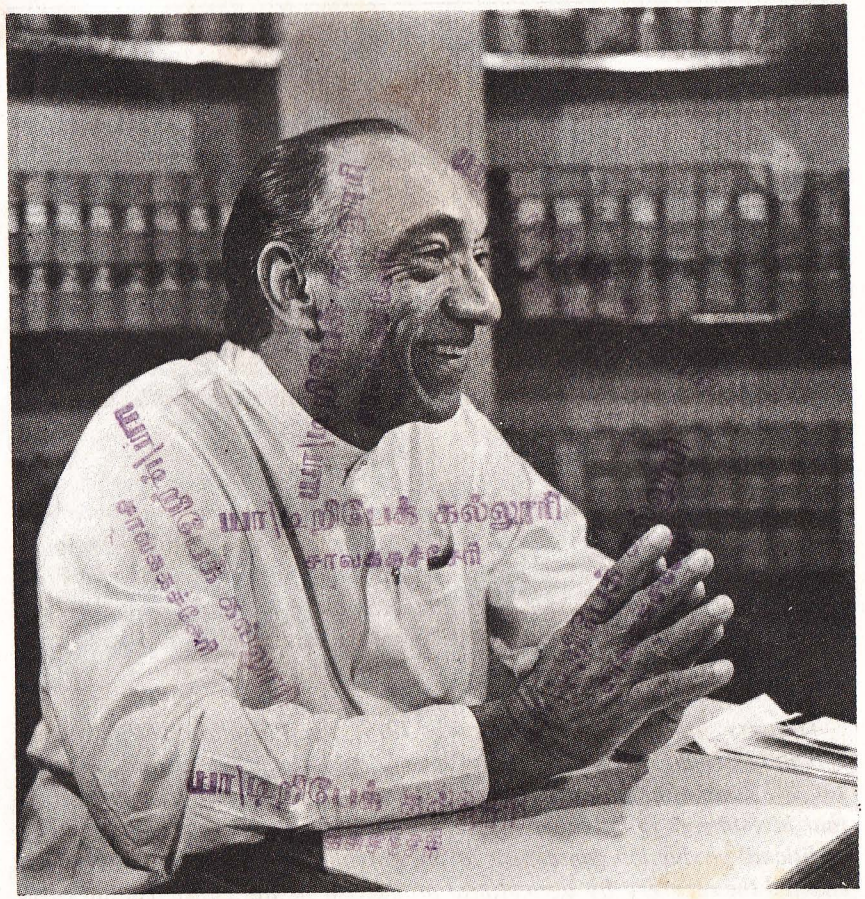
MAHAWELI WATER FOR ADJACENT BASINS

Brochure published by the Information Service of the Ministry of Lands & Land Development and the Ministry of Mahaweli Development to mark the ceremonial opening of the MAHAWELI EXHIBITION at the Jaffna Central College, Jaffna, by the Hon. GAMINI DISSANAYAKE, Minister of Lands & Land Development and Mahaweli Development on October 3, 1980.



"We have started work on the Accelerated Mahaweli Ganga Programme, and we will see it through."—

J. R. Jayewardene,
President of the Democratic Socialist Republic of Sri Lanka.

Quotation from a Message issued on the occasion of the ceremonial inauguration of work on the Kotmale Reservoir Project, February 4, 1979.

Message from Hon. Gamini Dissanayake, Minister of Lands and Land Development & Mahaweli Development

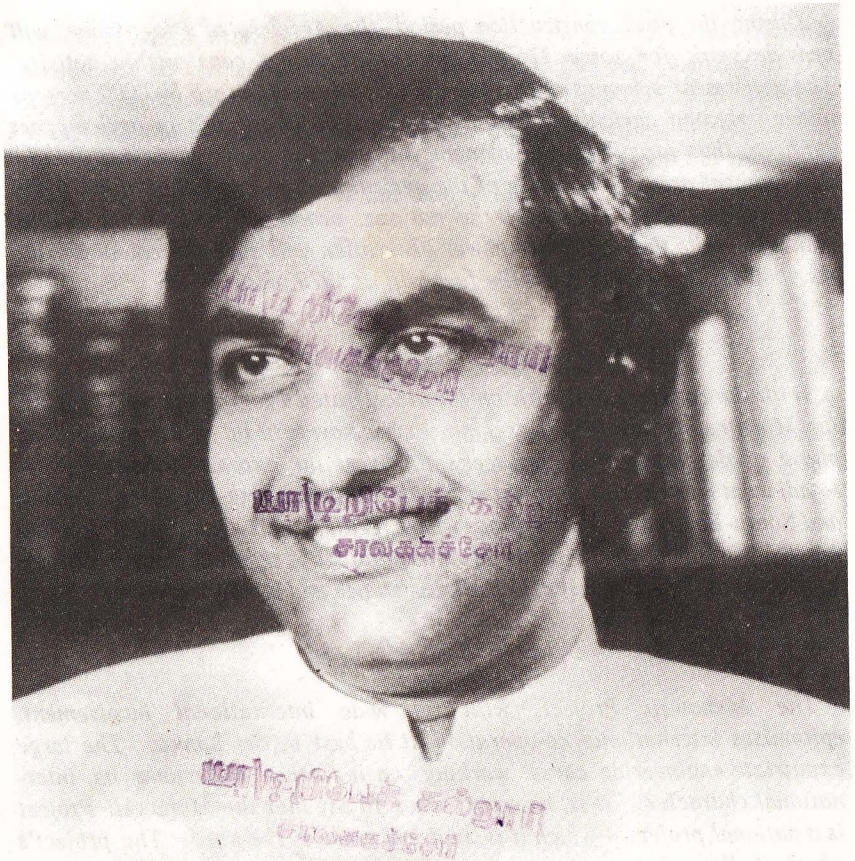
The Mahaweli Project is the largest development project conceived in Sri Lanka. Indeed, it is the largest conceivable in this country. The Project covers 39% of the whole Island, 55% of the Dry Zone, and encompasses 60% of the total irrigable and as yet undeveloped fertile land of our motherland.

On the basis of a Master Plan prepared for its implementation by a team of experts from the UNDP/FAO assisted by local counterpart expertise, construction work was launched on the project in February 1970 by the then Prime Minister, the late Hon'ble Dudley Senanayake and his Minister of Land, Irrigation & Power, the late Hon'ble C. P. de Silva.

The very first project completed in 1976, the Polgolla and Bowatenne complexes, brought benefits in the shape of double-cropping over an extent of 132,000 acres of existing paddy lands in the N. C. P., thereby demonstrating that investments in irrigated agriculture bring the quickest returns. The additional production consequent to the Polgolla and Bowatenne diversions enabled the recovery by agricultural production of the entire capital costs of these complexes in just two years. This nullifies an oft-repeated and uninformed view that irrigated agricultural projects have a long gestation period.

The development of some 70,000 acres of new land and the settlement of 25,000 farmer-families in Area H, was also the direct result of these diversions. Crop diversification, better farm and water management are significant features in Area H, which will be the trend-setter to future settlement patterns under the Mahaweli Project elsewhere.

The Accelerated Programme of Mahaweli Development, launched under the direction of His Excellency J. R. Jayewardene the President in 1977, has "taken on" for implementation the five large multi-purpose projects under the Master Plan in one bold sweep to benefit 320,000 acres and provide an installed capacity of 450 MW. As an exercise in taking time by the forelock, this has given the Accelerated Programme the momentum that



was lacking in a step-wise implementation of the project, whereby the benefits flowing from the overall Mahaweli development would have accrued to the country over a thirty-year span. Such a protracted construction schedule would have been the victim of spiralling construction costs following in the wake of the fuel crisis and international inflationary pressures which have got worse every year, since 1972.

During the peak construction period, the Accelerated Programme will provide work for some 175,000 persons in direct construction activity. The settlement schemes under the programme will absorb 300,000 persons under irrigated agriculture and a further 150,000 persons in agri-support services, thus providing employment for nearly a million people in the development area. The value of the agricultural production on the 320,000 acres of new land will boost the national product by Rs. 1,500 million annually while the additional power generation will save the country some Rs. 900 million annually on the fuel bill, at 1979 prices.

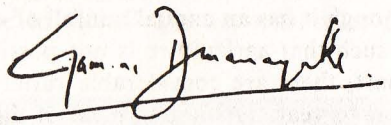
With the construction work on the Accelerated Programme well in hand, the Ministry of Mahaweli Development has now bent its efforts on a second phase of development. This seeks to divert the excess Mahaweli water to adjacent river basins toward the North-Central, North-Western, Northern and South-Eastern Dry Zone areas where fertile land is available for development. This study by a team of internationally reputed consultants has been commissioned with World Bank assistance and is now underway.

The Mahaweli Project, with its wide international involvement, epitomises international co-operation at its best in Sri Lanka. The large expatriate engineering corps working on it further underlines its international character. It is, however, truer to say that the Mahaweli Project is a national project—which it is, in every sense of the word. The project's physical dimensions are staggering. Its waters are tunnelled through natural barriers, cutting across district and provincial boundaries, taking life-giving water to where it is most needed. Its power supply will feed the national grid, taking supplies up and down the country and across it.

The top planning apparatus of the project is essentially Sri Lankan. Some of the best engineering and administrative talent from the Jaffna District are found among its top echelons.

The Mahaweli Project's national stature is apparent even to the most conservative farmer of our country because it is, in essence, a giant farming project making agriculture under irrigation a rewarding experience. And, as we all know, agriculture is but second nature to every Sri Lankan—be he Sinhala or Tamil. It is therefore fitting that the Mahaweli Project has enthused the whole nation, typified by the large voluntary turn-out at its Sramadhana sites.

Another factor that contributes to the Project's popular and national character is its built-in provision for mass participation. Looked at this way, the Mahaweli Project unifies and unites the nation in a common effort. All our peoples, no matter where they live, regardless of race or creed, instinctively recognise that the life-giving waters of the Mahaweli indeed flow from the heart of our motherland.



Minister of Lands & Land Development
and Mahaweli Development.

Introduction

The Dry Zone forms seventy per cent. of the land area of Sri Lanka. Though it has an annual rainfall of 40 to 60 inches, the pattern of rainfall is such that agriculture is not possible without irrigation. The average apart, there are considerable variations in the amount of rainfall from year to year. Although most of the rainfall normally precipitates from mid-October to mid-January, it can be concentrated in a few heavy downpours with long periods of drought in between. Rains may come early in October or may get delayed as late as the second half of December. It is in these circumstances that irrigation has always played a major role in the economy of our country and we have a tradition of irrigation commencing from the Fifth Century B.C.

The Dry Zone, the cradle of our civilization, had in the Polonnaruwa period over seventy major irrigation schemes and countless number of minor irrigation schemes, numbering over 12,000. Most of these irrigation schemes have been restored in the last forty years and work on the restoration of the rest of the schemes—major and minor—is continuing. The Dry Zone however is still subject to the vagaries of weather as the local runoff dependent on the variable rainfall does not give an assured water supply.

Mahaweli

The Mahaweli has its source in the central hills of Sri Lanka in the Nuwara Eliya and Badulla Districts, where the rainfall is high and evenly spread throughout the year, during both monsoons. Half of its length lies in the hill country and, between the source and Minipe, the river drops over 5,000 feet providing good potential for hydro-power development.

From Minipe downwards, it flows through the north-eastern dry sector of the Island, which is comparatively undeveloped. The Mahaweli is also capable of diversion economically to the north-central dry zone of the island. The Mahaweli Ganga contains about one fifth of the surface water resources of Sri Lanka, equivalent to about 7,500,000 acre-feet of water.

The development of the water resources of the Mahaweli to benefit the agricultural development of the dry zone, had always engaged the attention of the leaders of our country in ancient times as well as in this century after Sri Lanka received a measure of self-government, and later after Independence.

In ancient times during the Anuradhapura and Polonnaruwa periods, with the technology and resources then available considerable use was made of the water resources of the Mahaweli and its tributaries for irrigation.

On March 23, 1970 the then Ministry of Land, Irrigation and Power awarded the contract for the construction of the Polgolla Complex which included the Polgolla dam, tunnel intake and tunnel to M/s. Ingra Zagreb of Belgrade, Yugoslavia. The State Engineering Corporation of Sri Lanka constructed the Polgolla dam (barrage across the Mahaweli) straddling the river from Watapuluwa to Uyanwatte on a sub-contract. This concrete structure 565 feet long, 55 feet high and 34 feet wide with 10 gates, diverts 2,000 cubic feet of water per second through a five-mile long tunnel to the adjacent Amban Ganga basin.

The question of the development of the water resources of the Mahaweli to benefit the dry zone has been raised from time to time in the Legislative Council, State Council and later in the House of Representatives from 1948. The Irrigation Department started the collection of data, and conducted preliminary surveys and investigations in the early 1950's. The preliminary report on the development of the Mahaweli Ganga was published by the Irrigation Department in 1959. Further studies were carried out in the period 1958 to 1961 by a joint United States Operations Mission (as the USAID was then known) and an Irrigation Department team. Preliminary proposals for the development of the Mahaweli Ganga water resources were made in a report published in 1961.

UNDP/FAO Master Plan

From 1965 to 1968 the UNDP/FAO, in association with the Irrigation Department and other Government Departments, carried out the first comprehensive survey of the Mahaweli as a whole. These studies resulted in the publication of a Master Plan for the development of the Mahaweli Ganga. The Project area benefited in the Master Plan covered thirty-nine per cent. of the whole island and fifty-five per cent. of the dry zone. It included the Mahaweli Ganga basin, the basins of the Maduru Oya and rivers in the north-central part of the island. The UNDP/FAO Master Plan assessed the long-term annual yield of the Mahaweli Ganga at 6,400,000 acre-feet of water. By constructing reservoirs on the Mahaweli and its tributaries, it would be possible to obtain a regulated flow of 4,300,000 acre-feet of water for irrigation. An additional 400,000 acre-feet of water could be obtained from lateral flows. The yield of the Maduru Oya and the rivers in the north-central province would provide another 900,000 acre-feet, giving an over-all potential of 5,600,000 acre-feet of water.

The Master Plan provided for the utilization of these water resources to develop 900,000 acres, of which 246,000 acres are presently partially irrigated, the balance 654,000 acres being new lands. Of the new lands, 360,000 acres are in the Basin of the Mahaweli and Maduru Oya and 294,000 acres in the north-central part of the island.

The Master Plan envisaged the construction of fifteen reservoirs located on the Mahaweli Ganga, its tributaries and the Maduru Oya. Eleven of these reservoirs provided power stations near the dam sites. The total installed capacity of these stations was assessed at 508 MW. The Master Plan also provided for the development of a number of hydro-power stations, large and small, in the upper catchment of the Mahaweli giving an additional installed power capacity of approximately 460 MW.

The Master Plan provided for the development of the irrigation potential of the Mahaweli in three phases, each consisting of a large number of projects, over a period of thirty years. The first phase was to consist of the Polgolla Diversion, the Victoria-Minipe diversion and the Moragahakanda Project, to benefit 328,000 acres and develop 200 MW of power.

The Mahaweli waters held back at the Polgolla barrage back up along the Ravan Oya to enter the Polgolla tunnel intake leading into the 5-mile long 19 feet diameter Polgolla-Ukuwela tunnel cut through the Pata Dumbara ridge.

In the second phase, it was proposed to develop 230,000 acres using the storage available at Victoria and Moragahakanda, and to construct reservoirs at Maduru Oya and Taldena.

In the third phase, the other reservoirs in the Plan were to be constructed to provide irrigation in the north and north-central part of the island.

Polgolla Diversion & Benefits

Work on the first project in the Master Plan—the Polgolla-Bowatenna Diversion, was inaugurated in February 1970 by the late Hon. Dudley Senanayake, then Prime Minister, and his Minister of Land, Irrigation and Power the late Hon. C. P. de Silva. The main components of this first Project were the Polgolla Diversion Dam and Tunnel, the Ukuwela Power Station, and the Bowatenna Dam and Tunnel.

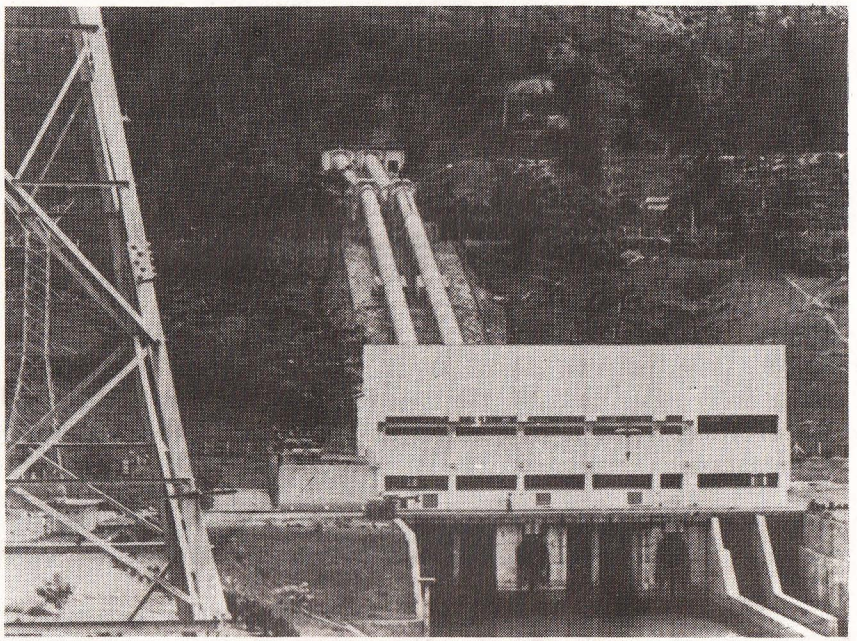
With the completion of the Polgolla and Bowatenna complexes in early 1976, 132,000 acres of existing lands in the Anuradhapura, Polonnaruwa and Trincomalee Districts were benefited. The completion date coincided with a period of dry years where local rainfall and runoff were depleted. But thanks to the Mahaweli waters, the full extent of 132,000 acres was double-cropped. The additional production attributable to Mahaweli waters, over four cropping seasons alone (two years) enabled the recovery by value of agricultural production of the entire cost of Polgolla and Bowatenna complexes amounting to approximately Rupees 400,000,000/-.

The development of 71,000 acres of new lands in the Kandalama and Kalawewa areas known as Area 'H' is in progress, and is expected to be completed by end of 1980. About 25,000 farmer-families will be settled in this area. Eight new townships, twenty-six village centres and hamlets, at the rate of one for every 125 families, are being set up to provide facilities for education, health, agricultural inputs, marketing, agricultural processing and consumer supplies.

The need for an Accelerated Programme

The Master Plan for the development of the Mahaweli Ganga Basin provided for implementation over a period of thirty years. But it was felt that such an extended programme would not provide the solution to the various problems facing our country. Over the past several years, we have been importing over thirty per cent. of the requirements of rice. Wheat imports amounted to about 600,000 tons annually. A variety of other agricultural produce such as sugar, dairy products and cotton are also imported. The annual drain on our foreign exchange resources by the import of these commodities is over Rs. 4,000 Million.

The new thinking was that rapid development of irrigated agriculture would not only provide employment but also release foreign exchange resources for investment in other spheres of economic development.



The diverted Mahaweli waters course down the 5-mile long Polgolla-Ukuwela tunnel and are then hurled through twin 9 feet diameter steel penstocks 1,300 feet in length to activate two turbines in the Ukuwela Power House with a 40 MW installed capacity. The spent waters then enter the Sudu Ganga, a tributary of the Amban Ganga.

The total number of unemployed in our country is nearly 1,000,000 and the annual addition to the unemployed workforce is over 150,000. Industrial development at present cannot take place rapidly enough to make an impact on the unemployment problem. The development of each 2½-acre lot for agriculture provides employment throughout the year for one family in farming activities. Every two-acre plot opened out provides employment for an additional person in a range of secondary services like tractor operation, repair and maintenance of agricultural machinery, supply of agricultural inputs and marketing, transport, agricultural processing and other supporting services. The investment needed per unit of employment created in agriculture is low compared to that required in industry.

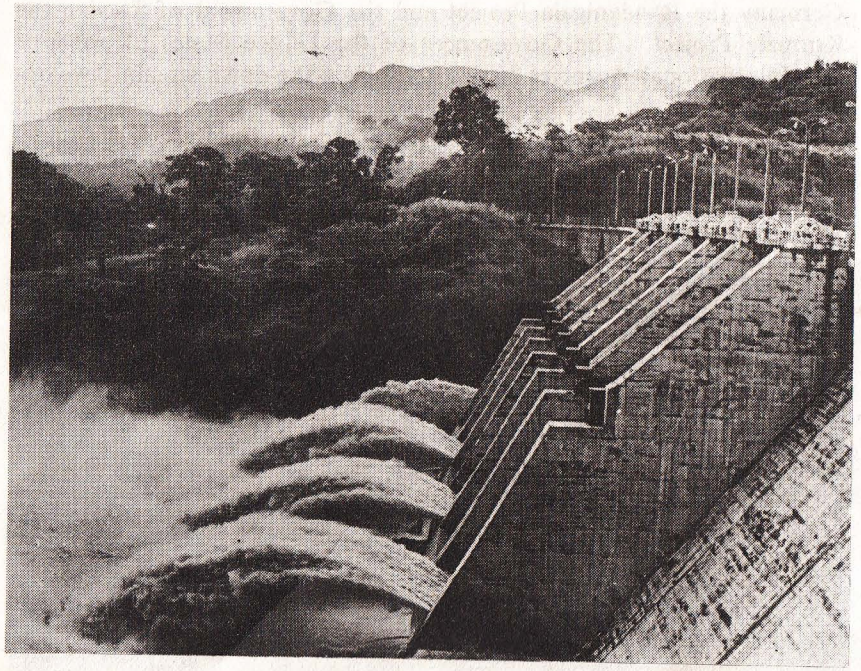
Sri Lanka at present has an installed capacity of 330 MW and an energy generation of 1500 Giga Watt hours. Accordingly Sri Lanka has one of the lowest per capita generation in Asia at 74.2 Kilowatt hours compared with 130.3 for India, 315 for Philippines, 479 for Malaysia and 4,325 for Japan.

The level of per capita energy generation is considered an index of the economic development of a country. About 75% of the population of Sri Lanka live in rural areas; a little over 10% have an electricity supply. The industrial development plans of the Government including the Free Trade Zone are dependent on the availability of power resources.

A further factor which has to be taken into consideration is the very high inflation prevailing throughout the world, and this upward trend is likely to continue. The longer the implementation of a project is delayed, the higher the eventual construction cost. The UNDP/FAO Master Plan estimated the cost of development under the Mahaweli at Rupees Six Thousand Million in 1968. At 1979 costs, the same development was estimated at over Rupees Thirty Thousand Million. Even assuming a low inflation rate of 10 per cent. per year, the costs will be double every eight years. It is in these circumstances that the Government of President J. R. Jayewardene decided to accelerate the development of the Mahaweli Ganga project.

The Big Five

After a detailed review of the financial resources needed and the technical personnel and construction capacities available, the Government decided to take up the development of five major multi-purpose reservoirs with an installed power capacity of 540 MW and the irrigation development of 320,000 acres of new lands, and 30,000 acres of existing lands during a time span of five to six years. The construction of the five major multi-purpose reservoirs, it was felt, would provide for the regulation of a major part of the water resources of the Mahaweli Ganga, and provide the base for the development of the balance irrigable area under the Master Plan in the next five-year period.

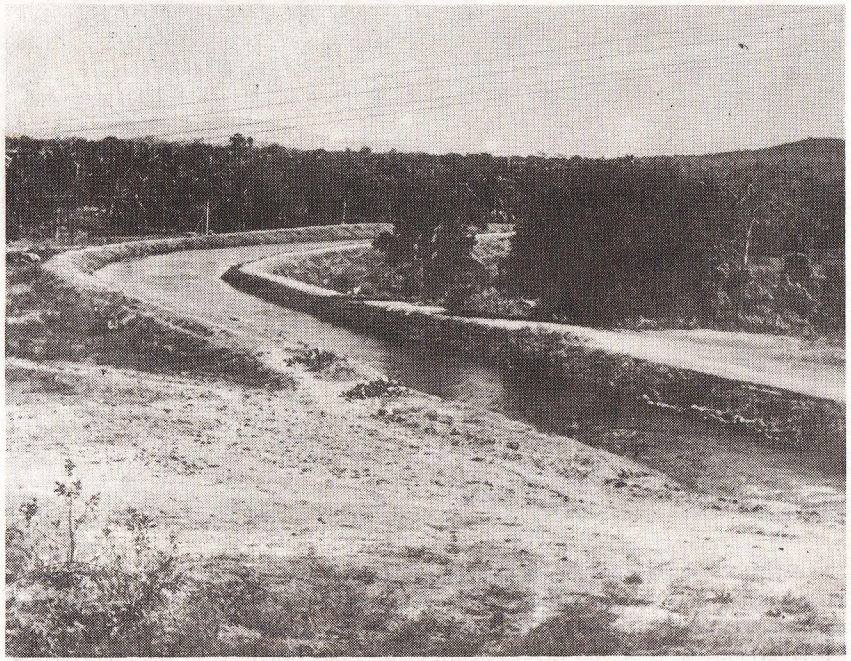


The diverted Mahaweli flows enter the Amban Ganga, a major tributary of the Mahaweli after passing through the turbines at the Ukuwela Power Station. The Bowatenna dam pictured above impounds the normal flows of the Amban Ganga and the diverted Mahaweli waters. A pivotal structure built by the State Development and Construction Corporation the Bowatenna dam is instrumental in diverting 1,000 cubic feet of water per second to augment the supplies of the Kalawewa (750 cusecs), Kandalama (150 cusecs) and Huruluwewa (100 cusecs).

The five major reservoirs consist of Victoria, Maduru Oya, Kotmale, Randenigala and Moragahakanda. Of the 320,000 acres of new lands, 280,000 acres are in the Right Bank of Mahaweli and in the Maduru Oya basin, and 40,000 acres are on the Left Bank of Mahaweli in the Polonnaruwa District.

Many countries were in agreement with the development programme of the Government, and readily responded to requests for assistance. These countries agreed to finance the individual projects pending completion of the feasibility studies and plans, designs and cost estimates. The studies were also funded with technical assistance from these friendly countries.

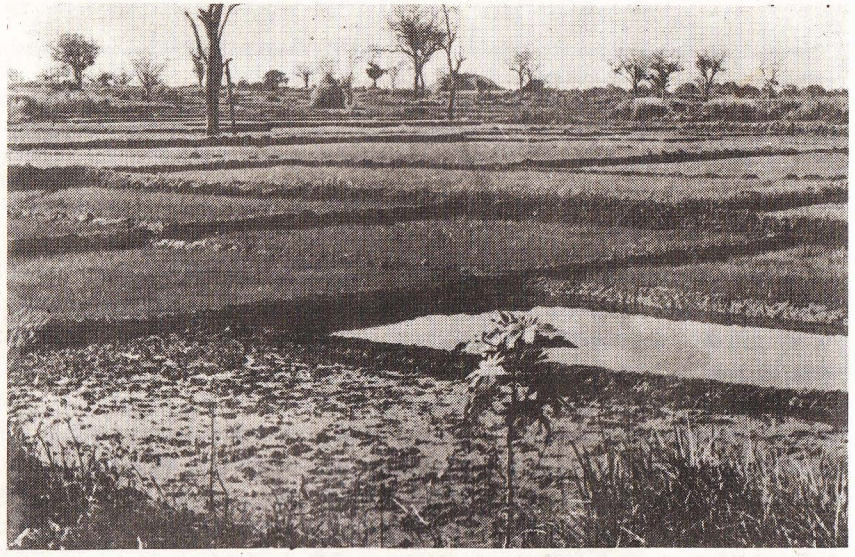
The Government of the United Kindom, for instance, agreed to finance the Victoria Project and further consider additional assistance for the development of 70,000 acres on the Right Bank of Mahaweli below the Minipe anicut. The Government of Canada agreed to finance the development of the Maduru Oya Project, the Government of Japan the Moragahakanda Project, the Government of the Federal Republic of Germany the Randenigala Project and the Government of Sweden the Kotmale Project. The Government of the United States of America and International Agencies agreed to finance the down-stream development.



A view of the Kalawewa Left Bank main canal snaking its way through Area 'H'. The diverted Mahaweli waters were used to develop the Left Bank area to begin with.

Nedeco Report

Of the five multi-purpose reservoirs, two are on the main stem of the Mahaweli Ganga, two on its main tributaries and one in an adjacent basin in the Eastern Dry Zone. With the assistance of the countries referred to, feasibility studies, designs, bills of quantities and specifications upto tender stage were initiated. Concurrently, an implementation strategy study was carried out by NEDECO, a Consultancy Agency from the Netherlands. These studies indicated that, based on efficiencies in water management which could be reached by about 1990, three reservoirs, namely Kotmale, Victoria and Maduru Oya, could together meet the irrigation requirements of the 350,000 acres in areas known as System A,B,C,D and G in the Mahaweli Basin. The NEDECO Report however stated: "These calculated irrigation requirements must be considered as a target only possible in a well-managed system with adequate possiblity for control and with no paddy grown on upland soils". Accordingly arrangements have been made to adopt several measures for improved water management and crop diversification under the Accelerated Programme of Mahaweli Development.

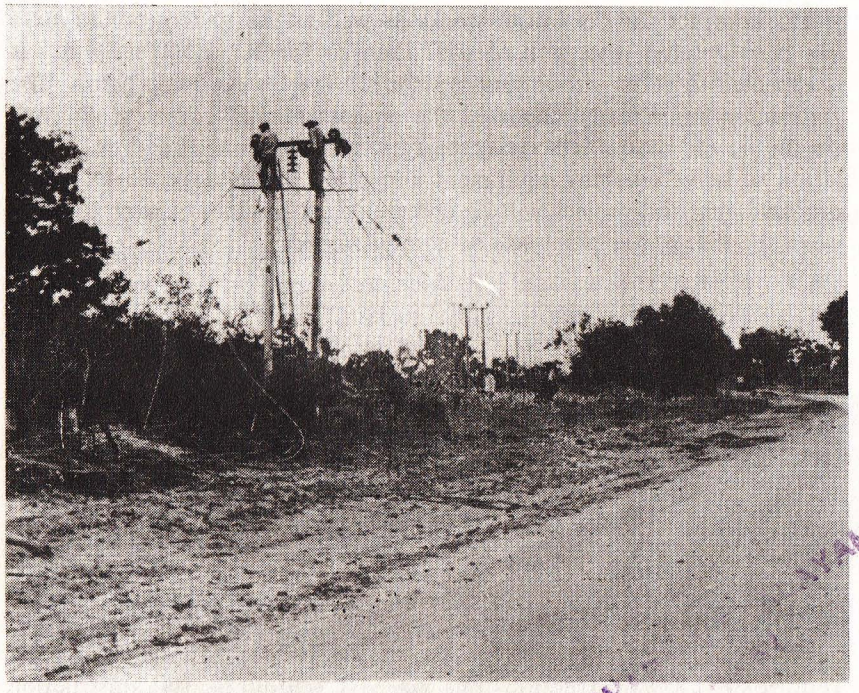


Diverted Mahaweli flows first benefited existing paddy lands in the North-Central Province stretching over 132,000 acres enabling full double-cropping. The first new land benefited by the diverted waters was in Kalawewa under Area 'H'. Pictured here is a stretch of new paddy land in Galnewa. Note the skeletal remains of some tough jungle trees which have resisted the dozers.

The programming of the construction of the multi-purpose reservoirs has been on the basis of the irrigation requirements as assumed by NEDECO and the power requirements of the country as forecast in the recent studies. Detailed and separate studies of anticipated power and energy growth, have been carried out by the Ceylon Electricity Board and an UN Energy Planning Expert, by NEDECO and by the individual consultants for the reservoir projects. While for the short-term period of five years there is agreement on a forecast of growth rate of approximately 10.5 per cent. upto 1985, there are some slight differences on the trend forecast thereafter. At present, almost the entire installed capacity and generation potential of the hydro-power system of approximately 330 MW in the country is fully utilised, and it is now necessary to utilise the existing thermal capacities as well. Two small hydro-power stations, one of 40 MW at Bowatenna and second of 30 MW at Canyon, (this project is on the Maskeli Oya, a tributary of the Kelani Ganga) are expected to be completed in the next two years. The hydro-power capacity in the next two to three years will be insufficient to meet the requirements, and action has already been taken by the Ministry of Power to meet the short-term requirements by the installation of gas turbine plant with a total installed capacity of 60 MW. The situation has been reviewed and additional gas turbine plant will be installed to meet the requirements upto the end of 1983 when the first hydro-power installation under the Mahaweli Accelerated Programme is expected to be commissioned.

The Kotmale Project

The Kotmale Reservoir is the **first** multi-purpose reservoir under the Accelerated Mahaweli Programme. Preliminary studies of this project were carried out by USAID and the Irrigation Department in the period 1958-1961 and again by UNDP/FAO in 1964-1968. Feasibility studies of the project were carried out by Water & Power Development Consultancy Services (India) Ltd., from 1973-1976, and the feasibility report was issued in February 1978. A firm of expatriate consultants, Sir William Halcrow & Partners in association with Messrs. Kennedy & Donkin, have reviewed the feasibility studies, and prepared the final designs, specifications and bill of quantities. Swedish import-support, which is expected to amount to Swedish Kroner 630 million (approx. 2,400 million rupees) over a period of five years, is being utilised to finance part of the foreign exchange component of the project, and



Infrastructure facilities like roads are basic and essential pre-requisites to development. The road named the "Jayamawatha," extends from Balaluwewa to Tambuttegama some 27 mls. It cuts through the new development area which has benefited by the diversion of Mahaweli waters. This roadway was designed by the MDB and was constructed by the RVDB. Photograph shows CEB workers laying the main powerline along this road.

the contract for the construction of the project has been negotiated with Messrs. Skanska of Sweden. The Kotmale Project envisages the construction of a 350 ft. (107 m.) high rockfill dam across the Kotmale Oya, a right bank tributary of the Mahaweli. The crest length of the dam is 1,969 ft. (600 metres). The capacity of the reservoir is about 408 million cubic metres or 331,000 ac.ft. The water impounded in the reservoir will be conveyed through a tunnel 4.5 miles long to an underground power station, and the tail water will be discharged by a tunnel into the Mahaweli Ganga near Atabage. It is proposed to install three units of 67 MW each at the power plant capable of generating 400 million KW hours firm energy and about 100 million KW hours of secondary energy.

The estimated cost of the project, at 1979 prices, is about Rs. 4,500 million.

The contract for the initial works as well as the underground works has been entered into with Messrs. Skanska for Rs. 1,560 million. It is expected to enter into a contract shortly for the Kotmale dam. The contractor has already imported the equipment and commenced work on the access roads, temporary bridges, construction of camps, installation of stone crushing equipment and other preliminary works. It is expected that the project will be completed in the third quarter of 1983, when the first power plant will be commissioned.

The Victoria Multi-purpose Project

The next multi-purpose project is the Victoria Project on the main stem of the Mahaweli. Feasibility studies and the preparation of plans, designs and estimates for this project were carried out under technical assistance from the Overseas Development Ministry of U.K., by a consortium of British Consultants, Sir Alexander Gibb & Partners, Preece Cardew & Rider and Hunting Technical Services Limited. A Joint Venture of U.K. Construction firms, viz. M/s. Balfour Beatty Construction Co., and M/s. Edmund Nuttal Ltd., was awarded the contract for the Dam and Tunnel. Construction has begun and the project is expected to be completed by the end of 1984.

. The Victoria Project envisages the construction of a 122m. (400 ft.) high and 507m. (1,660 ft.) long dam (measured along the crest). The tunnel will be about 4,900 m. (16,000 ft.) long. The installed capacity is 210 MW with an annual generation potential of 780 million KW hours. There is provision for the installation of a further 210 MW by the construction of a second tunnel at a later stage to meet the peaking requirements. The estimated cost of the Project is about £ 150 million (approx. Rs. 5,000 Million), at 1979 prices, of which £ 100 million is being financed by the Government of U.K. as a grant.

The irrigation benefits under this project will be spread over 112,000 acres of undeveloped lands in areas designated System C and B under the Mahaweli Master Plan, extending from Mahiyangana to Polonnaruwa. Irrigation supplies from this project will provide for the settlement of some 20,000 families in agricultural development whose production in terms of value has been estimated at Rs. 300 Million annually from system C and also provide for the settlement of a further 30,000 families in system B.

Initially generating employment for some 20,000 workers in construction activity, both at the headworks and in downstream development in System C and B, the Victoria Project will go forward to absorb nearly 100,000 persons in gainful employment at full production.

The Maduru Oya Multi-purpose Project

The designs, specifications and tender documents for the Maduru Oya Project were prepared by the Central Engineering Consultancy Bureau, assisted by Messrs. Sogreah of France and reviewed by a joint Review Board of the Canadian International Development Agency (CIDA) Canada and the World Bank.

The Minister of Lands and Land Development and Mahaweli Development, Hon. Gamini Dissanayake commissioned the Kalawewa Right Bank main canal on October 20, 1979 to convey the Mahaweli water diverted to Kalawewa to benefit the new development area and the city tanks complex at Anuradhapura. The Minister officiated at this function on the invitation of the Deputy Minister of Lands and Land Development, Mr. A. M. S. Adikari, who is the M. P., for Kalawewa. The Deputy Minister of Mahaweli Development, Mr. Nanda Mathew also attended this function.

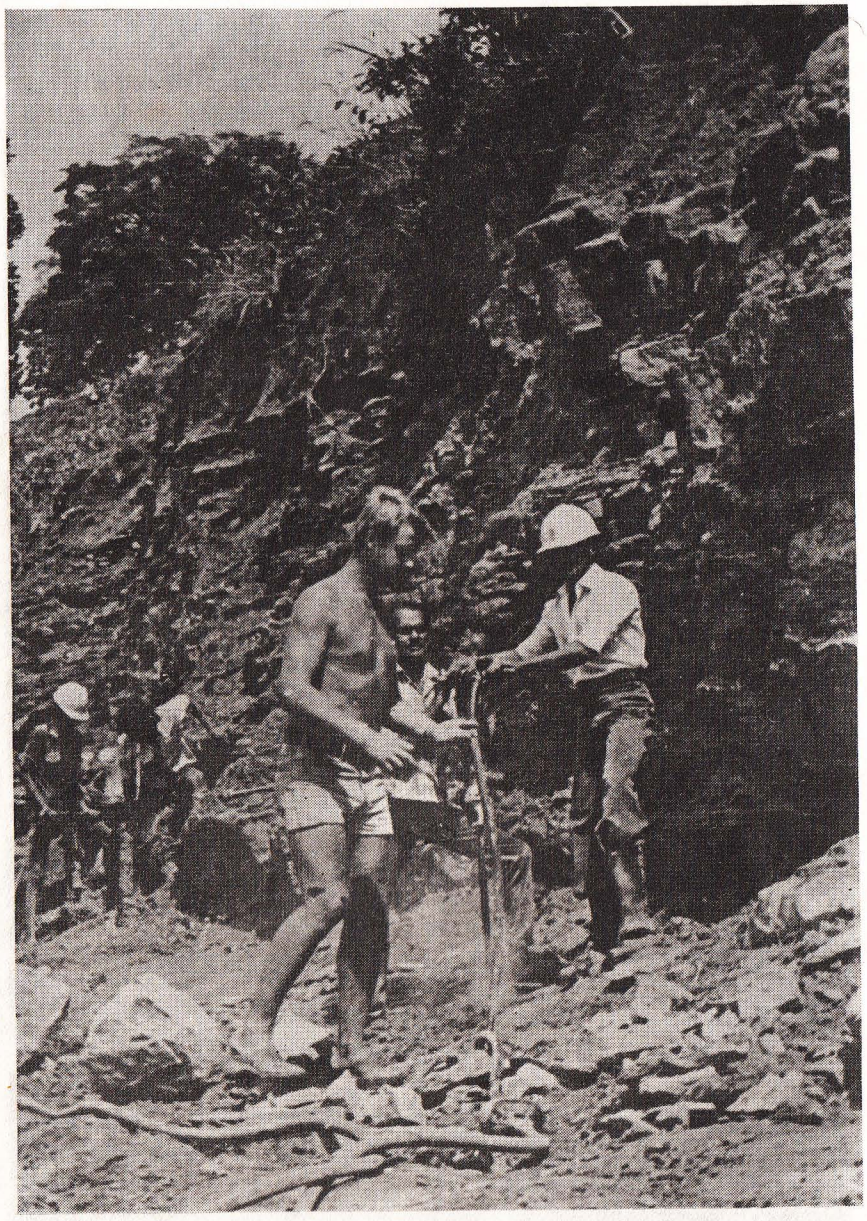
The Right Bank canal benefits areas designated as H 4 and H 5 and the city tanks in Anuradhapura totalling some 49,000 acres.

The Maduru Oya project envisages the construction of a 40 m. high and 100 m. long rockfill dam across the Maduru Oya to create a reservoir 467 million cubic metre capacity. Two 2.5 MW turbines will be installed at the sluices for generation of hydro-power. A 3½ mile long (5,740 m.) link tunnel will transfer water from the Ulhitiya Oya-Rathkinda Reservoir combination (under construction) to the proposed Maduru Oya Reservoir.

The project is being financed in Canadian Dollars 76 million, and the bids for the construction of the project, limited to pre-qualified Canadian contractors, closed on Nov. 20, 1979. The contract was awarded to the joint venture of Foundation Company of Canada Ltd., Atlas-Gest International Inc., Fitz Patric Construction Ltd., Jannin Costamatic Ltd. of Canada (FAFJ). The project is expected to be completed by 1982 to enable the reservoir to store water during the Maha rains 1982-1983. The estimated cost of the project will be about Rs. 2,100 million at 1979 prices.

The Randenigala Multi-purpose Project

The other project on the main Mahaweli is the Randenigala Project. Feasibility studies for the project were commenced under technical assistance from the Federal Republic of Germany, and based on the feasibility report issued in Nov. 1979, the Federal Republic of Germany has agreed to finance the project in a sum of DM 400 million. Feasibility studies by a consortium of consultants from the Federal Republic of Germany consisting of Salzgitter and Agrar-Und Hydro-technik of Germany and Electrowatt Engineering Services Ltd. of Switzerland commenced in April 1979, and the report was issued in Nov. 1979. The consultants have commenced work on the preparation of detailed designs, specifications, bill of quantities and tender documents, which are expected to be completed by the end of 1980. The project as envisaged provides for the construction of a rockfill dam at Randenigala approx. 500 m. measured along the crest and 90 m.high, having an installed capacity of 122 MW. The storage capaciy of the reservoir is 860 million cubic metres.



His Excellency J. R. Jayewardene, the President, inaugurated construction work on the Kotmale Project on February 4, 1979. Construction work on this project, one of the main projects of the Accelerated Programme of Mahaweli Development, is well in hand. The Kotmale dam will impound the Kotmale Oya to form a reservoir with a gross storage capacity of 330,000 acre feet. A Power Station with a 200 MW installed capacity will be located at Atabage, 4 mls. away from the Dam. Photograph shows drilling operations at the dam site.

The feasibility study also provides for the construction of a second reservoir at Rantembe about five miles down-stream of Randenigala. The Rantembe dam will be approx. 350 m.long, 40 m.high and will have an installed capacity of 49 MW. It will re-regulate the water of Randenigala and enable Randenigala to be used for peaking purposes when necessary. The estimated cost of the Randenigala project at mid-1979 prices is Rs. 2,560 million and that of Rantembe reservoir is Rs. 1,280 million.

Construction work is going on apace on the Victoria Multi-purpose Project at Teldeniya where an arch dam will be thrown across the Mahaweli, below its conflux with the Huluganga. While the Victoria Reservoir and the Power Station will be high up on the hills the area to benefit from the stored water for irrigation purposes is located on the plains below. Photograph shows preliminary work at Victoria on access roads.

While construction work goes on at the headworks as at Victoria, down-stream in the plains as in System 'C' worker-settlers are deployed on labour-intensive items of work to get the development area ready. The Minister of Lands and Land Development and Mahaweli Development, Hon. Gamini Dissanayake and the Minister of Labour, Hon. C. P. J. Seneviratne are seen with worker-settlers at Girandukotte.

The implementation strategy study of NEDECO came to the conclusion that three reservoirs, namely Kotmale, Victoria and Maduru Oya, will be sufficient to meet the irrigation requirements of 350,000 acres programmed for development under the Mahaweli Accelerated Programme. Victoria and Kotmale reservoirs have favourable cost-benefit ratios on the value of power production alone, and the power output of these two reservoirs will be sufficient to meet requirements till about 1986. Taking into consideration the installed hydro-power and thermal capacities available in the second half of 1980's the power output of Randenigala-Rantembe combine would be required by end of 1987. In view of the definite advantage of commissioning the Randeni-

gala-Rantembe combine earlier, and thereby avoid the high cost of thermal generation, it has been decided to advance the construction of the Randenigala-Rantembe combine and have this commissioned by the end of 1986. The Randenigala-Rantembe combine also has its economic justification on power benefits alone.

Accordingly, it has been decided to commence work on the Randenigala Project by 1981/82 and commission it by the end of 1986.

The Moragahakanda Multi-purpose Project

Feasibility studies for the Moragahakanda reservoir on the Amban Ganga, a tributary of the Mahaweli Ganga was carried out by a consortium of consultants—Nippon Koi Ltd. of Japan and Japan Engineering consultants on technical assistance provided by the Government of Japan. The feasibility report has been issued and provides for the construction of a reservoir consisting of the main dam, which is rockfill, and two saddle dams. The maximum height of the dam is 72 m. and the crest length of the main dam is 490 m. The installed capacity is 26 MW and estimated cost of the reservoir headworks is Rs. 1,715 million at 1979 prices.

Second Phase of the Accelerated Programme

Accordingly, the water resources of the Randenigala-Rantembe combine and of the proposed Moragahakanda Multi-Purpose Project would be available for serving other areas of the country outside the Mahaweli basin. Such areas have been already identified for investigation in the North, North-Central, North-Western and South-Eastern regions of the Dry Zone. It has been assessed that there are over 300,000 acres for development in these areas. These areas have accordingly been marked for investigation for development under the second phase of the Accelerated Programme of Mahaweli Development.

Inasmuch as the construction of the Randenigala Project is to be taken up in 1981/82 due to the pressing demand for power, the role of this reservoir for irrigation purposes has to be studied straightaway along with studies for the optimum use of the Moragahakanda Reservoir for irrigation purposes.

Thousands of youth have already contributed their labour at the Mahaweli Sramadhana site located at Maduru Oya. Photograph shows Jaffna youth marching to the Sramadhana site in procession with the Minister of Lands and Land Development and Mahaweli Development, Hon. Gamini Dissanayake.

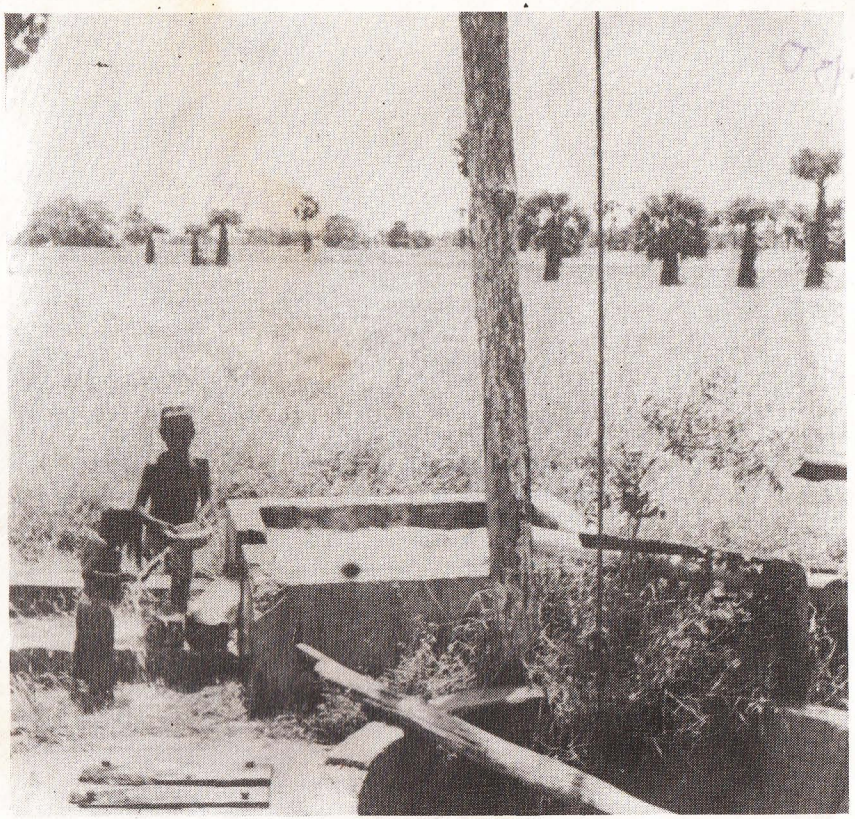
It is proposed to have these studies undertaken by a team of internationally reputed consultants and completed within a year. These studies are being funded by the World Bank and are already underway.

Jaffna youth at the Maduru Oya Sramadhana site at work with the Minister of Lands and Land Development and Mahaweli Development, Hon. Gamini Dissanayake.

Jaffna Lagoons

Such a study may indicate the feasibility of replenishing the Iranamadu Tank from Mahaweli Diversions and thereby indirectly provide for the spill waters of the Iranamadu Tank being led into the Jaffna lagoons to flush the salt-water out from these waterways and convert them into fresh-water lakes. This will improve the underground water and surface storage resources in the peninsula for the cultivation of peripheral lands.

Excessive draw-off from wells in the Jaffna Peninsula by the use of high-capacity pumps results in increasing salinity in the wells. This can be overcome by proper use of water and by not over-irrigating the crops and if possible by artificially re-charging the underground water resources.



Wells play a major role in the cultivation of the peripheral lands of the lagoons of the Jaffna District.

Jaffna Peninsula is about 400 sq.mls. and has about 84,000 wells, of which 66,000 are for domestic use and 18,000 for agricultural purposes.

Water-bearing limestone formation has a capacity of storing about 15% of the groundwater re-charge.

Four hundred and eleven wells, representative of all wells in the Peninsula were selected by the Irrigation Department for systematic analysis of behaviour of the water quality and water table fluctuations.

Studies in the 411 wells indicate that in July-August, when the water table is low, salinity increases due to sea-water intrusion.

Approximately 9,000 acres are cultivated annually by irrigation from wells. The total quantity of water needed is about 40,000 ac. ft., which is within the nett re-charge potential. The presently cultivated extent, only 5% of the land available, can be increased by an equal amount if more water is stored in the acquifer.

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The landscape illustrating the outer cover is typical of the Jaffna District mainland where reservoir projects like the Kanagarayan Aru, Iranamadu and Periyakulam are located.

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