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MAHAWELI

PROJECTS & PROGRAMME

1983

**A survey of the progress of work
on the Accelerated Programme
of Mahaweli Development
in 1982
and the development proposed
in 1983**

**Mahaweli
Projects & Programme
1983
is a publication
of the Information Service
of the Ministry of Lands and Land Development
and the Ministry of Mahaweli Development**

**No. 500, T. B. Jayah Mawatha,
Colombo 10,
Sri Lanka.**

April 5, 1983

The cover of MAHAWELI PROJECTS & PROGRAMME 1983 is illustrated with a montage of the main headworks of the Accelerated Programme of Mahaweli Development. It focusses attention on the towering Victoria dam where work is nearing completion. When fully complete, the Victoria dam rising 400 ft. from the river bed, will be nearly as high as the Sigiriya rock as seen from the Matale plains. Lined up, above the title of the publication are aerial views of the diversion tunnel inlet and the coffer dam at the Kotmale worksite, the Randenigala dam site and the Maduru oya reservoir – the first major reservoir to be completed under the Accelerated Programme. Comparatively smaller dams and major canals completed are pictured within this volume. Ed.

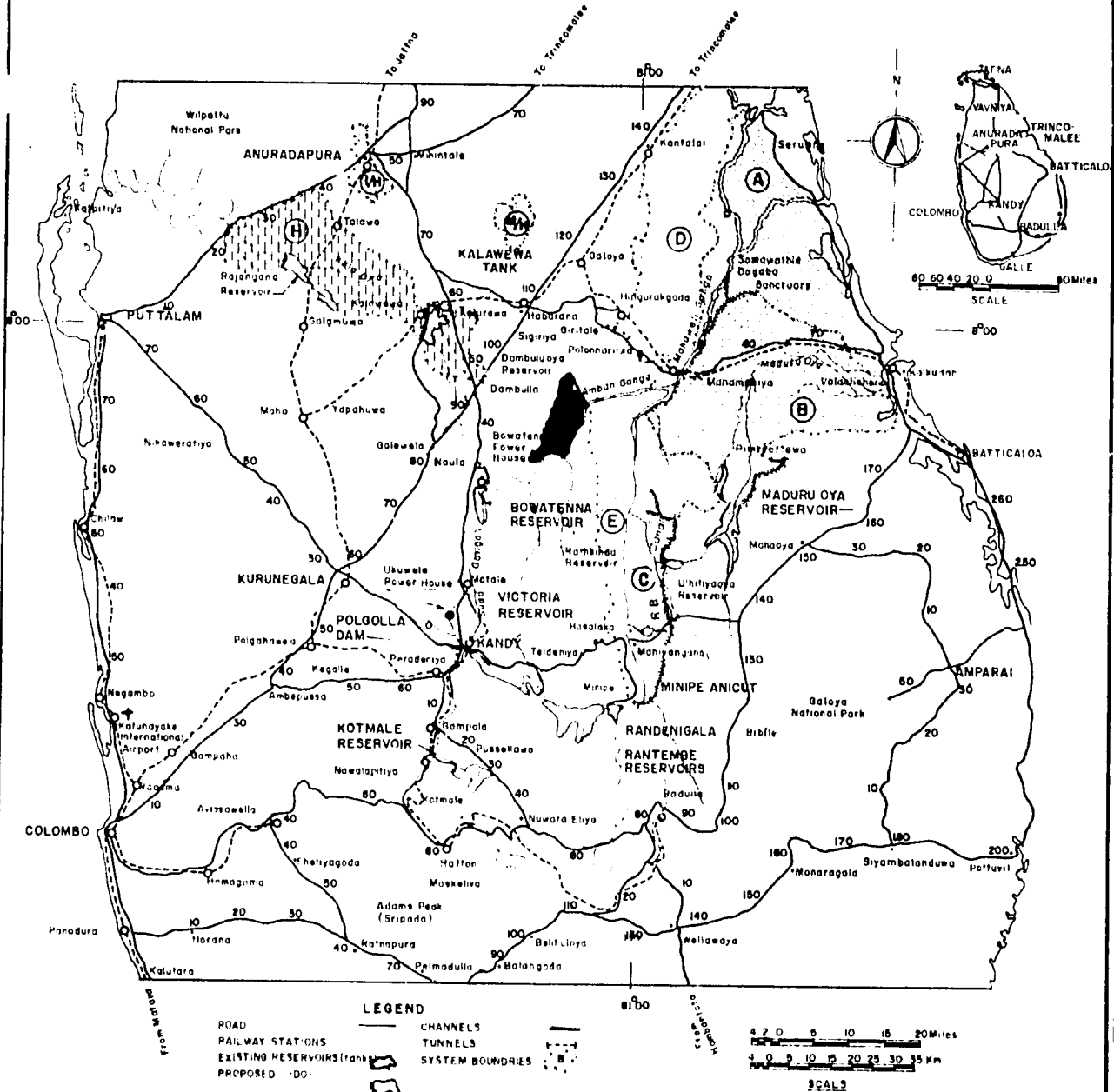
	Cover Design	Piyaratne Hewabattage	
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CONTENTS

The Accelerated Mahaweli Programme is on Stream—Gamini Dissanayake

- 1. Introduction**
- 2. Kotmale Hydro-Power Project**
- 3. Victoria Dam and Hydro-Electric Project**
- 4. Randenigala Project**
- 5. Maduru Oya Reservoir Project**
- 6. Minipe Anicut & Right Bank Trans-Basin Canal**
- 7. Financing of the Accelerated Mahaweli Programme**
- 8. Downstream Engineering (Major & Teritiary)**
- 9. Mahaweli Water System**
- 10. Water Management in the Mahaweli System**
- 11. System Management of Water for power generation**
- 12. Concepts of Mahaweli Settlements**
- 13. System H development as a model for other Systems**
- 14. Progress of Settlement**
- 15. Crop Diversification**
- 16. Livestock & Dairy Farming**
- 17. Marketing Needs**
- 18. UN Assistance to Special Projects**
- 19. Environment and Heritage**
- 20. Monitoring of Progress**
- 21. RVDB as a Construction Agency**
- 22. Consultancy Services**

ACCELERATED MAHAWELI GANGA PROJECT





The vision of the Mahaweli Programme in its totality is elusive inasmuch as its drama is enacted in widely disparate areas of the country, cutting across racial and ethnic boundaries, boring through natural barriers, sweeping away jungle fastnesses.

During periods of stability, when such development activity was possible, Sri Lanka's ancient Kings marked the country's progress by building soaring monumental edifices; and the tank and dagoba epitomised the Nation's economic and cultural progress.

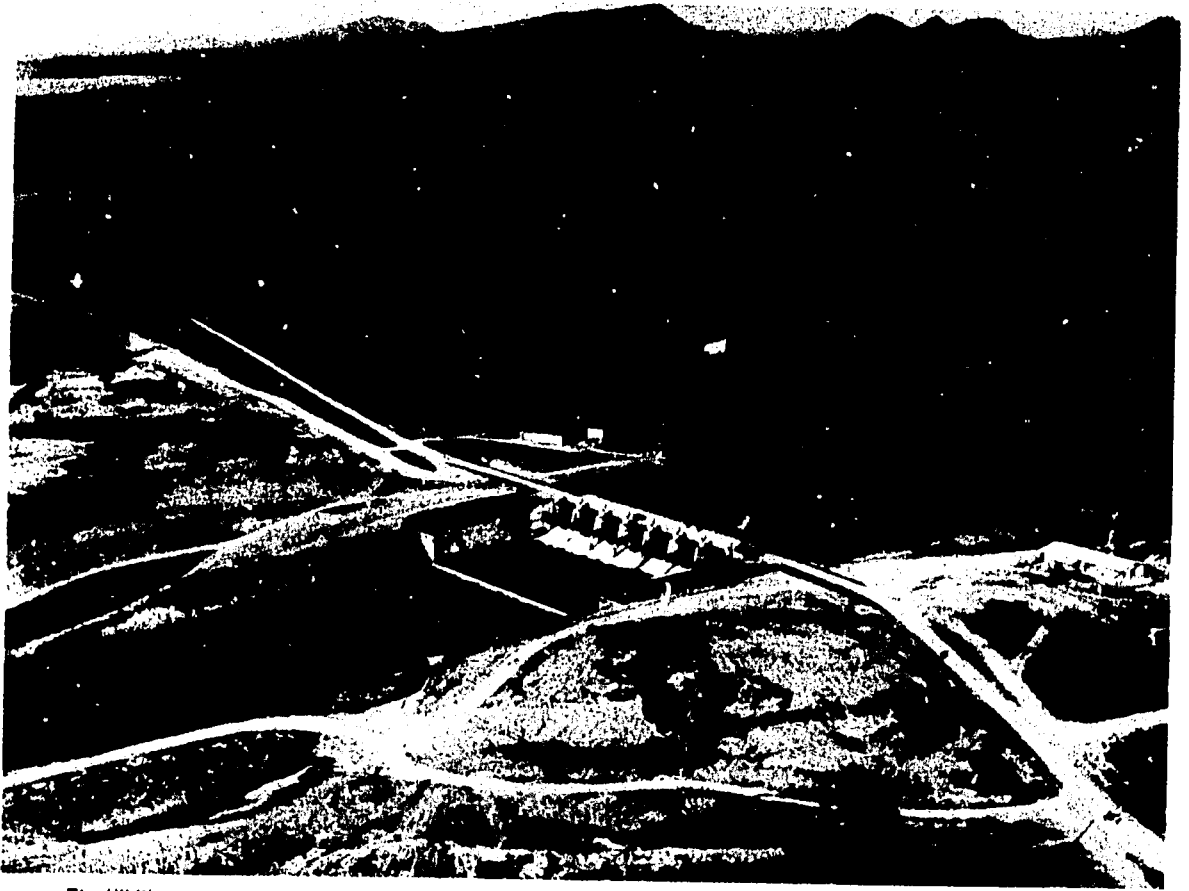
It is in that tradition that the foundation stone was laid by His Excellency President Jayewardene for the Mahaweli Maha Seya at Kotmale on March 20, 1983 at the invitation of Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development.

Apart from compensating for 8 temples which will be submerged by the waters of the Kotmale Reservoir, the Mahaweli Maha Seya must be seen as the homage of the

Nation to the Mahaweli Ganga itself and the heartland of Lanka, from which the Mahaweli unwinds itself to give the country its bounty.

With the completion of the Accelerated Mahaweli Programme, which was born out of the vision of His Excellency the President, Sri Lanka can put behind her, for all time, the recurring problems of unemployment, soaring food and fibre prices and the need to import same, and the dearth of energy for our growing industries. Thus the Nation will be able to close a sad chapter of dependence and want and open a new one, marking an era of fulfilment which will uplift the country's living standards and improve its quality of life.

This photograph by Ananda Dharmapriya shows His Excellency the President, Hon. Gamini Dissanayake, the Hon. E. L. B. Hurulle, Minister of Cultural Affairs among others with the reliquaries containing sacred Buddha relics which were enshrined in the foundation of the Maha Seya.



The Uihitiya reservoir was the first reservoir to come on stream under the Accelerated Mahaweli Programme. It is located in a sparsely populated region in the Uva Province on the right bank of the Mahaweli designated as System C. With a storage capacity of 24,000 ac. ft. the Uihitiya reservoir will regulate water releases diverted from the Mahaweli at the new Minipe diversion weir, along the Mahaweli right bank trans-basin canal, to which it is linked.

Designed by the Mahaweli Development Board (MDB) and constructed by the River Valleys Development Board (RVDB) with government funds—the project costs have been estimated at Rs. 178 million.

Photograph shows the spillway of the new reservoir and the dam of rolled earthfill. In mid-October 1982, during the NE monsoon, this reservoir started spilling over.

Settlements have already been established under this reservoir.

The Uihitiya reservoir will be formally commissioned by H. E. President Jayewardene on April 9, 1983 at the invitation of the Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development and the Minister of Labour, Hon. C. P. J. Seneviratne in whose electorate the reservoir is located.

THE ACCELERATED MAHAWELI PROGRAMME IS ON STREAM

*Hon. Gamini Dissanayake**

“ I think the Budget presented by the Hon. Minister for Finance, must be looked at today from the standpoint of the totality that goes to make the present global economic and fiscal crisis that had rocked the whole world. I will try to show, in the course of my speech, that one significant factor, which my good Friends in the Opposition do not like to deal with after saying that we are on the brink of disaster, is to trace the history as to how we come to be on the brink of disaster and I would like to show that the arrival at that brink is not a thing that happened yesterday or the day before. I think there is a long history to that. So, let us try to understand what has happened.

The Hon. Minister of Finance has said, I think at a public speech that what took place last year in the international economic order was similar in every respect to what happened in the world during the great depression of the 1930s, if not worse.

* Excerpts from the speech of Hon. Gamini Dissanayake, Minister of Lands and Land Development and Minister of Mahaweli Development on 17.3.83 during the Second Reading of the Appropriation Bill 1983.

There were many countries : Mexico, Brazil, Argentina among them, and Poland—these countries were not only on the brink of bankruptcy but they were bankrupt. For example ; a collectivist economy, a marxist philosophy, no private sector, no private business, having very little to do with multi-nationals, had to be saved from disaster and bankruptcy by the World Bank, the IMF and a consortium of Western banks.

.there were bread queues in Poland, why there was no meat in Poland, why there were food queues 1 1/2 miles long, why there was street rioting, why it was necessary for the Polish Government, backed by outside support, to crack down so heavily on the Free Trade Union Movement in Poland ? He does not say why or how. He likes to ignore that fact, and from our point of view we say that, not with the feeling that we have a right to judge what is happening in another country, not in the belief that our system is better than that system, but only to drive home the point that there are no easy solutions to these problems, that each country must find its own path to economic salvation and how we find that salvation is not a matter that we can decide that easily. As Dr. Kissinger has said, in a very interesting article which he had published in international journals, 'developing nations through defaulting on their debts could threaten the economies of the industrial nations', and he drives home the point that 'politicians these days certainly have many economic theories to choose from, most discordant and quite few of them now defunct'. Not a single economist in the world, not even the ghost of Karl Marx has been able to find answers to our problems.

But we have been given the very responsible and difficult task of running this country, of getting this country moving. How were we to do that ?

. . . .Our President has met at the Summit Meeting in India a very distinguished African Leader, Julius Nyrere, the President of Tanzania. He has frankly confessed, 'We are in such a plight. I do not know whether we can buy one barrel of oil next year.' That is the state of the economy in a country in which the private sector has not been encouraged for the last 25 years, a country in which there is a one-party government, a country which has practised consistently, year after year, with a continuous leadership

and stability, centrally planned socialist policies. What is the problem? The problem is that they cannot find the capital to undertake basic infrastructural development, to give water to the people, to build reservoirs, to build roads, to build hospitals, to use modern technology, to have electronics, modern telephone systems, to uplift the living standard of the people.

Now this is the problem that is afflicting the whole Third World. Let us understand as we should. . . .

These problems afflict Yugoslavia, Cuba, Greece, Turkey, Poland, all the African countries, practically all the Asian countries, and really it is in relation to this problem that the former President of the World Bank, Mr. Robert McNamara, on the eve of his retirement, said, unless and until the developed countries—it can be the USSR, it can be the United States—decide to put more capital to change the international economic order, at the turn of the next century there will be more famine, more starvation and more national disasters on a hitherto unseen and unmatched scale. That is the situation. So in that context do not try to say that the IMF is dictating or the World Bank is dictating. Who will go to the World Bank or the IMF if you have all the resources you want?

So let us see. How we are in this situation. The hon. Members of the Opposition know that there is an organisation called the UNCTAD—United Nations Conference for Trade and Development of which the Secretary General is Dr. Gamini Corea, a former Deputy Governor of the Central Bank of Sri Lanka. What are they doing?—(Interruption.)—I am telling you something about the UNCTAD. I am trying to say they have been trying for the last so many years to realise the objective of getting stable prices for commodities, but with very slow success. If we get stable prices for our basic commodities, for example, in the plantation tree crop sector, we need not want assistance to build a single reservoir. We can build all our roads—the way we built the Gal Oya reservoir without asking for foreign assistance. At that time Mr. Eugene Black was the President of the World Bank. Our present President was the Minister of Finance. Eugene Black had come to Sri Lanka and asked the then Finance Minister—and at that time the Finance Minister was in a

slightly more fortunate position than the present Minister of Finance—how much money he wanted for our development projects ?

Our President, who was then Minister of Finance, replied : 'Thank you very much. We do not need anything because we have what we want.' We built the Gal Oya Scheme entirely with our own resources. It cost Rs. 900 million then for the entire development of the Gal Oya Valley – for the construction of the reservoir, the roads and the buildings and the settlement of the people. It cost Rs. 900 million at that time, and the money came entirely from within Sri Lanka.

But if the World Bank were to come to Sri Lanka today and ask the Hon. Minister of Finance – 'What do you want ?'. What reply would he give ?

Even centrally planned economies need the IMF and the World Bank.

Yes, they control their economy, and we also control our economy. Are you saying that we are not controlling our economy ?

I will tell you how we are controlling our economy. It was our decision to go to the World Bank. We have not been told by anybody to go to the World Bank. Nobody told Dr. N. M. Perera to go to the World Bank. No one threatened Mrs. Indira Gandhi and told her to go to the IMF, but she went ! And why did they go ? They went because they needed capital for certain development projects which, in retrospect, as the Hon. Minister of Finance said, was not easily coming. You cannot do these things willy-nilly. You cannot smuggle from the World Bank through the back door. If you are dealing with them you must deal with them It must be a legitimate relationship.

UNCTAD has been espousing the cause of the Third World Countries trying to realize the objectives of stabilizing commodity prices, and if there is a stabilization of commodity prices year in and year out—our tea, our coffee, our rubber and other minor export crops—we will know exactly where we stand. It will not depend on the vagaries of the

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weather. That is what international institutions, the United Nations are trying to achieve. But we have yet to arrive at the destination.

Some of the most enlightened – I would call them progressive – leaders in countries who have a certain clout, like Mr. Willy Brandt, Mr. Edward Heath. What are they trying to say? They are saying that they must lift the Third World out of its present difficulties. They say that something in the nature of a Marshall Plan, a lot of assistance, a lot of aid, must be given to the Third World countries to rescue their economies from sliding down.

Whatever the motive, the argument is – and the argument is right – that we needed a change in international economic thinking to see that there is a revival of our economies. Now, that is so whether the Sri Lanka Freedom Party was in charge of the Government or the United National Party was in charge of the Government or, conceivably in the future, if a national government, as espoused by my good Friend Mr. S. D. Bandaranayake comes into being.

This is the problem that all the developing countries are having. They cannot get capital to start their development projects. And when I say they cannot get assistance, it is not that they cannot get it on commercial terms. If you go and float a syndicated loan you can get at 10 per cent. or 12 per cent. repayable in 10 years. But infrastructure development takes time to deliver profits. You cannot get soft loans easily whereas you get commercial loans.

· That is, Sir, the general picture of the Third World. It is so in all the countries, communist, socialist or capitalist. That is the problem of the Third World and two of the institutions with which communist countries, socialist countries and non-communist countries have been dealing for the last two decades are the World Bank and the IMF. Of course, now there are other banks, other institutions like the Asian Development Bank, the OPEC Fund, the Saudi Fund, the OECD, the Common Market Fund and many other funds – which lend capital not only to developing countries but even to the developed countries like the Federal Republic of Germany.

In this situation, against this background, in 1977 we formed the Government. We said before we came to office that we were going to open

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up the economy, that we were going to invite foreign investment, that we would like to restructure the plantation economy for more investment, that we would accelerate the Mahaweli Programme, that we would put more capital into the rural sector. We said all that. I must say that no Government laid its cards on the table, no party did so, as we did in 1977. We formed the Government. Then we had to get this country going. We have done many things, some of which have been tremendously successful ; others have not been so successful ; some have been partially successful. But I must say, broadly, that there is no catastrophic failure that one can think of.

I will try to illustrate with the Mahaweli Project. You need foreign capital to do this. How are you going to get the foreign capital ? You say the Free Trade Zone is bad. Let us say we accept that. How are you going to get foreign capital ? You are not going to print notes and buy your equipment – your bulldozers, trucks, cement, steel – and technical personnel ? You are not going to do that. So what was your thinking on how to get this country out of this rut ?

You had the experience of 1971. I think in the entire history of our country the bloodiest blood-bath that took place was in 1971. That was the time when hon. Members of Parliament found refuge inside.—(Interruption)— No, they crept inside their beds when the police stations were being attacked. Then revolvers were given to the MPs for their protection, police escorts and military escorts. When that happened did you think ‘what is the root cause of this ?’ ‘What was your answer to unemployment ?’ How were you going to get the rural sector moving ? I think the Hon. Minister of Agriculture quoted figures. Do you know that the agricultural produce really dropped from a peak in 1969, through 1970, 71, 72 and 73 from 19 million bushels of paddy to 14 million bushels ? How can you excuse that ? Can you really give an explanation ? At least maintain it at existing levels.

Your six year plan—Mrs. Bandaranaike as Prime Minister, was the Minister in charge of Plan Implementation. Dr. H. A. de S. Gunsekera and a large number of Central Bank economists wrote a Six Year Plan. Dr. S. A. Wickremesinghe was in the Government, Mr. Pieter Keuneman was

in the Government. Six Year Plan was started to develop the country and I remember Members of Parliament, and Deputy Ministers coming and talking about the Six Year Plan. If you look at HANSARD you will see that the Prime Minister, the Minister for Plan Implementation, getting up on the Floor of the House in answer to a question I raised in Parliament in 1976, and saying that the Six Year Plan was a total failure. So we have had failures—admitted at a national level in Parliament.

The hon. Second Member for Nuwara Eliya-Maskeliya speaks about Mahaweli. I do not know who is briefing him. But if he were to ask me, would you say that your Mahaweli programme is the failure? I would tell him that he does not know the meaning of the word 'failure'. What is he talking about? They say like father, like son. On Mahaweli at least they are one. Mr. Deputy Speaker—the hon. Member for Medawachchiya is not present. The Publicity Officer and the Press Relations Officer in my Ministry are the same people who served the former Minister for Irrigation, Power and Highways, Mr. Maithripala Senanayake. They are working for me now. They told me 'We were given an assignment at that time, because it was the fashion those days to say that Mr. Bandaranaike started everything, that he started all the colonization schemes, he built the roads, he built the villages, he built the airport—that he did everything, that he was the father of the Non-Aligned Movement, the Liberator of the country, the founder of the Sri Lanka Freedom Party—did everything. So they said, 'find out, so that we can put in documentation form Mr. Bandaranaike's views on the Mahaweli'. Mr. Deputy Speaker, do you know the result? These two officers, very honourable and very capable, looked through every page in HANSARD, they looked at all State Council Debates, they looked at all his public speeches, made locally and abroad, they studied all his writing and they could not find one place where he had used the word 'Mahaweli' even once. That is the record of the Sri Lanka Freedom Party in relation to the biggest development project this country has ever undertaken. So, if my friend Mr. Anura Bandaranaike does not know what he is talking about Mahaweli, he is following his father's foot-steps. He is asking my Deputy Minister and me: 'Are you going to say that you are going to finish everything by 1983?' I would like to tell him: 1983, this year, we have finished the biggest reservoir in the dry zone—the Maduru Oya reservoir, which will be declared open in May. I would like to tell him that we have developed over 100,000 acres in System H, and we

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have moved in 17,000 families. I would like to tell him that the Ulhitiya reservoir is over, the Rathkinda reservoir is over. I would like to tell him that under System C, 30 minor reservoirs have been built, completed, and 20 more reservoirs are being built. I would like to tell him that in System B 20 village tanks are being built. I would also like to tell him that the Loggaloya, Hepaloya and the Diyabanaoya reservoirs are being built. I also like to tell him that the link channel is built and that in Ulhitiya from the 15th of April 19,000 acres will be irrigated under the Accelerated Mahaweli Programme. I would also like to tell him that the Giranduru Kotte new township and Dehiatta-kandiya are being built. I would like to tell him that all the roads have been opened out. In fact, if he wants to travel on a road better than the Kandy-Colombo road, he should go to Kotmale and to Victoria. They are better than the Kandy-Colombo road. So, why do you not tell this to your Friend, your leader's son? Why are you just sitting there and waiting when he is saying these things in this House? Surely, we gave him the facilities to go and visit these places—*(Interruption.)*—That is his wish? That is the problem.

So, we have got things moving. There are managerial problems, I accept. There are other problems like inflation. I accept that also. But these are not problems affecting only Sri Lanka. The hon. Member for Kalawana (Mr. Sarath Muttetuwegma) says we are going to the brink. What is the brink? Is the opening out of 350,000 acres of land going to the brink? Putting 350,000 acres under agriculture—is that a brink? Is the releasing of 200 million rupees to develop Giant's Tank and putting right that system which the hon. Member for Mannar (Mr. P. S. Soosaitasan) referred to, going to the brink? Are we going to take the people of this country to the Kandalama reservoir, shoot them and annihilate them? I am asking you, tell us where this brink is? You say that 19,000 people working in the Free Trade Zone are not paid enough, labour laws do not apply, is that a brink? Mr. Castro is going to do the same thing. I hope you will take us there to show what they are trying to do. Fidel Castro told our President in Delhi, 'I am going to open a Free Trade Zone just like your Zone', and here his disciple is telling that this is a brink and not to do it. Please tell him before he starts what you are thinking about this matter. You should tell him, 'My god, do not open a free trade zone. There is one here in Katunayake. I have gone and seen it, the girls are suffering, the boys are suffering. They can be hired, they can be fired. Do not start the

same thing in Cuba'. I think in fairness to the spirit of brotherhood in the international movement, my good Friend must give this free advice. I think that advice may or may not be taken seriously, because I must tell you our good Friends go to the Soviet Union very often, but I can tell you from my own experience, that in the Soviet Union we are taken more seriously than the comrades !

So Sir, what is this brink that he is talking of ? There was a brink ; there was a disaster ; there was a time when young men in this country were saying, 'we have no way'. Why ? Because they would see their father losing his job ; factories being closed; no investment in irrigation ; no investment in agriculture ; no investment in the private sector. In short, every year more and more people were added into the long queue of unemployment. That was a fact before 1977. You do not paint a building, because you cannot get paint. You do not repair a building, because you cannot get cement. You do not put up a building, because you cannot get steel. You cannot dress, because you cannot buy clothes. You do not want to have children, because you cannot get milk. That is the brink. These were the problems.

Today the prices are going up, we admit. The prices of everything have gone up, we admit. But it is not in the direction of marching towards the brink. That is why, if you want to find the reason why, with all the suffering, with all the difficulties, the Presidential Election was won, why the referendum was won. After all, you are not the only elected Member of Parliament ; we are also elected. After all Member for Kotmale is not the only elected Member of Parliament. We are also elected. We also go to the houses to get votes, and most of us have been increasing our votes. In 1977 we got a certain number ; in 1982 we got a certain number. We are coming again to the South. Let us go there fairly and squarely.

We know the problems ; people are having lot of economic difficulties. But, in the salaried sector, salaries also have gone up. The Hon. Minister of Transport said that a clerk in his Ministry gets Rs. 600 more than in 1977. I would say that Rs. 600 is hardly sufficient to cushion the impact of the economic problem. But there is another factor ; two of his children may be employed, or at least one child would be employed. If a child is going to the school, all the school books are free. What is the use

of free education if you do not get free school books, or if you cannot get books? That is a fact. We cannot analyse; we do not want to rationalise. That is the direct result of the free economy. You find more transport. Twentyfive thousand new lorries have come into the country. If you say twentyfive thousand lorries, at the rate of two people for a lorry, a driver and another assistant, a cleaner, that is fifty thousand jobs. That is better than the Free Trade Zone. What about the garages and their employees? What about those who are employed in the transport business? So, these are the benefits that the economy is trying to revive. He is saying, for six years you have gone on with the Free Trade Zone, what have you achieved? Nineteen thousand jobs on the 1981 statistics! But he was reading the 1981 statistics. They may be printed in 1983; but they were 1981 statistics; so that is correct. Sir, when there is an economic rejuvenation and a revival, the indirect effects of economic activity are much more meaningful sometimes than the direct impact of economic activity, and that is a fact. I myself and certainly the Hon. Minister of Finance have had discussions about hotels, in the Cabinet. I am not disclosing Cabinet secrets. We have had our own views about the tourist industry; some say it is good and some say it is bad. But you must accept the fact that it is one of the fastest growing industries in the whole world. We are breaking down the Katunayake International Airport. Why?— Because that is an Airport designed to deal with three hundred thousand passengers a year. A million passengers are coming now every year. There is no room to sit, to walk about, to use the toilets, baggage clearance and various things like that. Now the airport is virtually being brought down. Why? Because by 1986, it is envisaged there will be three million tourists coming to Sri Lanka. Therefore, the Galadari Hotel, the Taj Hotel and the Swiss Hotel are coming up. Sheraton might come up, Hilton might come up, and you can send some people from Kalawana also for employment. Do you know their income, Hon. Member of Parliament? It is bigger than your income or my income. An employee in a hotel gets Rs. 3,000 a month with food. I am asking you, can we be so heartless, just because we are disciples of Karl Marx to say: 'No, these people should not get employment because I do not like his form of investment'. Who says that? Of course hon. Member for Kalawana never said that but there was an hon. Deputy Minister of the previous government who in the 1970 election campaign said, when our President just launched the infrastructure of the

tourist industry . . . referring to the Bentota Beach Hotel. 'If we come to power we will convert all these hotels into hospitals'. Our President, as Minister of State went and made a speech at that very same spot and said, 'No, I know what these people will do if they come to office. They will go and occupy the hotel free'. That is exactly what they did.

I was dealing with the quiet growth of this economy, and I will tell you something. Mr. Bob Hawke, a very distinguished Labour leader— in fact he has been in Parliament for only three years, happens to be the Prime Minister of Australia today, because after Mr. Malcolm Frazer dissolved Parliament, the Labour Party changed its leader, and Mr. Bob Hawke took over the leadership of the Labour Party, and he has now formed the Government. His thinking on many matters is very much to the left of centre. But what is he saying? 'I am not going to change the economic theories practised by this very Conservative Government of Malcolm Frazer immediately. I am in no hurry to change'.

He has done a one-shot devaluation by 10 per cent. and he has given a double-shot and said I am not going to change 'he economic theories in a hurry, I will take my time. And I am asking the Hon. Member for Kalawana, supposing he takes over, what is the revolutionary change he is going to do? Tell me.

If he is the Finance Minister or he appoints the Finance Minister, the first thing he will do is to go to the IMF. Then close to the IMF is another big building called the World Bank. He will go there and he will not inquire whether there is a rope in the World Bank President's room. He will go there, and he will enjoy going there.

Dr. N. M. Perera did that very successfully. I think he was more popular with the World Bank than the present Minister of Finance.

So, Sir, we go the path of all revolutionaries. We go the same way, and the future revolutionaries in the absence of anything better . . . will work with the World Bank and will work with the IMF. But there is a difference of course, as was evidenced in what our President was trying to do at Delhi. They are trying to bring pressure to change the mentality of

those institutions. You will not do that because you do not believe in those institutions. But you would like to look the other way if they slip something into your hand.

So, if I were to tell you that you cannot change anything, that is so, and you will not change anything. Are you going to get oil cheaper, because you form a government? Are you going to get one rupee more for the price of tea because you form a government? Are the coconut trees in this country suddenly going to produce double the nuts, just because you form a government? Are your trade union people going to work double the amount, just because you form a government? In fact, idling and wastage was much more when you were in government. Why? Because all the trade union leaders were hanging round the Ministers' offices. They were coming and dictating terms!

I must tell you quite frankly—that opposition trade unions are working much better today than our own unions. They are not round the Ministers.

The hon. Member for Medawachchiya knows the River Valleys Development Board. I had nearly four thousand idle labour! Each Minister who comes into the Ministry had to give jobs after forming a government. You cannot suddenly build a tank and irrigate ten thousand acres. So, you got to give jobs somewhere. What do you do? You give an order to recruit 200, and five months later another 200. We do not pay personally. The State pays. So we had nearly four thousand redundant labour. What are we doing. Because we have development going we are keeping that corporation going. We are keeping that corporation going by earning, by constructing this and that, by constructing roads. The River Valleys Development Board is constructing the Lunugamvehera Reservoir. What is the cost? Two thousand two hundred million rupees. Now that money comes to the corporation. Therefore, we are keeping the labour going. If we are not doing that, if there is no public sector expenditure, those salaries will have to be paid by the Treasury. Then after the land is developed we are telling them, 'We will give the labour some of the land. You retire, get your commuted pension, get your honorarium and become a land owner'. So, we are facing these situations and these problems because there is development. And while the theoretical part of it is very

sweet—that is a privilege we also have enjoyed in the Opposition—you get up and you criticise. You say this is wrong and that is wrong! 'IMF', 'World Bank' 'recession' and you sit down. How are you going to run this country?

The rupee income of the Hon. Minister for Finance is not sufficient to pay the recurrent expenditure of this country.

Sir, my good friend, the Second Member for Nuwara Eliya-Maskeliya had asked some very cutting questions about the Mahaweli. He said, 'Let me know what you are going to finish? Let me know what you have done? Have you not reduced the scale of the accelerated Mahaweli Programme?' He even said, 'You call the Mahaweli Programme accelerated. What have you accelerated?' I want to ask him whether he can point to me a single hydro-electric project anywhere in the world which has been done in under five years. Let him point it out to me. Nowhere. Because there is or rather there was a very fascinating exercise undertaken by the donor agencies, the lending institutions, bilateral agencies, called the 'Necessity for Feasibility Studies'. Feasibility studies, Hon. Members of Parliament know, are those studies which are relevant or necessary or thought to be necessary for the purpose of undertaking projects or a project on which millions and sometimes billions of public expenditure has to be incurred.

What happens in the Third World? A Government says, 'We want to build a hydro-electric dam or an irrigation scheme' or it says 'We want to Undertake urban development or rural development', and if you go to multilateral agencies they say, 'All right, let us undertake a feasibility study'. Then, to draw up the terms of reference for the feasibility study you take about five months at least.

These are the items which must be studied. If it is an irrigation project, the aspects of it which should go into the feasibility study are : how much rainfall is there—and that itself is a study which will take you to study the rainfall pattern not ten years before, perhaps fifteen years in the past. Then you study the topography of the area ; then you study the geography of the area and then you study the possible designs of the

project. You study whether the rock formation is right or wrong or good or suitable. You try to suggest the different methods by which the project can be built. It is like designing a house. Then you try to cost it : how much will go for cement, how much will go for steel, how many billion tons of concrete must be poured into it.

Now, to select people who should do the study you have got to call for world-wide bids. Then you have got to prepare two to three volumes on the basis of which the proposed company can put forward its bid. That will take another six months. Then the company is selected, and the selection of that consultant or the company has to be a joint study undertaken by the lending institution, the country receiving the multilateral assistance and perhaps an independent consultant chosen by both parties by consensus. After the offers come, you take another six months to evaluate it. Then after you select the person to study, the person comes or the group comes and, depending on the magnitude of the project, they take two to three years to finalize their study, at the end of which they say whether it is economical to undertake the project or not. Then this report is presented to the institution, the Asian Development Bank or the World Bank or some other institution which would like to consider whether it is going to lend the money.

If you study the history of the Aswan Dam—there is a very fascinating book called 'Hydro politics' ; it traces the history of the initial suggestion and the planning to undertake the construction of the Aswan Dam and after about 10 years of study the Egyptian Government suddenly found that the United States Government was not willing to lend the money or was not willing to ask the World Bank to lend the money. Well, Sir, this is a very fascinating exercise—the exercise of feasibility studies.

One of the questions that the Hon. Second Member for Nuwara Eliya-Maskeliya asked is, 'Have you studied sufficiently before you undertook this programme? Have you studied sufficiently?' I like to mention here a conversation that took place between our President and the World Bank when he was Prime Minister, at 'Temple Trees', at which I was present. The World Bank was present. He told the World bank, 'I have got a huge mandate, a 5/6 majority in Parliament. I have committed myself to undertake a programme of development to get this country

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moving, to accelerate development to find some answer, may be not the perfect answer, for unemployment, for our food crisis, energy crisis. Now I want to get on with the job. Are you going to help me or not? I do not want your reasons as to why this cannot be done or that cannot be done'. He reminded the World Bank that when he was an Alternate Governor of the World Bank as the Minister of Finance he used to go year in and year out for World Bank conferences and he noticed there the difference in the way they treated the European countries as against the countries in the Asian region. He said, 'I do not want your advice to tell me that I should not do things. If that is going to be your advice, please leave me alone and leave the country. You can go back as quickly as you came. But if you want to help us, help us, so that we can get the development, that our people want in this country, off the ground as quickly as possible'.

I like to tell the Hon. Member for Kotmale who is representing the same political thinking as the second Member for Nuwara Eliya-Maskeliya, that Victoria Dam was not designed when we took office in 1977, Kotmale Dam was not designed, Randenigala Dam was not designed, the place where the Maduru Oya Dam was going to be built was not even discovered and had not been visited, only 1/25 of Kalawewa system development had taken place. Apart from the Bowatenne evacuees no new family had been settled. The entirety of System 'C' i.e. the Mahiyangana area was not opened out, no new roads were built, the entirety of System 'B' the Maduru Oya area was not developed or even conceived of. So what we have done, If I may answer the Hon. Second Member for Nuwara Eliya-Maskeliya is to get the Projects moving, to get the funds to start the projects side by side with the feasibility studies and the implementation schedule being worked out. We did that. By 1980 all the projects were on-going. If my good Friend wants to know the meaning of acceleration it means precisely this, that we started off the huge head-works in the Mahaweli project at the same time.

He is asking me when the projects will be over. I will answer him. All the projects will be over by 1986. All the projects will hold sufficient water to irrigate a million acres of land. But, of course, moving people from one place to another is not easy, particularly in a democracy. You cannot hold a gun and tell people, 'get into this lorry; we are going to

dump you like animals somewhere'. No, you cannot do that. You have got to take the whole gamut of social problems into consideration.

You are going to uproot people who have been living in a particular place for perhaps thousands of years and placing them somewhere else. If you are thinking in terms of settlement of people, I do not think you can find a parallel to what successive UNP Government have done in relation to human settlements, starting from the late Mr. D. S. Senanayake onwards.

If you look at the economy of our country, you get the plantation economy of tea, rubber and coconut, which is largely a creation of British colonial times. Outside of tea, rubber and coconut, what have we got? What new crops have we planted? We started the development of the Dry Zone. I might ask the Hon. Member for Kotmale (Mr. Ananda Dassanayske), was it Mr. S. W. R. D. Bandaranaike?

All Irrigation projects before Independence were the vision of one man and one man alone, the late Mr. D. S. Senanayake. After Independence we built the Gal Oya Valley—once again the vision of Mr. D. S. Senanayake. Then we did the Walawe Scheme. The whole thing was planned out by the late Mr. D. S. Senanayake. The feasibility studies, the negotiation, funding and implementation started during the time of the late Mr. Dudley Senanayake and completed during the time of the late Mr. C. P. de Silva. From 1948 to 1977 there were only 4 major irrigation schemes. They were Gal Oya and Walawe, Rajangana and Polgolla. The Rajangana scheme was started by the late Mr. C. P. de Silva and Polgolla by the UNP Government.

I remember I was in the Gallery when the Debate on the Mahaweli Scheme took place in March 1970. I remember the relish with which the Members of the Opposition announced to the country that the first thing they would do after forming the Government would be to tear up the Agreement with the World Bank.

My good Friend the Hon. Second Member for Nuwara Eliya-Maskeliya, asked about the Mahaweli programme. I wish to tell him that the programme has been accelerated beyond all expectations. Most of

the projects are ahead of schedule, and we will be keeping our targets as we have set out to do. There may be a delay in some projects, as for example Victoria Project where there were tremendous difficulties in the tunnelling because they came across porous soil. They had to get down special equipment from England—some shuttering device. That problem is now over. We are not doing small projects. We are doing huge projects. At 420 feet. Victoria Dam is one of the tallest dams in Asia. These is about 7 1/2 miles of tunnelling to be done. It is nearly over. From 1948 up to 1977 I think Sri Lanka undertook four projects, three of which were planned and executed by the UNP Government, except Rajangana which was done by the SLFP. From 1977 up to now we are undertaking five massive Mahaweli projects. We are undertaking Lunugamvehera, we are undertaking Nilwala, we are undertaking Gin Ganga, we are undertaking Inginimitiya. We are opening up 350,000 acres of land. We are undertaking minor tank rehabilitation. The Hon. Member for Mannar was speaking about Giant's Tank. I think the Hon. Member will enlighten us and say for how many years that tank has not been modernized? I do not know. I think nearly 20 years.

For over 50 years not one single cent has been spent to modernize and rehabilitate that tank, but we are spending Rs. 200 million. These are difficult things to do. It is not easy but we are doing these programmes. If there is any hope for Sri Lanka, it is only these programmes which will give our younger generation a hope that there is still a future for them in Sri Lanka.

Many economists have said, 'You have done the correct thing because you have started to do these things when there is world-wide recession; when it is difficult to get the money, you have got the money'. Ten years from now the hon. Member for Kalawana will get up and say sometimes, 'Sri Lanka built the Victoria project only for Rs. 5,000 million'. It might cost Rs. 15,000 million then. It might cost Rs.20,000 million then.

That is the way that all developing countries must try at least to keep their development pace in line with the very high expectations of our younger generation. They want to dress well. They want to learn an

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international language. Why should English, French, German, Russian or Chinese be the prerogative of only a small class? They want to learn an international language. They want to have independent transport—a motor cycle or a small car. Well, these are things you and we cannot help. We might regret some of the bad things of materialism, but I think that controlled growth will result in people getting more and more oriented towards a comfortable life. You cannot help that. But it fits ill a Member of Parliament whose entire political philosophy is materialistic, 'dialectical materialism,' to say that materialism is bad. Are you trying to say that you must build an economy on spiritualism—by meditation, *sila* and *bhawana*?

So, difficult choices have to be made. Those choices are being made. We are not running away from that responsibility. Criticism can be made and criticism can be met, but we have to go on. What will be in store next year I do not know. As Julius Nyrere has told our President, maybe we will not be able to buy one single barrel of oil.—(*interruption*). If those people go and jack up the price of a barrel of oil to \$ 100, how can we buy it?

So what I wish to stress, Sir, is this one fact. I am not trying make a point out of Fidel Castro starting a free trade zone in Cuba. What I am trying to stress is that all small countries, all poor countries, are trying to find a way out of their problems. They are trying to find answers to their problems. Why should the hon. Member for Kotmale and myself have a debate as to whether a man should have employment or not, whether he should have a decent house or not? We agree on that. The problem is how to do it. The difference is that your Minister of Housing built 400 houses in seven years, our Minister of Housing has built 100,000 houses in five years.

There is a slight difference I think, even you will agree! You subtract four hundred houses from one hundred thousand. What is the answer the Hon. Member for Kotmale can give? It is nine hundred thousand and six hundred. So there is a slight difference! The difference is I can tell you, I can give you the names, I can table the names of the schemes in the House.

We have between 1977 and 1982 built three thousand village tanks. The Hon. Members know where those tanks and anicuts are. We

built them. there is no communist village tanks, no SLFP village tanks, no UNP village tanks. A *wewa* is a *wewa*. Whether it irrigates hundred or two hundred acres. Whether it is the UNP or the SLFP the farmer gets the benefit. That is the biggest change that has taken place in this country. That is why all these arguments are useless. You can say Samajawadaya, Socialism, Bandaranaike Socialism,—my good friend can say Karl Marx has announced the best way of changing the country. But the villager wants a house to live, water for his paddy field, wants better schools, better health ! I think the answer to our political success partially is the fact that we have brought about these changes in the village. Village electrification, for instance. We were trying to electrify one thousand villages a year. But what happened ? The cost of all the equipment went up. The cost of wire, the cost of electrical generator plants, transformers all went up. So we have to cut down. If you are in power you will have to face the same problem. Then the Asian Development Bank was prepared to give us the foreign money, but we cannot find the local rupees. We have only one hundred thousand tax payers in this country.

So, Mr. Speaker whoever runs the country have to come to terms with a very real challenge of pumping more money into the village, by doing more rural development and by creating more employment in the village. And that is the answer to our problem. We have a big problem, the problem is, we want to lead a comfortable life. That is the problem in all democratic countries. Politicians come and say we can give you more and more. In the last election they said—'Vote for pot, everything will be all right'. Yes, the Lamp also said the same thing, and the people accepted the Lamp in preference to the Pot. This competition has been going on, so people think they can get more and more and we also say we can give more and more, and ultimately when in the seat of Government and the expectations are so high, we find that we cannot deliver mainly because costs are going up all the time.

Sir, all of us can do well if we can get one message home to our villages, that every day cannot be Christmas. That nothing can be got free. We have to pay for oil. We have to pay for cement, for steel, for medicine and clothes, and we have to pay for these in hard currency in the financial capitals of the world. That is a fact.

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Now, that is something which all leaders have tried to say and most often failed. That is because there was competition between the Government and the Opposition. Governments have fallen, governments have been elected, but, at the end of it the truth dawns that the Platitudes have not been matched by action. But finally Mr. Speaker, the answer is how did the nation respond to the challenge? We have our own answers. Our President has been courageous enough to say, 'I cannot do this, I cannot give this free, I want to channel some of the money for development', and his success was that whereas most of the leaders having done so could not get the public support, he succeeded in getting the public support. We are not bothered about these job banks, I think most of our MPs are saying, 'Scrap job banks'. We do not mind giving employment to SLFP supporters, to Communist supporters; certainly we would like to do that. But let us get this country going and get employment because most of the communists will become UNP supporters after sometime, if they get the jobs. That is what we would like to do during the next few years, and our President has suggested this at the Delhi Summit of Non-Aligned Nations and he has proposed that Mrs. Indira Gandhi as the Chairman of the Non-Aligned Group of Nations should lead a delegation of heads of Government of Non-Aligned countries to meet these people who are in charge of the developed world and say, 'Devote a small percentage of your GNP to develop our countries so that we also can stand on our own two feet'. Now, the Hon. Second Member for Nuwara Eliya-Maskeliya (Mr. Anura Bandaranaike), they always think that Mrs. Indira Gandhi is only their friend. They feel that they can come and say things here, excite us and make us say things against her. No, we do not want to do that. She is the leader of a great nation and I think she has got a very rich political experience and she knows what she is doing. We are not going to get excited about what our good Friends say. He had used the words that the Indian leader has given a 'slap in our face', when she had a press conference and said, 'I am not going to go the developed countries and plead the cause of other people'. I think that she did not mean anything personal, she is too big a person to deal with international matters on a personal basis, and in the course of time as head of Government our President will communicate with the head of the Non-Aligned Movement, because the Resolution which he brought before the Non-Aligned Movement was passed unanimously. Even Mr. Castro

voted for it. They unanimously acted and accepted the fact, 'Yes, we will go and meet these people and tell them to help us to get the World Bank and the IMF to change. We want development, we want employment. Every second two children are dying in the Third World'. They all realise that and are deeply concerned. They must be. They mentioned the Brandt Commission, UNCTAD and the article by Dr. Henry Kissinger published in all the leading journals—

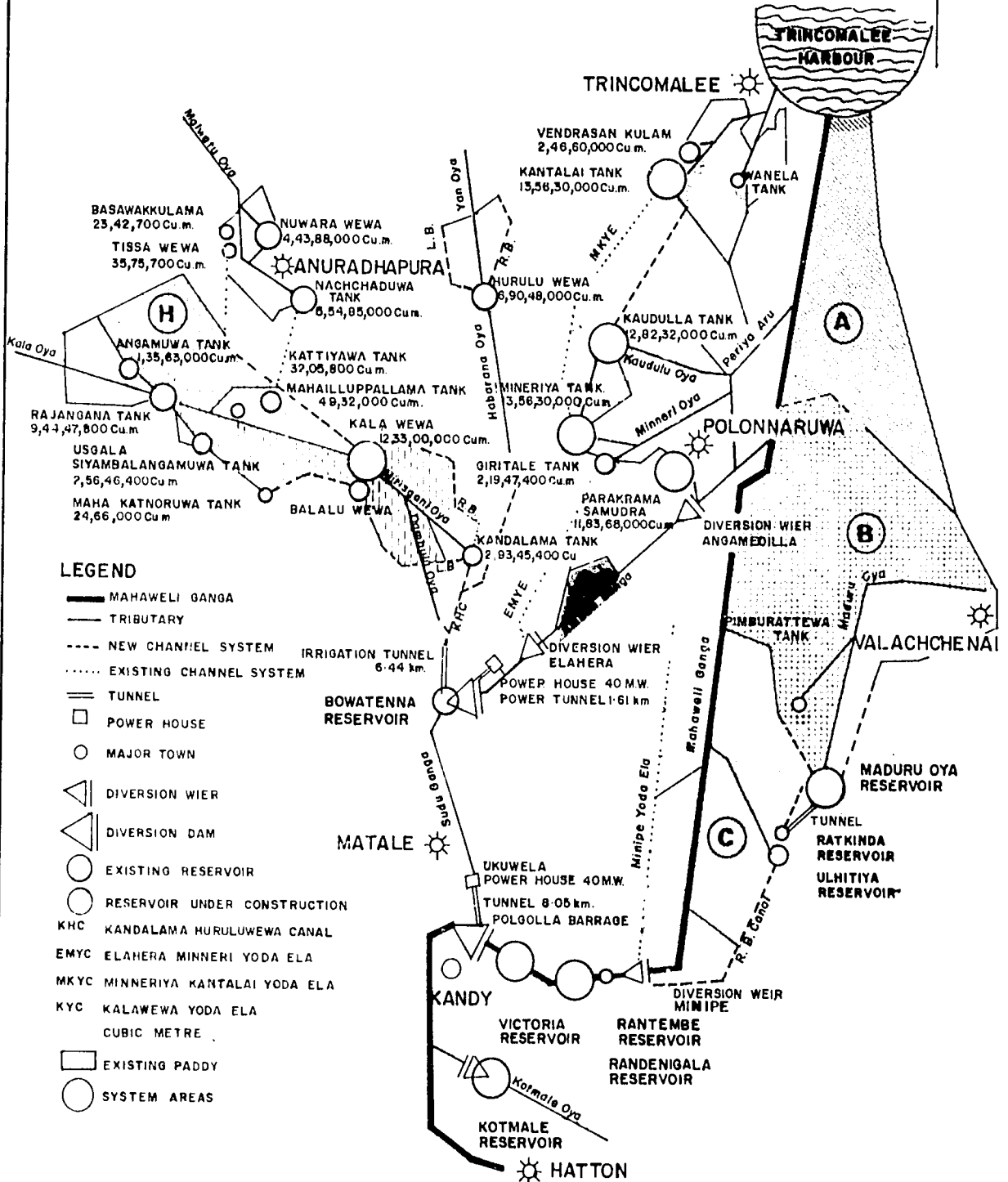
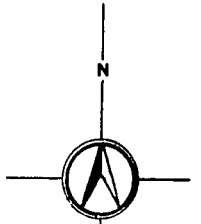
At stake is the survival of society. People are dying. There is famine. There is unemployment. We had this situation in Sri Lanka when we went to fight the by-election of my Deputy Minister, Mr. Adikari in Kalawewa in 1974. People had not had a successful harvest for 3 years. They were eating boiled papaw. These were the situations there. No one was happy. I think he broke that seat from the S.L.F.P. after 25 years because of those economic conditions. Now, my good Friend must go to Kalawana and see what it is like. The hon. Member for Kotmale has gone there many times. No one is boiling papaws and eating now — largely because we have made a success of an irrigation system of 130 thousand acres.

So, Sir, problems are difficult. We have tried to do what we could have done under these circumstances. As I said earlier, we have failed in some instances. We would have liked as my good Friend the Member for Kalawana said, more electronic industries to come to the Free Trade Zone. But, if they do not come, are we going to ask the garment industries now to close up and go? Why should we? Nineteen thousand to twenty thousand people are employed. So, I think under difficult and trying conditions, we have in a context where about 30 million workers are unemployed in industrial countries, in Germany, in England, in the United States — as my good Friend said, there are soup kitchens to feed the poor people; there are so many difficulties; there is famine in Africa and in India — under trying conditions, I say, we have done well. The wonder is not that we have had this problem. The wonder is that we are surviving at all. The wonder is that the Hon. Minister of Finance can get up in this House and present a Budget. The wonder is that we have no turmoil other than some small political issues some political adventurers are creating. You are searching for dead bodies. You want another Dambarawe Ratanasara. We will not give you. You want another Weerasuriya. We are

not going to give you. So, till then the Hon. Members of the Opposition of the Sri Lanka Freedom Party, you have to put your own houses in order. You must get your two factions together. You must get your leaders to talk to each other and behave as mature political leaders and not behave like kids. You must abandon family bandyism. Those are the real challenges that you have got. Try and resolve them, because it is good for the country if you resolve them ; then we will have a strong opposition.

As for the Hon. Member for Kalawana, I think, Sir, next year his criticism will be the same. The year after also it would be the same. I do not expect it to change. In the meanwhile he will organise a few protests with a few people carrying placards during the day time and in the evening he will go to cocktail parties, meet socialist leaders, trade union leaders and discuss, and say, what a tragic thing Mr. J. R. Jayewardene is doing ? 'He is working with th I.M.F. and the World Bank'. But quietly he will say in a whisper, 'Frankly, it is not so bad after all'. That I think will be his milieu of life. They will reconcile themselves too. In the meanwhile we will finish all the development programmes that we have undertaken ; we will finish Mahaweli ; we will finish housing ; we will try to improve the Free Trade Zone ; we will try to improve transport ; we will try to get better terms from the I.M.F. and the World Bank. And I hopefully think the next decade, starting from now, certainly the next period of office of the United National Party, will be a better period for Sri Lanka.

MAHAWELI PROJECT DIAGRAMATIC REPRESENTATION OF PROJECT I AND THE ACCELERATED MAHAWELI PROGRAMME



INTRODUCTION

At the time the present Government assumed office in 1977, the responsibility for the implementation of the Mahaweli Development Programme lay with the Ministry of Irrigation, Power & Highways. However, after the decision taken by Government in 1977 to accelerate the Mahaweli Development Programme, the responsibility for its implementation was vested in the newly established Ministry of Mahaweli Development, which was set up exclusively for work connected with the Mahaweli Development Programme.

As an umbrella organisation for planning and implementing the Programme, the Mahaweli Authority of Sri Lanka (MASL) was established by Parliamentary Act No. 23 of 1979. The MASL, the Mahaweli Development Board (MDB), the River Valleys Development Board (RVDB) and the Central Engineering Consultancy Bureau (CECB) were placed under the aegis of the Ministry of Mahaweli Development.

Earlier on, soon after the new Government was formed in 1977, the entire Cabinet of Ministers, along with the officials concerned, explored in great detail the feasibility of accelerating the Programme and a decision was taken for the immediate implementation of certain key projects of the Programme based on the recommendations in the Mahaweli Master Plan that had been formulated by the United Nations Development Programme and the United Nations Food and Agriculture Organisation, with assistance of the Departments of Irrigation, Survey, Agriculture and the then Department of Government Electrical Undertakings.

The Master Plan

This Master Plan had envisaged the development of 365,000 ha. (901,500 ac.) new land under irrigation of which 100,000 ha. (247,000 ac.) consisted of already developed land but which had been recommended for improved

Irrigation facilities. It planned for the construction of a series of reservoirs on the Mahaweli Ganga, its tributary the Amban Ganga, the Maduru Oya, Yan Oya, Malwatu Oya and proposed the development of irrigation projects in thirteen "Systems". The Master Plan also recommended the installation of hydro-power capacity of approximately 600 MW. The development process was proposed to spread over a 30-year period.

The implementation strategy of the Master Plan included three phases ; each phase consisting of a large number of projects. The first phase consisted of the construction of the Polgolla-Bowatenne Complex, the Victoria-Minipe diversion and the Moragahakande reservoir to benefit 135,000 ha. (333,400 ac.) of land under irrigation and installation of 200 MW capacity for power generation. The second phase was for the development of 95,000 ha (234,600 ac.) using the storage of water which would be made available in Victoria and Moragahakande reservoirs, etc., and install approximately 15 MW of capacity for power generation. The third phase was for the construction of other reservoirs such as the Kotmale, Randenigala and those on the Uma Oya, Loggal Oya and certain tributaries of the Amban Ganga to irrigate parts of the North Central and Northern Provinces and install approximately 380 MW capacity for power generation.

The new Government however, in November 1977 decided to telescope the implementation programme proposed in the Master Plan into a tight time frame of

five years and included the major projects of the Master Plan in the Accelerated Programme.

Why Accelerate ?

The Government was prompted by many motivating considerations to accelerate the implementation of the Mahaweli Programme within the shortest possible time. The imperatives of keeping the Nation fed, the colossal annual drain on the foreign exchange resources of the country arising from the necessity to import staple food and subsidising the ever increasing population, and the problem of acute unemployment were among the main considerations. In 1977, the official unemployment figure stood at 1.2 million with an annual increment to the work force of about 125,000. In view of the restrictions imposed by the non-availability of other natural resources, such as minerals to develop the industrial sector of the economy, to expand and diversify the nation's economic base and provide additional employment opportunities, the Government had perforce to opt principally for the speedy development of the comparatively abundant resources of land and water. A broad base had to be created for increased agricultural production, for human settlements and for additional employment opportunities. It had been estimated that a hectare of farm-land would provide full-time employment for an average farm family and also full-time employment for an additional unit of labour in the services sector. Thus the development of farmland with facilities for services and agri-business would with certainty provide opportunities for the employment

of thousands in agricultural pursuits, besides creating immediate employment opportunities in the construction stages of the many projects.

The increasing costs of fossil fuels and the increasing demand for electricity in the rapidly expanding commercial and industrial sectors such as those in the Free Trade Zone (FTZ) and in Urban re-development areas and the high demand for rural electrification too prompted the Government to accelerate the Mahaweli Programme, as the generation of hydro-power formed one of its essential components.

The installed capacity in Sri Lanka even in 1982 was 455 MW and the average for the country was 123 KW hours per caput, which was one of the lowest averages in Asia. Also at the time, only about 10% of the rural population was provided with this facility. Thus there existed a clear case for the expansion of the rural electrification programme.

The slow implementation of the Mahaweli Programme, over the originally estimated period of thirty years, would have made the cost of construction unbearable for the country in the face of spiralling inflation, which was pushing up construction costs. Government resources on the scale required for the implementation of the Mahaweli Programme would hardly be forthcoming in the future, in the face of the problems the country would be faced with in providing the bare basic necessities of the increasing population.

Multi-Purpose

The Accelerated Mahaweli Programme envisaged the construction of a series of reservoirs with hydro-electricity plant, to develop a large extent of land in the downstream areas with irrigation facilities, for establishment of new settlements and for agricultural development. The accelerated plan included the construction of the Kotmale, Victoria, Maduru Oya, Randenigala and Moragahakande Projects simultaneously in a single concerted construction phase.

A later review of this implementation strategy by a Netherlands – Consultancy firm, NEDECO, pointed to a situation that with proper water management, the construction of Kotmale, Victoria and Maduru Oya reservoirs alone would be sufficient to irrigate the land area and generate hydro-power to the extent that was expected under the Accelerated Programme. However, the Government decided to take up the construction of four reservoirs including the Randenigala reservoir, along with the three recommended by the NEDECO studies. Randenigala was justified solely, and was deemed necessary on the basis of the energy requirements of the country anticipated around 1986.

Basic Features

The basic features of the projects falling within the Accelerated Programme are as follows :

Approximate extent of new land in the Accelerated Mahaweli Programme

System A	-	36,000 ha. (89,000 ac.)
System B	-	48,000 ha. (118,000 ac.)
System C	-	24,000 ha. (59,000 ac.)
System D	-	16,000 ha. (39,000 ac.)
System G	-	2,800 ha. (7,000 ac.)

Additionally the on-going work of System H was also speeded up and brought under the Accelerated Programme.

Generation of Hydro-Power

K. L. Simala	- 134 MW (an additional unit of 67 MW capacity to be installed later)
	- 210 MW (provision has been made to install additional units to meet any likely demand for peaking capacity in the future)
Randenigala	122 MW

The Accelerated Programme by itself is of immense magnitude when considered in the light of the demand it makes on the country's resources. It is dramatized by the time target the Government has set for its implementation. That exercise necessarily made it contingent on many other action programmes, before construction work actually commenced on the Projects.

The decision to accelerate the Mahaweli Programme called for quick action to get the feasibility of the key projects, which were recommended in the Master Plan in general terms, studied and appraised in detail before acceptance for implementation and for foreign funding. In this, the services of a number of well known foreign agencies were obtained and the studies were financed by a number of donor countries. Based on those feasibility studies, a development programme and implementation strategies were prepared. Herein, it may

be mentioned that apart from the Master Plan and the feasibility report which was prepared by Messrs SOGREAH of Grenoble, France, in respect of system H and the feasibility reports on Polgolla, Bowatenne Complexes and the Kotmale Power Project, no other feasibility study had been done in respect of any other Project under the Mahaweli Development Programme, before 1977.

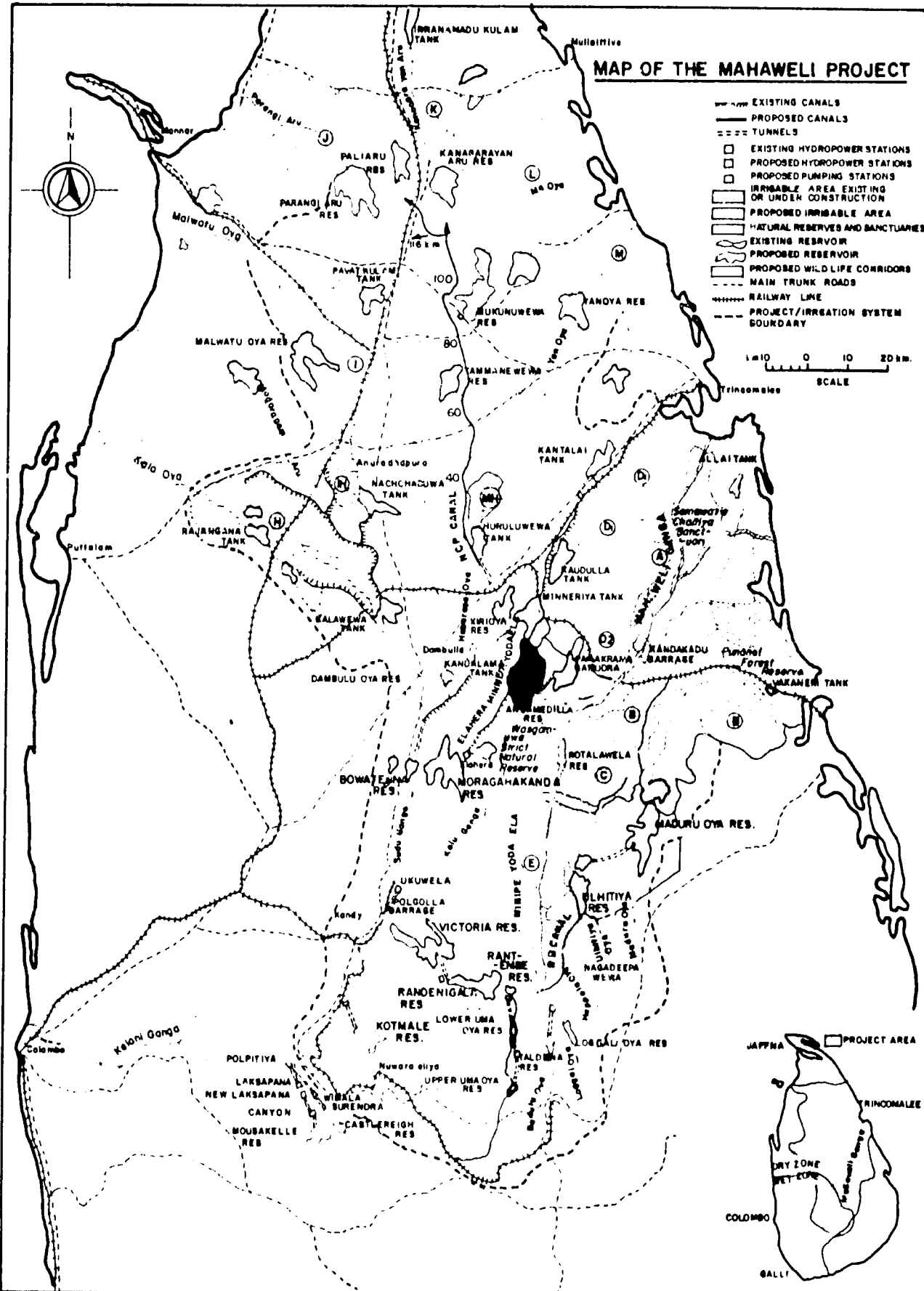
Friendly Assistance

The implementation of the Programme also called for harnessing adequate resources, particularly the raising of foreign funds for the construction of the Projects and the implementation of the various downstream development programmes. In this, the Government was fortunate to be able to obtain funds either as grants or soft loans from an array of friendly countries such as the U.S.A., Canada, U.K., the Federal Republic of Germany, Sweden, The Netherlands, Belgium, Kuwait, Saudi Arabia, Japan and from international funding agencies like the World Bank.

It is necessary to record with satisfaction the quick response and the steady co-operation that the international community evinced in mobilising the financial and technical resources for the implementation of these projects. Perhaps such interest and co-operation would have stemmed from an appreciation of the economic and social rationale and the immense potential of the Projects, as well as the political philosophy of the new Administration.

Up to end of the year 1981 about Rs. 10,800 Million had been spent and the

MAP OF THE MAHAWELE PROJECT



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financial allocation for the current year is Rs. 7,217 Million. In the resource allocation for national development, the Accelerated Mahaweli Programme has continued to receive the highest priority, the expected investment between 1982 and 1986 being in the order of Rs. 40,000 Million.

Logistics

The optimal mobilisation of real resources to bring about the proper resource combinations called for scrupulous care and attention at the national level, to sustain overall balanced development. The concurrent development of the Projects entailed severe logistical problems connected with the deployment of men, material, plant, equipment and machinery on the several projects. The effects this could have on and its interfacing with other sectors of the economy had necessarily to be examined in deep detail. Overall, a management structure that befitted this programme on an objective basis had to be meticulously put together.

Since the beginning of the implementation of the Mahaweli Development Programme in 1970, the Mahaweli Development Board (MDB) was responsible for the integrated development of all Mahaweli Projects, including headworks. In 1978 the responsibility for designing and engineering of the headworks was transferred to the Central Engineering Consultancy Bureau (CECB) and on 1.1.81, the responsibility for post-construction development work in the downstream Projects was transferred to the Mahaweli Authority of Sri Lanka

(MASL). The MDB continues with the task of designing, engineering and construction of downstream development work in all the Mahaweli Projects, (except in System G which is being done by the Department of Irrigation) inclusive of the construction of the Minipe Right Bank trans-basin canal system

Historic Decision

The decision taken by the Government in 1977 to telescope the Mahaweli Development implementation programme, so pregnant with hope and expectation, has been vindicated by the progress made so far in achieving the goal of self-sufficiency. Considered in historical perspective the construction of these reservoir complexes within a span of 5-6 years, make the 1977-83 period one of the most spectacular in terms of agro-engineering in the annals of Sri Lanka. Apart from the number, magnitude and the surface coverage of these projects, certain key considerations such as the increased power generation capacity, the increased extent of land that would be made available for agricultural settlement, make this a remarkable period in Sri Lanka's history. For instance, with the completion of the power projects on the three major reservoirs, 466 MW of power would be added within a period of five years to the total installed capacity of 380 MW which the country had developed over a period of about one hundred years. The ever escalating cost of fossil fuel and increasing demand on electricity alone justify the investments which are being made in these projects. The development of around 127,000 ha. (313,700 ac.) of new land in areas which are presently

undeveloped and uninhabited or sparsely populated, within a decade at most, stands in contrast to the period of over fifty years the country had taken to develop 200,000 ha. (494,000 ac.) under major settlement schemes. The quantifiable and non-quantifiable benefits which result from the implementation of the Mahaweli Programme on the national economy and society in general would be immense, serving to make the intensive and heavy investments in the Programme an unparalleled politico-economic exercise.

KOTMALE HYDROPOWER PROJECT

The Kotmale project was one of the first projects taken up under the Accelerated Programme for development of the Mahaweli Ganga basin. The basic elements of the project are a dam on the Kotmale Oya (a tributary of the Mahaweli Ganga) and a tunnel system leading to a power station with an outfall to the Mahaweli Ganga. The primary function of the project is the generation of hydro electric power. Additional benefits will arise from an increase in the amount of irrigation water available at Polgolla due to regulation of flows in the Kotmale Oya.

Preliminary studies of the Kotmale Project were carried out by the Government of Sri Lanka with the assistance of US Agency for International Development (USAID) in 1961 and subsequently by UNDP-FAO from 1964 to 1968. A feasibility study of the project was carried out by the Water and Power Development Consultancy Services

(India) Limited (WAPCOS) from 1973 to 1976.

Sir William Halcrow and Partners UK., in association with Messrs. Kennedy & Donkin UK., and the Central Engineering Consultancy Bureau (CECB) were appointed in 1979 to provide consultancy services for the project.

Scope

The Kotmale Project envisages the construction of a 87m. (285 ft.) high rockfill dam across the Kotmale Oya. The dam would create a reservoir having an effective storage capacity of about 174 m.cm. (141,000 acre feet) enabling regulation of a large proportion of the recorded mean annual flow of the Kotmale Oya at the dam site. The water impounded by the reservoir would be conveyed through an underground water conductor system to an underground power station located at about 7.2 km.

(4.5 miles) from the dam for generation of electric power. After power generation, this water will be discharged through the outfall into the Mahaweli Ganga at the Atabage Oya confluence.

In addition to the generation of power, the regulated water will improve the pattern of inflows of the Mahaweli Ganga at the existing Polgolla diversion dam. This will firm up the power benefits from the Ukuwela power station as well as from the Bowatenne power station (recently commissioned) and serve to increase the irrigation water supplies from the Bowatenne dam.

Location and Access

The dam site at Kadadora is located at about 6.6 kms. (4.1 miles) from the Kotmale Oya - Mahaweli Ganga confluence. The underground power house is situated in the neighbouring Atabage Oya valley on the right of the Kotmale valley, near the confluence of the Mahaweli Ganga-Atabage Oya or 6.4 kms. (4 miles) downstream of the Mahaweli Ganga - Kotmale Oya confluence.

The project area is located on the right bank of Mahaweli Ganga and is covered partly in the Kandy District and partly in Nuwara Eliya District. It is well connected to Colombo through 2 main road routes. Three towns, namely Gampola, Ulapane and Nawalapitiya located on the left bank of Mahaweli Ganga are in the project vicinity. The distance from Nawalapitiya to Gampola is about 16 kms. (10 miles) with Ulapane situated midway. The right bank of the dam is located at mile 7 of the existing Ulapane-Pussellawa minor road.

The left bank of the dam is located at mile 7 of the existing Nawalapitiya-Pussellawa minor road. The power house site is situated at about 4 kms. (2.5 miles) from mile 2 (approximately) of the existing Gampola-Pussellawa principal road. The railway line connecting Hatton with Colombo via Peradeniya, Gampola, Ulapane and Nawalapitiya passes close to the road connecting Gampola, Ulapane and Nawalapitiya.

Hydrology

The river and its tributaries originate in the south central massif at an elevation of 2,134 m. (7,000 ft.). Along its main course, the Kotmale Oya is 70 kms. (43.3 miles) long. It drains a total area of 58,534 ha. (226 sq.mil.) and drops by 1,585 m. (5,200 ft.) before its confluence with the Mahaweli Ganga. At the dam site, the bed elevation of the river is 620 m. (2,035 ft.) and the catchment area is 54,390 ha. (210 sq.mil.).

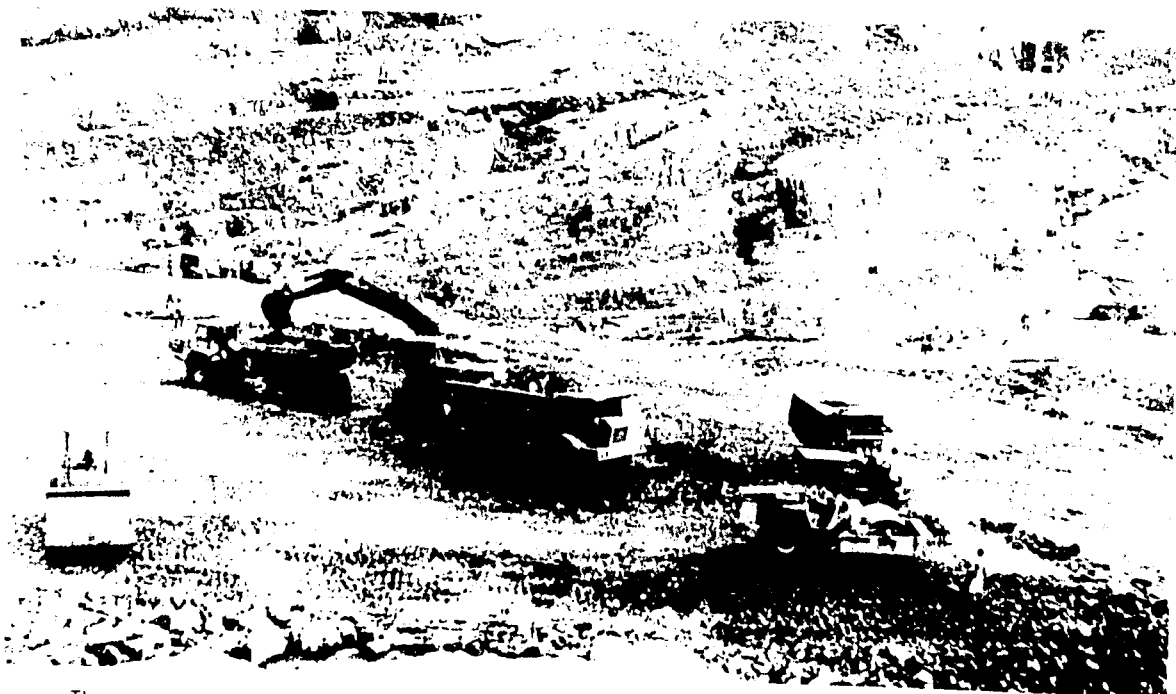
Historical flow series on a monthly basis are available for 24 years (1950 - 1973) along with rainfall data for 66 years (1907 - 1972) from 19 stations located within the catchment area of the project. A unit hydrograph of 3-hour unit duration was derived using short interval rainfall data and by iterative tallying of the derived and observed flood hydrographs.

Using the design storms and unit hydrograph, the design flood (probable maximum flood) with a peak of 5,550 cumecs (196,000 cusecs) was arrived at. The flood hydrograph based on the unit hydrographs storm maximisation approach has been found acceptable for



The break-through in the Kotmale Power Tunnel was a significant Mahaweli event on January 11, 1983. Photograph shows the Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development setting off the blast inside the tunnel to effect the break-through while Bhikkus chanted 'Sethpirith'. Among

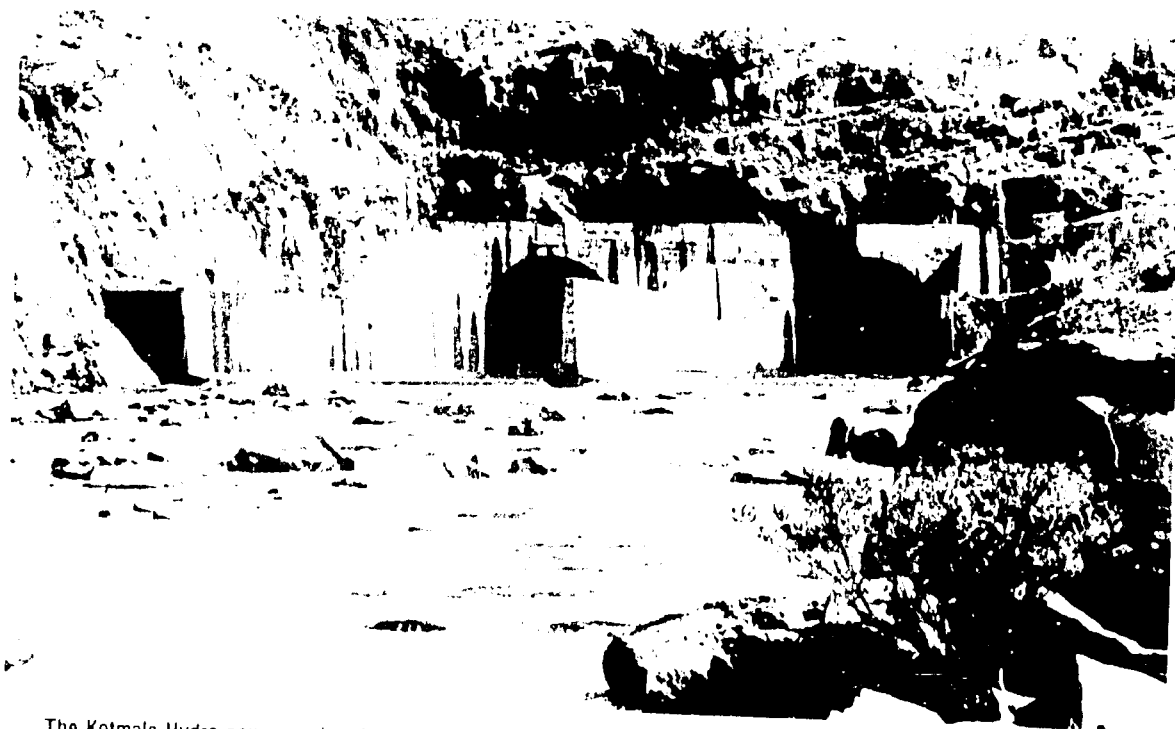
those present on this occasion, were the District Ministers of Kandy and Nuwara-Eliya Districts, Mr. W. M. P. B. Dissanayaka and Mrs. Renuka Ranaweera, and the Secretary to the Ministry of Mahaweli Development, Mr. Ivan Samarawickrema.



The contract for the Kotmale reservoir works was awarded to M/s SKANSKA in October 1982 and rock excavation of the foundation has been completed and plinth concreting done.

Rockfilling on the dam is now in hand.

Photograph shows work during excavation of the dam foundation.



The Kotmale Hydro-power project based on the Kotmale Oya, a tributary of the Mahaweli—in its upper reaches, will have an installed capacity of 201 MW from three units of 67 MW Francis turbines. The Kotmale Project envisages the construction of a 285 ft. high rockfill dam, 1968 feet long, to create a reservoir with an effective storage capacity of 141,000 ac. ft. The Kotmale Power Station, Sri Lanka's first underground power station, is situated in the

neighbouring Atabage Oya Valley. The contract for the main civil works on the Kotmale Oya Project has been awarded to M/s. Skanska Cementjuteriet, Sweden. The Project is scheduled for commissioning in 1985. Photograph shows front view of the Kotmale diversion tunnel with the portal of the power tunnel under construction.

adoption in the spillway flood routing studies.

Geology

A review of the previous geological studies and the additional investigations performed since 1979 were carried out by a panel of experts who were appointed by the Ministry of Mahaweli Development to advise on the layout to be finally selected. The panel identified a variety of adverse geological features, such as unstable soil and rock masses in the reservoir area, solutioned and cavernous limestone in the reservoir and below the dam site and deep and irregular weathering of rock associated with strong lineaments representing either master joints or faults. The potential problems considered were reservoir landslides, leakage of water either into adjacent valleys or beneath the dam, sliding, stability of the dam under varying conditions and the potential for piping around the foundation.

The panel considered that these problems could be handled within reasonable costs by the present design with some additions and modifications recommended by them. Most of these modifications have now been incorporated in the design and the panel's recommendations regarding further investigation are being carried out.

Project Features

Taking into consideration the financial constraints associated with the project the Hon. Minister of Lands, Land Development and Mahaweli Development

directed that the scheme be modified leaving provisions for raising of the dam later. The modified scheme is described below.

A 600m. (1,968 ft.) long rockfill dam with a concrete membrane is proposed across Kotmale Oya. The full supply level of the reservoir would be 703 m. (2,206 ft.) mean sea level (MSL) which would provide a gross storage capacity of 174 m.cm. (141,000 ac.ft.). The crest elevation will be 706.5 m. (2,317 ft.) MSL. The concrete membrane on the upstream face will have a thickness of 300 mm. (1 ft.) at the crest, increasing to 474 mm. (1.6 ft.) at the plinth. The chute spillway located on the left bank will have three gates of size 14m. x 15m. (46ft. x 49 ft.) capable of discharging 5,550 cumecs (196,000 cusecs) with all three gates open.

River diversion will be effected through two 9.2 m. (30 ft.) diameter "D" shaped lined tunnels capable of discharging 1,700 cumecs (60,000 cusecs) which is the 1 in 100 year flood.

A bottom outlet has been considered necessary to control the level of water in the reservoir and it is proposed to use one of the diversion tunnels for this purpose. Suitable modifications with a plug and control equipment will be installed to enable a discharge of 60 to 90 cumecs (2,100 to 3,200 c.f.s.) to be made when necessary. A new access tunnel leading up to the control chamber is being considered.

The intake structure, located on the right bank, is capable of discharging 113

cumecs (4,000 cusecs). The 5.2 m. (14 ft.) diameter and 84 m. (275 ft.) deep gate shaft is located 165 m. (540 ft.) downstream of the intake.

The water conductor system consists of a 6,560 m. (21,517 ft.) long 6.2 m. (20 ft.) diameter horseshoe shaped lined low pressure tunnel, 15 m. (49 ft.) diameter 160 m. (525 ft.) deep surge shaft, and a high pressure tunnel system. The lower end of the high pressure tunnel system leading into the underground machine chamber will be steel-lined. The steel-lined section will initially be 4.8 m. (15.8 ft.) diameter bifurcating twice to serve each machine with a gradual reduction of diameter to 2.5 m. (8.2 ft.).

The machine chamber will be 70 m. × 18 m. × 34.7 m. (230 ft. × 59 ft. × 114 ft.) capable of housing three machines. The downstream surge chamber will be located just downstream of the machine chamber and the horseshoe shaped lined tailrace tunnel will be 6.2 m. (20 ft.) in diameter and 442 m. (1,450 ft.) long. The transformers and switchyard will all be located on the surface immediately above the machine chamber. A cable cum ventilation shaft will connect the machine chamber to the switchyard area.

Two Francis type turbines directly connected to the vertical shaft generators with an installed capacity of 134 MW will be commissioned initially. The increase in system firm energy due to the introduction of Kotmale Project has been estimated at 460 GWh with a long term average annual total of 500 GWh.

Cost Estimates

The estimated final cost of the project as could be forecast at the end of 1982 in summary is as follows :-

<u>Description</u>	<u>Cost</u> (Rs. millions)
(a) Work by Government Agencies	500
(b) <u>Civil Works</u> ;	
(i) Initial Works	915
(ii) Underground Works	1700
(iii) Reservoir Works	3600
(iv) Electrical & Mechanical Works	1200
(c) Contingencies, etc.	585

	8500

Present Progress

Work on the project commenced in 1979 with the appointment of the Consultants and the signing of the framework agreement with the Main Civil Contractor. The Progress of Work on the main Contracts are described below :

1. Initial Works Contract on 4th August 1979 to Messrs. AB Skanska Cementgjuteriet,
2. Underground Works Contract on 18th December 1979 to Messrs. AB Skanska Cementgjuteriet,
3. Power Station Plant Contract (KOT/P1) on 26th June 1981 to Messrs. ASEA AB.,
4. Reservoir Works Contract on 2nd October 1981 to Messrs. AB Skanska Cementgjuteriet,
5. High Pressure Steel Liner Contract (KOT/E1) with Messrs. ASEA AB on 4th November 1981,
6. Substation Plant Contract (KOT/P2) with Messrs. ASEA AB on 15th October 1981,

7. Diversion and Low Pressure Tunnels, Gates and Screens Contract (KOT/E2) on 29th December 1981.

The contract for the spillway gates (KOT/E3) is to be awarded while tenders have been called for the cable and ventilation shaft hoist (KOT/E5).

A final solution for the bottom outlet has not been completed so far and hence tenders have not been invited for the necessary equipment required for the structure.

Initial Works Contract

This contract is for the construction of :

- (a) Contractors and engineers camps and officers,
- (b) Access roads,
- (c) Diversion tunnels,
- (d) Access tunnel to the Underground Power Station,
- (e) Quarry investigations.

The progress to date is as follows :

All work on the above contract has been complete except for concreting of the upstream portals which work is interlinked with the other civil contracts. It is proposed to wind up this contract and transfer the very small balance work to be done to the other contracts.

Underground Works Contract

This contract is for the construction of the intake structure, low pressure tunnel, intake gate shaft, surge shaft, high

pressure tunnel system, machine chamber, cable cum ventilation shaft, surge chamber, tailrace tunnel, outfall structure and switchyard area.

The progress to date is as follows :

- (a) Excavation of intake structure completed and concreting of same is in progress.
- (b) Excavation of low pressure tunnel almost completed fully. The completion was delayed due to a short length of fault zone encountered in November 1982 on which steel arches had to be placed and backfilled with concrete.
Trimming of underbreaks, grouting and construction of concrete kerbs in progress.
- (c) Intake gate shaft – excavation completed. Concreting in progress from the bottom and has reached to within 10 metres of the gate house floor.
- (d) Surge shaft – excavation completed. Concreting about to commence.
- (e) High pressure tunnel system – excavation completed. Assembly and erection of steel liner in the lower portion of the high pressure tunnel has commenced.
- (f) Machine chamber – excavation completed. Concrete work had commenced and loading bay area completed. Crane support structure completed. Office block area foundations cast. Most of concrete walls, stairways and concrete in the draft tubes completed including the downstream manifold.

- (g) Cable cum ventilation shaft – excavation completed. Drilling and fixing of rock support bolts in progress. A revised proposal for a precast concrete structure which would reduce time of construction was finalized.
- (b) Surge chamber – excavation completed.
- (i) Tailrace tunnel – excavation completed. Concreting of invert about 75% completed and lining of arch has commenced.
- (j) Outfall works – excavation completed and rock supports installed.
- (k) Switchyard – earthwork in excavation completed. Work on permanent drainage and road works commenced. Excavation for equipment foundations commenced.

Reservoir Works Contract

This contract is for the construction of the main dam and spillway across the Kotmale Oya. Associated works comprise general clearance of dam and reservoir sites, site investigations, river diversion and control and closure works, bottom outlet and other miscellaneous works such as access roads, grouting gallery, et cetera.

- (a) Dam – Dam excavation – First stage (above el. 625 m.) completed under the Initial Works Contract.

General excavation in soft below el 625 m. completed and 2nd stage rock excavation including plinth excavation in progress (95% completed).

Foundation treatment under the plinth for the upstream concrete membrane including installation of dowels and anchors began in mid-1982 and actual concreting of plinth began in November 1982.

General foundation preparation for the embankment commenced and, in the downstream area, dam fill commenced.

- (b) *Spillway* – Rock excavation in the approach channel and control structure area in progress. Excavation of rock in the chute commenced and on the rock faces, rockbolting, shotcreting, etc., was done as required.
- (c) *Intake Ramp & Screen* – Work commenced on excavation of the right bank slope for the construction of the intake screen ramp but owing to an earth slide in May 1982 work was stopped and only remedial measures to stabilize the slope was undertaken. The screen ramp has been re-designed for the screen to be raised for maintenance repairs to the ultimate reservoir level of el. 730. meters. (2,394.4 ft.)
- (d) *Bottom Outlet* – A decision was taken to utilise one of the diversion tunnels to be used as a bottom outlet instead of constructing a new tunnel for this purpose. At the request of the CECB, a model study of this proposal is being carried out at the Irrigation Department Hydraulics Laboratory.

Programme for 1983

- (1) *Initial Works Contract*. – All work

completed on this contract.

(2) Underground Works Contract –

- (a) Intake structure to be completed except for erection of intake gate which will continue up to mid-1984.
- (b) *Low pressure tunnel.*– To complete 75% of concreting in tunnel.
- (c) *Surge shaft.*–Lining to be completed except for erection of surge shaft gate.
- (d) *High pressure tunnel system.*–Erect the lining and backfill with concrete. Grouting work to be continued up to 1984.
- (e) *Machine chamber.*–Complete office block, erect EOT crane, erect and concrete draft tubes and spiral case for two units.
- (f) *Cable cum ventilation shaft.*–Complete Construction of 60% of the shaft structure other than erection of hoist which will be done in 1984.
- (g) *Surge chamber downstream.*– Complete all works.
- (h) *Tailrace and outfall.*–All work to be completed.
- (i) *Switchyard.*–Complete road, drainage works, complete 75% of foundations for switchyard equipment and installation of 50% of equipment under the Equipment Supply Contract.

Reservoir Works Contract

- (a) *Excavation for embankment.* –To be completed by mid-1983.

- (b) *Plinth.*–Complete concrete plinth, foundation treatment for same to commence and continue in 1984.
- (c) *Embankment.*–Filling to continue at an increased pace of work. Completion by end of 1984.
- (d) *Grouting under embankment.* – Complete work on grouting gallery and commence consolidation grouting.
- (e) *Spillway.*–Complete excavation and commence concrete work on structure and chute. Gate installation in 1984.
- (f) *Bottom outlet.*–Excavation of tunnel to commence. Design to be finalized after completion of model studies in February 1983.

Road Deviation

When the Reservoir starts filling up, sections of the left bank road (Mailapitiya – Sangilipalama Road) from Hasagalle to Pundulu Oya, crossing a length of 22.5 kms. (14 miles) and the right bank road from Ulapane to Pussellawa have to be deviated and improved to be above water. Work on the left bank road was entrusted to the State Development and Construction Corporation (SD & CC) and very little progress has been possible because of acquisition problems. Actually, only about two miles of road in sections have been formed to approximate profile and four outlets built.

The first six miles of the Ulapane – Pussellawa Road had to serve as access to the project-site and have had to be improved quickly. This work was done by M/s. Skanska, the main Civil

Contractor. Out of the balance length from Kadadora to Maswela, a length of 2 1/2 miles has to be raised above water level in the proposed Reservoir. This work was entrusted to the Colombo district (Low-Lying Areas) Construction and Development Board but they have not been able to move in, because the trace has not been itemised of occupants. In the meantime, a limited amount of work is being done with Direct Labour in sections where there are no acquisition problems.

Reservoir Works

The contract for the reservoir works was awarded in October 1982 and so far only the excavation of the foundation has been completed and 30% of plinth concreting has been completed.

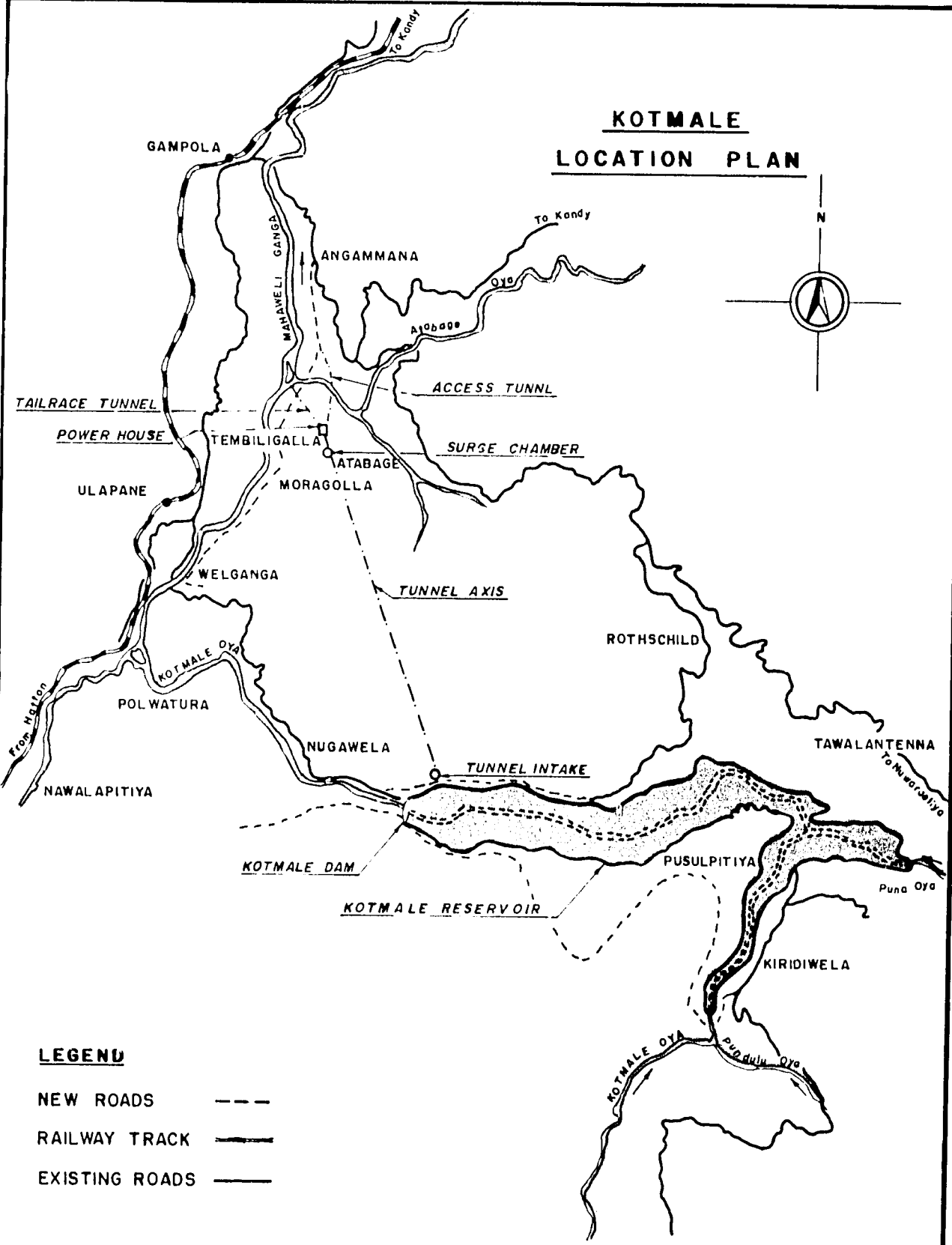
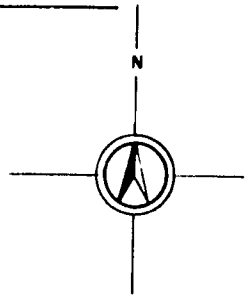
Rock-filling has just commenced and is moving fast.

Target date for completion of all works is 1985.

KOTMALE HYDRO-POWER PROJECT

Salient Features		
	<i>Metric Unit</i>	<i>Imperial Unit</i>
Hydrology		
Catchment area	544 sq. km.	210 sq. miles
Maximum observed discharge	761.5 cumecs	26,890 cusecs
Reservoir		
Full reservoir level	703 m - MSL.	2,306 ft. - MSL.
Highflood level	704.5 m - MSL.	2,311 ft. - MSL.
Maximum drawdown level	664.5 m MSL.	2,180 ft. - MSL.
Gross storage up to FRL	175 m cu. m.	141,000 act. ft.
Dam		
Type	Rockfill with concrete membrane	
Maximum height above bed level	87 m	285 ft.
Crest elevation	706 m	2,317 ft.
Length along crest	600 m	1,969 ft.
Spillway		
Type	Chute spillway	
No. and size of gate	3 Nos. 14m X 15m	3 Nos. 46 ft. X 49 ft.
Discharge through spillway at HFL.	5,550 cumecs	196,000 cusecs
Diversion Tunnel		
No. and size of tunnel	2 of 9.2m	2 of 30 ft.
Type	'D' Type lined	
Maximum capacity	1,700 cumecs	60,000 cusecs
Headrace Tunnel		
Total length up to surge shaft	6,560m	21,517 ft.

KOTMALE LOCATION PLAN



- NEW ROADS - - - - -
- RAILWAY TRACK ————
- EXISTING ROADS ————

14a

Type	Horseshoe concrete lined	
Diameter	6.2m	20 ft.
Maximum capacity	113.3 cumecs	4,000 cusecs
U/S Surge Shaft	<i>Metric Unit</i>	<i>Imperial Unit</i>
Diameter	1.5m	49 ft.
Height	142m	466 ft.
Type	Restricted Orifice	
Pressure shaft		
No. of type		One circular
Diameter	5.5 - 4.8m	18 - 15.7 ft.
Length	120m	394 ft.
Power plant		
Type	Underground Power House	
Size of cavern	67 m X 18m X 38m	220 X 66 X 125 ft.
Installed capacity		2 units of 67 MW
Type of turbine		Francis turbine Later an additional unit of 67 MW
Gross head	226m	743.3 ft.
Total Annual Power	455 GWh	
Firm Power	310 GWh	
Tailrace Tunnel		
Length	635m	2,083 ft.
Diameter	6.2m	20 ft.
Type	Horseshoe type concrete lined	

VICTORIA DAM AND HYDRO-ELECTRIC PROJECT

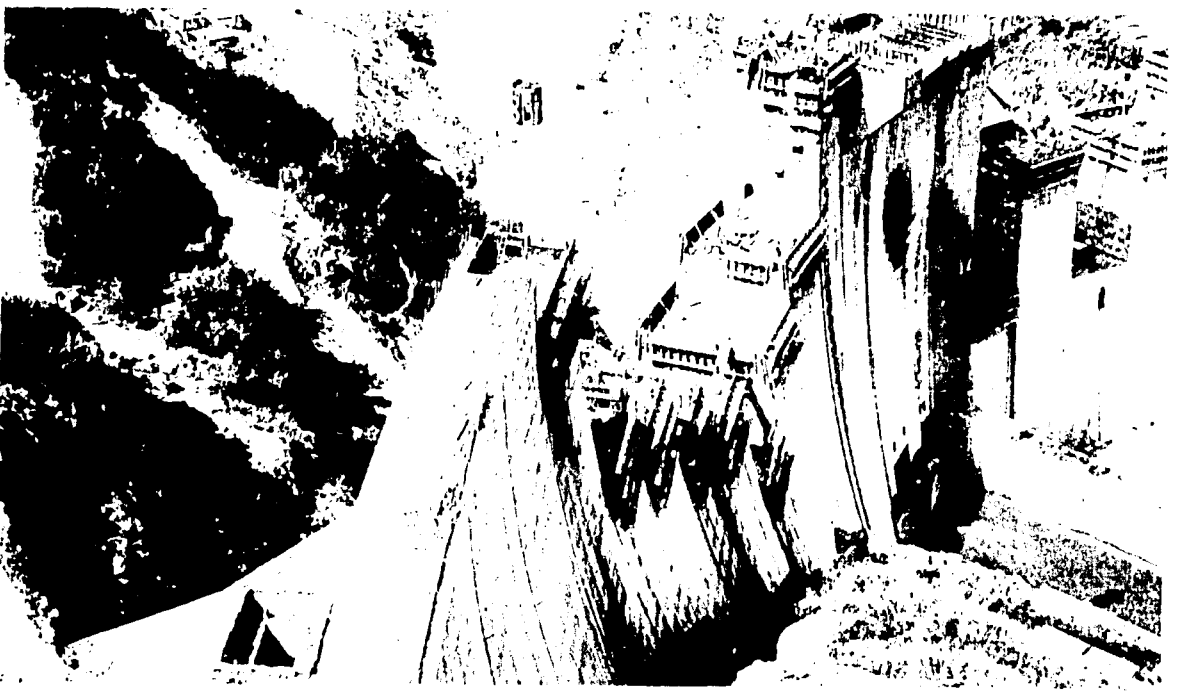
The Victoria Project is one of the most beneficial of the multi-purpose projects included in the Mahaweli Master Plan. The proposals for the project were studied by Huntings Technical Services of Canada in 1964 and the UNDP-FAO Team thereafter. The dam is located between the Hulu Ganga and the Victoria rapids across the Mahaweli. The catchment area at this dam site is 1,869 square kilometres (730 square miles). The proposed dam will be a double curvature arch similar in shape to a quarter egg shell. The maximum height of this dam will be 122 metres (400 feet) and it will be 507 metres (1,663 feet) long measured along the crest. The gross capacity of the reservoir will be 728 million cubic metres (590,800 acre feet) at full supply level of 438 metres (1,437 feet). The active storage is 698 million cubic metres (565 TAF) and could generate 780 Giga Watt Hour (GWH) units of useful electrical energy per year. The hydro-power

potential of this reservoir will be the largest available in Sri Lanka.

Rapid Progress on the Dam

The construction of the Victoria Dam was taken up in 1980. It is programmed for completion in 1984. Very rapid progress was made in the implementation of this project. Within a period of one and half years it was possible to award contracts for the dam and tunnel, which under normal circumstances would have taken a period of not less than four years.

The regulated releases from the impounded Victoria reservoir will pass through a concrete lined tunnel to a Power Station located on the Right Bank in Adikarigama. For the present, the Power Station will accommodate three units of 70MW each for the generation of hydro-power. Provision has been made for the construction of a second tunnel and the installation of 3 units of 70 MW



The Victoria Dam, a double curvature concrete arch dam is being constructed across the main stem of the Mahaweli—near its conflux with the Hulu Ganga, one of its major tributaries, some 17 miles to the south-east of Kandy city.

The dam is located in the deeply incised Dumbara Valley.

Four hundred feet high from the river bed, the Victoria dam which is now nearing completion will be Sri Lanka's tallest hydraulic structure.

The Victoria reservoir which will be impounded in April 1984 will have a storage capacity of 590,880 ac. ft. of

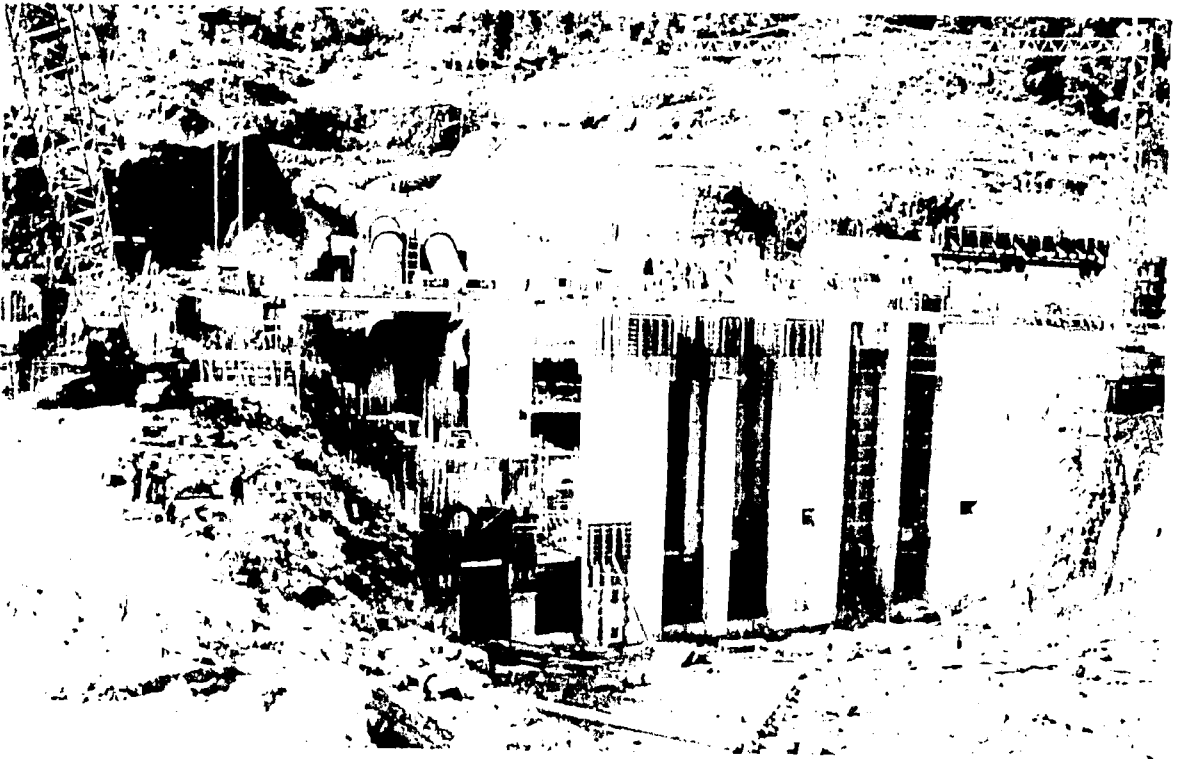
water. It will inundate Teldeniya town on the east of Kandy. Those affected by the impoundment are now being re-settled around the peripheral area of the reservoir or in agricultural re-settlement in the new development area downstream on the right bank of the Mahaweli, about 50 miles away.

Sri Lanka benefited by an outright grant of £ 100 million sterling from the U. K. which enabled construction work to be taken up on this project. The work on the contract for the Victoria dam, tunnel and power house (210 MW) is being executed by UK firms.



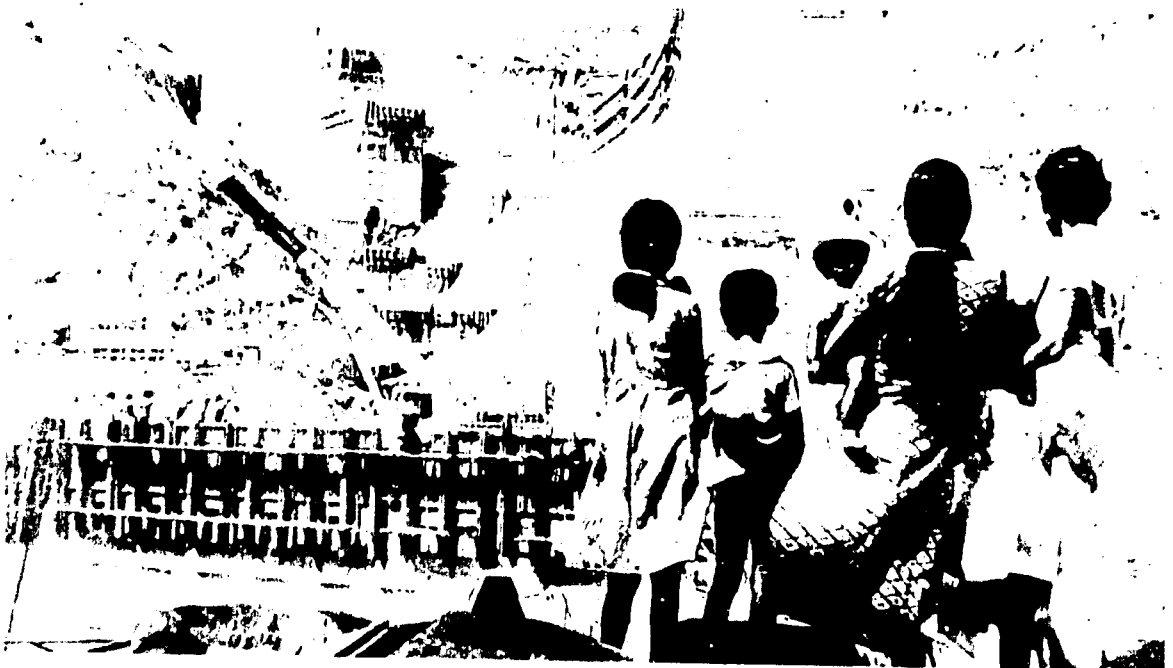
A circular tunnel, 19.7 ft. diameter, was chosen to provide maximum strength to resist anticipated external pressures under the Victoria Project. The tunnel is

concrete lined, at the final downstream end the tunnel will be steel-lined. The Victoria tunnel is being constructed by M/s Balfour Beatty-Nuttall UK.



The energy capacity of the country will be doubled by the hydro-power projects under the Accelerated Mahaweli Programme. The first turbine of the Victoria multi-purpose project is scheduled for commissioning in 1984 easing the demand on the Ceylon Electricity Board's national grid, which has had to fall back on costly gas turbines to meet the increasing demand for power.

Photograph focusses on the Victoria Power Station located in Adikarigama close to Hanguranketa. The power station is being built by M/s Costain International Ltd., UK.



Mahaweli Project sites attract thousands of sightseers daily. By far the most popular attraction is the Victoria Jamsite. A Public Relations Unit is in attendance to explain to interested sightseers the complex functions of

the Victoria multi-purpose project. A viewing platform has been established with TV facilities to depict the work going on at Victoria

each, at a later date. The discharges from the tailrace will be further regulated at the proposed Randenigala reservoir which was taken up for construction in 1982. Until such time as the Randenigala reservoir is constructed, the regulated releases from the Victoria reservoir will flow down the Mahaweli Ganga upto the Minipe anicut (diversion weir) for diversion to the existing Left Bank canal and the new Right Bank canal, which is now under construction. The flows in the Right Bank canal will be further regulated in the Ulitiya-Ratkinda twin reservoirs for irrigating lands in System C and for further diversion to the Maduru Oya reservoir which is also under construction.

Design of the Dam

Investigations confirmed that a double curvature arch dam could be the most economical dam that can be constructed at the selected site between the Hulu Ganga confluence and the Victoria Falls.

High Victoria-Low Randenigala

Several studies were conducted to determine the optimum height of the dam. The study had to take into consideration the planning of the Randenigala reservoir immediately below the Victoria Dam. A combination of High Victoria-Low Randenigala or Low Victoria-High Randenigala was examined. The first study resulted in the selection of Victoria reservoir storage level of 430 metres (1,411 ft.) above sea level. Further studies indicated that a storage level of 438 metres (1,437 ft.) above sea level gave increased benefits which outweighed the losses sustained by the inundation of the Teldeniya town. The

height of the dam could not be raised any further as the operation of the Polgolla Diversion Dam would have been seriously affected. The storage level of 438.0 metres (1,437 ft.) corresponded to a crest level of dam of 442.5 m (1,452 ft.) above sea level and a height of dam above lowest foundation level of about 122m. (400 ft.).

Award

Automatic crest gates which open when pre-determined water levels are reached have been adopted and electric power will be required only to close the gates. The consultants who designed these gates have won an award for innovation in civil engineering from the Institution of Civil Engineers of U.K. Eight radial gates 12.5 m. (41 ft.) wide and 6.5 m (21 ft.) have been provided. The gated overspill with an effective width of 100 metres (328 ft.) is capable of passing a discharge of 8,200 cubic metres per second (289,542 cusecs) under the head of 11 metres (36 ft.). The overall nappe is dispersed by the combined effect of the splitters and ledge system located 13 m (42.6 ft.) below the solid weir crest. Hydraulic model tests were carried out at the Wallingford Research Laboratory in the UK to finalise the design of the crest and the spilling basin. Two low level sluices are provided in order to make provision for-

- (a) Drawing down the reservoir at initial filling or on any subsequent time.
- (b) To pass silt which may accumulate immediately above the dam. These gates have 4.1 m (13.5 ft.) diameter pipes with centre line at 350 m (1,148 ft.).

A 300 mm. (12 inch) diameter branch pipe from each of the low level sluices is provided to pass compensating water. Model tests on these gates are being conducted at the Wallingford Hydraulic Research Laboratory. The model tests will provide data for determining the protective measures to be adopted on the downstream.

Power Tunnel

A circular tunnel, 6 metres (19.7 ft.) diameter was chosen to provide maximum strength to resist the anticipated external water pressures. The tunnel will be concrete-lined while 240 m. (1,378 ft.) length at the downstream end will be steel-lined. The velocities in the tunnel will be limited to 4 1/2 metres per second (14.8 ft. per second) for concrete-lined sections and 6 1/2 metres per second (21.3 ft. per second) for steel-lined sections.

The tunnel route was selected so as to fit into the topography and anticipated geological conditions and also to reduce the length over which difficult ground conditions were anticipated and to minimise external ground water pressures.

Tunnel Intake

The Intake Structure including the tunnel intakes, gate shafts, etc., will be provided initially for both the present and the proposed future tunnels. A length of the future tunnel has been constructed to a point 150 m. (492 ft.) downstream of the gate shaft to ensure that the future tunnelling would not cause damage to the shaft or gates.

Surge Chamber

A 21 m. (69 ft.) diameter concrete lined chamber has been designed to withstand hydrostatic pressures due to maximum groundwater pressure when the tunnel is de-watered.

The surge analysis has been carried on the basis of the following assumptions :-

- (a) Full stroke opening time of turbine gates – 15 seconds.
- (b) Full stroke closing time of relief valves – 25 seconds.
- (c) No load flow, spinning reserve – 10 percent of load flow.
- (d) Turbine gate and relief valve operating times are linear with flow.

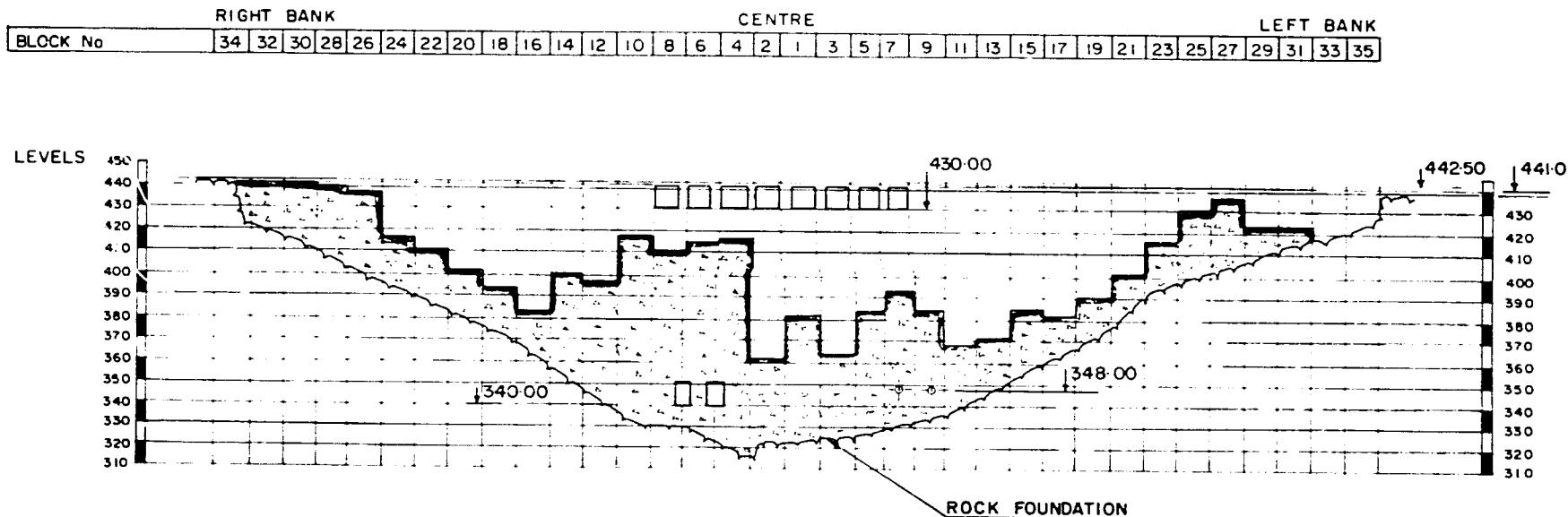
The maximum upsurge occurs when the reservoir is at flood level and all three machines are rejected to no flow in 25 seconds. The upsurge level has been computed to be approximately 463.0 m. (1,520 ft.).

The power Station building 52 m. (170 ft.) long by 30 m. (98 ft.) wide, will be a reinforced concrete structure. The roofing will be of composite construction consisting of precast light weight concrete slabs treated after installation with a weather proof coating, and an outer layer of profiled coated and insulated steel sheeting. The three units will be at 13 m. (43 ft.) centres, and the tailrace will lead the water back to the Mahaweli Ganga.

Power Station Plant

Three Francis Turbines operating under a design head of 190 m. (623 ft.)

CONCRETED SECTION OF DAM AS AT 31.12.82



FIGURES AT A GLANCE

HEIGHT OF DAM	122.0 m.	DIAMETER OF TUNNEL	6.2 m.
CREST LENGTH OF DAM	520.0 m.	INSTALLED CAPACITY	210 MW.
VOLUME OF CONCRETE IN DAM	480000.0 m ³	ANNUAL ENERGY PRODUCTION	600 GWh.
RESERVOIR STORAGE VOLUME	722 m ³ (MILLION)	TOTAL ESTIMATED COST (ON COMPLETION)	Rs. 8000 MILLION.
LENGTH OF TUNNEL	5.8 k.m.	TOTAL NUMBER EMPLOYED ON PROJECT AT SITE	5200

and a total discharge of 125.5 cubic metres per second (4,431 cusecs) will have a speed of 333.3 rpm. The rated capacity of the station will be 3×70 MW (210 MW). Pressure relief valves will be provided to limit the speed rise in the turbines.

Victoria – Kotmale – Colombo

The generator will be directly coupled to the turbine and will have a thrust bearing and two guide bearings. The main generator transformers will be mounted on a deck on the upstream side of the power Station. Transport restriction necessitate 3 single phase units. The primary voltage of 12.5 KV will be stepped up to 220 KV. The station will be connected to a substation to be constructed at Kotmale for supplying the 220 KV transmission line which will link Kotmale to Colombo.

Construction Programme and Progress

Construction work on the project was formally inaugurated by His Excellency J. R. Jayewardene, the President, on March 23rd, 1980. Preliminary works like construction of access roads and camp buildings commenced during 1979.

The construction of the dam was awarded to Messrs. Balfour Beatty-Nuttall (UK) on March 3rd, 1980. The total tender value for this contract is Rs. 1,467,625,620.20.

The total cost of construction was estimated at £ 137.5 million of which £ 100 million will be provided by the UK as a grant. This cost is inclusive of cement, steel and other imported building materials, plant and equipment, and construction equipment etc.

Sri Lanka is extremely fortunate to get UK aid to finance this project and Britain has helped immensely in accelerating this project to the present status. Sir Alexander Gibb and Partners were selected by the UK Overseas Development Ministry, (ODM) now, Overseas Development Administration (ODA) as the Consultants for the initial study. The same Consultants were retained by UK. ODA for the Design and Contract Documentation stage as well, as for the balance work, such as detail design and construction supervision.

The contract for the construction of the tunnel was also awarded to Messrs. Balfour Beatty-Nuttall (UK) at the same date. The total tender sum of the contract is Rs. 645,391,793.

The contract on the power station buildings was awarded to Messrs. Costain International Ltd., of UK on October 28th, 1980. The total value of the contract is Rs. 250,611,011.

All other contracts for hydraulic equipment, turbines, generators, transformers, switchgear, station miscellaneous plant, cables, cranes and transmission lines have been awarded and work is in progress.

The construction schedule provides for the impounding to commence by April 1984 and the commissioning of the first unit by July 1984. The final completion will be by the end of 1984 when all the units are expected to be commissioned.

The main construction camp of the Victoria Project is located at Digana and

consists of over 225 permanent houses with communal facilities such as hospital, school, shops, etc., and with all services such as water supply, drainage, sewerage, electricity and telephone facilities. At the end of the construction period, the Digana township would prove to be a valuable asset to the Kandy district. It is envisaged that there would be a surplus of houses which could be made available for the development of a new industrial complex or for housing to meet the expanding needs of the Kandy District.

A second camp at Adikarigama will be needed in 1984 by the Ceylon Electricity Board (CEB) operation and maintenance staff of the Victoria Power House. Initially these houses were made available for the construction staff.

Concerted Construction Activity

The diversion of the Mahaweli Ganga through an opening in the partly completed Victoria Dam was effected one day ahead of the scheduled date, viz., 16th January, 1982, in order to enable the river bed to be excavated to receive concrete for the dam. The construction work on the dam is an exercise in co-ordination of several complicated activities. Specially manufactured low heat type of cement has to be shipped from Mombasa and stocked in large silos at the Colombo Harbour. Fifteen heavy duty tankers are on the run daily between Colombo and Victoria to replenish the silos at the site during a turnaround time of about 18 hours. Rock blasting and crushing of rock proceeds for 24 hours to keep pace with the speed of concreting

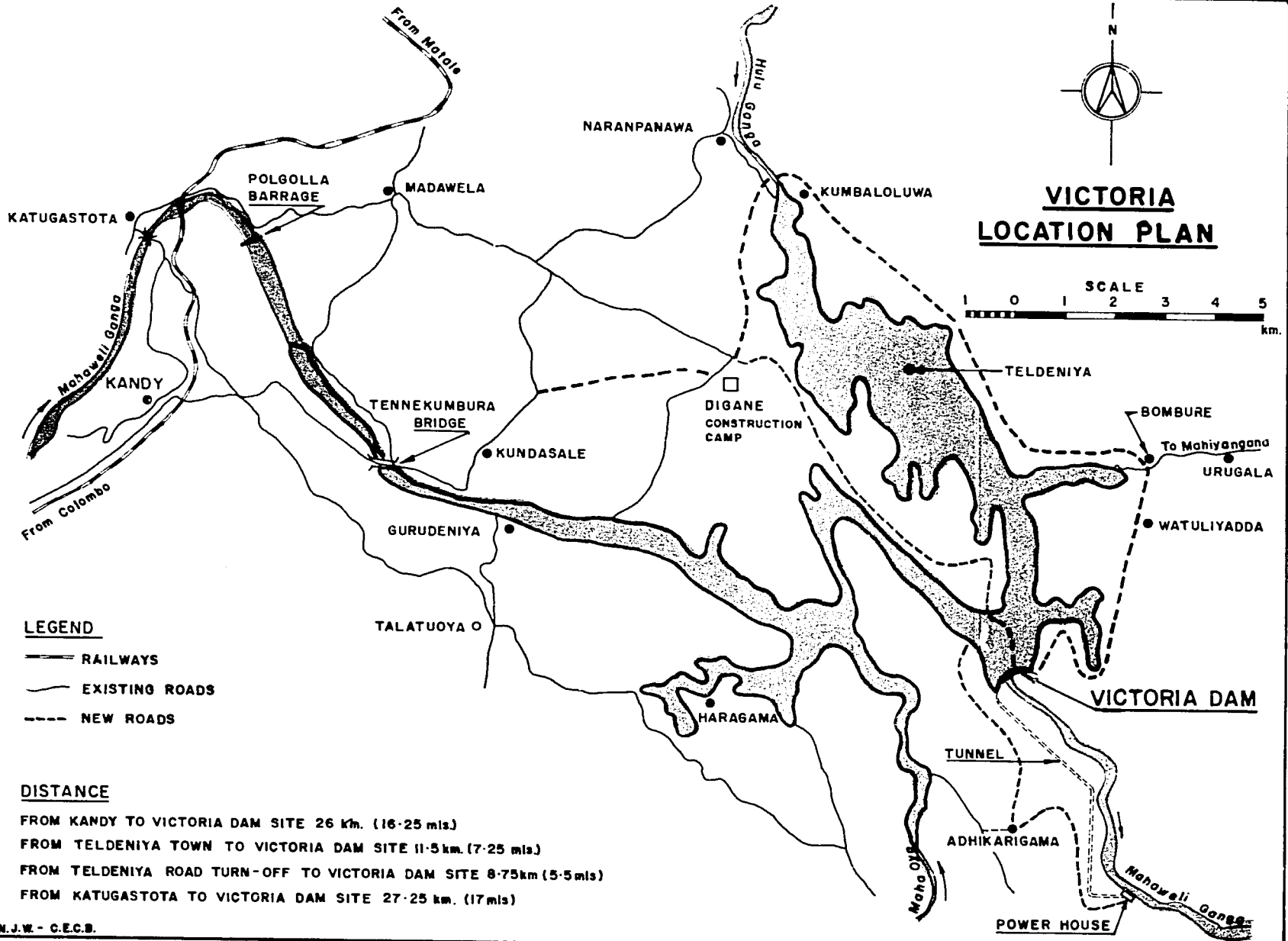
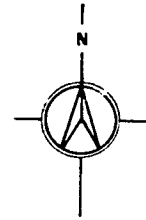
on the dam. In order to reduce the rise in temperature of the concrete blocks immediately after concreting, flaked ice (manufactured at the site) is added to the water used for concreting. Pipes with cooling water are embedded in the concrete blocks so that the concrete is cooled quickly in order to obtain quick contraction in the blocks. Speed is necessary for this operation so that maximum contraction of the joints can be achieved for the cement grouting operations to commence. Arch action of the dam is dependent on the efficient grouting procedures.

Setbacks Surmounted

The excavation of the tunnel, which had its setbacks resulting from poor geological conditions has been finally completed with the "hole through" on 17th November, 1982. A serious rock fall in the outfall end of the tunnel, in July 1982, necessitated a deviation of the tunnel trace in that area so as to avoid a continuing zone of poor rock conditions. This also resulted in a relocation of the surge chamber to ensure that these items of construction did not seriously delay the programme of completion of the Project. Work on the dam as well as the tunnel and the power house are proceeding at a brisk pace employing over 5,000 men. A little over 50% of the concrete in the Dam has already been placed in position.

There were considerable setbacks during the mobilisation and initial construction period. The Engineer's evaluation of these delays totalled to an extension of the contract completion period by 4 months in Dam and Tunnel

VICTORIA LOCATION PLAN



LEGEND

- RAILWAYS
- EXISTING ROADS
- - - NEW ROADS

DISTANCE

- FROM KANDY TO VICTORIA DAM SITE 26 km. (16.25 mls.)
- FROM TELDENIYA TOWN TO VICTORIA DAM SITE 11.5 km. (7.25 mls.)
- FROM TELDENIYA ROAD TURN-OFF TO VICTORIA DAM SITE 8.75 km (5.5 mls)
- FROM KATUGASTOTA TO VICTORIA DAM SITE 27.25 km. (17 mls)

Handwritten signature or initials.

contracts. However, swift action was taken to correct this situation and a substantial additional bonus was built into the contract for completion of the construction within the original contract period. The Contractor has accelerated his efforts by injecting additional

resources. According to the current progress, the original target of commissioning of the first machine by July 1984 could be achieved.

The expenditure on the project is given below :

1. Civil Works

CONTRACT	EXPENDITURE = A Rs. x 10 ⁶	ESTIMATE = B Rs. x 10 ⁶	% of A B
C1 - Dam	1412	2588	54.6
C2 - Tunnel	602	1139	52.9
C3 - Power Station	207	381	54.3
C4 - Hydraulic Equipment	380	658	57.8
C5 - Elec. Dist.	-	49	-
	2601	4815	-
2. Mechanical & Electrical C11 to C18 - Turbines, Generators, Transformers & associated equipment.	319	1037	30.8
3. Expatriate Consultancy	217	365.0	59.5
4. Local Consultancy	35	60.0	58.3
5. Digana Township	40	100.0	40.0
6. Work by other Agencies	241	768	31.4
7. Provision for Charges in Parity Rate or Exchange.	763	2003	-

Dam Completion by 1983

During 1983, the programme envisages the completion of all concrete work on the Dam except for the final plug, through which the river flow will be maintained. The final closure of this opening will be in April 1984, when the impounding of the reservoir will begin. Installation of Gates for the spillway and the bottom outlets on the dam will be in progress during the year and continued into 1984. Concrete lining of the tunnel would also be completed using telescopic shutters which would permit a non stop activity in concreting to be maintained. Major part of the grouting work on the tunnel is expected to be completed in 1983.

Power House this year

The Civil Engineering work on the Power House structure would be completed (except for finishes) during 1983 while the installation work on the Electro-Mechanical Equipment will be in full swing by the end of the year.

The transmission line to convey the power to the Kotmale Sub-station (new station being built under the Kotmale Reservoir Project) would be completed in 1983 so that the Victoria Power Station can be connected to the Island's Grid when the test generation is commenced in June 1984.

Re-Settlement Work

Teldeniya Town and the surroundings would be inundated by the new reservoir. This market town, teeming with people and busy trading activity has to be relocated. Instead of a single town as a replacement, proposals for the

establishment of three towns viz., Digana, Karalayiadda and Udispattuwa are being implemented.

A Socio-Economic Survey carried out recently established that about half the number of the 4,000 families who have to be rehoused prefer to settle down in System C development area. A good number of these families have already been resettled. The balance fifty percent of families are being systematically resettled in areas around their present dwelling areas. New villages at Haragama, Rajawella and Pallekelle are being created for this group of settlers.

The Tennekumbura-Mahiyangana road has to be deviated from near Tennekumbura upto Moragahamulla. Construction work on this new road (about 15 miles) is proceeding. A new road to link Moragahamulla to the Left Bank end of the Dam is also under construction.

Benefits

The principal benefits from the scheme are hydro-power production and providing a regulated source of water for irrigation. There is a very high potential for the development of inland fisheries and development of tourism.

At present, all available flows in the Mahaweli Ganga are diverted at Polgolla, maximum capacity 57 cubic metres per second (2,000 cusecs) for generation of hydro-power at Ukuwela. When the Victoria reservoir is constructed the diversions at Polgolla will be limited to the minimum requirements for irrigation only, thereby reducing the total

hydro-power production at Ukuwela. This loss will be more than compensated by extra energy generation from the higher heads available at Victoria and Randenigala. Studies reveal that about 600 GWH. (600 million units) of firm energy can be generated while about 200 GWH of secondary energy can be added to the grid. The provision of 210 MW of installation and availability of regulation facilities downstream make this system capable of functioning effectively as a peaking station. The regulated releases from Victoria (even without Randenigala reservoir) can meet the irrigation

requirements for lands in Systems B and C where about 70,000 hectares (175,000 acres) of new lands can be developed.

At the price of oil prevailing in 1979, and basing the benefits from hydro-power production in comparison with energy produced by oil, the internal rate of return had been computed to be over 12 percent. Though the inflationary trends have increased the investment cost of the Victoria project, the increase in price of oil is at a higher rate, thereby making the project more attractive.

RANDENIGALA PROJECT

The Randenigala Project is the last project under the Accelerated Mahaweli Programme. It is also the largest reservoir under the Mahaweli Programme. It utilises Mahaweli waters used at Kotmale and Victoria just as the water used at Randenigala will again be used at Maduru Oya. The Randenigala Project is expected to produce about 20% of the country's present annual electrical energy production and will act as the most important base reservoir for the water management of Systems B and C.

Project Features

The project comprises of the construction of a 860 million cu. meter (697,000 ac. ft.) reservoir by straddling Mahaweli about 9.7 km upstream of the Minipe anicut by a rock-fill dam of 495 m. (1624 ft.) length and 94 m. (308.4 ft.) height and a power house on the left bank immediately downstream of the dam with an installed capacity of 122 MW and an

annual generation of 528 GWH of electrical energy.

The dam will consist of a gated spillway capable of discharging a flood of 8,085 cubic meters per second and an irrigation outlet which will be utilised to issue water for irrigation purposes when the water level in the reservoir falls below the spill level.

The irrigation outlet in the form of a tunnel of diameter 9.2 m. (30.2 ft.) and of 115 m. (377.3 ft.) length will be sited underneath the spillway towards the right bank end of the dam. This tunnel along with another similar tunnel will be used to divert the river during the construction stage of the dam.

Finances

The Government of the Federal Republic of Germany provided a grant of 8.5 million Deutsche Marks (about Rs. 75



His Excellency President J. R. Jayewardene ceremonially unveiled the plaque marking the inauguration of construction work on the Randenigala multi-purpose reservoir project under the Accelerated Mahaweli

Programme on November 21, 1983 at the invitation of Hon. Gamini Disanayake, Minister of Lands, Land Development and Mahaweli Development.



On November 21, 1983 His Excellency J. R. Jayewardene, the President ceremonially inaugurated construction work on the Randenigala multi-purpose reservoir project which is aided by the Government of the Federal Republic of Germany.

His Excellency is seen pressing the button to set off the blast on the Randenigala dam axis to enable construction work to commence.

His Excellency, the Hon. Prime Minister Mr. R. Premadasa, the Hon. Juergen Warnke, the German Federal Minister for Economic Co-operation—who represented the FRG on this occasion and Hon. Gamini Disanayake, the Minister of Lands, Land Development and Mahaweli Development are seen watching the cloud of smoke rising from the blast.



Several British firms are executing contracts on the Victoria Power Project. Photograph shows components of

the penstocks been transported to the Victoria Power Station site at Adikarigama.



The River Valleys Development Board (RVDB) which built the Ulhitiya dam and spillway pressed into service even some Gal Oya vintage machinery, on the excavation work on the spillway to speed up work. Photograph

shows Hon. Gamini Dissanayake, the Minister of Lands, Land Development and Mahaweli Development inspecting the spillway with officials of the RVDB and the Mahaweli Authority.

million) for the feasibility studies and preparation of the tender documents for this project. The total estimated cost of the project is Rs. 4,500 million and will be met by a soft loan of DM 400 million provided by the Federal Republic of Germany.

Consultancy Services

The Joint Venture Randenigala (JVR)—a joint venture of the consultancy firms, Salzgitter Consult GmbH, Agrar und Hydrotechnik and Electrowatt Engineering Services of Zuerich, along with the engineers of the Central Engineering Consultancy Bureau (CECB) were responsible for feasibility studies and preparation of tender documents for the project. The contract for the final design and supervision of the project was awarded to the JVR on 29th September 1982 and activities were started immediately in their head office and in Sri Lanka.

Main Construction Works

For the civil works which are the main component of the works, 8 West German major construction firms, out of 11 firms interested in this construction, were pre-qualified. The tenders were closed on 31.3.82. After a thorough evaluation by JVR (Joint Venture Randenigala—Consultants) and a Technical Evaluation Committee of the Government of Sri Lanka, the civil construction works contract was awarded on 16.8.82 to the "Randenigala Civil Contractors" (RCC) which is a Joint Venture of the three firms Dyckerhoff Widmann, Bilfinger & Berger and Alfred Kunz and of the Federal Republic of Germany.

The order to commence work been given, the civil contractor, moved to site in early September, 1982. Five West German firms were pre-qualified to submit their offers for Hydro-mechanical works of the project on 30th September, 1982. However, only one firm submitted a tender which led to the decision to re-tender this lot.

Subsequently, five competitive offers from as many major firms were received on 7th January, 1983 for evaluation, which is under process. Award of this work will be made by March 1983.

For supply and installation of mechanical equipment, after pre-qualification procedures, two tenders were received and opened on 30th September, 1982. Evaluation of these offers are under way and award of the contract by beginning of March, 1983 is anticipated.

After pre-qualification procedures, two firms submitted their tenders for the electrical equipment by 29th October, 1982. Award of this work will be made by March, 1983 after evaluation which is under process. The Civil Contractor will act as the main contractor and will have co-ordination agreements with the equipment supply firms.

Preliminary Works

The CECB was responsible for the provision of the infrastructure to facilitate the main construction works. A camp consisting of 74 houses, offices, shops and other buildings complete with water supply and electricity for the supervisory

staff is nearing completion. Work on this camp carried out by local contractors and supervised by the CECB was started in early 1982.

The Ceylon Electricity Board (CEB) handled the erection of over-head power lines over a length of 15 km and the distribution system inside the camp. The Telecommunication Department is entrusted with the provision of telecommunication facilities to the project and has already provided a direct dialing telephone to the Base Camp at Minipe and is expected to complete the installation of PABX and direct dialing facilities to site by the end of February, 1983.

Widening of road platform, metalling and tarring the access road from the Hasalaka-Mahiyangana main road turn off to the site was carried out by the Highways Department and 95% of this work is now complete. The Department of Highways is also carrying out improvements to the roads from Habarana to Mahiyangana via Chenkaladi which is the route planned for the transportation of heavy loads. The Survey General's Department has carried out the engineering surveys of the project area and the acquisition surveys required for acquisition of land for the head works.

Current Activities

The contractor for civil works is already mobilised at the Randenigala site and already works on the contractor's camp buildings, offices, access roads, temporary bridge across the Mahaweli and clearing and grubbing for access to the quarries and for workshops, have started. Coffor dams, river diversion

tunnel and other connected diversion works have been started since February, 1983 to be completed by end of December, 1983. Clearing and grubbing for diversion work has already started. Construction of the bottom outlet is to commence in March, 1983 to be completed by the end of September 1983. The following works are also to start in 1983.

Drilling and grouting, Power Intake and Waterways, Rockfill Dam construction, Spillway construction, Power House and annexed buildings, Switch Yard, Hydro-mechanical Works, Mechanical Works and Electrical Works.

Advanced works (preliminary construction on Rantambe) are also to commence in March, 1983 and will continue until end of 1985.

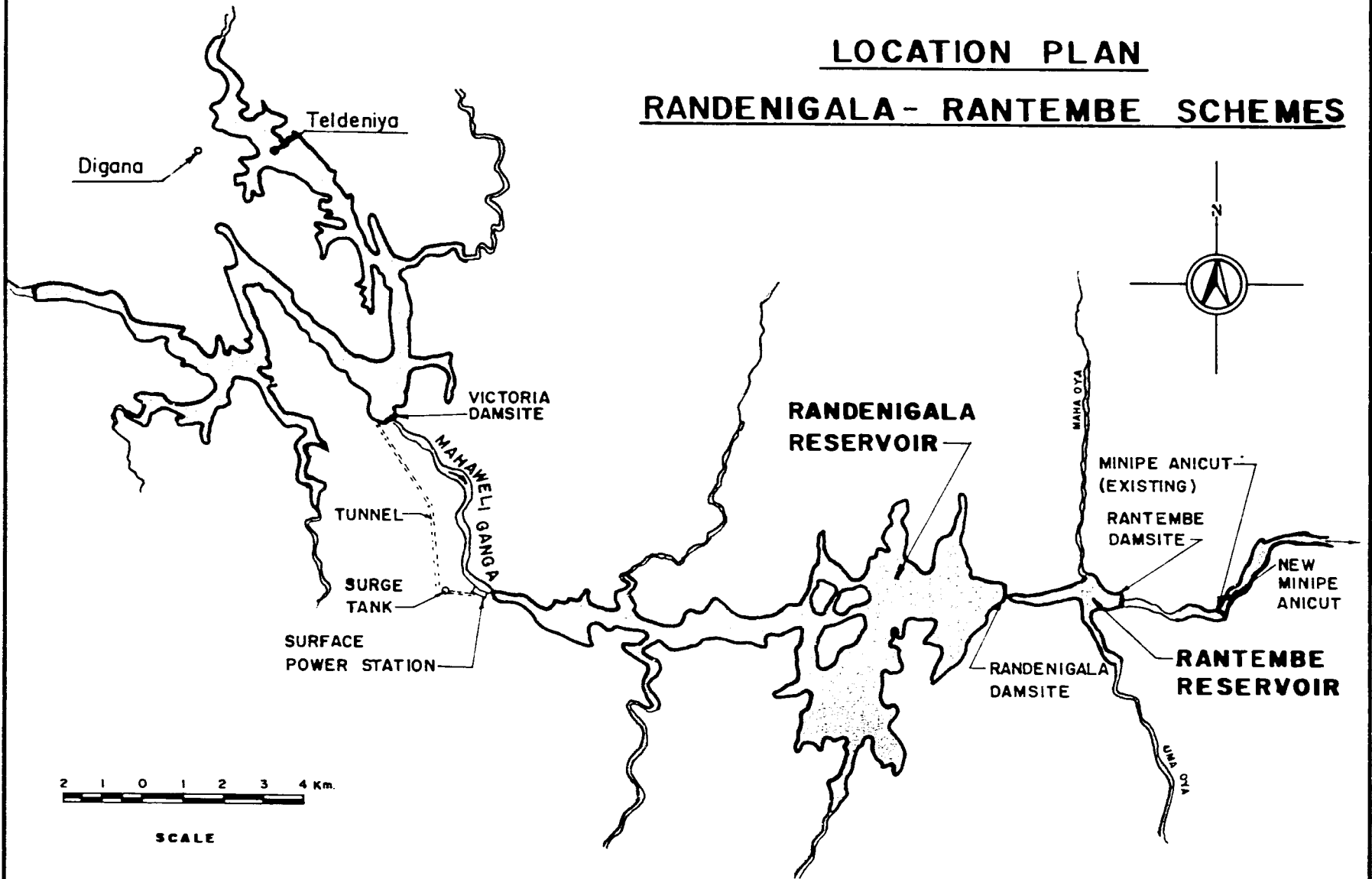
Future Programme

In 1984, it is planned to continue the works already mentioned above. The second half of 1983 and the whole year of 1984 will be the period of highest activity of this massive project.

By the end of 1985, drilling and grouting and most of the work on Rockfill Dam, Power Intake and Waterways, Spillway Construction, Power House Building, Hydro-mechanical, Mechanical and Electrical Installations will come to an end. Major work on Switch Yard at Rantambe which will start in March, 1985 will be completed by the end of 1985.

According to the construction programme, by mid-1986 all work on the Randenigala Project will be completed.

LOCATION PLAN RANDENIGALA - RANTEMBE SCHEMES



2 1 0 1 2 3 4 Km.

SCALE

RANDENIGALA PROJECT

CONSTRUCTION PROGRAMME

DESCRIPTION		1982	1983	1984	1985	1986
A	CIVIL WORKS (LOT 1)					
1	CONTRACT AWARD	●				
2	MOBILISATION	—				
3	SITE INSTALLATION	—				
4	DRILLING & GROUTING		—			
5	CLEARING & GRUBBING		—			
6	DIVERSION WORKS		—			
7	BOTTOM & IRRIGATION OUTLET		—			
8	POWER INTAKE & WATER WAYS		—			
9	DAM CONSTRUCTION		—			
10	SPILLWAY CONSTRUCTION		—			
11	ROADS & PAVEMENTS		—			
12	POWER HOUSE, ANNEX & DIESEL BUILDING		—			
13	SWITCHYARD		—			
14	ADVANCED WORKS AT RANTAMBE SITE		—			
B	HYDROMECHANICAL WORKS (LOT 3a)	—	—	—	—	—
C	MECHANICAL WORKS (LOT 4a)		—	—	—	—
D	ELECTRICAL WORKS (LOT 5a)		—	—	—	—

269

Project Benefits – Irrigation

The Randenigala reservoir will regulate the water releases of the Victoria reservoir and will provide supplemental irrigation benefits to Systems A, B and C, with the subsequent development of the Systems in the overall Mahaweli Programme.

Flood Control Benefits

Flood control benefits of the Randenigala reservoir will be very

substantial and would specially alleviate flooding problems in System A.

Power Benefits

The Randenigala power station will generate 428 GWH of firm energy and 100 GWH of secondary energy.

During the construction period employment will be provided to about 2,000 Sri Lankans.

THE MADURU OYA RESERVOIR PROJECT

The Maduru Oya Reservoir Project will be the first project to be completed under the Accelerated Mahaweli Development Programme. The reservoir will be formed by impounding of the waters of Maduru Oya, which lies on the eastern side of the Mahaweli. Natural inflow from the Maduru Oya basin will be augmented by Mahaweli water, conveyed from the Minipe anicut, through the right bank Transbasin Canal to the Ulhitiya-Ratkinda reservoirs and then through the link tunnel into the Maduru Oya reservoir. The reservoir will provide assured irrigation facilities for about 46,750 hectares (115,473 acres) of virgin land and 3,750 hectares (9,263 acres) of developed land. The area to be developed under this scheme is demarcated as System B in the Mahaweli Master Plan.

Project Features

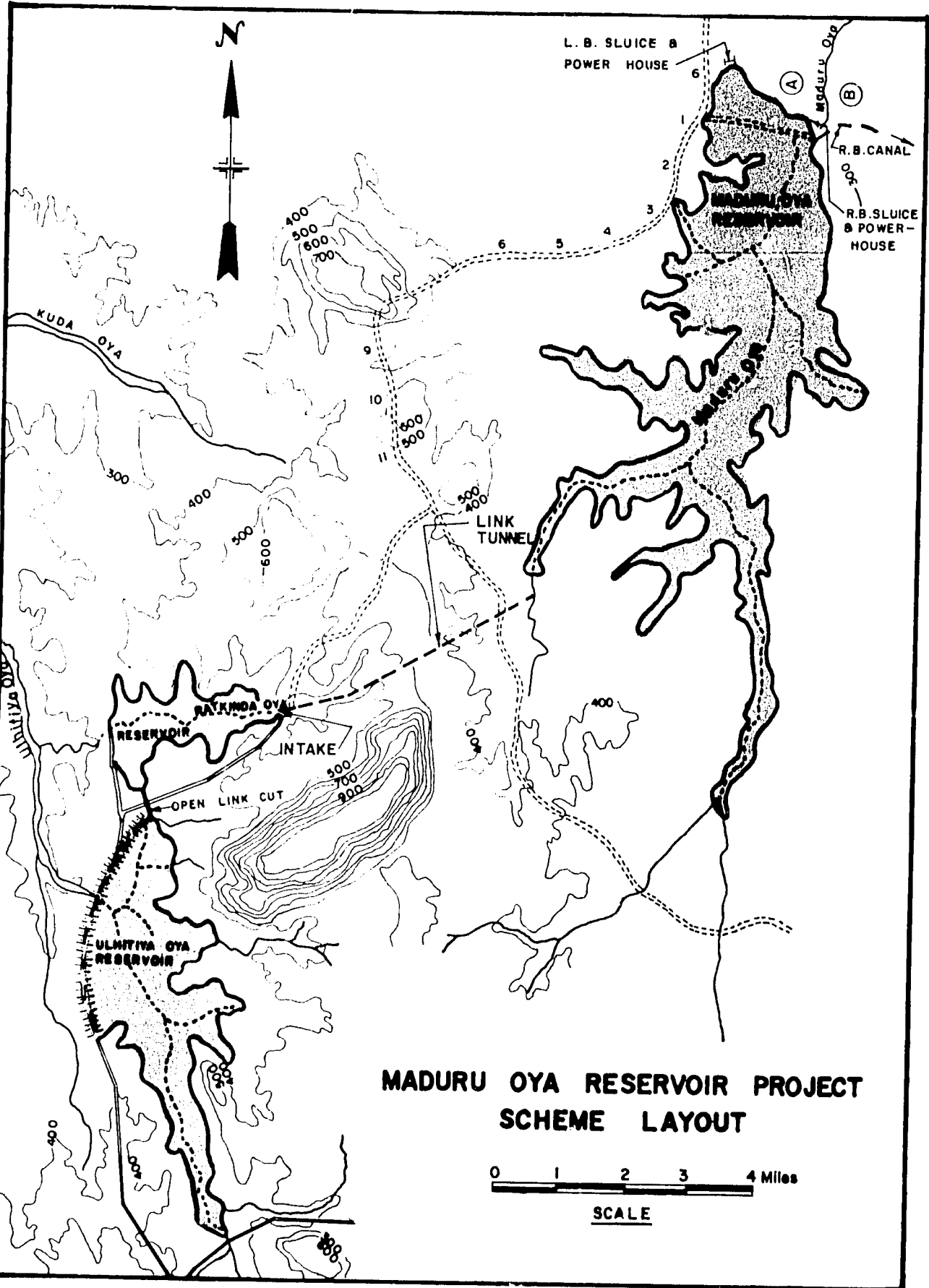
The Maduru Oya Project requires the construction of a 43 m. (141.08 ft.) high rockfill dam across the Maduru Oya. A

free flow spillway, two irrigation Sluices, a link tunnel, left bank and right bank saddle dams are the main features of this project. In addition, provision has been made in the project layout for the construction of two Power Houses to generate 7.2 MW and for a 2.0m. raising of the full supply level at a later date.

The main parameters of the reservoir, dam appurtenant structures and the link tunnel are as follows :-

Reservoir

Catchment Area	- 453.0 sq.km (175 sq. miles)
Full supply level	- 96.0m (314.98 ft)
Gross storage upto FSL	- 596.6×10^6 cu.m (483,470 acre. ft)
Dead storage	- 111.5×10^6 cu.m (90,350 acre. ft)
Live storage capacity	- 485.0×10^6 cu.m (393,000 acre. ft)



226

Dam	
Maximum height above foundation	- 43.0 m (141.08 ft)
Crest Elevation	- 103.0 m MSL (337.93 ft)
Length along crest	- 1,008 m (3,306 ft)
Spillway	
Length of Spillway	- 150.0 m (492 ft)
Discharge capacity	- 1600 cumecs (56,460 cusecs)
Outlet Works	
Capacity of Right Bank Irrigation Outlet	- 28.0 cumecs (988 cusecs)
Irrigation conduit diameter	- 4.0 m (13.12 ft)
LB Irrigation Conduit diameter	- 3.5 m (11.48 ft)
Link Tunnel	
Length of Link Tunnel	- 5,728 m (3.58 miles)
Diameter of Link Tunnel	- 4.5 m (14.7 ft)
Capacity	- 34 cumecs (1200 cusecs)

Project Costs

The estimated financial costs of the project (expressed in terms of 1979 prices) are :

	<i>Local</i>	<i>Foreign</i>
Dam	185,925,200	51,018,960
Spillway	23,519,970	5,668,550
Sluices	24,397,830	6,385,490
Roads	1,389,000	343,000
Tunnel	53,768,000	15,584,000
Total:	Rs. 289,000,000	C S 79,000,000

Finances

The project headworks are financed by a soft loan from the Government of Canada. The amount of the loan is

76,000,000 Canadian dollars, and is free of interest, commitment or service charges. The loan will be repaid in 80 semi-annual instalments commencing on March 31st, 1990, and ending on September 30th 2029. This loan is intended to meet the foreign component of the project. The local cost of the project will be met by the Government of Sri Lanka.

Consultancy Services

Initial site investigation, preparation of plans, designs and tender documents were done by the Central Engineering Consultancy Bureau (CECB). Further Canadian aid was provided by the Canadian International Development Agency (CIDA), the organisation of the Canadian Government responsible for monitoring the project and disbursement of the funds. CIDA has provided as a grant, the engineering consultants, Crippen International Limited, who are responsible for development of the construction drawings and for supervision of works on site, in collaboration with the CECB.

Contract Awards

The Mahaweli Authority has awarded all the contracts for the construction of dam, spillway and associated structures (contract - No. 2) and Link Tunnel (Contract No. 4).

The contract for the main civil works contract No. 2 and 4 was awarded on 7th April, 1980 to a Canadian Contractor FAFJ, a Joint Venture comprising the following Canadian Firms: The Foundation Company of Canada Ltd.

(Sponsor); Atlas-Gest International Ltd; Fitzpatrick Construction Ltd and Janin Construction Ltd.

the Hydraulic Engineering Corporation of China in September, 1981 for the supply and installation of Hydro-Mechanical Equipment.

The contract for Hydro-Mechanical works, Contract No. 3 A was awarded to

The values of contracts awarded are :

	<i>Local Rs.</i>	<i>Foreign Rs.</i>	<i>Total Rs.</i>
Contract No. 2	235,031,981	849,369,671	1,084,401,652
Contract No. 4	53,834,927	200,141,600	253,976,527
Contract No. 3A	2,164,500	19,791,429	21,955,929
Total	291,031,408	1,069,302,700	1,360,334,108

(Conversion rate used : 1 C S = 13.25)
1 U S = 21.00

Infra structure

The Maduru Oya Reservoir Site is situated in jungle quite far away from habitations. The nearest town is Polonnaruwa, which is about 64.4 kms (40 miles) away.

It was therefore a great challenge to provide the required infra-structure to undertake the construction of this project. The infra-structure can be classified under the following headings :

- (a) Roads,
- (b) Camp Facilities,
- (c) Power Supply, fuel supply,
- (d) Water Supply,
- (e) Telecommunication.

Roads

Some 56 kms (35 miles) of access roads, most of it paved have been provided at an approximate cost of 30 million rupees.

Camp Facilities

A complete town site for some 200 Canadians, including their families, and some 250 Sri Lankan staff has been established on the banks of Pimburettawa tank. This town site has attractive married-staff bungalows, bachelor accommodation, a large recreation centre with swimming pool and tennis courts, a school and medical facilities.

Nearby is the labour camp accommodating the 2300 workers on the project.

Power and Fuel Supply

The required electric power supply for construction and domestic purposes is provided by the Ceylon Electricity Board (CEB) from power lines extended from Mahiyangana and Polonnaruwa. Full standby emergency diesel generator power supply was also provided.

The Ceylon Petroleum Corporation (CPC) has constructed a special refueling

station at Welikande to cater to the needs of this project. This depot has a storage capacity of 250,000 litres (50,000 gallons) diesel and 22,500 litres (5,000 gallons) of petrol.

Water Supply

A water supply scheme for the construction staff and workers has been completed. The purified water for this purpose is supplied from the Pimburettewa tank.

Telecommunications

A radio link between Colombo and the site was established 3 years ago. A direct dial telephone link is installed and is functioning in the Chief Resident Engineer's Office and Contractor's Office at Elawakumbura.

Implementation Schedule

The schedule for construction of the main dam required impounding to commence prior to the 1982/83 monsoon, 30 months after award of the main contract. The link tunnel schedule required completion by April, 1983 to allow transfer of Mahaweli water to the reservoir.

Project implementation is proceeding on schedule. The following bar chart illustrates the main schedule of item.

Present Status of the Project

Reservoir impounding commenced on 12 October, 1982 with closure of the dry-season diversion conduit. At time of closure the main dam was still some 12 meters (32.8 ft.) below its final crest elevation requiring intensive effort to

raise it to a level sufficient to safely pass the monsoon flood flows through the partially completed spillway facility. By the end of December this objective had been achieved and the dam was 94% complete. The reservoir level had risen to elevation 87.8 m. (288 feet) storing a total of 200 million cubic meters of water (162,000 acre ft.) which represents 34% of total capacity. The dam and spillway will be complete by February, 1983.

Work on the Irrigation Outlet Structures at both left and right banks is well advanced despite a major re-design necessitated by the presence of an ancient "horowwa" (sluice) which was discovered directly on the original alignment of the RB Outlet Works. preservation of this archaeologically important structure has necessitated driving a 180 m. (590 ft.) long tunnel which is now only 6 m. (20 ft.) short of break through.

Excavation of the trans-basin link tunnel was completed ahead of schedule on 16th July, 1982, only 15 1/2 months after driving commenced. The intake portal is complete, and work on the outlet portal is about to start. Invert lining is 70% complete. Where required, arch concrete and shotcrete work is proceeding on schedule, and the tunnel will be ready to pass water on schedule.

Manufacture of all hydro-mechanical works by the Hydraulic Engineering Corporation of China (HECC) is complete and most of the equipment has already been delivered to site for installation.

Project Benefits

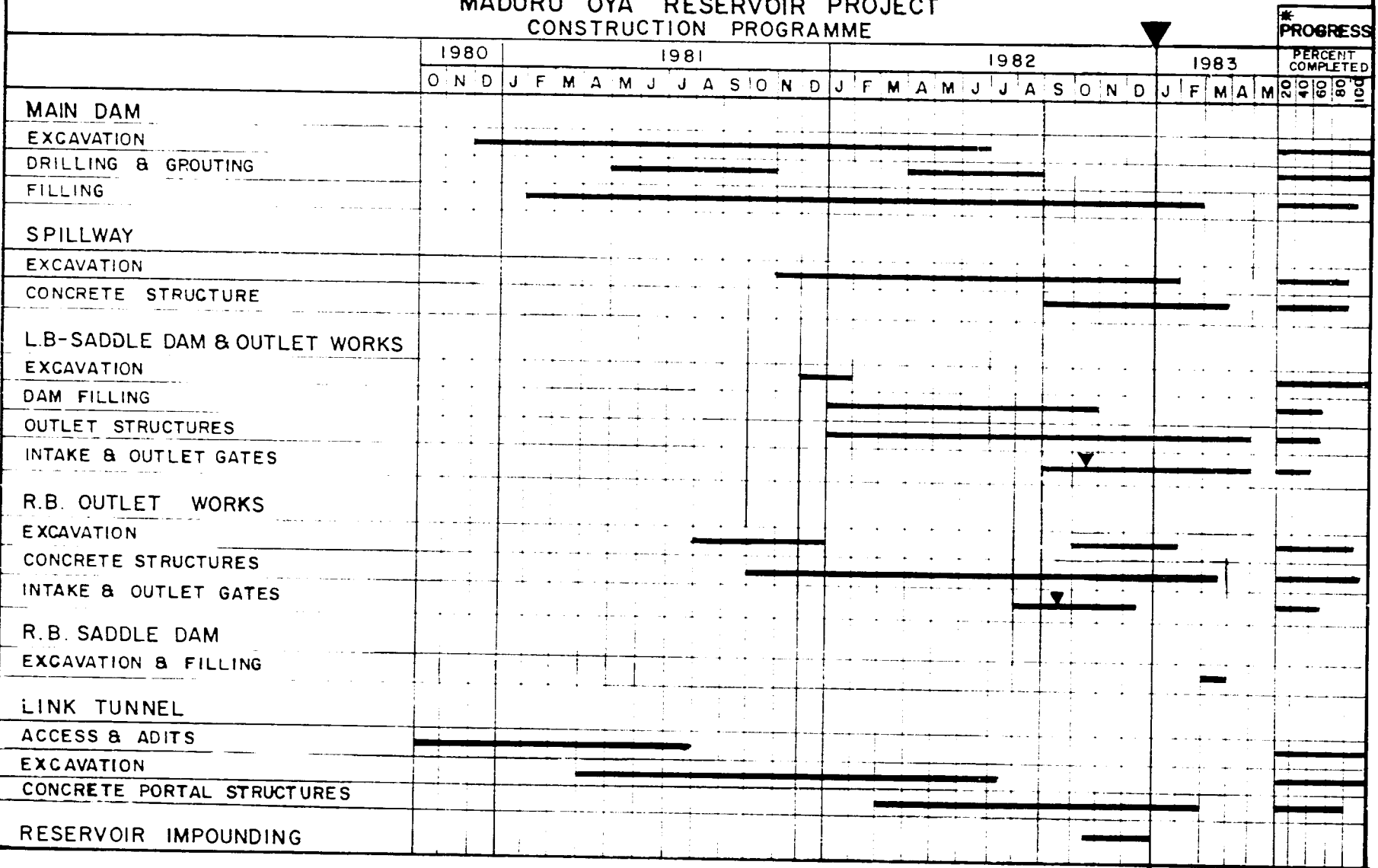
The Maduru Oya Project is a

multi-purpose project, which will ultimately provide hydro-power, irrigation facilities, housing and employment to a considerable segment of the unemployed population of Sri Lanka. Land already developed under Pimburettewa and Vakaneri Schemes, 3,750 hectares (9,300 acres), which is cultivated in paddy during the Maha season and with limited success in Yala season, will be assured of an adequate year-round supply of water. Agricultural land consisting of 46,750 hectares (115,000 acres) will be distributed among 47,000 new farming families. Furthermore it is proposed to supply water to Gal-Oya in the near future by increasing the reservoir storage

capacity. When completed the project will generate a large number of new agricultural jobs and several permanent jobs in the project organisation. Further, it will generate some two thousand non-skilled and semi-skilled jobs during construction. In short, this project will significantly contribute to solving some of the problems that the country faces in employment and the production of food crops.

In addition to all these benefits, it is envisaged that the present flood damage experienced in this area will be greatly reduced.

MADURU OYA RESERVOIR PROJECT CONSTRUCTION PROGRAMME



LEGEND ——— PROPOSED SCHEDULE
 * UP TO 31ST OF DEC. 1982
 ▽ CLOSURE OF INTAKE GATES



Maduru Oya dam is the first major construction project completed under the Accelerated Mahaweli Programme. The Maduru Oya is a perennial river on a basin adjacent to the Mahaweli, rising in the mountainous centre of Sri Lanka. The Maduru Oya snakes its way through the plains on the eastern coast and empties itself in Vandeloos Bay, north of Batticaloa.

The Maduru Oya dam 141 feet (43 meters) high is a rockfill structure, 3,306 feet (1008 meters) long measured along the crest.

Work commenced on the dam in 1978 facilitated by a soft loan provided by Canada in a sum of (Canadian) \$ 76

m. Impounded in October last year during the North-East monsoon, the Maduru Oya reservoir already holds 113,000 ac. feet of water which represents 35 per cent. of its storage capacity. Diverted Mahaweli waters will be stored in the Maduru Oya reservoir, which has a gross storage up to 483,470 ac. ft. to benefit 15,473 acres of new land and nearly 10,000 acres of existing land.

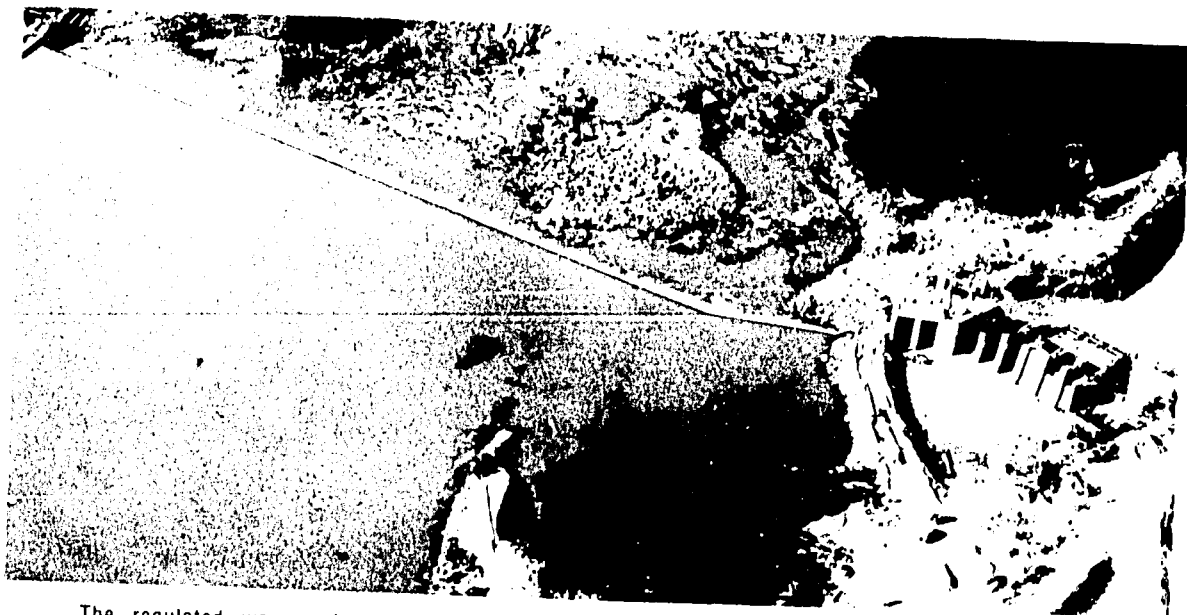
Photograph shows the reservoir ten days after impoundment.



The main civil contractor on the Canadian-aided Maduru Oya Project, FAFJ—a joint venture of four Canadian construction firms invited the Hon. Gamini Disanayake, Minister of Lands, Land Development and Mahaweli Development and the Canadian Minister of Justice, Hon. Dr. MacGuigan to ceremonially place the final corefill on the Maduru Oya dam to top off work on the dam on February 14, 1983.

The Canadian Minister was in Sri Lanka for the Commonwealth Law Ministers' Conference.

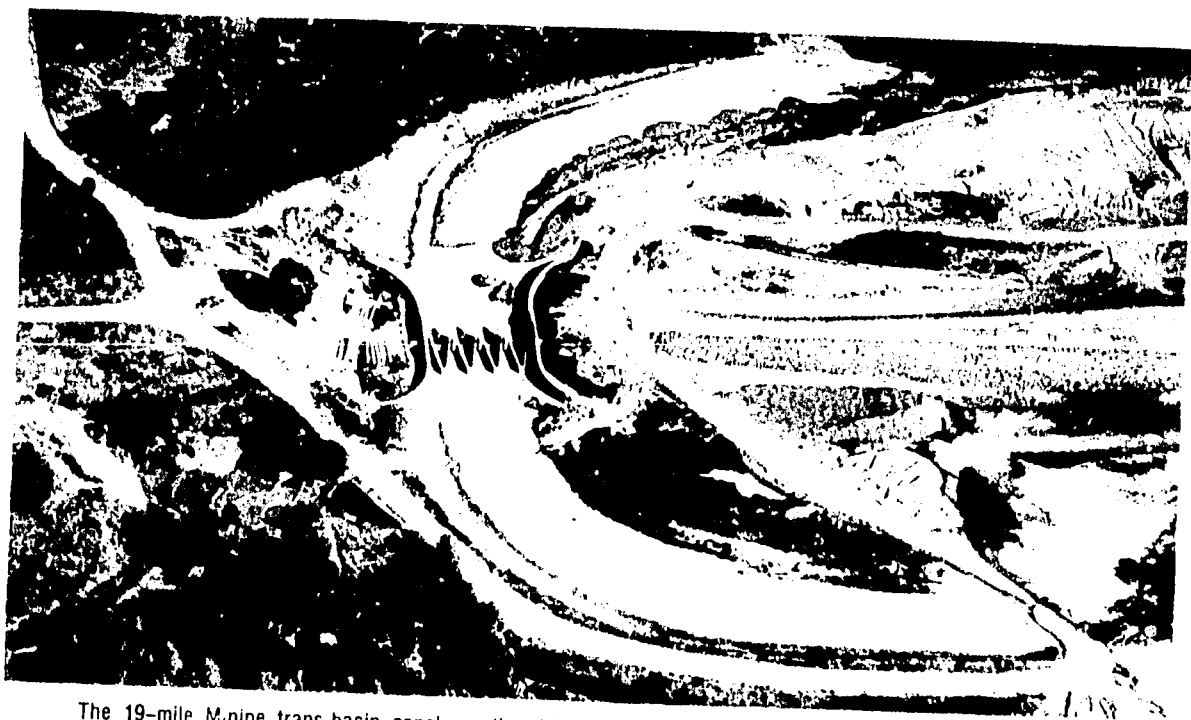
Photograph shows Hon. MacGuigan and the Hon. Gamini Disanayake together with the Deputy Minister of Mahaweli Development, Mr. M. S. M. Abusally; District Minister for Polonnaruwa Mr. Merril de Silva; the Secretary to the Ministry of Mahaweli Development, Mr. Ivan Samarawickrema; the Additional Secretary of the Ministry of Mahaweli Development Mr. C. W. E. Rosa among others.



The regulated water releases from the major hydro-power projects on the Mahaweli at Victoria and Randenigala will be picked up by the new Minipe anicut and diverted through the Minipe Right Bank canal for the development of 200,000 acres under System C and System B.

The new Minipe anicut constructed by the State Development and Construction Corporation, immediately below the ancient Minipe anicut will also serve the existing left bank development of 16,600 acres.

Photographs focusses on the Minipe anicut across the Mahaweli also showing the trans-basin canal intake and silt-ejector on the right foreground.



The 19-mile Minipe trans-basin canal, on the right bank of the Mahaweli, which is the largest canal in Sri Lanka, will be ready for water issues well ahead of the North-East monsoon cultivation period 1983/84. This canal, a pivotal structure under the Accelerated Mahaweli Programme will be the first major canal in Sri Lanka to be concrete-lined in its entire length.

M/s Vianini S.P.A. of Italy was awarded the contract for the construction of the major length of this canal together with the major river crossings at Loggal Oya, Heppola Oya and Diyabana Oya with impounding reservoirs.

MINIPE ANICUT AND RIGHT BANK TRANS - BASIN CANAL

Victoria reservoir and development of 80,000 hectares (200,000 Acres) under Systems B and C form a major component of the Accelerated Mahaweli Development Programme undertaken by the Government.

The Victoria reservoir is primarily a hydro-power project with an installed capacity of 210 MW and a firm energy out-put of 600 GHW per annum. The regulated releases from the Victoria reservoir will be picked up by the new Minipe anicut and diverted by the Trans-basin Canal for the irrigated development of the area under Systems B and C located on the right bank of Mahaweli Ganga.

The new Minipe anicut, a concrete structure of Ogee Section 230 metres (754.4 ft.) in length and heights varying from 3.6 m-5.1 m 12'-17' having a silt ejector with 2 Nos. radial gates and head

sluices with 6 Nos. electrically operated vertical lifting gates is built immediately below the existing anicut to divert the regulated releases from Victoria to Ulhitiya and then to Maduru Oya. The new anicut also serves without any modification the existing left bank development of about 6,700 ha (16,600 Acres).

The Trans-Basin Canal would convey water from the new anicut at Minipe to Ulhitiya and Ratkinda reservoirs where it would be regulated for release to System C. The canal in its traverse crosses four other major tributaries in between. The first, Badulu Oya is crossed by an aqueduct while the other three Loggal Oya, Heppola Oya and Diyabana Oya are through "Level crossings" (reservoirs).

The Badulu Oya Acqueduct

A major concrete structure rectangular in section with 7 m. base and 4 m. height

supported on concrete pillars ; seven spans of 20.1 metres.

The Loggal Oya reservoir

Embankment length 2.26 km. (1.4 mls.) maximum height 28.2 m. (92.4 ft.) with a storage of 50 million cubic meters (40,500 c. ft.) with a labyrinth type spill of 168 m. (551 ft.) in length.

Heppola Oya Reservoir

Embankment length 900 metres, (2,952 ft.) maximum height 21.0 m. (68.8ft.) storage of 13.6 million (cubic meters) (11,000 Ac. ft.) with a labyrinth type spill of 121.2 metres (397.5 ft.) in length.

Diyabana Oya Reservoir

Embankment length 722 metres, maximum height 9.3 m. (30.5 ft.) storage of 1.5 million (1,200 Ac. ft.) with a labyrinth spill 31.20 m. in length.

A short tunnel is also necessary to cross a ridge at the 5th kilometre. The tunnel is designed for a maximum discharge of 70 cusecs. (2,500 cusecs.) and is of horse-shoe shape with a base of 5.8 metres (19 ft.) 6.1 metres (20 ft.) in height and 208 metres (682 ft.) in length and concrete lined on the sides and shotcreted on the Arch.

The canal 8.2 metres (26.8 ft.) bed width is designed to be concrete lined in its entire length (nett) of 21.5 kilometres (13.3 mls.).

The inflow from the canal into Ulhitiya Oya together with the inflow of 102 million M³ (82,700 ac. ft.) from its own catchment area of 290 sq. km. (112 sq. miles) will be regulated by the Ulhitiya

reservoir formed by an earthen embankment located 10 km. from the outfall of the Minipe-Ulhitiya Canal.

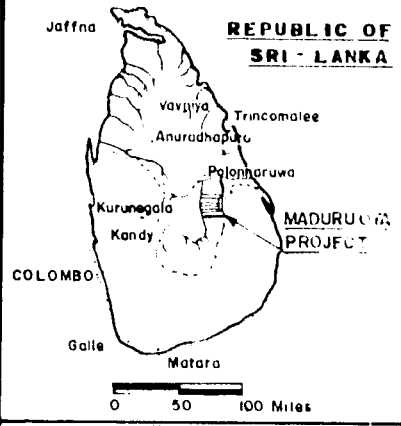
The earthen embankment forming the Ulhitiya reservoir is of total length 5.9 km. and consists of Ulhitiya Oya dam and Ratkinda Oya Dam across a tributary of Ulhitiya Oya. The two separate reservoirs thus formed are connected by an open cut link canal. The total storage capacity is 142 million cubic meters (115,000 ac. ft.). The embankments have a top width of 6 metres and a maximum height of 26 metres. A spillway with seven radial gates 10 metres × 4.5 metres is provided.

The Ulhitiya reservoir serves as a balancing reservoir and feeds the System C area through two main sluices on the left and right banks of Ulhitiya Oya and Ratkinda Oya dams respectively.

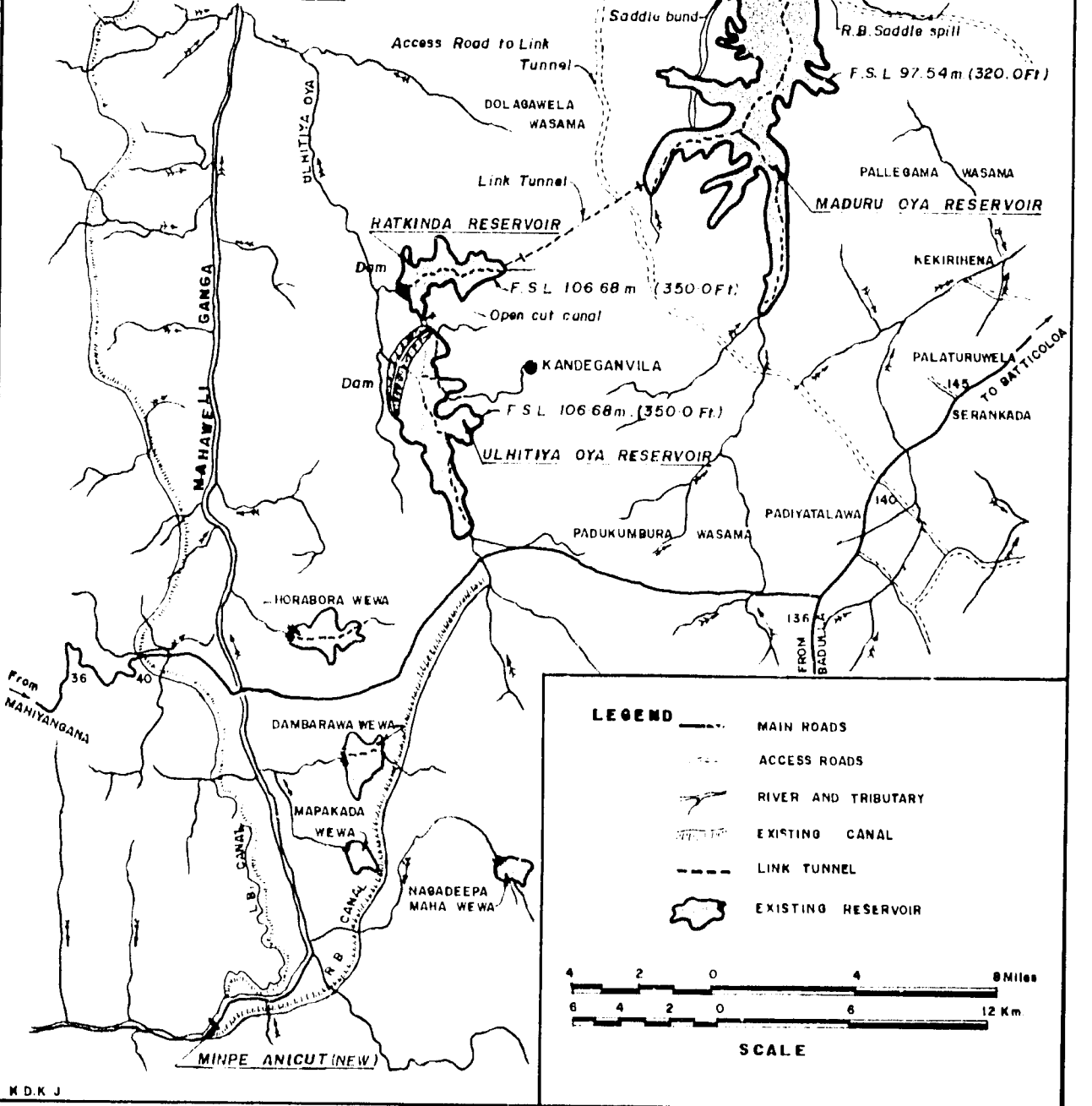
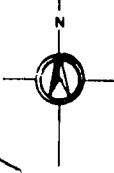
The area under System B of the Mahaweli Programme is located in the adjacent river basin of Maduru Oya. The Maduru Oya reservoir of capacity 470 million cubic meters (382,000 Ac.ft.) will provide irrigation water to 50,000 ha. (124,900 ac.) in System B. The supply to System B is to be augmented from Ulhitiya reservoir through a Trans-basin tunnel from Ratkinda to Maduru Oya reservoir.

Existing Projects

The Trans-basin Canal in its run to Ulhitiya Oya crosses four Major Irrigation Works, viz., Soraborawewa, Mapakadawewa, Dambarawawewa and Nagadeepawewa.



SRI LANKA
MAHAWELI GANGA
DEVELOPMENT PROJECT
MINIPE RIGHT BANK CANAL

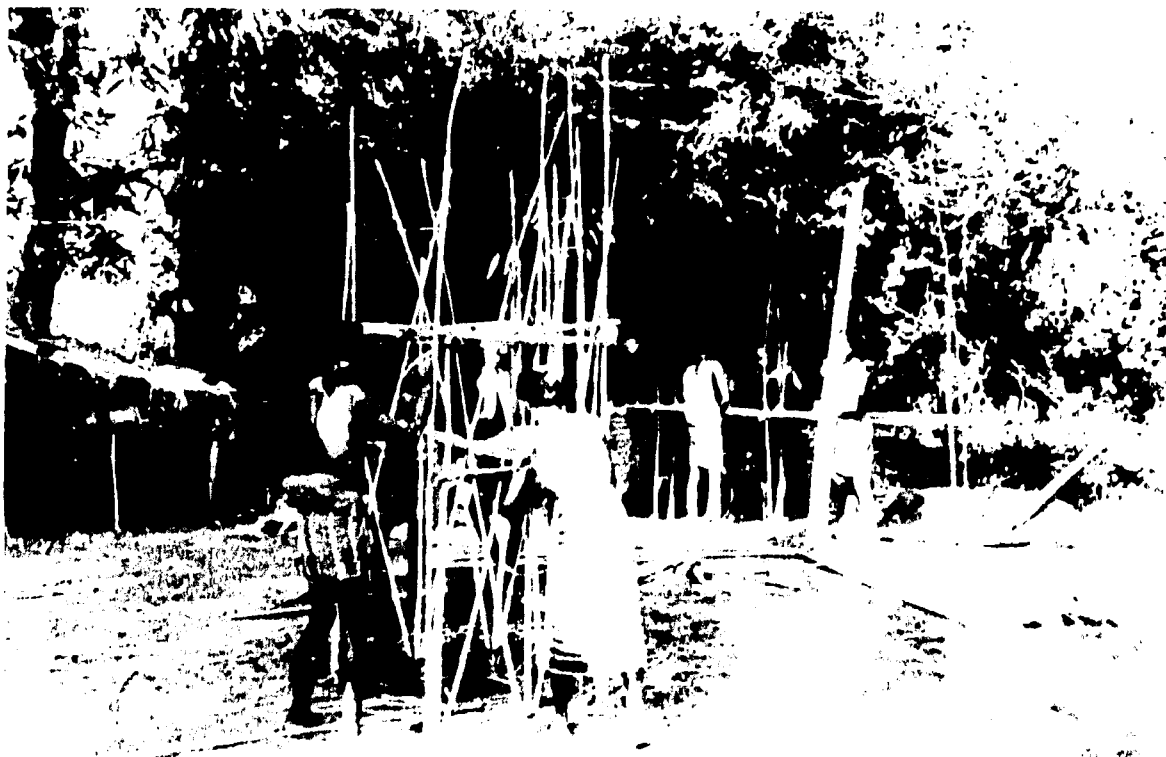


344



Shortly before their re-settlement in System C Veddhas of Kandeganwila were honoured by a visit from Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development.

The Veddhas received the Minister with song and dance and gifted him a bow, arrow and an axe. The Minister reciprocated by giving the Veddhas agricultural implements.



Before leaving for re-settlement in Hennanegala in System C the Kandeganwila Veddhas, devout ancestor worshippers, enacted the traditional ritual of 'Kiri Koraha'

and invoked the spirits of their ancestors to accompany them to their new settlement. Here the Veddhas are seen setting up the 'ailey' for the ritual



Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development is seen

admitting a settler's daughter to a new school opened at Grandurukotte to serve settlers at system C.



Settlers were earlier housed in 'Wadiyas' built of cadjan sheds when they moved in to stake their lots. The Mahaweli Authority has now planned temporary

dormitories, more pleasing and altogether more habitable, considerably easing the initial period of induction of the settlers.

In the first three projects, the water supply to these will be cut off by the construction of the Trans-basin Canal and the water requirements will be met by direct outlets provided from the Trans-basin canal. At Nagadeepawewa certain irrigated tracts will be cut off by the Trans-basin Canal and provision has

been made to carry these channels in concrete troughs over the Canal.

The trans-basin Canal when completed would be the largest though not the longest canal in Sri Lanka. This will also be the first major canal in Sri Lanka to be concrete-lined in its entire length.

TABLE SHOWING THE WORK COMPONENTS AND COST

<i>Major Components of Work</i>				<i>Cost (millions)</i>
A. STRUCTURES				
1. Minipe Anicut, Head Sluice and Silt Ejector	Excavation:	Earth	6,300 m ³	Rs. 20.0
		Rock	19,000 m ³	
	Concrete:	1 : 2 : 4	8,700 m ³	
	Re-inforcement		40 met. tons.	
	Gates. Hd. Sluice		6 Vert. Gates	
	Silt Ejector		2 Rad. Gates	
2. Badulu Oya Aqueduct	Earthwork :	Excav :	6,500 m ³	Rs. 40.0
		Filling	241,000 m ³	
	R.C. Concrete Piers		3,000 m ³	
	Troughs		1,440 m ³	
3. Badulla Oya Tunnel	Earthwork :	Excav :	6,500 m ³	Rs. 25.0
		Filling	21,000 m ³	
	Rock	Excav :	32,500 m ³	
	Concrete		5,000 m ³	
	Re-inforcement		16,500 kg.	
B. RESERVOIRS				
1. Loggal Oya	Earth)	Excav :	500,000 m ³	Rs. 125.0
	Embank :)	Fill :	1,478,000 m ³	
	Spill cum bridge			
	Inlet & Outlet Str:		3	

2. Heppola Oya	Earth	Excav:	120,000 m ³	Rs. 80.0
		Fill:	305,000 m ³	
	Spill cum bridge Inlet & Outlet Str:			
3. Diyabana Oya	Earth	Excav:	45,000 m ³	Rs. 40.0
		Fill:	132,500 m ³	
	Spill cum bridge Inlet & Outlet Str:			
4. Ulhitiya Oya	Earth	Excav:	742,000 m ³	Rs. 180.0
		Fill:	1,307,000 m ³	
	Rock	Excav:	121,000 m ³	
	Spill cum bridge with 6 radial gates L.B. Sluice			
5. Ratkinda Oya	Earth	Excav:	276,000 m ³	Rs. 82.0
		Fill:	1,062,784 m ³	
	L.B. & R.B. Sluices			
<i>Major Components of Work.</i>				<i>Cost, (Millions.)</i>
C. CANALS				
1. Minipe—Ulhitiya Oya	Earthwork:	Excav:	304,000 m ³	Rs. 45.0
Trans-basin Canal		Fill:	154,000 m ³	
0—3.24 km. (Badulu Oya)	Rock	Excav:	111,000 m ³	
	Concrete Lining & Retaining Wall		8,300 m ³	
2. Badulu Oya—Loggal Oya	Earthwork:	Excav:	90,000 m ³	Rs. 10.0
		Fill:		
	Rock:	Excav:	30,000 m ³	
	Canal Lining		13,000 m ³	
	Drainage Under- Crossing		1 No.	
3. Loggal Oya—Heppola Oya	Earthwork:	Excav:	135,000 m ³	Rs. 20.0

		Fill :	115,000 m ³	
	Rock	Excav :	20,000 m ³	
	Concrete Lining		46,000 m ³	
	Drainage Under-Crossing		3 Nos.	
4. Heppola Oya—Diyabana Oya	Earthwork :	Excav :	850,00 m ³	Rs. 100.0
		Fill :	435,000 m ³	
	Rock	Excav :	115,000 m ³	
	Concrete Lining		275,000 m ³	
	Drainage Under-Crossing		17 Nos.	
	Bridges		5 Nos.	
5. Diwabana Oya-Uhitiya	Earthwork :	Excav :	400,000 m ³	Rs. 60.0
		Fill :	130,000 m ³	
	Rock	Excav :	235,000 m ³	
	Concrete Lining		150,000 m ³	
	Drainage Under-Crossing		4 Nos.	
	Bridges		1 No.	

FINANCING OF THE MAHAWELI PROGRAMME

The Master Plan formulated by the United Nations Development Programme (UNDP) and the Food and Agriculture Organisation (FAO) for the development of the Mahaweli and adjacent basins in 1968 recommended a 30-year phasing of the Mahaweli Development Programme. This recommendation was made in the background of the financial and resource capacity of the country at that time.

The first Mahaweli Project was launched in 1970 with financial assistance in a sum of US\$ 14.5 million from the International Development Association (IDA) – the soft loan agency of the World Bank, together with a loan of US\$ 14.5 million from the International Bank for Re-construction and Development (IBRD) or the World Bank, with only a nominal interest rate.

The headworks of the first Mahaweli Project known as Project I, consisted of (i) a concrete barrage, across the main

stem of the river at Polgalla for the diversion of 2,000 cusecs through a 5-mile long tunnel into the adjoining Amban Ganga basin, (ii) a Power House at Ukuwela, with an installed capacity of 40 MW., (iii) a concrete dam at Bowatenne on the Amban Ganga and a diversion tunnel 4 1/2-miles long for yet another trans-basin diversion of a part of the water (1,000 cusecs) into the Kala Oya basin.

Existing irrigation systems were re-conditioned to utilise effectively the Mahaweli waters so diverted in 132,000 acres of existing fields in the Anuradhapura, Polonnaruwa and Trincomalee districts.

The benefits derived from these areas in double cropping during the first 2 years after the first Mahaweli Project was completed in 1976, more than compensated the investment on the headworks.

The Accelerated Programme

When the present Government took office in mid-1977, it decided to accelerate the Mahaweli Development Programme, taking in its stride the most beneficial Major Projects of the Master Plan and complete them in a tight constructional schedule of 5 to 6 years. This bold step was taken to surmount the main problems the country was facing, viz. -

- (a) unemployment which had reached a staggering figure of 1.2 million (which was nearly 10% of the population);
- (b) to provide the increasing hydro-power energy needs for industrial development and rural electrification. (The power demand growth had risen from 6% prior to 1977 to about 12% after 1977, with the intensified development programmes); and
- (c) to make the country self-sufficient in its food requirements. (The import bill for food was nearly 1/3rd of the annual budget).

.With financial assistance from several friendly countries, which was readily forthcoming after the new Government came into office, it was possible to undertake four large reservoir projects and the downstream development of a wide area for irrigated agriculture, coupled with the necessary social infra-structure for community development.

Financing of this project was fraught with severe constraints at the beginning,

in the early 70's. The 30-year span of construction as envisaged in the UNDP/FAO Master Plan was mainly to facilitate financing. The experts who formulated the Master Plan also envisaged other constraints like management problems that would invariably surface. The decision to telescope the construction schedule of the major projects in the Master Plan into a tight time-frame of 5 to 6 years was taken by the new Government in the context of positive responses from the World Bank and donor countries.

The Sri Lanka Aid Group sponsored by the World Bank was more than sympathetic to the case made by the new Government to accelerate the Mahaweli Programme. The Aid Group mobilised external resources from donor countries and institutions. In this regard, IDA commenced mobilising external resources for co-financing projects, (appraised by agencies) like the Mahaweli Stage II (which involved UK financing, USA financing and support from the European Economic Community (EEC), the Canadian International Development Agency (CIDA) and The Netherlands; and for Mahaweli Stage III which is operative in System C involving financing by Japan and Kuwait apart from the IDA itself.

The Asian Development Bank is another multi-lateral regional organization, based in Manila, which has offered substantial aid to the Accelerated Programme. The ADB arranged a long term soft loan of US.\$ 22.5 million for System B and C for the construction of new main trunk roads linking the two Systems. The transport network is a vital

prerequisite to development in the new settlements and for the growth of development points.

Swedish Assistance

The Swedish International Development Authority (SIDA), which is the main organization in Sweden through which loan funds are disbursed, is providing financial assistance for the Kotmale Hydro-Power Project. Of the import-support grant available from Sweden for the Kotmale Hydro-Power Project, a sum of Swedish Kroner (SEK) 307 million had been used upto 1982. There is a further commitment of SEK 1,088 million for the Kotmale Hydro-Power Project under an agreement covering six Swedish financial years, i.e., 1982/1983 to 1987/1988.

The total assistance committed by Sweden for the Kotmale hydro-power Project (including SEK already disbursed to the project) amounts to SEK 1,395 million. The Swedish Government will therefore support the Kotmale hydro-power Project by making available to Sri Lanka, subject to the provision set forth in these agreements on economic and social co-operation, a grant not exceeding SEK 1,828 million for the period 1st July 1982 and 30th June 1988.

The allocation for each financial year of the agreement is as follows :-

1982/83 an amount not exceeding 135 million Swedish Kroner ;

1983/84 an amount not exceeding 190 million Swedish Kroner ;

1984/85 an amount not exceeding 259 million Swedish Kroner ;

1985/86 an amount not exceeding 260 million Swedish Kroner ;

1986/87 an amount not exceeding 150 million Swedish Kroner ;

1987/88 an amount not exceeding 103 million Swedish Kroner .

For the financing of the electro-mechanical equipment for the Kotmale Project a Credit Agreement has been signed between the Central Bank of Sri Lanka and the Skandinaviska Enskilda Banken. Under this agreement Sri Lanka was given a credit facility amounting to financing 85% of the amount of the contract and to a maximum of SEK 42 million. An aggregate credit facility under this Agreement amounts to SEK 200,560 million.

U.K. Assistance

The United Kingdom assistance for the Victoria Project commenced with the Technical Assistance Grant of £ 4.7 million. This enabled finalising the feasibility studies and the preparation of designs and tender documents for the project. This was done on the basis of a Consortium of Consultancy provided by the UK Government. This was followed by a grant of £ 100 million for the Victoria Project headworks, spread over a 5-year construction period. This was to meet major portion of the foreign component of the cost of this project. With escalation of construction costs and inflation it was found that this amount was not adequate to meet the total cost of headworks, and a further loan of £ 20 million was obtained from the Hanover Trust with a guarantee by the Export Credit Guarantee Department (ECGD) of the UK. This £ 20 million was to meet the major part of the

cost of the installation of equipment of the Victoria Project.

Canadian Assistance

Canadian Assistance is provided through the Canadian International Development Agency (CIDA). CIDA gave a Technical Assistance Grant of Canadian \$ 7 million for feasibility studies of the Maduru Oya Project. Subsequently the Canadian Government agreed to contribute Canadian \$ 76 million as a soft loan towards the construction cost of the Project. There is no interest on the Canadian Loans which are repayable over 50 years with no payment during the first ten years. The total cost of construction was estimated to be more than Canadian \$ 100 million which included the contribution that has to be met by the Sri Lankan Government towards the project. Canadian assistance was also for a large computer for monitoring Water management for all the Systems under the Mahaweli Project. For this purpose the Canadian government assistance was a grant of Canadian \$ 2,803,000. The installation of a computer to monitor the Systems Management of water is very vital in view of the competing demand of water for agricultural and power generation. The computer will be installed in the Water Management secretariat (to be set up in the Mahaweli Headquarters Building) under the Mahaweli Authority of Sri Lanka in the first quarter of the current year.

Assistance from Federal German Republic

The Federal Republic of Germany, acting through Kreditanstalt für Wiederaufbau (KfW) has provided necessary finance for the Randenigala

and Rantembe Projects. Under technical Assistance, a grant of DM 8.5 million was made available by KfW in 1978. This provided for the investigations, feasibility studies and the preparation of designs, plans and specifications upto tender level for both the Randenigala and Rantembe Projects. With this technical assistance grant a full feasibility study of the System A and also a study of the environment of the Randenigala reservoir and its surrounding areas were carried out. In November, 1981, a loan agreement was signed between the Kreditanstalt für Wiederaufbau (representing the Federal Republic of Germany) and the Democratic Socialist Republic of Sri Lanka for the sum of DM 400 million as a soft loan to be used for the construction of the Randenigala Dam and Power Station. This loan provides for the civil works, hydro-mechanical works, mechanical works and electrical works of the Randenigala Project. It is estimated that the cost of the Randenigala Dam and Power Station would be about Rs. 4,500 million. The loan from the Federal Republic of Germany would amount to approximately Rs. 3,600 million.

United States Assistance

United States aid which is extended under the aegis of the Agency for International Development (USAID) is concentrated on the following areas :-

- (1) For design and supervision of 37,400 ha. of the Irrigation Farmland in System B.
- (2) Study in regard to the mitigating factors of the environment of the Accelerated Mahaweli Programme.

- (3) Development within System B of the Accelerated Mahaweli along the Left Banks of the Maduru Oya by providing irrigation systems for settling families and providing infra-structure. The loan was specifically for the main and branch canals.
- (4) Mahaweli Sector Support by way of assistance to Sri Lanka to enable to maintain an adequate level of local currency investment and also partake in the downstream activities constructed by Sri Lanka with or without expatriate technical assistance.

In terms of the first Loan Agreement in 1980 the United States Agency for International Development authorised a loan of US. \$ 10 million to finance the design and supervision and construction of the main and branch canals of the design of the main drainage system. Of this, up to US. \$ 400,000 was allocated for an Environmental Impact Study, with particular reference to wild life.

The agreement in regard to construction of System B was signed in 1981 whereby there was provision for US. \$ 25 million, with an additional US. \$ 60 million to be given in future years subject to the availability of funds and satisfactory progress of the project. The project is expected to be complete by 1986, including the development of Zone 1-5 of System B, the construction of Main and Branch canals of the area up to approximately 23.5 kilometres. This includes all works necessary so that irrigable land in this area can be cultivated for Maha 1984/85.

The last USAID loan specifically referred to the Mahaweli Environment Project, where assistance is to be given in the way of infra-structure development of national parks including the Somawathiya Sanctuary, Wasgomuwa Strict National Reserve, Maduru Oya National Park and Flood Plain National Park. Assistance was also to be given to survey 500 miles of boundary, 700 acres of buffer zones, and the strengthening the planning and management capability of the Wild Life Conservation Department which functions within the Ministry of State. Toward this end it was also proposed to develop the Research and Training Centre in the Wild Life Conservation Department. The funds for this was in the nature of a Grant of US. \$ 1,500,000.

Assistance in Regard to System C

The International Development Association (IDA) is funding System C, by and large with co-financing from Japan and the Kuwait funds. The IDA has committed a sum of US. \$ 90 million and Overseas Economic Co-operation Fund of Japan (OECF) has pledged a sum of US \$ 45 million. The European Economic Community (EEC) has specifically taken up the development of Zone 2 under System C in a sum of US \$ 22.5 million.

The cost of the Right Bank Trans-basin canal from Minipe leading into System C is also met mainly from the IDA Loan. The estimated cost of the Right Bank Trans-basin canal is about Rs. 946 million.

Australian Aid

The Australian Government has agreed to give US \$ 15 million by way of

Commodity Aid for the development of the road network of Maduru Oya Project.

Saudi Aid

Saudi aid in a sum of US. \$ 26 million has been earmarked for development of the Left Bank of Maduru Oya Project and in a further sum of US. \$ 50 million for the development of the Right Bank of Maduru Oya Project.

UNDP Technical Assistance

Under the UNDP Country Project, assistance was made available for the establishment of a Monitoring and Progress Unit presently operated by the Mahaweli Authority of Sri Lanka (MASL). Also under the fund set up by the UNDP for Technical Co-operation among Developing Countries, (TCDC), a sum of US \$ 500,000 has been utilised to pay salaries of Senior Indian Engineers whose services are now being made available to the Accelerated Mahaweli Programme.

UNICEF Assistance

The United National Childrens' Emergency Fund (UNICEF) also assisted in a programme for community development in the Mahaweli areas which covers the training of farmers in Nutrition, Child Care and Health. UNICEF also provides assistance for water supply schemes.

World Food Programme (WFP)

WFP assistance is provided by way of food aid to persons in settled areas. This supplements farmers' incomes and also helps to step up their nutritional levels.

Peoples' Republic of China

Peoples' Republic of China has provided Rs. 3 million for the

establishment of a demonstration farm in Kalawewa-System H. Chinese Experts work at this farm to demonstrate food techniques and agricultural development.

System G - Sponsored by FAO

System G coming within the Mahaweli Special Areas has already the basic irrigation facilities. However, under an FAO sponsored scheme (on small farmer development) financial assistance in a sum of US \$2 million is available for revamping the irrigation and social infra-structure. The European Economic Community (EEC) and the Belgian Government has assisted in this project. Apart from revamping the irrigation schemes, this project has served to add 3,750 hectares (9,000 acs.) of new land to System G.

Assistance from The Netherlands

The Government of The Netherlands assisted Stage II of the Mahaweli Programme in System H. The Netherlands Government also supported the study undertaken by a Netherlands Consultancy Agency - NEDECO, to devise an implementation strategy for the Accelerated Mahaweli Programme. Their final report, referred to as the NEDECO REPORT, was issued in December, 1979. The study was spread over a period of 1 1/2 years, and had covered all resources of the Mahaweli Project. The implementation of the Accelerated Mahaweli Programme is based on strategies canvassed by the NEDECO REPORT.

The Netherlands also assisted in regard to the Mahaweli Water

Management Project along with the Government of Canada. The assistance is toward the establishment of a proper Water Management Secretariat presently set up under the MASL.

Assistance from India

The Kotmale Project feasibility studies were undertaken by Water and Power Development Consultancy Services (India) Ltd. – WAPCOS – a Government of India sponsored organisation. This study was undertaken as Indian Technical Co-operation with Sri Lanka, without cost to the Sri Lankan Government.

Assistance from Japan

Apart from coming in as co-financiers to System C, in the downstream development involved in the IDA Agreement, the Japanese Government first assisted in the feasibility studies of the Moragahakande multi-purpose Reservoir, a Project earlier earmarked for the Accelerated Mahaweli Programme. The assistance for this Project was channelled through the Japanese International Co-operation Agency (JICA) which despatched a team of experts to conduct preliminary surveys and possible technical co-operation in regard to the planning of the Moragahakande multi-purpose Project. The object of the

study was not only to formulate the feasibility studies for a Moragahakande Agricultural Project, but in the process to promote transfer of knowledge and technology to the Sri Lankan counterparts during the period of that study. The Moragahakande Project was however suspended by the Sri Lankan Government. It was subsequent to this that the Japanese Government pledged support as a co-financier to downstream development of System C to meet consultancy services, costs of construction of irrigation infra-structure, purchase of equipment and vehicles. The loan agreement in this regard signed between Japan's OECF and the Government of Sri Lanka on 16th October, 1981, was for Yen 7,700,000,000. The Japanese Government has also made a grant of Yen 996,000,000 for the establishment of a Pilot Demonstration Farm within the Mahaweli Area. The grant will be made to the Government of Sri Lanka to obtain the necessary services for the construction of irrigation facilities for this Demonstration Farm. The Japanese Government will execute the grant on the construction work incurred by the Sri Lanka Government in this regard.

DOWNSTREAM ENGINEERING (MAJOR & TERTIARY)

The assured annual water issues from the designed sources of water under the Mahaweli Project is estimated to be capable of irrigating about 364,000 ha. (900,000 acres) of land. The area to be irrigated under the Project will be issued with water by means of :

- (a) Trans-basin diversions and conveyance canals from the Headworks to major tanks in the development areas, and
- (b) Irrigation networks consisting of main, distributory and field canals.

The trans-basin diversions under the project are at Polgolla and at Minipe. At Polgolla the Mahaweli waters are diverted to Kala Oya, to the Anuradhapura city tanks, to Huruluwewa, Elahera and Angamedilla. A total of about 53,500 ha. (132,000 acres) of existing paddy lands were benefited by this diversion and

enabled the farmers in these areas to have two assured crops per year. In addition to these existing areas, 28,800 ha. (71,000 acres) of new paddy lands were opened up under Kandalama and Kalawewa reservoirs. To cultivate these new areas, about 25,000 families were settled. The total area covered by the diversion to Kala Oya is known as System H.

Right Bank of The Mahaweli

At Minipe, the Mahaweli is diverted to feed about 6070 ha. (15,000 acres) of existing paddy land on the Left Bank and to transfer water to the recently constructed Ulhitiya-Ratkinda and to Maduru Oya Reservoirs on the Right Bank to feed an estimated 50,000 ha. (120,000 acres) of new paddy lands in Systems C and B. The irrigable area under Maduru Oya Reservoir, known as System B, lies partly in the Polonnaruwa District and

partly in the Batticaloa District. System C is the area on the Right Bank of Mahaweli River, north of Minipe.

Besides the gigantic projects under construction for the storage and diversion of the Mahaweli waters, the development of new lands for paddy cultivation and the settlement of peasant families in the areas involve a tremendous volume of Civil Works. Leading the water from the main system up to the farmers' fields requires a well designed network of main, distributory and field canals with all appurtenant structures like drainage crossings, road bridges and water-control devices like canal drops, regulators, canal off-takes and farm turnout structures. Again, the social infrastructural development necessary for the massive settlement programme involves the construction of schools, hospitals, post offices, banks and other public buildings together with housing facilities for the staff who will take up residence in the new areas.

A Network of Roads

A proper road network has to be constructed to enable the provision of public transport facilities and for transport of produce. A properly distributed well construction program is required to ensure safe drinking water to the farming community, whilst water supply schemes have to be constructed for the various townships that are proposed in the development area.

In the first-stage of the design of each irrigation system, the following main problems have to be resolved :

- (a) Determination of the boundaries of the irrigable areas under command of the various tanks.
- (b) Establishment of the net irrigated area.
- (c) Working out the methods of irrigation of new lands and improvement of the existing irrigation systems.
- (d) Determination of the tentative cost of the main canals, branch canals, the remaining irrigation network, and the preparation of lands for development.

In dealing with the drainage facilities for each system, it is necessary to consider ;

- (a) The drainage of the irrigated areas and prevention of salinity ;
- (b) The provision of adequate cross-drainage of the irrigation canals, particularly at their conjunctions with the natural drainages ; and
- (c) Protection of the irrigation canals from damage by storm water.

In the following stages of development of each System, detailed designs, plans and construction schedules have to be drawn up in respect of the necessary irrigation infrastructure and the corresponding social infrastructure. The relationship between the settlement program and the related programmes for the development of the irrigation and social infrastructure has to be carefully worked out so as to cause little or no hardship to the settlers. The settlers are brought into their new lands one year

ahead of the due date, so that they can participate in the construction of the irrigation canals and do their own preparatory work on the land.

Apart from the full development of about 28,800 ha (71,000 acres) in System H, the Accelerated Mahaweli Program has been designed to provide irrigation water to 13,000 ha (320,000 acres) of new lands and a total hydro-power development equivalent to nearly 500 MW.

Ten Thousand Families

Under this program, an extent of 60,000 ha. (150,000 acres) of new paddy lands will be opened up in the next few years in Systems B and C for the settlement of about 45,000 families. This work has commenced, and around 10,000 families would have been settled in these two areas by the end of 1983.

The key headworks necessary for this development, i.e. the reservoirs at Ulhitiya-Ratkinda and at Maduru Oya, the new Anicut at Minipe and the Minipe-Ulhitiya trans-basin canal with associated structures, have almost been completed. The other irrigation and social infrastructural development work is now in progress in both Systems B and C.

The main conveyance system to feed the Mahaweli waters into these new areas in Systems B and C comprises :-

- (a) The new Minipe Anicut and the Minipe-Ulhitiya trans-basin canal, about 31 km. (19.26 mls.) in length.
- (b) The twin reservoirs at Ulhitiya-Ratkinda.

- (c) The 10.90 km. (6.77 mls.) Ulhitiya Left Bank main canal feeding Zone 2 of System C.
- (d) The 17.35 km. (10.78 mls.) Ratkinda main canal feeding Zones 3 to 6 of System C.
- (e) The 5.6 km. (3.5 mls.) tunnel conveying water from Ratkinda to Maduru Oya Reservoir.
- (f) The Maduru Oya Left Bank canal about 55 km. (34.2 mls.) in length, of System B.
- (g) The Maduru Oya Right Bank canal about 42 km. (26 mls.) in length, of System B.

On-farm Development and Roads

Besides the above main items of work, the conveyance system also comprises a large number of branch, distributory and field canals. There is also a large volume of work to be done on jungle clearing and on-farm development, before water can be issued for cropping.

The road network in the project area has also been planned for a phased implementation. In addition to the large number of market roads and hamlet roads that are being constructed in the project area in Systems B and C, a total length of 159 km. (99 mls.) of seven trunk roads will also be constructed. Some of these roads are new roads to be built whilst the others will be upgraded and paved. All these roads will eventually form an integral part of the national road network and will facilitate the efficient movement of goods and people to and from the region. Tender procedures are now nearly complete and construction work on these

roads is due to commence shortly. The work will be completed by about the middle of 1985.

The roads that will come under this program are as follows :-

- (1) Mahiyangana-Angunuwara Wewa -- 10 km (6 mls)
- (2) Maduru Oya-Maha Oya -- 24 km (15 mls)
- (3) Welikanda-Trikonamadu -- 22 km (13 mls)
- (4) Angunuwara Wewa-Ulhitiya Oya -- 13 km (8 mls)
- (5) Aralaganwila-Maduru Oya -- 19 km (12 mls)
- (6) Manampitiya-Ulhitiya Oya -- 51 km (31 mls)
- (7) Dehiattakandiya-Aralaganwila -- 19 km (12 mls)

The main items of civil works done in the different Systems of the Project on irrigation and social infrastructure can be summarised as below :-

System H

Irrigation infrastructure development undertaken by the MDB in the entire System H area was substantially completed by the end of 1982. Construction of drainage canals in Block 419, and a program of canal improvements and lining in the H 4 and H 5 areas will be carried on in 1983.

The total length of roadways metalled and tarred up to end of 1982 in System H was about 65 km. (40 mls.). The balance work on a length of about 16 km. (10 mls.) is in progress and due for completion before the middle of 1983.

In regard to the social infrastructure buildings, out of a total of 2,306 buildings in the program, 2,016 have already been completed. The balance work on buildings is in hand and will be completed before the end of 1983.

System C

Work on the Left Bank Main Canal (from Ulhitiya Reservoir) and its Branch & Distributory canals is nearly complete, and will be ready for water issue in Yala 1983. The total length of these canals is around 130 km. (80.7 mls.) and would feed an area of about 5,000 ha. (12,500 acres) in Zone 2. The numerous field canals necessary to convey irrigation water up to the individual paddy allotments are also nearly completed.

Work on the Right Bank Main Canal (from Ratkinda Reservoir) to feed Zones 3, 4, 5 and 6 is due to begin shortly. The portion of this canal necessary to issue water to Zone 3 will be ready by about end of 1983.

About 200 social infrastructure buildings have been completed in Zones 2 and 3 and about 140 are under construction. The Girandurukotte township buildings are under construction and will be completed by the end of the year. Construction work on buildings in Zone 3 and the priority buildings in Zone 4 are commencing in 1983 and will be completed before the end of the year.

A total of about 95 km. (59 mls.) of roads have been constructed to date in Zones 2 and 3. An extensive road development program is yet underway in these Zones. This includes metalling and tarring of the township roads and about 62 km. (38.5 mls.) of market roads in Zone 2. About 37 km. (23 mls.) of this work will be completed this year.

Work on a Rs. 12 million water supply scheme for Girandurukotte is underway and is scheduled for completion by mid-1984.

System B

Work on the Left Bank Main Canal (from Maduru Oya Reservoir) and its branch and distributory canals has commenced. The construction of the main and branch canals is divided into 2 phases. Under the first phase, about 60 km. (37.3 mls.) of main and branch canals have to be constructed. The second phase comprises about 80 km. (49.7 mls.) of main and branch canals.

Work on this canal system has been given on contract to Messrs.

Zachry-Dillingham, a joint venture of American firms. Construction work is in progress and those portions of the Main Canal and the Left Bank Canal serving blocks 501 and 502 in Zone 5 are scheduled for completion before the end of 1983. Construction of the canals serving blocks 101, 102 and 103 in Zone 1 will be completed before the end of 1984.

In regard to the distributory and field canals, work is being done by local contractors and irrigation facilities will be ready for Zone 5, about 1,500 ha. (3,700 acres) in extent, by the end of this year.

MAHAWELI WATER SYSTEM

A comprehensive programme for the utilisation of the water resources of the Mahaweli Ganga was outlined in a Master Plan prepared by a UNDP-FAO team in 1968.

The first Project, the Polgolla-Bowatenne Complex, under this programme, was commenced in March 1970 and completed in 1976. The diversion at Polgolla consists of a weir across the Mahaweli Ganga to enable the diversion of a maximum of 2,000 cusecs through a tunnel for the development of 40 MW of hydro-power at the Ukuwela Power Station. The tail water from the Ukuwela Power Station discharges into Sudu Ganga from where the natural river channel conveys the water to Amban Ganga upto Bowatenne. The Bowatenne Dam impounds the diversion flows from Ukuwela as well as the natural in-flows in the Amban Ganga for regulation and for diversion to the Kala Oya. The diversion

to Kala Oya from Bowatenne reservoir is through a 25.3 cumecs (1,000 cusec) capacity tunnel. Before this diversion is sent down to Kala Oya, a bifurcation structure constructed below the tunnel portal enables water releases to Kandalama reservoir and Huruluwewa. The in-flow into Kala Oya is first regulated at the Dambulu Oya Reservoir for irrigation of H-9 area in System H and for further releases to the Kalawewa. The Kalawewa will re-regulate the Mahaweli diversion and help in irrigating areas H-1 to H-5 in System H. Releases from Kalawewa will also be made to the Nachchaduwa reservoir (and then to Nuwarawewa) through the newly constructed Right Bank Main Canal. The Right Bank main Canal will also convey water to Tissawewa and Basawakkulama. The Rajangane reservoir which is located below Kalawewa on the Kala Oya, benefits from the drainage flows from the irrigated area in System H and would, in

normal years, not need any special releases from Mahaweli diversions. However, during critical years, water can be released to Rajangane reservoir from the Kalawewa.

The Bowatenne Reservoir is also utilised for generating hydro-power from the water releases that are to be made to the Elahera-Minneriya-Kantalai System and the Angamedilla-Parakrama Samudra System. A power tunnel leading from the reservoir conveys the water to the power house with a 40 MW installation before the water is used for irrigation in the Elahera System.

The Elahera diversion weir is utilised for diverting water into the Elahera-Minneri-Yoda Ela which feeds the Minneriya and Giritale reservoirs. This System is also utilised for diverting water to Kantalai and Kaudulla reservoirs through the Minneri-Kantalai-Yoda Ela.

The ancient Angamedilla anicut located below the Elahera Anicut diverts water to the Parakrama Samudra.

Kotmale Reservoir

The second Project that was commenced in the Mahaweli Development Programme was the Kotmale reservoir where a rockfill dam is under construction. This reservoir has been conceived as a pure power project where 201 MW of hydro-power could be developed in an underground power station that is under construction. Though the Kotmale Project has been designated as a power project the regulatory storage available in this

resevoir will benefit the Polgolla diversion by providing planned releases during critically dry periods of the year.

Victoria and Randenigala Reservoirs

The Victoria Reservoir Project, one of the key items in the Development Programme, was commenced in 1980. The Victoria Reservoir, located below the Polgolla diversion weir, will be one of the main regulating reservoirs in the Mahaweli System. The water releases through the tunnel, after utilisation in the 210 MW power installation, will flow back into the river to be re-regulated by the Randenigala Reservoir.

The Victoria Reservoir will be impounded in April 1984 and the first unit of hydro-power will be commissioned in July 1984.

Work on the Randenigala Dam was commenced in 1982. As in the case of the Victoria Project, the releases from Randenigala will flow back into the river after utilisation in the 122 MW installation in the power house.

The releases from Randenigala will be diverted by the newly constructed Minipe Anicut into the RB Trans-basin diversion canal to the Ulhitiya-Ratkinda Reservoirs. The Ulhitiya Reservoir has been completed, while the transbasin canal is due for completion in mid-1983. The irrigation of System C will be effected through the canals leading from the Ulhitiya-Ratkinda Reservoirs.

The Link tunnel from the Ulhitiya Reservoir to the Maduru Oya Reservoir

has just been completed for diversion of water from the Minipe Anicut. Surplus water passing below the Minipe Anicut would be diverted for irrigation of System A by the construction of a suitable diversion structure to Kandakadu.

Maduru Oya Reservoir

The Maduru Oya Reservoir has just been completed by the construction of a rock-fill dam on the Maduru Oya. Though the Maduru Oya is outside the Mahaweli Ganga basin, the resources of the Maduru Oya augmented by that of the Mahaweli Ganga, are being utilised in an integrated development programme outlined in the Mahaweli Master Plan. The Left and Right Bank Canals taking off from the reservoir will irrigate System B.

Projects after the Accelerated Programme

The Projects outlined in the foregoing are within the scope of the Accelerated Mahaweli Programme. The surplus water from the Projects which would be completed in the Accelerated Programme could be used suitably in other areas. The North West Dry Zone in the Mi Oya region is being studied as a likely area for development in the future.

Several dams and reservoirs have been proposed in the Master Plan for implementation at later stages. Systematic investigations and implementation of these Projects will be undertaken after the completion of the Accelerated Programme.

WATER MANAGEMENT IN THE MAHAWELI SYSTEM

The Mahaweli multi-purpose Development Programme, when completed, will utilise the available water resources in its basin for achieving self sufficiency in agricultural products and for the generation of hydro-power to meet the increase in demand for industries and rural electrification. This is possible only through good water management practices. A Water Management Panel (WMP), serviced by a Water Management Secretariat (WMS) has been established by the Mahaweli Authority of Sri Lanka (MASL). Policy decisions and overall programmes for cultivation are the responsibility of this Panel.

Water Management Panel

The WMP which was under the Mahaweli Development Board (MDB) until October 1980, was later re-structured with the Director-General of Mahaweli

Authority of Sri Lanka (MASL) as its Chairman.

The WMP comprises of the following :
Director General, MASL --
Chairman ; Executive Director
(Engineering), MASL ; Executive Director
(Settlement), MASL ; Director of
Irrigation ; Director of Agriculture ;
Chairman, Ceylon Electricity Board ;
G.A.-Anuradhapura ; G.A.-Polonnaruwa ;
G.A.-Trincomalee ; G.A.-Matale ;
G.A.-Kurunegala and the Director, Water
Management Secretariat, MASL
(Secretary of Panel).

The WMP meets twice a year, prior to the Maha and Yala seasons, whereat decisions are made on the allocation of water to the different areas, the crops to be grown and the cropping calendar. The WMS is responsible for providing the necessary data and recommendations to

enable the WMP to make its decisions. Once the decisions are made, the diversion of water at all the diversion weirs, such as Polgolla, Bowatenne, Elahera and Angamedilla, and monitoring of the total programme is directed by the

Water Management Secretariat.

Areas Benefitted at Present

The details of systems benefitted by the Mahaweli diversion at Polgolla are given below :

Name of Irrigation System	Name of Diversion Point	Name of benefitted Tank	Capacity of Tank		Extent under Cultivation		
			MCM	(TAF)	Tha	(Tac)	
H	Bowatenne	Kandalama	33.8	(27.4)	4.2	(10.4)	
H		Dambulu Oya	11.7	(9.5)	2.0	(5.0)	
H		Kalawewa	123.3	(100.0)	25.1	(62.0)	
H		Rajangane	100.7	(81.6)	6.7	(16.5)	
M (H)		Huruluwewa	67.8	(55.0)	3.2	(8.0)	
I (H)		Nachchaduwa	55.6	(45.1)	2.4	(5.9)	
I (H)		Nuwarawewa	44.4	(36.0)	1.0	(2.4)	
I (H)		Tissawewa Basawak-					
		kulama	6.7	(5.4)	0.4	(1.1)	
G		Elahera	Elahera	-	-	3.6	(9.0)
D 1			Giritale	24.0	(19.4)	3.0	(7.5)
D 1	Minneriya Galamuna		135.7	(110.0)	8.9	(22.0)	
D 1	Kaudulla		128.3	(104.0)	4.5	(11.0)	
D 1	Kantalai Vendrasan		157.9	(128.0)	8.5	(21.0)	
D 2	Angamedilla	P.S.S.*	134.4	(109.0)	10.1	(25.0)	
			Total		83.6	(206.8)	
					--	---	

The schemes under System H, except Rajangane, namely Kandalama, Dambulu Oya and Kalawewa are managed by the Settlement Division of the MASL. All the other schemes, in the above list, are managed by the Irrigation Department. Management of Diversion Units at Polgolla, Bowatenne are carried out by the MDB while those at Elahera and Angamedilla are operated by the Irrigation Department.

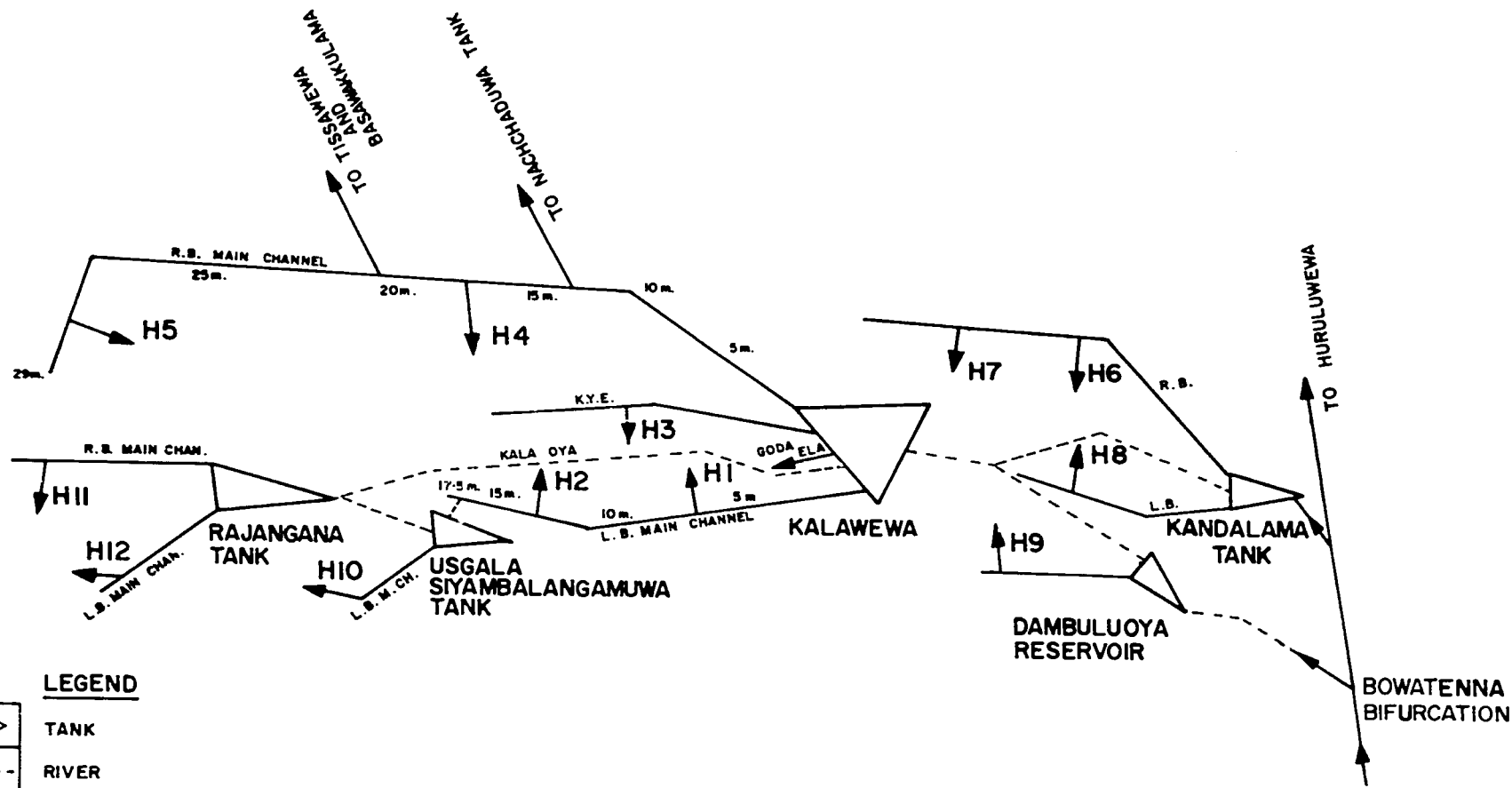
trans-basin Canal will be completed during 1983. Diversions at the Minipe Anicut would augment the catchments of the recently completed reservoirs on Ulhiti Oya and Maduru Oya. This would enable the cultivation to be carried out in Zone 2 of System C and Zone 5 of System B during 1983/84 Maha. The acreages in these Zones are 4,453 ha. (11,000 acres) in System C and 1,417 ha. (3,500 acres) in System B.

New Areas During 1983





Construction work on the Minipe RB

1981/82 Maha Season and 1982 Yala

Dry conditions prevailed during Maha



LEGEND

-  TANK
-  RIVER
-  CANAL
-  BLOCK No.

SYSTEM H & I(H)
SCHEMATIC LAYOUT OF WATER ISSUE SYSTEM

81/82 season and the anticipated water availability was not realised to meet the requirements. However, Polonnaruwa District had a very successful cultivation while crop failures in a few schemes in Anuradhapura District were experienced.

During Yala 1982, cultivation was not undertaken under Anuradhapura city tanks and Huruluwewa while varying extents, depending on availability of

water, were cultivated under other schemes. Only 30% of the available extent was cultivated under Kalawewa, even though water was assured for the cultivation with upland crops in the full extent of new lands.

The availability of diversion water and the forecasts at different diversion points are given below :

Season	Units	Polgolla Division		Amban-ganga Flow		Total at Bowatenne		Div. to H-area		Div. at Elahera to EMYE		Div. of Angamedilla	
		F'cst.	Act.	F'cst.	Act.	F'cst.	Act.	F'cst.	Act.	F'cst.	Act.	F'cst.	Act.
81/82 Maha	MCH	576	449	395	121	971	571	392	303	530	333	160	95
	TAF	467	364	320	98	787	463	318	246	430	270	130	77
(Oct. - Mar.)													
82 Yala	MCM	491	599	63	97	554	707	358	312	208	381	116	43
	TAF	398	486	51	79	449	573	290	253	169	309	94	35
(Mar. - Aug.)													

The Extent cultivated and the duty (quantity of water used per unit area)

during the two seasons and the current season are given below :

Scheme	Extent Available (1000 Acres)	Maha 81/82		Yala 1982		Maha 82/83		Cultivation in progress
		Extent	Duty	Extent	Duty	Extent	Duty	
Kandalama	10.4	6.43	5.61	Nil	-	10.4		
Huruluwewa	8.0	9.95	3.16	Nil	-	8.6		
Dambulu Oya	5.0	5.16	5.35	Nil	-	5.0		
Kalawewa	57.0	51.51	6.4	12.2	9.1	53.0		
Nachchaduwa	5.9	5.89	2.70	Nil	-	5.9		
Nuwarawewa	2.3	2.40	3.32	Nil	-	2.4		
Rajangane	16.5	16.30	6.47	13.3	7.3	13.2		
Tissawewa								
Basawakkulama	1.1	1.15	4.9	Nil	-	1.3		
Elahera	9.0	-	-	5.2	6.9	9.0		
Giritale	7.5	7.5	4.11	5.2	6.1	7.5		
Minneriya	22.0	22.0	3.55	6.7	8.4	22.0		
Kaudulla	11.0	10.68	3.39	2.5	9.42	12.0		
Kantalai	21.0	14.0*	4.38	14.0	3.98	22.6		
P.S.S.	25.0	19.67	5.10	19.0	4.68	25.0		

1. Due to drought conditions, full issues were not made and hence, duty in tanks in System H, I(H) and M(H) is under conditions of shortfall.

2. *Paddy only.

1982/83 Maha Season

The meeting of the Water Management Panel (WMP) for 1982/83 Maha season was held on 12th August, 1982 at the MASL Office and it was decided to cultivate the full extent of 83,280 ha. (205,700 acres) including 6,883 ha. (17,000 acres) of encroachments with 4 1/2 month variety paddy. The first date of water issue, in most of the schemes was 1st October and for late sowing, short term varieties were used. Most of the tanks were full during December 1982 and prospects of successful Maha cultivation in all areas are bright.

Water Management Secretariat

The Water Management Secretariat (WMS) was shifted from the Mahaweli Development Board premises at Jawatte road to a rented-out building at Union Place. It is proposed to house the WMS at its final location on the second floor of the Mahaweli Headquarters building at T. B. Jayah Mawatha during early 1983.

An IBM 4331 Computer, gifted by the Canadian International Development Agency (CIDA) for the use of the WMS, will be in use from early 1983. Recruitment of the full complement of staff for the WMS is in progress.

Communications System

The Water Management Secretariat (WMS) should be in constant direct communication with the main water distribution agencies in the Mahaweli Project area and with each of the main reservoirs and stream flow diversion points. The three main Agencies connected with use of water in the Project

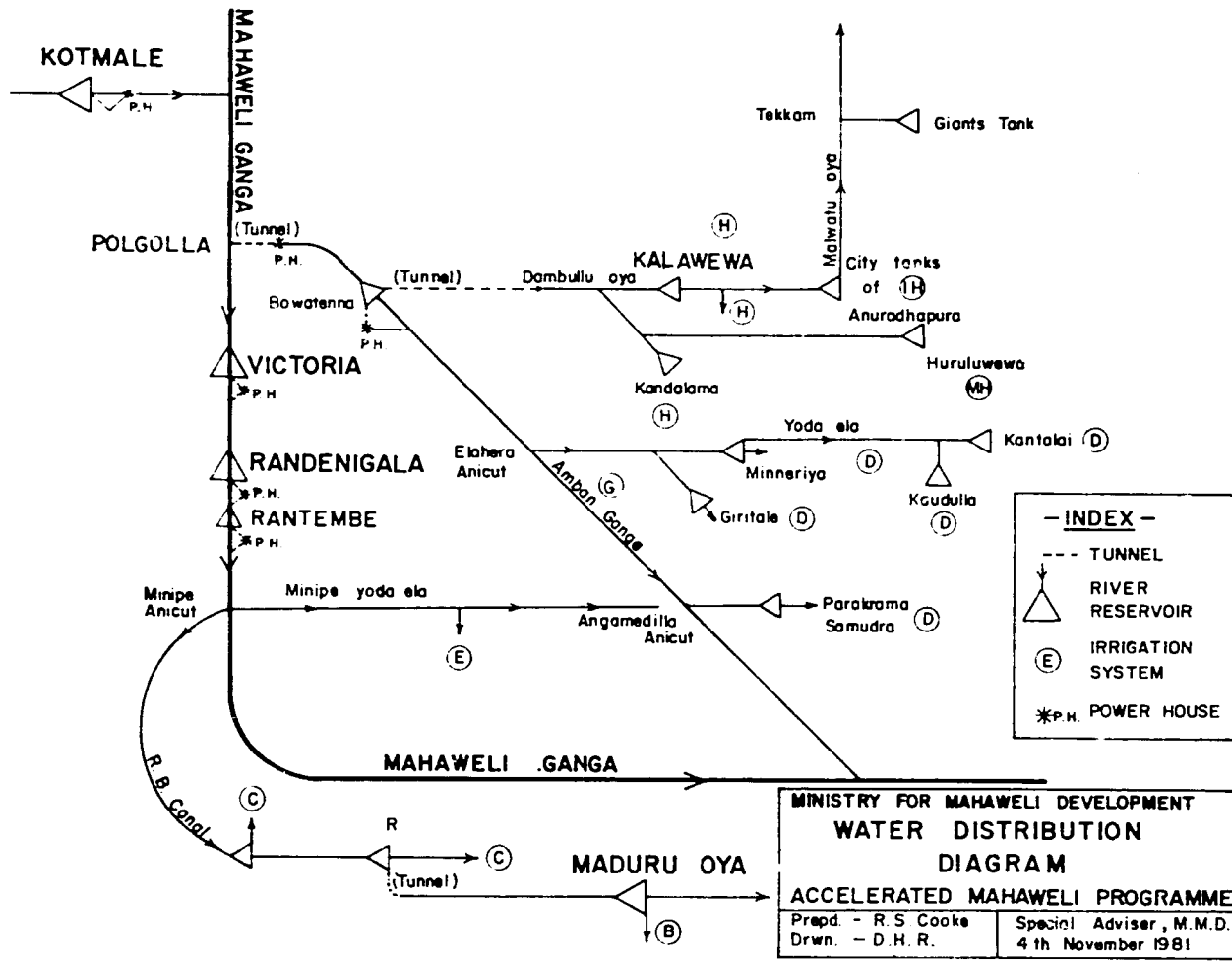
are : (a) Settlement division of the MASL, the Mahaweli Economic Agency (MEA); (b) The Irrigation Department (ID) and (c) The Ceylon Electricity Board (CEB).

It is proposed to set up a comprehensive communication system using UHF and VHF radio network. This network should be in operation during 1983.

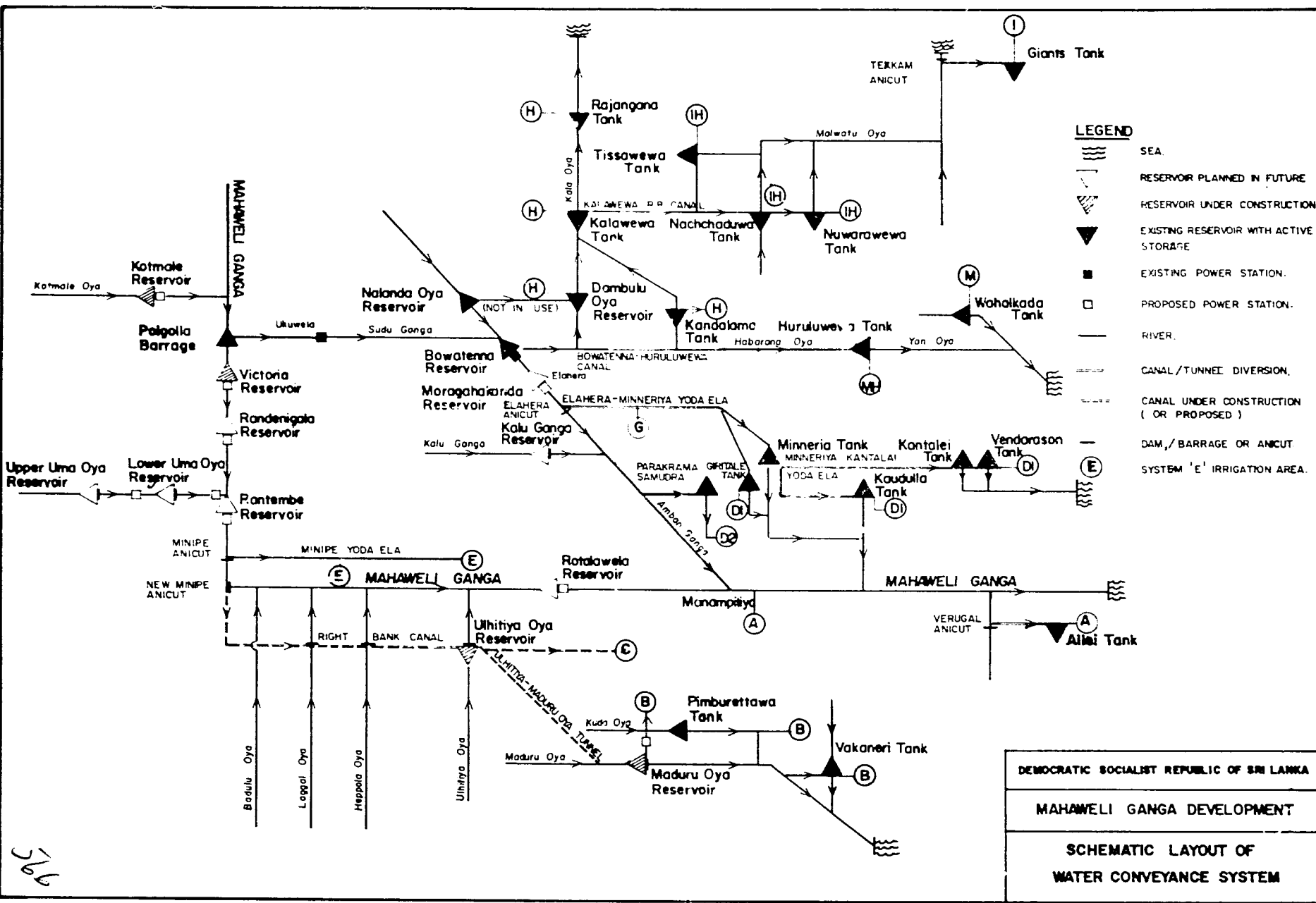
Macro Model for Water Management

The main components of the Mahaweli Development Programme are designed as multipurpose projects where hydro-power development and irrigation play important roles. There could be conflicts in the allocation of water for irrigation and hydro-power development as the demands for each one of these requirements vary seasonally. The hydro-power generation in the Mahaweli projects have to be integrated with the operation of other power generation systems in the CEB grid, while the demand for irrigation in the Mahaweli area is determined seasonally by the WMP.

In order to achieve optimum utilisation of water, it is necessary to rationalise and co-ordinate the use of water that becomes available not only in the Mahaweli projects but also in the hydro-power projects of the CEB System. A plan of a water conveyance system on completion and the full development under the Mahaweli project is shown in the diagram on the water conveyance system. In order to manage such a complicated system it is found necessary to computerise the management and monitoring of the use of water for optimum efficiency. A team of



6/11



- LEGEND**
- SEA.
 - RESERVOIR PLANNED IN FUTURE
 - RESERVOIR UNDER CONSTRUCTION
 - EXISTING RESERVOIR WITH ACTIVE STORAGE
 - EXISTING POWER STATION.
 - PROPOSED POWER STATION.
 - RIVER.
 - CANAL/TUNNEL DIVERSION.
 - CANAL UNDER CONSTRUCTION (OR PROPOSED)
 - DAM, BARRAGE OR ANICUT
 - SYSTEM 'E' IRRIGATION AREA.

DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

MAHAWELI GANGA DEVELOPMENT

SCHMATIC LAYOUT OF WATER CONVEYANCE SYSTEM

566

foreign Consultants has been commissioned to develop a macro model which could be utilised for use on the computer. The Canadian Government through CIDA, had donated an IBM 4331 computer which will be installed for use by the Water Management Secretariat. The Consultants have already completed the macro model and the programme is being tested on a similar computer which is available at the Ceylon Petroleum Corporation. The model will use historical flow data available for the different water systems and on the basis of pre-determined requirements of water for irrigation and power generation. In the initial stages of operation, the data used will be approximate, but field-testing and checking will refine this data during the initial years of operation.

It is proposed to determine the water distribution quantities on a weekly basis for management and monitoring purposes. The individual agencies responsible for water distribution and the CEB will work out the operation of the System within the weekly allocations. Co-ordination of all these activities will be carried out by the WMS. Where large Systems like System H, Systems B or C are to be operated, it has also been proposed that a mini-computer be used in those Systems.

Arrangements have already been made to purchase a micro-computer for use in System H. The micro model will be developed for System H where development work has already been completed. This micro model will be in operation, after initial testing, during the Yala season 1983.

SYSTEMS MANAGEMENT OF WATER FOR POWER GENERATION

The Mahaweli Accelerated Programme consists of 4 multipurpose projects. A primary purpose of the Headworks in the Accelerated Mahaweli Programme is for the generation of hydro-power and the water flowing down after hydro-power development is used for largescale irrigation development. The three major hydro-power stations of the Accelerated Programme viz., Victoria, Kotmale and Rāndenigala will more than double the existing hydro-power capacity of the island and these power stations in the Mahaweli Ganga and its tributaries are going to play a dominant role in the generation of power and energy in the island.

The bulk of the present hydro-power generation is from the following power stations in the Kehelgamu Oya - Maskeliya Oya Complex in the upper reaches of the Kelani Ganga.

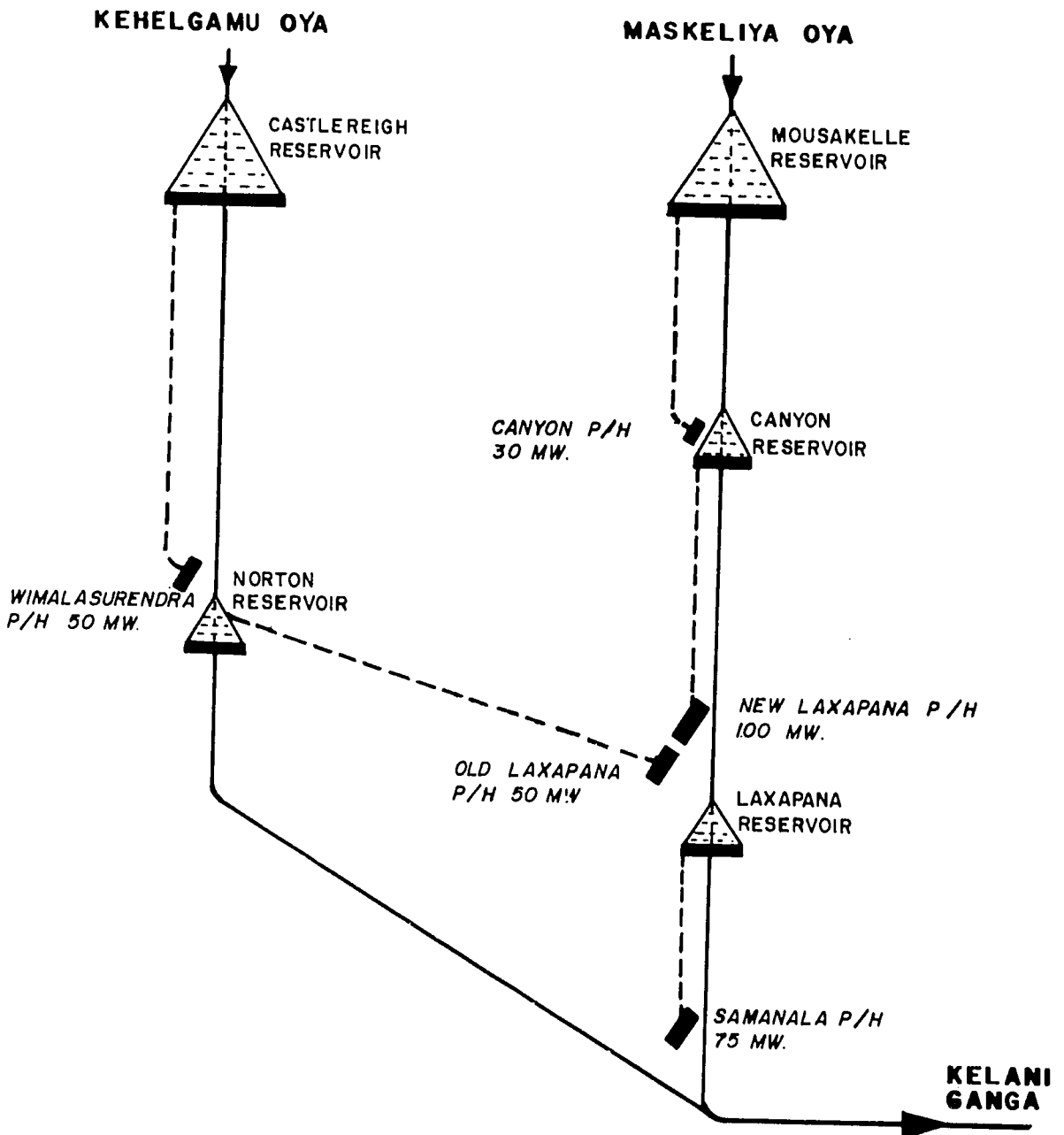
<i>Power Station</i>	<i>Installed Capacity</i>	<i>Annual Firm Energy</i>
	<i>MW</i>	<i>GWH</i>
Old Laxapana	50	228
Wimalasurendra	50	104
Samanala	75	448
New Laxapana	100	504
Canyon	30	144
Total	<u>305</u>	<u>1,428</u>

The power station in the Mahaweli Ganga and its tributaries (Fig. 2) will have the following capabilities.

<i>Power Station</i>	<i>Installed Capacity</i>	<i>Annual Firm Energy</i>
	<i>MW</i>	<i>GWH</i>
Ukuwela	38	168
Bowatenna	40	108
Victoria	210	626
Kotmale (1st stage)	134	310
Randenigala	122	366
Total	<u>544</u>	<u>1,578</u>

KEHELGAMU OYA - MASKELIYA OYA COMPLEX

SCHEMATIC DIAGRAM



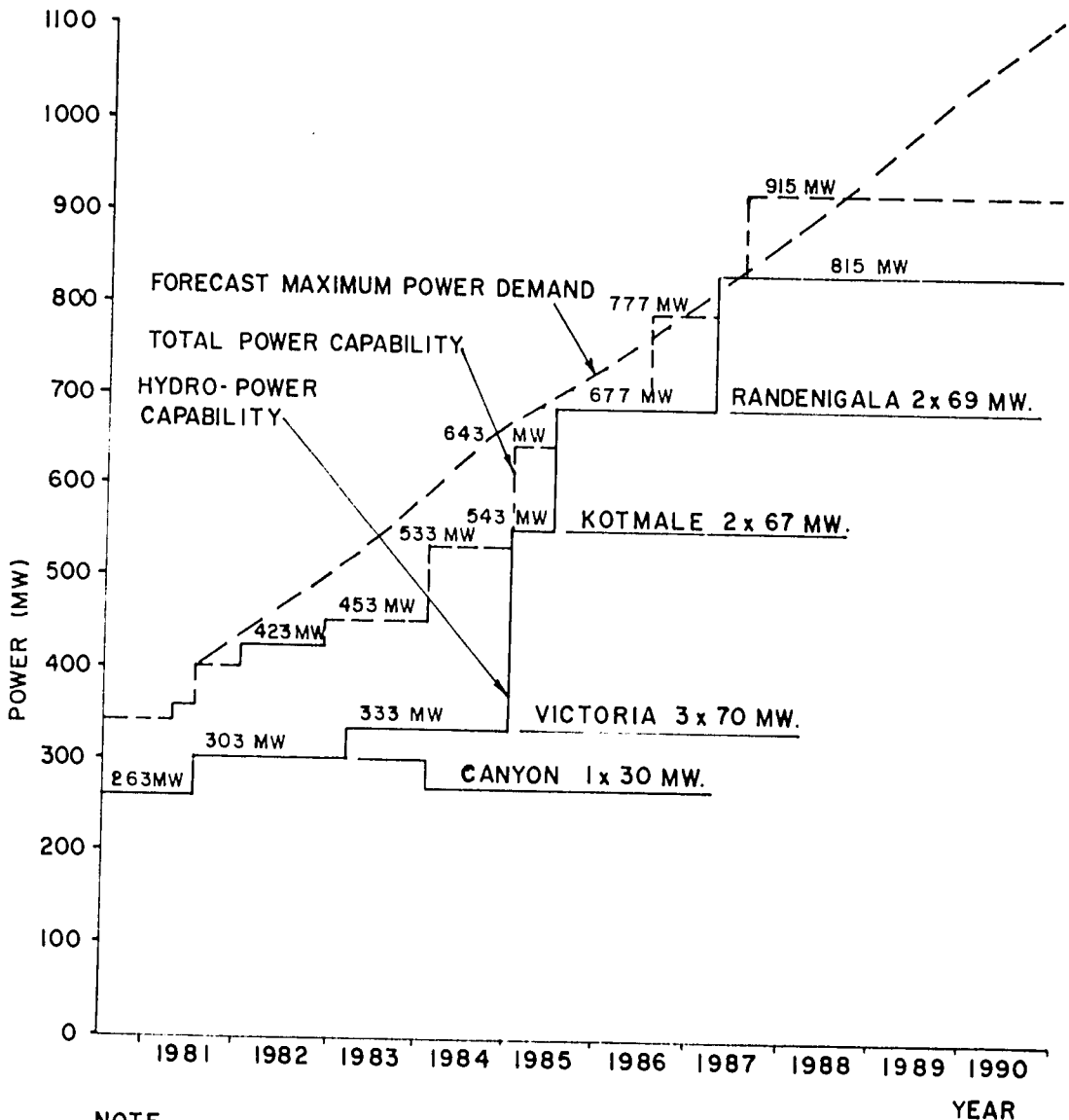
LEGEND

RESERVOIRS SHOWN THUS
 TUNNEL SHOWN THUS
 POWER HOUSES SHOWN THUS



SBa

PEAK POWER DEMAND & PLANT COMMISSIONING FORECAST 1982 - 1988



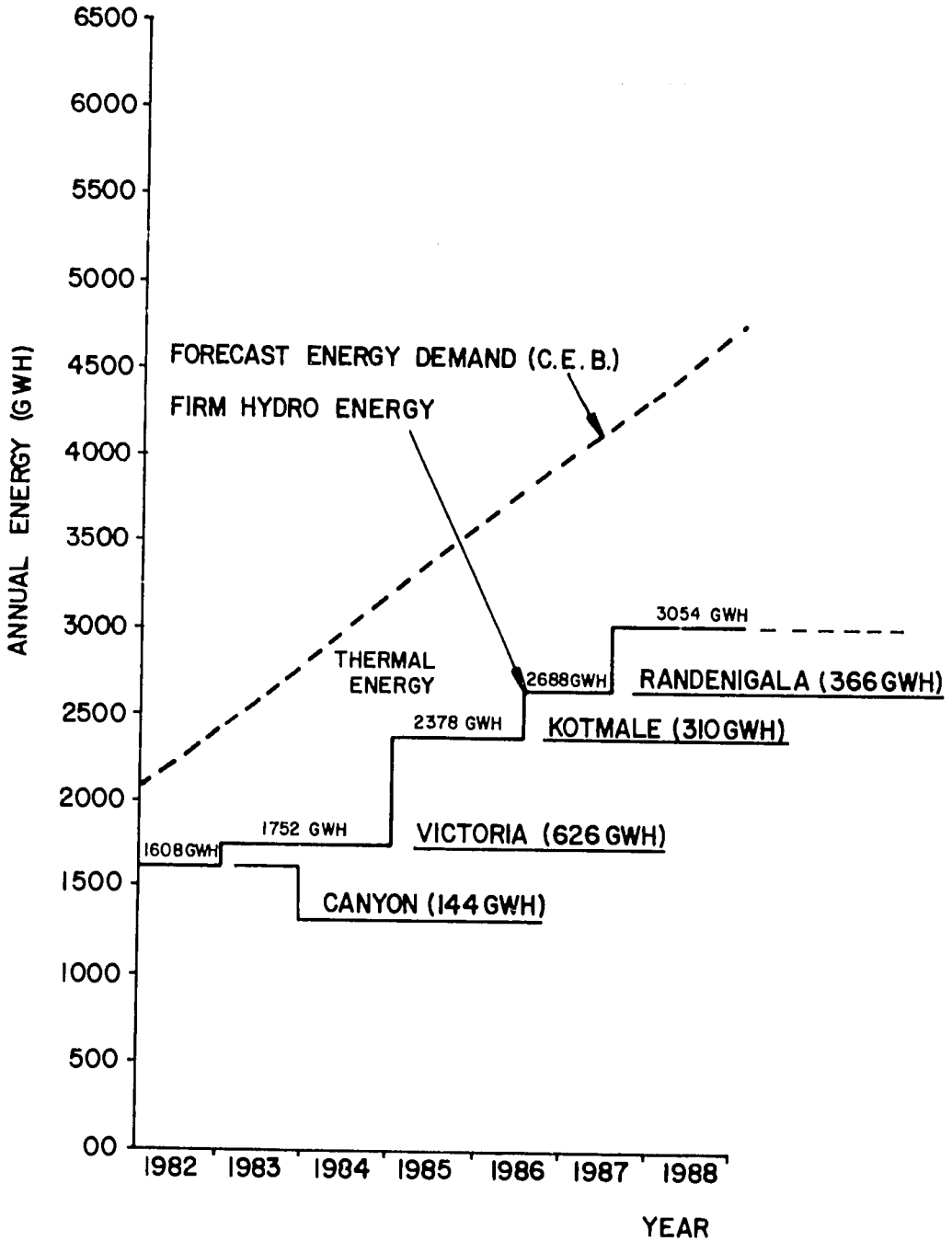
NOTE

HYDROPOWER PEAKING CAPABILITY ASSUMES
LARGEST SINGLE UNIT INOPERATIVE

586

ANNUAL ENERGY DEMAND & GENERATION

1982 - 1988



The contributions that will be made by the Victoria, Kotmale and Randenigala power stations to the peak power and annual Energy demands of the power system are given in Fig. 3 and 4.

There are no major seasonal variations in power consumption in Sri Lanka. The daily consumption has two industrial peaks at 9.00 a.m. and 3.00 p.m. and the night peak at 7.00 p.m. However the irrigation requirements of water will be uniform over a day but will vary seasonally depending on the cultivation season. These diverse requirements of water for irrigation and generation of power will both have to be satisfied for the optimum use of water.

The major power stations on the Mahaweli Ganga have large storage reservoirs and the projects are in cascade, allowing tailrace discharge from the power stations to be stored in the downstream reservoirs for irrigation development. In the case of Ukuwela and Bowatenne power houses the tailrace discharges are being stored in existing N.C.P. reservoirs. On the other hand the power stations in the Kehelgamu

Oya – Maskeliya Oya Complex are operated purely to satisfy power requirements, as they do not have irrigation constraints. Systems Management of water for power generation becomes all the more important for multi-purpose projects on the Mahaweli Ganga, because it can be expected that the power stations on the Mahaweli Ganga and tributaries will have to consider irrigation issues on priority and supplemented by power from the Kehelgamu Oya – Maskeliya Oya Complex with the shortfalls met by thermal generation.

The systems management of water for power generation being more complex as the Mahaweli power stations will have to consider irrigation issues at the same time, the Mahaweli Water Management Unit together with the Systems Control Unit of the CEB will have to jointly play a vital role in the optimisation of the use of water. With the large number of variations and options in storage and issues coupled to probabilities of rainfall and flows, computerisation as planned now will be the best and perhaps the only solution.

CONCEPTS OF MAHAWELI SETTLEMENT

The irrigation and settlement schemes in the dry zone in Sri Lanka began to be established in the early 1930s. Since then, upto the commencement of settlements on new land under the Mahaweli Development Programme the extent that had been rendered irrigable under the major irrigation projects had been about 213,000 ha. (532,500 ac.). Thus the average progress of irrigation development under major works had been about 4,600 ha. (11,500 ac.) per year.

The Accelerated Mahaweli Development Programme planned to develop 128,000 ha. (320,000 ac.) under irrigation and establish mainly, small farmer settlements, within a compressed period of time. The targetted annual performance was expected to dramatically exceed the rate of settlement hitherto achieved in the settlement sector in the country.

The broad concepts underlying the Mahaweli Settlement Programme are the best utilization of land and water resources; to expand the area for agricultural productivity and settlements; to produce the basis for the growth of a stable and prosperous farmer community and balanced regional development.

This extensive and costly project called for a dynamic settlement and development policy to achieve the desired objectives. For that, past experiences in planning and development of settlement schemes needed to be critically examined, available resources assessed and socio-economic requirements determined.

The following is an outline of some of the concepts that have influenced the planning of the settlement project.

Regional Development

The concept of integrated development of resources in terms of geographical regions govern planning of the programme. Many of the old settlement schemes had been developed in restricted areas, in enclaves, of regions. Often, such decisions had been conditioned by the nature of availability of water for irrigation etc. Whatever the conditioning factors were, such planning prevented total accessibility to the resources in the region and tended to keep the settlements away from the "land and life" in the surrounding environment. Necessarily, planning had to be for integrated resource development. The Mahaweli Programme has been more fortunate in this respect. River basin development with trans-basin diversion for supplementary water provided it with a wide resource base for integrated development of geographical regions, e.g. irrigated agricultural and settlement projects are being developed in the Kala Oya valley and in the Mahaweli basin enmeshing certain other river basins by trans-basin water conveyance.

This leads to the concept of regional development. In summary, Mahaweli is an extensive exercise in regional development. Its planning has recognised the necessity to relate its infrastructure development, establishment of settlements and connected socio-economic activity to the wider region. The layout of the planned roads in relation to the national road network, development of existing and new towns within the projects and on their periphery, to serve as nodal-points in a regional rur-urban network, the

reservation of large extents of land as national parks – the conservation of wildlife and forestry development are some of the activities planned to relate them to a wider setting.

Optimisation of resources

Another concept that has influenced settlement planning is the recognition of the need to plan the layout of the irrigation system and farm-land expanse in such a way to get the best use of land available for development. In this regard sociological research done on village life and experiences gained in the old settlement schemes showed the need for certain innovations/modifications (a) Layout of the channel system not to be solely guided by convenience and low construction cost, but to bring under irrigation the largest area possible with suitable soils ; (b) The layout of channels to be on shorter lengths so that the irrigation system could be effectively operated and maintained ; (c) The field channel system to be designed in small tracts average 20 ha. (50 acres) in size, so that the farmers in each such small area could form into an irrigation community (on the lines of the dry zone traditional communities based on small village tanks) and manage irrigation and agricultural activity by themselves ; (d) The homesteads of settlers to be clustered in well selected places so that they would promote social interaction and community consciousness and facilitate the provision of civic amenities (the "cluster villages" were to be a deviation from the widely spread, scattered homesteads which had been adopted as the model in the old settlement schemes); (e) That

infrastructure need to be adequately provided for the successful establishment and growth of settlements. Examination of old schemes showed that inadequate provision of these, had retarded their progress and caused many a hardship to settlers.

Settler induction

The Mahaweli settlement development model consists of its complement of roads, channels, community buildings, services centres, wells and in selected localities, electric power. These are provided well before the bringing in of settlers, or in the early years of the settlements. It was an accepted concept that at least some of these civic facilities must be available well before the settlers moved in.

The consideration that the types of settlements within the projects need to be functionally integrated, was yet another concept that was accepted. Settlements within projects have been planned with this concept in view. Homesteads (each 0.2 ha./0.5 ac.) have been clustered into villages and located in suitable sites within convenient walking distances to the farm lands. Village centres were available to service a group of such villages. They were to contain civic services e.g., a Sub-post Office, Co-operative Branch, dispensary, Primary/Junior School, Village Stores, Community service centre etc. To serve a population of about 10,000 a township was considered necessary. As experience in the Kalawewa Project (System H) showed that the unit of population considered for these different settlement type was low, it has been raised in

respect of the newer projects, yet conforming to the same structure.

Social cohesion

Settler types are many. There are settlers and re-settlers. Families who had to sacrifice their lands and source of livelihood to the construction of reservoirs such as Victoria, Kotamale, Randenigala needed to be found alternative land as a priority. Some preferred to live on land receivable close to their lost land. Others preferred to receive farmland in the distant Mahaweli new settlement projects. Certain other type of farmers who were living within the areas taken up for the development of settlement projects needed to be placed in possession on the re-developed land. Others are those brought into the settlements, through selection procedures, from areas outside the project. Whatever the type of settler, the guiding principle has been that they be made to reside and farm, in social groupings, they were accustomed to, in the areas of their origin. Thus, settlers selected from similar geographical areas and social background were made to live in clusters and cultivate their lands allotted, close to each other, sometimes with their kith and kin. This helped them to continue and further develop their social relationships, promote mutual help and collectively meet the challenge of making a new homeland in the new environment. Those who got displaced by the construction of reservoirs and preferred to live in an around the reservoir area, are to be re-settled in planned villages with the necessary infra-structure facilities. Reasonable extents of land, mostly planted in tea, is

given to them to serve as a means of income. Three new townships are being developed in the Dumbara Valley to relocate the commercial, industrial and service sectors, the necessity of which has sprung up from the construction of the Victoria Reservoir.

The standard unit size of farmland i.e. 1 ha. (2.5 ac.) has been decided on the basis that proper cultivation of land should give a small farmer family a fair round-the-year income. Eventual development of various services, establishment of agro-industries, commercially-oriented agricultural production, both on irrigated and highland areas, are expected to provide substantial non-farm employment avenues, especially for the second generation of the settlers. The concept is that the settlements should become catalytic and generate development momentum within themselves.

Worker-Settlers

In their induction the need to provide opportunity for the settlers to participate in the development of the land has been recognised. It is considered that such participation, by way of contribution of labour, with fellow-settlers, could promote a feeling of belonging to the newly gained land and community. Initially only the selectee, without his family, was inducted to the project. He was to live in community housing, contribute labour (on-payment and other assistance) to such work. An effect of this arrangement was at least partly, availability of labour for development works in the sparsely populated areas where the new settlement schemes are

being developed. At first it was thought that the settlers (called "worker settlers") could be collectively assigned work such as excavation of distributory and field channels, construction of minor structures, filling of roads etc. However, the performance during the last two years has shown that it was difficult for worker-settlers to keep pace with the settlement programme which was being implemented. As a result, the quantity of such work so assignable has been reduced - yet adhering to the worker-settler concept. The accepted principle now is that they are shown their individual allotments in a way that they could shift their families to the new land within an year of induction, by which time the area would have sufficient infrastructure developed to render it habitable by a family.

After satisfying the requirement of land for re-settlement of the people living within and around the project areas, selection of farmers is done from areas where there is demand for agricultural land, in the congested parts of the country. Such selections are done on certain criteria. In their selection, due consideration is given, among others, to the degree of landlessness, experience in agriculture, family size, level of education, interest in community affairs etc. The idea is to select the right type of farmer who would contribute to high agricultural activity and community living.

Life and colour

Suitable land provided with roads, water and electric power facilities is being given to those who intend setting

up agro-industries and other necessary services. These complementary and sometimes competitive forces are expected to introduce, sustain and add to life and colour in the new settlement projects.

A guiding principle in land-use and settlement planning is that the land need to be used to fit its capability. The Mahaweli development plans have been prepared accordingly, based on physical agronomic and economic studies. Within the broad development frame-work, unirrigable land is mapped out for diverse development needs as centres of settlement and land for pasture, forestry, fuelwood and tree crop plantations etc. The areas under the irrigation network, are to be cropped according to the nature of soils. As the extent of land that has been taken up for irrigation development, within a short period of time is large and it is generally contiguous, the necessity of special arrangements for the regulation of water issues, proper water-use by farmers and adoption of irrigation methods to suit the soils have been recognised.

Research & training

The need for continuous research on agricultural, environmental and community aspects, the findings of which could be useful in taking timely and effective steps in the development process has been accepted. In this connection, the establishment of agricultural and irrigation research projects, training pertaining to rural institutions, form an important component of the Mahaweli development programme.

A basic settlement concept is that any development should ultimately lead to benefit Man. Considering the extent and the population involved in the development process, the Mahaweli settlement exercise could be considered as a large scale exercise in social engineering and rural development. The tangible components of this exercise include the provision of social infrastructure, initial settler assistance (monetary assistance for farmland development, provision of seed and planting materials and agricultural implements, assistance for subsistence etc..) agricultural extension, provision of production and marketing facilities etc.

However, the value and the importance of the intangible components – the aspect of community development – the most difficult and time-taking one – have been well recognised.

Social roots in new land

In this regard the necessity to pay extra attention to the iritiation and development of rural institutions and citizenship is well seen. It is through rural institutions that a new community could send down its social roots in the new land and promote the growth of rural leadership.

In keeping with the State land policy the land allotted to settlers, on completion of the initial development period, which is subject to close guidance and supervision, would become their own, on State Grants. Such ownership will promote attachment to and pride in holding the land and release

impulses conducive to higher productivity. economies in development costs, provide means to a faster rate of growth of the economy and substantially solve the problems of unemployment, agricultural landlessness and generate resources for further development.

The thinking behind the decision for accelerating the Mahaweli Development Programme was that its completion in a curtailed time frame could effect

SYSTEM H AS A DEVELOPMENT MODEL FOR OTHER SYSTEMS

The implementation of the Mahaweli (downstream) Development programme has been classified as a number of separate Projects referred to as System A to M which conforms to different river basin, for purposes of identification. According to this nomenclature the Kala Oya Basin came to be marked as System 'H'. The irrigation systems in and around Anuradhapura was marked IH as that was an adjacent river basin augmented from the Kalawewa reservoir.

The first Project of the Mahaweli Development Master Plan was the Polgolla Diversion which included a barrage, tunnel and Power Station together with the Bowatenne diversion for the development of about 28,400 ha. (71,000 acres) of new lands in System H and the provision of supplementary irrigation supplies to certain existing

reservoirs in the Anuradhapura, Polonnaruwa and Trincomalee Districts.

System H as Prototype

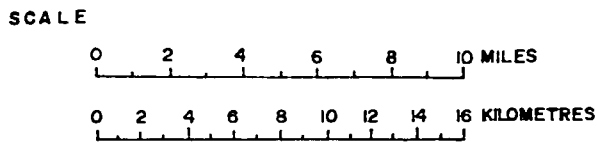
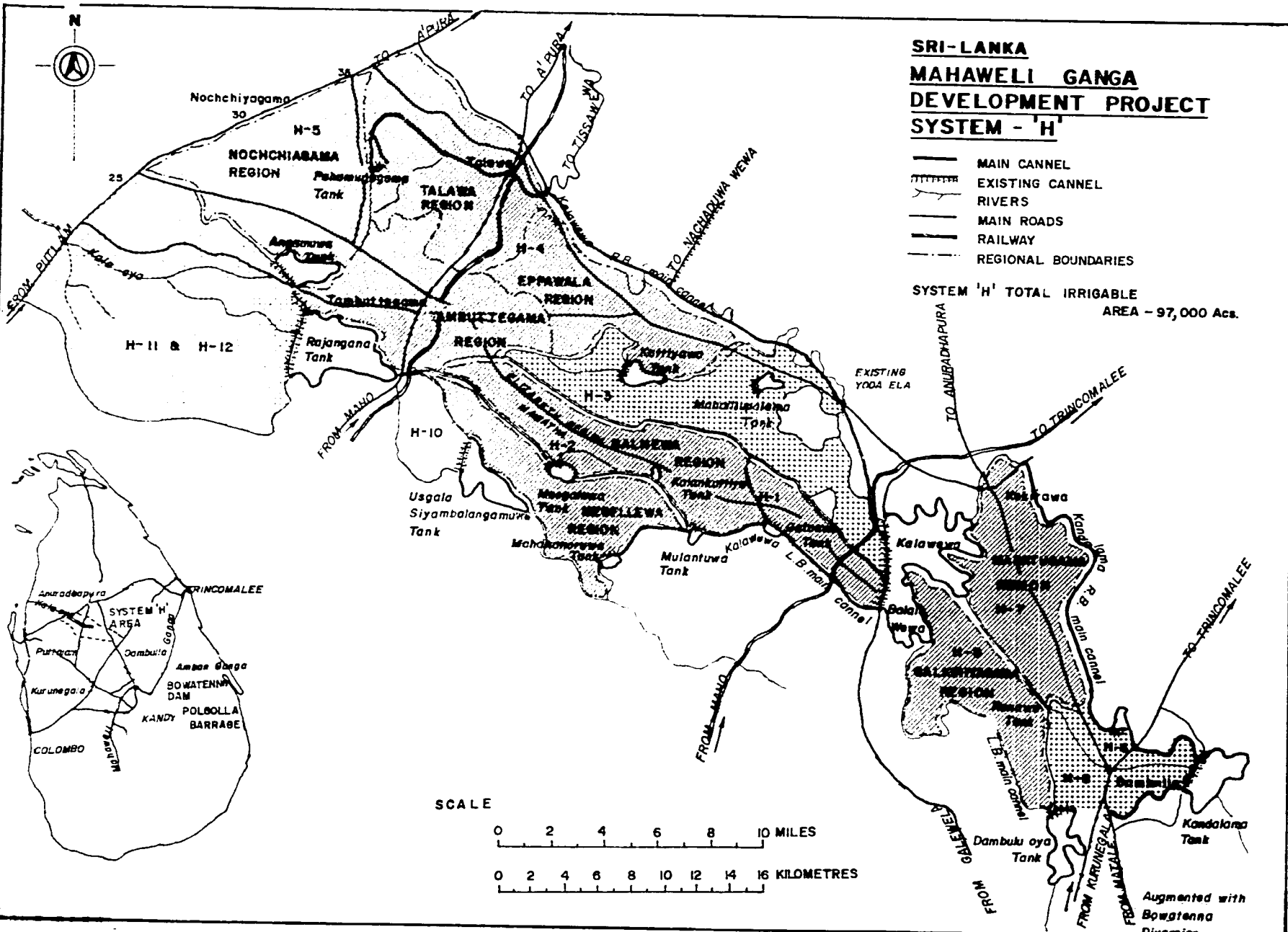
System H was studied in great detail in view of the fact that it was the first Project to be taken up with funding from the World Bank, The Netherlands, United States of America and Canada. System H was going to serve as the precursor for larger projects to follow. The experiences gained in the development of System H were going to serve as the model in designing the larger Systems, C and B.

The System H covers the area in the Kala Oya basin westwards up to the Anuradhapura – Puttalam road ; on the North, the Kalawewa Right Bank Yoda-Ela (Nava Jayaganga) and on the South, the Left Bank Balaluwewa Yoda-Ela of Kalawewa – Usgala-Siyambalangamuwa Ganga right up to Rajangane served by its

SRI-LANKA MAHAWELI GANGA DEVELOPMENT PROJECT SYSTEM - 'H'

- MAIN CANNEL
- EXISTING CANNEL
- RIVERS
- MAIN ROADS
- RAILWAY
- REGIONAL BOUNDARIES

SYSTEM 'H' TOTAL IRRIGABLE
AREA - 97,000 Acs.



Augmented with
Bowstenna
Direction

Left Bank Canal. Land under the Kandalama and Dambulu Oya reservoirs also fell within System H as also the older settlement areas in Rajangane, the Kagama-Kattiyawa and Usgla-Siyambalangamuwa.

Several socio-economic studies were done during the pre-planning stages of the new lands in the System. The habitat, economy, society of the numerous small village communities, which were virtually jungle villages in the undeveloped Kala Oya Valley, were necessary to integrate these villages into the new System.

Before the commencement of the Mahaweli Programme, only about 6,400 ha. (16,000 ac.) had been cultivated in the area covered by System H, either rainfed or irrigated. About 25% of these fields were left fallow due to lack of water. Only 60% of that land had been cultivated in Maha and only 19% in Yala. The people in general had been living at subsistence level, in conditions very similar to those obtaining in the Dry Zone generally. The infra-structure facilities and the community services available at the time were thinly spread and inadequate.

A decade of development has changed the landscape in System H. The impact of System H has spilled over its boundaries. Today, as a result of concerted efforts by the state and considerable public investment in the area, harmonious relationships have been established between Man and Land and a prosperous farming community has sprung up to benefit the Nation. Over 22,000 farmer families have been settled on the land and

the general population in the area exceeds 100,000. The area is regularly cultivable with irrigation facilities and the Nation is the richer on account of the contribution made by System H. To develop the area, a thick and expensive network of canals and roads have been constructed. To help the farmer and his activities social infra-structure facilities have been adequately provided. Over 300 settlements of different types have been established and developed.

Regional Planning

Except for the planning and development of the Gal Oya Valley and the Udawalawe Projects, it was under the Mahaweli Development Programme that river basins or geographical regions have been considered in their totality and taken up for resource development. In this exercise the Kalawewa system was the first to be taken up. It was planned for total resource development within the Project, with complementary links with the broader region.

The irrigation system has been laid out not only to irrigate the new lands within the Project but also to supplement irrigation supplies to the farmland in the old settlements which are within the System (i.e. Rajangane, Usgala, Siyambalangamuwa, Kagam-Kattiyawa) and the lands as far away as the Anuradhapura city tanks complex. Thus the Kalawewa reservoir came to be the pivot of a regional irrigation network.

The construction of roads formed an important component of the infra-structure development programme. The Project added nearly 80 Km. (50 miles) of different types of road to the

area. The network of roads has been laid out in a way to integrate the Project area with the wider region outside it, and to serve as arteries in the national road system.

The social infra-structure facilities (such as schools, health centres) have been planned with the regional perspectives in mind, e.g. the availability and future needs of these facilities have been considered in the determination of the number and nature and location of such services within the Project area. In this, the availability and future needs of the surrounding area as well, have been considered.

New Townships

A number of new townships and existing townships have been taken up for development within a broad rural-urban development programme. Thus the townships which had existed in the area before the commencement of the Mahaweli Programme like Kekirawa, Madatugama, Talawa, Eppawala, Nochchiyagama and Tambuttegama have been developed by deliberate efforts apart from indirect benefits by the spin off from the development thrust in their hinterland.

New townships have been created within convenient distances. Galnewa, Galkiriyagama and Migellawa-earlier old villages—have now been developed as townships within the System. The new townships at present provide only basic services. They are expected to develop in a multifaceted way with an upward trend in economic activity.

The settlement structure in three tiers, namely the hamlet (village), the village centre and the township has been planned to function complementary to each other, so that the entire settlement Project would form one agro-socio-economic system.

The irrigation distributory system has been designed and constructed with irrigation turnouts (small irrigation tracts) providing bases for small, yet viable glass-root level agricultural communities.

The land-use planning in System H was preceded by comprehensive soil classification studies. It has been determined that about 50% of the area under the irrigation command is covered by soils of fairly high permeability (Reddish Brown Earths) suitable for non-paddy crops and the balance area with low permeability (Low Humic Gley) soils suitable for paddy cropping. The irrigation system has been laid out to all the farm lots (irrespective of soil types) on a standard basis, on the assumption that cropping and water use would be adapted to suit the soil types.

From experience gained in the old Settlement Schemes, it was decided that the new settlements under the Mahaweli Development Programme should not in anyway be set back by inadequate social infra-structure facilities. Such facilities included the irrigation system up to the individual farm, the road network and community services such as Schools, Health units, Co-operatives, Post offices etc. Timely provision of these facilities in System H has gone a long way in



The current Maha harvest (1982/83) is expected to be a bumper crop in System H which headed the average per acre paddy yield in the country with 93.30 bushels in the Maha season of 1980/81. Photograph shows Hon. Gamini Dissanayake, Minister of Lands, Land Development and

Mahaweli Development with the Deputy Minister of Lands and Land Development, Mr. A. M. S. Adikari and Mrs. Adikari partaking of the traditional "ambula" at the ceremonial harvesting of the Maha crop at Telhiriyawa, in System H.

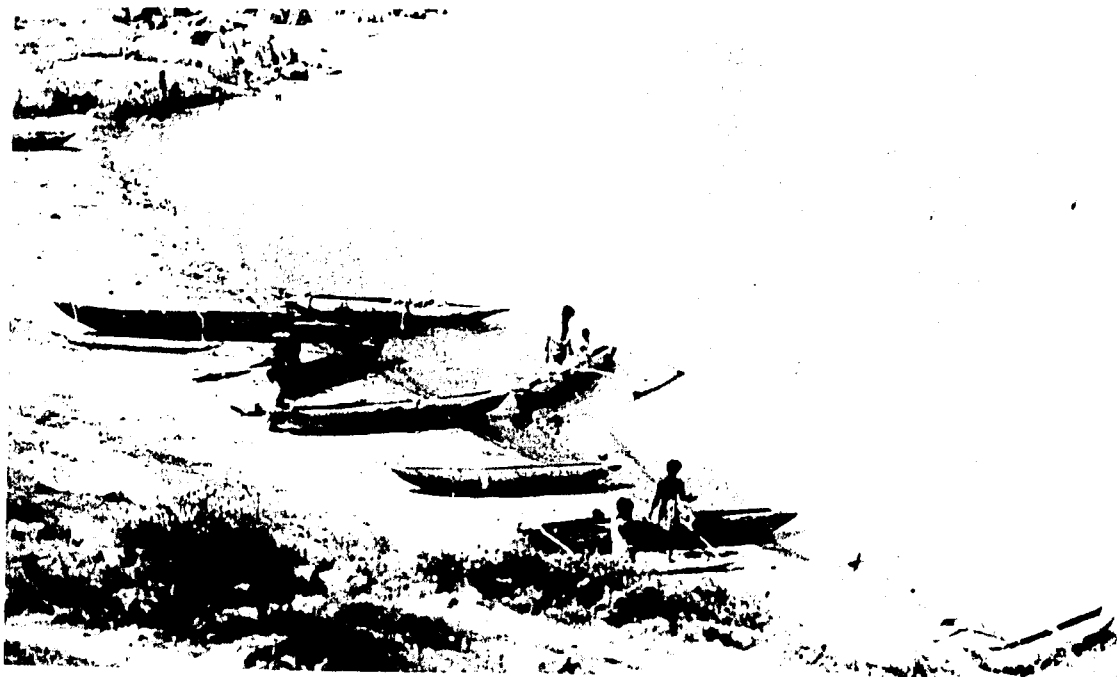


About 50 to 60 percent, of the villages in the System H Project Area were 'purana' or traditional villages. These villages have been integrated into the new hamlets

planned by the Mahaweli Development Board during the early stages of re-settlement in System H. Photograph depicts a typical patriarch of 'purana' stock in Kalawewe.



UNICEF-sponsored child-care and preventive medicine are important facets of the community development effort in System H.



With a view to raising nutritional standards, UNICEF sponsors stocking of reservoirs with popularly edible varieties of fish. Photograph shows a cove in the

Kalawewa, where fishermen put in, early in the morning to sell their catch.

alleviating hardship that may be caused to new settlers during their early period of adjustment to the new environment.

Priority for Existing Villages

The old villagers of Purana stock who were living in the area before the commencement of the Mahaweli Programme were given priority in the selection for settlement in System H. They were living primarily in the land and agriculture formed their main means of subsistence. About 70% of the land in the System H had to be set apart for the re-establishment of such old villages. The balance 30% of the area was settled with farmer families brought from outside the Project area, preference being given to landless farmers in the Anuradhapura district – thus causing the least disturbance to the social environment.

The necessity to respect and provide an opportunity for the promotion of social institutions of the villagers who were to be re-established or settled on the new land had been well recognised by the settlement planners. It had been accepted that traditional living patterns resulting from centuries of community living could be dislocated on exposure to new social forces. The Community Development effort in the new settlements had to take cognisance of these factors in order to ensure that such shock was adequately cushioned. Previous experience had demonstrated that human misery followed in the wake of such abrupt social dislocation. The settlement experiences gained in the Kalawewa Project have certainly benefited the settlement work in the larger projects taken up later. The System H settlements were a combination of settling people from far away climes on

an alien new land and re-establishing old villages. It was therefore a complex exercise.

Viable Farmer Groups

A number of rural organisations had been tried out in the country without much result and without having appreciable impact on the farmer community. The social planners of System H first thought of the establishment of farmer co-operatives. However, initial settlement experiences in the Project showed that it was more practicable to develop small, yet viable farmer groupings, preferably based on the irrigation turnout areas. These groups of farmers were developed to cover almost the entirety of the project area and they were made the medium of farmer training in farm water-management, agricultural extension, agrarian and community services.

The development model of the System was built on the assumption that eventually the entire settlement would develop into a compound of intensive agricultural and agri-industrial activity by a socially stable settler community. Areas were reserved for the establishment of agro-industrial activity; subsistence agriculture was to give way to commercial farming; the regional economy was to develop so as to generate non-farm employment opportunities. Apart from crop cultivation the planners realised the necessity of developing certain selected localities in pasture and fodder for livestock, and in tree crops and forestry.

The basic development and settlement work in the System H are now almost over.

System A Studies

Under the Accelerated Mahaweli Development Programme, two other large Settlement Projects i.e., System C (Ulhitiya-Ratkinda) and System B (Maduru-Oya) have been taken up for development. Project studies on System A (area North and East of Somawathiya Sanctuary) have been completed. Planning of these Projects have been basically guided by the System H development model, with certain modifications.

The three-tiered settlement structure, which had been developed for System H, has been adapted assuming a higher population per settlement type. In System H a hamlet was to consist of about 100 to 125 families and in the newer systems it had been increased to about 200. Similarly, the Village Centres were to serve larger population groups. It had been observed that the number of townships for the System H was excessive, and therefore in the newer Systems, the number of townships had been reduced. It has been decided, that large and viable urban centres with better services and opportunities for development should be established, instead of several small townships.

Also it was being considered whether the layout of separate irrigation systems for different soil groupings would be practicable and more efficient specially in terms of proper use of irrigation water. Apart from facilitating efficient water management, such a separate layout could help better planning and cultivation of non-paddy crops and eliminate any problem of rising sub-soil water level.

A number of pilot projects and trials have been conducted in System H to determine the best possible irrigation and cropping systems for varying soils and land conditions and also to determine the best method of land preparation. These research findings have been made available in development works within the system. These findings have proved to be useful in other systems as well.

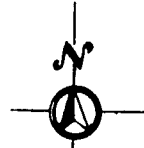
Worker-Settlers

The principle that the settler must be made participatory in the initial land development work and that such participation could provide labour for construction work in the sparsely populated new project areas was observed in a modified manner in the System H settlement model. In System H the arrangements were to induct the settler to the new settlements only upon fair completion of the irrigation system and the infra-structure facilities. In Systems C and B the concept of worker-settler was adopted i.e. firstly the settler arrives on the land before its development then contributes his labour to its development and thereafter shifts his family after the development of the land and provision of basic facilities. However, the performance of work-settlers during the last two years has resulted in a review of this approach.

In spite of these minor modifications, in almost all other respects the System H model is being adopted as the prototype for the establishment of new settlements under the Mahaweli Development Programme.

TRINCOMALEE

SYSTEM - A



LEGEND

- SYSTEM 'A' BOUNDARY
- - - DISTRICT BOUNDARY
- - - GRAMASEVAKA DIVISION BOUNDARY

MUTUR - A & A DIVISION HQ
 KILIVEDDY - NAME OF GRAMASEVAKA DIVISION

RANDENIGALA PROJECT
 IRRIGATION SYSTEM - A
 FEASIBILITY STUDY
 JANUARY - 1981

JOINT VENTURE RANDENIGALA

SALZGITTER CONSULT. GMBH, SALZGITTER.
 AGRAR UND HYDROTECHNIK GMBH, ESSEN
 ELECTROWATT ENGINEERING SERVICES LTD.
 - ZURICH

KODDYAR BAY

MUTUR

THOPPUR

ALLACKALIE
LAGOON

BERUWILLA

ALLAI TANK

KILIVEDDY

SOMAPURA

KANTHALAI-ALLAI ROAD

VERUJAL ARU

VERUJAL

KATHIRAVELI

KANDAKADU

UPPER
LAGOON

VAKARAI

POLONNARUWA

BATTICALOA

SUNGAVILA



SCALE

NJW - CECB

700

PROGRESS OF SETTLEMENT WORK

Up to mid-1977 settlement work was in progress only in System H (Kalawewa) as the other settlement projects had been scheduled for development only in the latter phases of the Mahaweli Programme in the Master Plan.

In terms of the decision that was taken by the Government in 1977 to accelerate the implementation of the Mahaweli Programme, measures were set going for a number of settlement projects in areas which were earlier scheduled to be developed in the distant future. Thus in addition to System H the development of System C, under Ujhitiya-Ratkinda reservoirs, and System B under the Maduru Oya reservoir were taken up for the provision of civic and other infrastructural facilities. Additionally System G (Elahera extension) was taken for development. Feasibility studies on System A have been completed and work remains to be commenced in this System.

The following summary review of progress of settlement work encompasses the progress that has been made on land development, provision of infrastructure facilities and the settlement of farmer families on land.

System H

Work on System H had commenced in 1972 and by mid-1977, 4,862 farmer families had been settled. Of the extent that had been developed, only a part had been provided with irrigation facilities.

As at present, the provision of irrigation facilities and development of infrastructure in the entirety of the System has been nearly completed. The farmer families who have been settled on land number 22,395. In addition, land has been given in the village centres and townships for commercial and industrial purposes.

System C

This was taken up for development in 1978. As Zone I of System C mostly consists of land that had been developed and populated, Zone II was taken up for initial development. Settlement work in Zone II is nearly completed and work in Zone III commenced in 1981. By the end of 1982, 5,433 settlers had been brought into Zones II and III.

The target of settlement for 1983 is 2,000 in Zones III and IV.

System B

Initially the development of Zones V and I has been taken up.

Settlement work commenced in 1982 and 1050 had been settled in Zone V by the end of the year 1982. This included the re-settlement of a section of the Veddah community that lived within the newly established Maduru Oya National Park and who needed to be re-settled outside the park area. A total number of 460 local villagers and 94 evacuee families from the reservoir areas have been so settled. The balance consist of those selected from a few electorates who needed to have priority consideration in selection. When the families of the worker-settlers also move in this year, the settlement of Zone V would be complete. Construction of the irrigation system and the other infrastructure facilities are in progress and it has been programmed to settle 2,000 families in Zone I in 1983.

System G

It has been programmed to extend the existing Elahera Settlement Scheme by the addition of 2,952 hectares (7,320

acres) of irrigable farmland in the area lying between the old Elahera Settlement Scheme and the Amban Ganga on the East.

Work commenced in 1981 and the programme is to settle 2,900 families by end of 1985. The target for land development and settlement in 1983 is 700 ha (1,750 ac.) to settle 700 farmer families on the newly developed land.

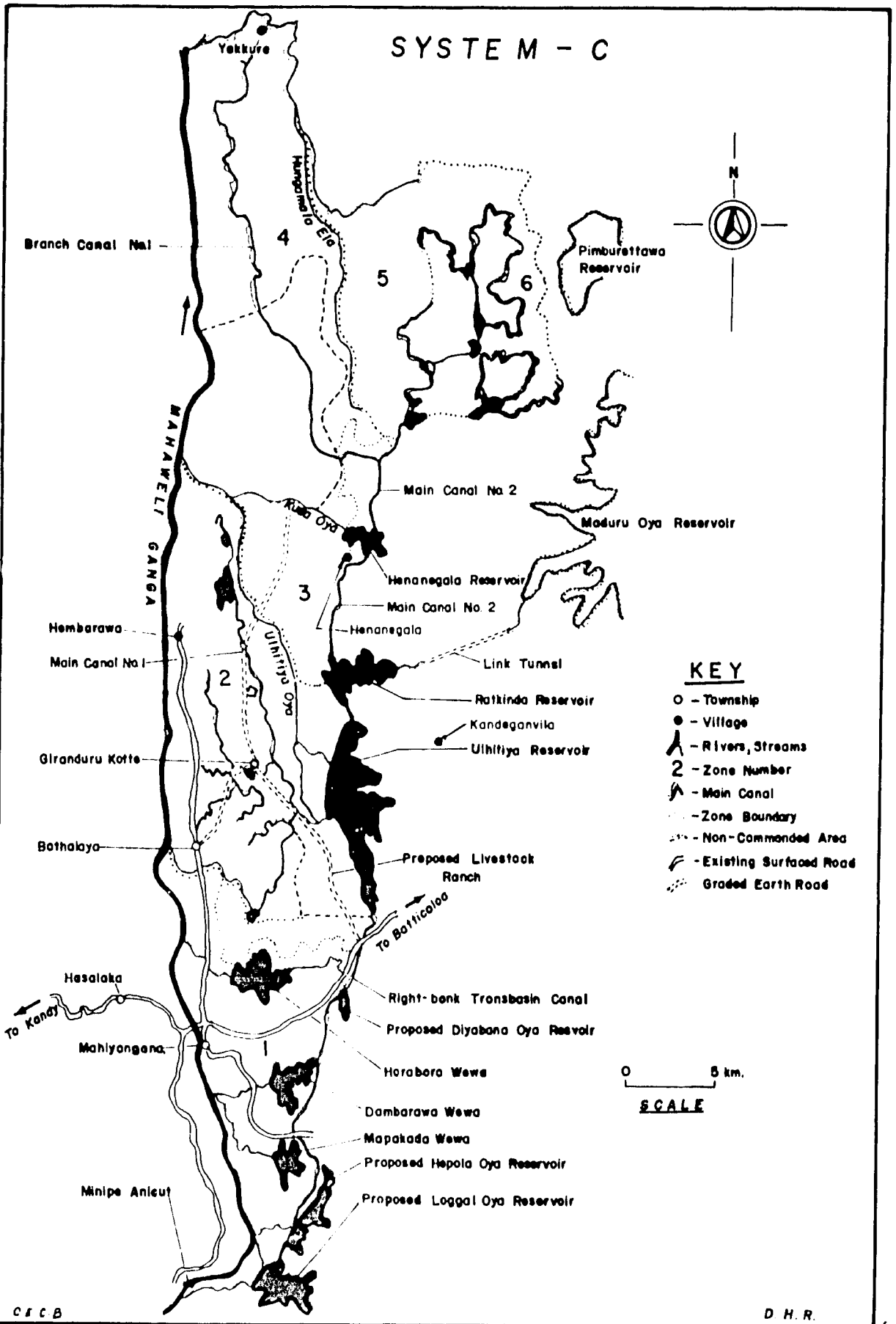
Re-settlement of dehousing families

The construction of the Victoria, Kotmale and Randenigala reservoirs has caused the displacement of a considerable number of families who have been living within the reservoir bed areas. These persons have been given priority for re-settlement in the peripheral areas (in the neighbourhood of these reservoirs) or in the downstream projects.

About 3,800 families needed to be evacuated from the Kotmale Project area while the Victoria Project has displaced about 4,930 families. Some of these families have been re-settled in Systems H and C and a small number in System B. Re-settlement of those who would be displaced has been targetted for completion by the end of 1983.

The re-settlement in the peripheral areas has called for the establishment of planned new villages and townships with adequate provision of infrastructure facilities. Three new townships are being developed on the peripheral area of the Victoria reservoir at Digana, Udispattuwa and Karaliyadde.

SYSTEM - C



Branch Canal No 1

Yakkure

4

5

Pimburettawa Reservoir

N



MAHAWELI GANGA

Main Canal No 2

Moduru Oya Reservoir

3

Henanegala Reservoir

Main Canal No. 2

Henanegala

Link Tunnel

KEY

- O - Township
- - Village
- Rivers, Streams
- 2 - Zone Number
- Main Canal
- - - Zone Boundary
- Non-Commanded Area
- Existing Surfaced Road
- Graded Earth Road

Hembarawa

Main Canal No 1

Ralkinda Reservoir

Kandeganvika

Uthitiya Reservoir

Glanduru Kotte

Proposed Livestock Ranch

Bathalaya

To Batticaloa

Hesalaka

Right-bank Transbasin Canal

Proposed Diyabana Oya Reservoir

To Kandy

Mahiyangana

Horabora Wewa

0 5 km.

SCALE

Dambarawa Wewa

Mapakada Wewa

Proposed Hepola Oya Reservoir

Minipe Anicut

Proposed Loggal Oya Reservoir

17/6

CROP DIVERSIFICATION IN THE MAHAWELI PROGRAMME

Paddy production increased from 77 million bushels in 1970 to a record level of 106 million bushels in 1981; concurrently per-acre yield increased from 49 to 57 bushels during the same period. Sri Lanka is now 90% self-sufficient in rice and greater emphasis should prevail from now onward on crop diversification in order to bridge the gap between production and consumption of Sugar, Cotton, Dairy Products, etc.

Varieties of rice cultivated in Sri Lanka are not acceptable to foreign markets due to the following factors :-

- For varieties of rice to be acceptable abroad they should be long-grained milled raw and have over 80% head rice (unbroken grain) ;
- milling quality of local rice is sub-standard due to use of

out-moded mills and milling techniques ;

- high competition in foreign markets due to increased surpluses in Burma Thailand, Malaysia etc.

Other Crops, not Paddy

The Master Plan estimated that 80,900 ha. (200,000 ac.) of a total of 264,700 ha. (654,000 ac.) proposed for development under irrigation in the Mahaweli project would be cultivated with paddy, whilst the balance 182,180 ha. (450,000 ac.) was identified for the cultivation of cash crops like sugar cane, cotton, pasture, etc., mainly with the object of import substitution. The cultivation of certain crops exclusively for export was also envisaged. The expansion of the irrigated extents in projects currently implemented is not confined to the Mahaweli project

alone. The other major schemes such as Inginimitiya, Muthukandiya, Kirindi Oya etc., and minor schemes totalling approximately 30,360 ha. (75,000 ac.) would be developed for rice production and other crops. In the circumstances, large extents of land in the Mahaweli irrigated systems must necessarily be demarcated for crop diversification.

Crop Diversification

The following crops, cropping patterns and farming systems are identified with a two-fold objective :

- Import substitution of agricultural produce to effect saving of foreign exchange.
- Export of agricultural produce that make entry into non-traditional markets.

Sugar Cane

Well-drained soils in contiguous areas adequate to cater to economically viable sugar factories are being identified in Systems C and B. Recent experience of alienating sugar cane land in one hectare units to outgrowers at Hingurana has met with success. Therefore a nucleus estate with outgrowers, combined with effective irrigation system, management and extension services would be required for successful cultivation.

Cotton

The expenditure on imports of textiles and allied products (cotton, yarn and textiles) has increased from

Rs. 458 million in 1977 to Rs. 3,159 million in 1981. Cotton, like sugar cane should be cultivated on well-drained soils and studies are being made to locate suitable land for this crop under the Mahaweli.

Fodder

Irrigated fodder combined with low density coconut would form an economic package for increasing milk production.

Well-drained soils in both Systems C and B render themselves suitable for this type of farming.

Subsidiary Crops

Crops recommended are soyabeans, groundnut, chillie, cowpea, vegetables, etc., which can be grown on irrigated upland soils.

Soyabean

Soyabean, in particular, produces the highest yield of protein per unit area of land and also an oil, not only edible, but usable for pharmaceutical preparations, paints, etc., Soyabean flour could substitute imported wheat flour for baking purposes. Assuming a substitution rate of 7%, soyabean production for this purpose alone, is estimated to be 42,000 tons per year. Soyabean is also processed as soya milk powder as well as textured vegetable protein substitutes for meat.

Groundnut

Local demand for groundnut is limited, but there is potential for export. The main objective of production

should be the export of oil, while the residue – groundnut cake – has a high digestible protein content (42%) and can be used as livestock feed.

Chillie

The cultivation of chillies on well-drained soils is feasible but the local demand is limited. Nevertheless increased demand from Middle East countries, especially for green chillies could be met from the Mahaweli settlements.

Vegetables

The present demand for fresh vegetables in the Middle East countries is likely to continue. The vegetables exported to the Middle East are mostly indigenous varieties like snake-gourd, bitter-gourd, brinjals, onions, grams and curry leaves.

There is therefore ample potential for the cultivation of these crops in the Mahaweli settlements, to build-up and sustain an export market for fresh vegetables. An extensive survey is required to explore market potential of fresh vegetables and vegetable based products.

Storage, preservation and packaging are important requisites for such a market.

Rainfed and partly irrigated Crops

A variety of crops mainly coconut, mango, banana, lime, cocoa, coffee, cashew, etc., have a potential for organized cultivation in the Mahaweli settlements, both for consumption by

settler, and production of surpluses for export. The following are some of the important crops.

Coconut

Domestic needs of settlers can be met by cultivation of 5-10 palms in each homestead. Crop residues of the palms would also contribute largely to their fuelwood requirements. Coconut has the potential of being grown on irrigated well-drained soils in combination with fodder. Medium to large plantations are also possible in regions such as Zones 1-4 in System C and south eastern-part of System B, where rainfall is high and falls within the intermedidate zone.

Lime

Lime has a potential both as a rainfed crop and as a partially irrigated crop on well-drained soils. A potential for production of lime juice, lime oil and other by-products exist with the establishment of sizable plantations. There is considerable demand for lime oil in the export market.

Mango

Mango is easily cultivated as a homestead crop and there is a great potential for canned mango juice and slices in the foreign market. Raw mango in brine, is used as a base for the manufacture of sauces, which have an attractive export market.

Cashew

Cashew is a highly drought resistant crop but yields tend to be higher with higher rainfall, if cashew is grown on

well-drained soils. Extensive highland areas are available where cashew can be grown in Systems C and B. The main markets for cashew are in the Middle East, Japan, U.S.A., etc.

In 1981 the Cashew Corporation exported 1.1 million kg. of cashewnuts. Apart from the demand for cashewnut, there is a continuing demand for cashewnut shell liquid, which is used for industrial purposes and has a good export market.

Regionalisation of Farming Systems

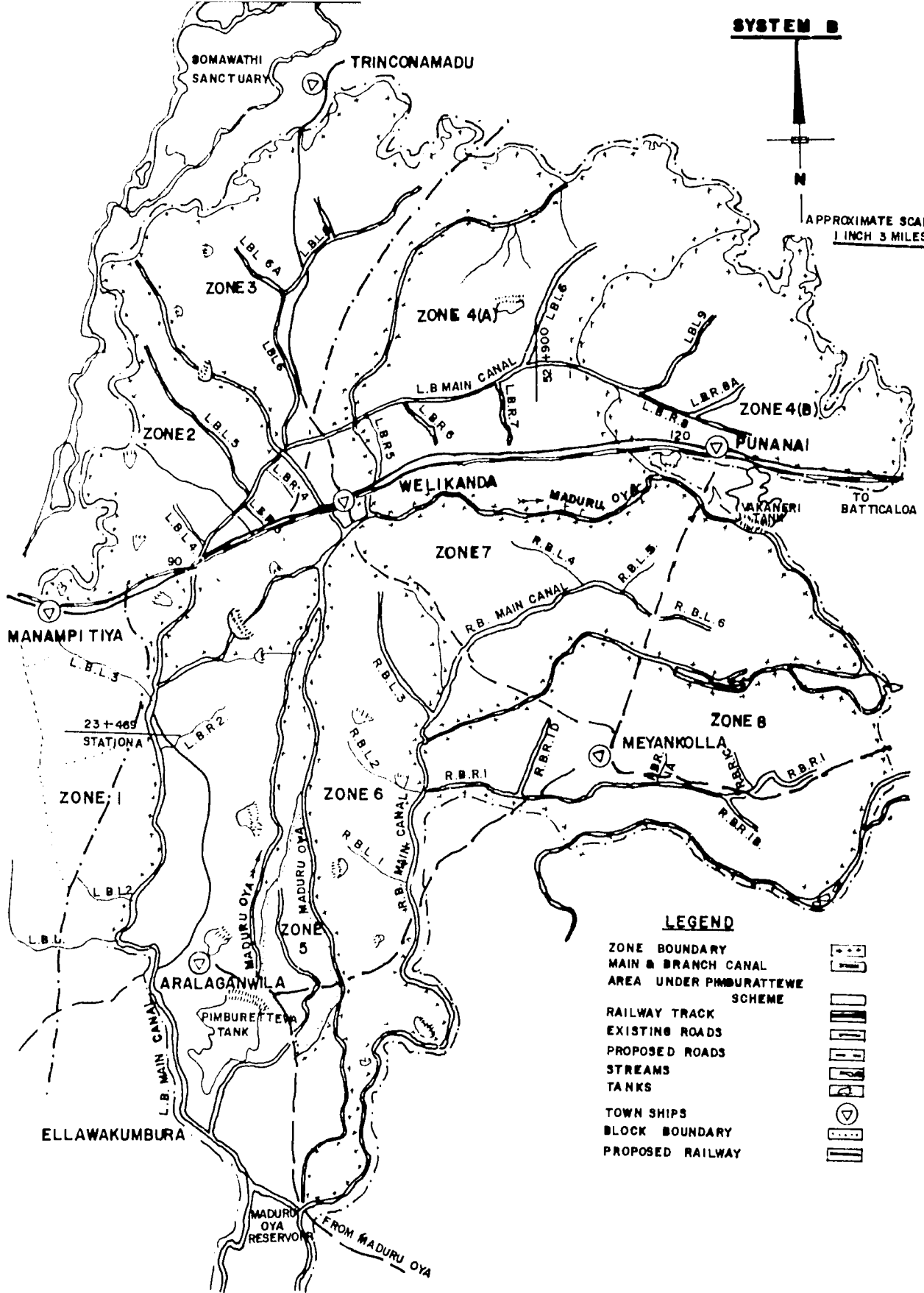
A planned crop diversification programme in the Mahaweli settlements must necessarily cater to regional specialisation of crops, cropping patterns and farming systems. For example, sugar cane cultivation would be most economical if cultivated in a contiguous area where a package of facilities like

transport, extension and management would be provided. Sugar cane being a crop particularly suitable for highly erodible well-drained soils (Reddish Brown Earth and Non-Calcic Brown Earth) must necessarily be grown on such soils in Systems C and B.

Farming systems designed to increase milk production, similarly, should be regionalised in a manner that extension services, milk collection, marketing, processing, etc., could be given concentrated attention.

Production of cash crops for export would similarly require strong extension, marketing, quality control and packaging services. Concentration of production in specially selected regions in the Mahaweli Project would be conducive to more efficient production, marketing and management.

SYSTEM B



LEGEND

- ZONE BOUNDARY
- MAIN & BRANCH CANAL
- AREA UNDER PIMBURETTEWA SCHEME
- RAILWAY TRACK
- EXISTING ROADS
- PROPOSED ROADS
- STREAMS
- TANKS
- TOWN SHIPS
- BLOCK BOUNDARY
- PROPOSED RAILWAY

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LIVESTOCK (DRAUGHT ANIMAL) & DAIRY FARMING

The majority of the neat cattle and buffalo population of Sri Lanka is found in the Dry Zone. Much of this area comes under the Accelerated Mahaweli Programme. Due to the escalating cost of tractors and sharply rising oil prices coupled with the unavailability of adequate draught stock for farm power, the Mahaweli Authority of Sri Lanka (MASL) initiated a Draught Animal Programme to salvage stock finding its way to the meat market. By rearing and diverting these animals for draught power in settlement schemes, the MASL has set going the nucleus of a livestock project covering upgrading to proceed at tandem with the settlement effort. A project of this nature has commended itself in the face of the high costs involved in oil-fired traction.

System H, where settlement was completed in 1982, is provided with stock from a combination of small intensively

managed neat cattle and buffalo units in Niraviya and Kalankuttiya. The out-put of animals for sale to settlers was adversely affected during 1981/82, by the worst drought in 5 decades which affected the credit worthiness of settlers wishing to purchase stock for land preparation and haulage purposes. Niraviya Farm, which was started in 1979 is situated in System H, in the Anuradhapura District and caters primarily for red animals of good conformation, as it is this feature that has characterised the demand for stock in this area, traditionally. Nevertheless, due to the paucity of adequate stock, segments of white animals, normally associated with the Eastern Province were fed through this outlet with favourable response from prospective farmers in the area. In the case of buffaloes at Kalankuttiya Farm, also in System H, and which commenced operations in 1980, both male and female

animals are used for draught purposes. The production of curd has resulted in the monthly recurrent expenditure of this farm being covered by sale proceeds.

The intensive operations at Niraviya Farm (where planting over the balance land was commenced during the last North-east Monsoon) are expected to be fully operative by the end of 1983. This farm received a welcome gift of Sahiwal cattle from President Zia to President Jayewardene, following negotiations by the Hon. Minister of Mahaweli Development, his visit to Pakistan in February 1982. These animals have already calved and it is hoped that further negotiations will result in a further influx of suitable stock for upgrading purposes in the near future.

At Niraviya Farm, the Straw Treatment Programme has been finalised and the first field trials in settler units will be carried out in 1983. The Straw Treatment Programme and the capital expenditure of the Draught Animal Programme are funded by a grant from the Royal Netherlands Government, initially for the first year of operation and now extended to the second year of operation.

In System H, following a mass Vaccination Programme against Haemorrhagic Septicaemia (HS) at the commencement of operations, a second vaccination programme was conducted during the months of March and May 1982. A general extension programme is now being intensified on the basis of statistical information obtained from the Vaccination Programme and other surveys conducted in this area. This has

been achieved partly by field seminars and the use of audio-visual extension services. The Rajarata Broadcasting Service has assisted considerably in promoting the work done at these two stations.

In addition to System H, the work in System A, which commenced in June 1981 progressed favourably despite the adverse weather conditions in Maha 1981/82. The total area cleared and ready for planting in 1982 Maha, now covers 1,700 acres and the stocking rate on salvage animals has risen appreciably. Whilst System A is the last of the Systems to be developed under the Accelerated Mahaweli Programme, this area contains possibly the second largest neat cattle strength.

The Kantalai Farm commenced work primarily as a salvage station. In order to conduct a more dynamic and aggressive upgrading programme, a Tract Breeding Programme moved into top gear in the early part of 1982. By the end of the year, over 20,000 animals had been vaccinated against HS and whilst conducting this work, valuable statistical data was obtained. Due to the large areas to be covered, the extension service both in regard to elementary animal health and extension programmes under the vital ingredient of upgrading indigenous stock was soon absorbed into a three-pronged attack under the heading 'Tract Breeding'. The paucity of valuable stud bulls for the purposes of upgrading in this area led to negotiations with the Indian Government for the importation of Kangayan stock.

Hopefully, negotiations will be completed by March 1983 for the importation of this valuable stock in 1983. Apart from the neat cattle herds, the distribution of studs to certain buffalo herd-owners has also materialised, with constant monitoring as to the upgraded off-spring.

At Kantalai, straw treatment trials were conducted paving the way for the final experiments currently being carried out in Niraviya.

Early in 1982 the European Economic Aid Commission agreed to the financing of capital expenditure in relation to the commencement of yet another farm for draught animal power in System C. This programme which covers 1,000 acres has reflected remarkable progress and with the influx of Teldeniya settlers, with few credit problems in their initial year of settlement, sales of suitable neat cattle and buffaloes have already commenced in the 7th month of this operation.

Of the 1,000 acres located for this purpose, 600 acres have been completed. The securing of a suitable salvage unit in System B was delayed due to unavoidable circumstances. Agreement has now been reached as to the opening out of 1,500 acres at Poonani. This work will commence in 1983.

It will be seen from the foregoing that by the close of 1982 three of the four units had the necessary infrastructure development so as to permit the maximum throughput of stock to settler farmers. In the case of Kantalai, the completion of projected work will be

finalised by the close of 1983 and in the case of System B, work will commence in 1983, scheduled for full development by end of 1984.

In the wake of the impetus given to the upgrading of indigenous stock, the need for draught animal stock by farmer settlers has followed the logical sequence of dairy development. In System H, there has already been an awareness of the need for female stock. An experiment commences in 1983, with provision for repetition in subsequent years, with 20 sons of settler farmers in Kalankuttiya who will manage pregnant animals for a period of one year, under direct farm supervision. The introduction of fodder grasses is finding more acceptance but the paucity of adequate grazing land continues to be a problem.

System C provides the most fertile ground for an aggressive thrust into dairy development. Former encroachers and Purana villagers are anxious to exchange stunted indigenous stock for upgraded animals, and cattle fairs to promote a wider exchange of ideas will become a reality in early 1983. In all Units, the normal extension work has been supplemented by audio-visual filmlets and this thrust has met with most encouraging response. It is planned to produce five more filmlets relating to calf management, pasture and fodder development, milk marketing, etc., throughout 1983.

System B contains the largest percentage of indigenous cattle and buffaloes in the area of Mahaweli activity. It is unfortunate that work in this segment

has been delayed due to the inability of securing an adequately large base from which to operate. However, this matter has now been resolved and work in this system will be accelerated to catch up with other systems. Dairy development encompasses a much wider range of inputs, primarily marketing, and the price of milk paid to producer, at the moment is one of the most serious constraints to the

increase in production of milk in this country.

Inadequate manpower and training facilities have posed a problem in the Draught Animal Programme since its inception. The programme has taken a number of trainees who will assume higher positions of responsibility shortly, but the need for more training to cater for increased areas in livestock production is of paramount importance.

GENERAL INFORMATION

NIRAVIYA FARM (Cattle only) Commenced in :

Extent	- 458 Acres
Land Developed and planted	- 405 "
Stock of Cattle as at 31.12.82	- 425
Sales of Cattle up to 31.12.82	- 407
Purchase of cattle up to 31.12.82	- 407

KALANKUTTIYA FARM (Buffaloes only) Commenced in :

Extent	- 110 Acres
Land Developed and planted	- 100 "
Stock of Buffaloes as at 31.12.82	- 119
Sale of Buffaloes up to 31.12.82	- 92
Purchases of Buffaloes upto 31.12.82	- 82

KANTALAI FARM - Commenced in June 1981

Extent	- 2845 Acres
Land Developed up to 31.12.82	- 1516 "
Planted up to 31.12.82	- 897 "
Stock of Cattle as at 31.12.82	- 433
Stock of Buffaloes as at 31.12.82	- 147
Purchases of Cattle/Buffalo up to 31.12.82	- 493
Sales of Cattle/Buffaloes up to 31.12.82	- 218

GIRANDURUKOTTE FARM - Commenced in March 1982 :

Extent	- 972 Acres
Land Developed and planted	- 600 "
Stock of Cattle as at 31.12.82	- 264
Stock of Buffaloes as at 31.12.82	- 60
Sales of stock up to 31.12.82	- 02



With the decision to diversity patterns of agriculture under the Mahaweli Programme cattle rearing is being accorded priority. Apart from dairy purposes the Livestock Unit of the Mahaweli Authority is en thusing settlers to purchase cattle for draught and tillage purposes as oil-fired traction is costly. Photograph shows Hon. Gamini Dissanayake, Minister of Lands and Land Development and Mahaweli Development during a recent visit to a cattle farm in System C.



The Pakistan Government gifted several head of Sahiwal cattle to Sri Lanka to improve the indogenous stock in System H. The Charges de Affairs of the Pakistan Embassy is seen formally handing over the Pakistan gift to the Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development, early this year, at a simple ceremony in System H.

G. D.



While the Mahaweli Economic Agency (MEA) has set going arrangements for marketing the Yala produce of settlers on an organised scale, traditional private

enterprise fills in the gaps by organising Sunday fairs and weekly 'Polas' for retail sales in the village itself.



The new Galnewa Township in System H has begun to vie with Kekirawa, as an important market place in System H where wholesale transactions now take place.

5/20

MARKETING NEEDS OF MAHAWELI FARMERS

The Mahaweli Development Programme is expected to add a large extent of land to the agricultural base area presently available in the country. The cultivation of crops under the Mahaweli Programme, under varying market conditions and in terms of national food needs, and the necessity of giving 'reasonable farmer incomes requires the implementation of a well conceived production and marketing plan.

It is a truism that the marketing needs of producer farmers are related to the Production Programme adopted by them. Therefore the marketing needs for a set of farmers engaged in a laissez-faire system of production cannot be fully met. The Mahaweli Economic Agency (MEA) has attempted to meet these needs to some degree by involving the Mahaweli farmers in an organised and systematic production programme.

Policy

The marketing policy of the MEA is primarily to assist farmers to obtain the best possible price for the produce cultivated by them in their allotments. The MEA therefore arranges buyers such as the Co-operative Wholesale Establishment (CWE), Co-operative Agricultural Remittances Everywhere (CARE), Markfed, the Oils & Fats Corporation as well as large scale private buyers to take over the produce of Mahaweli farmers. The Mahaweli Authority of Sri Lanka (MASL) provides facilities to collect the farmer's produce, pack it and transport it to the buyers stores. The buying organisation will only incur the minimum overhead charges paid by the MEA for the collection and delivery of the produce to them, while the producer will get the maximum benefit of prices which are higher than what the private trader would pay them.

The Production Programme

The Marketing Division of the MASL carries out a market intelligence study in between cultivation seasons and every attempt is made to work out, well in advance, an appropriate production programme geared to the local demand for various agricultural commodities, as well as the forward prices that could be obtained for these commodities. In actual fact, the final programme will be dependent on the maximum economic benefit that will accrue to the farmers by the possible cultivation of high value crops during a given season.

Market intelligence is very necessary to keep the MASL informed well in time of market requirements, at least 6 months ahead, so that farmers can be advised on the marketability of crops.

There have been cases where crops like Tomato grown by farmers were not in demand, because of a glut, when prices plummeted.

Given the kind of alternative crops, and their likely pay-off schedules, the ultimate responsibility of what to produce, is entirely taken by the farmers.

Once these decisions are made the project management has to take the responsibility of providing the other services required by the farmers so as to maximise their incomes. Thus, the timely availability of high quality seed, and planting material, the basal and top dressing fertilizer mixtures, agro-chemicals agricultural credit etc. is ensured by the project management

system. The continuous maintenance of an efficient extension service, so as to fulfil the diverse needs of farmers is also an important function of the project management.

It is quite evident that the farmer acceptance of an organized agricultural implementation programme has been improving over the years, perhaps due to the gradual improvement in the organizational structure and the corresponding work output of the MASL, particularly, in regard to production aspects.

Marketing and Marketing Channels

The Marketing Division of the MASL organizes the marketing arrangements for the various types of crops produced by the farmers. Generally speaking, the Marketing Division, is in contact with a number of Governmental and Non-governmental organisations. These include organisations such as the CWE, Care, Markfed, Oils and Fats Corporation and many other private organisations. By maintaining a continuous dialogue with these organisations the Marketing Division has been able to determine firstly, the quantities of different commodities required by them, secondly the likely whole-sale prices to be paid by the different buyers, thirdly the time schedules of their requirements, and lastly the quality standards required by these buyers.

Arrangement for Collection of Produce

The Marketing Division ensures a smooth collection operation by attending to the following arrangements in the project areas—

Establishing a sufficient number of collection centres.

Appointing or allocating sufficient staff such as store-keepers and watchers to man the collecting centres.

Providing required packing material, weighing-scales etc.

Setting out quality standards for purchases.

Arranging adequate transportation facilities to facilitate collection at the farm gate.

Arranging funds through various wholesale purchasing agencies in collaboration with the respective banks in the different project areas.

The purchase of farm produce on the GRN-(Goods Received Note) scheme has been introduced as a means of commercialization of farmers by encouraging them to get involved with the banking system. As a consequence of this, not only are they encouraged to make use of the bank-operated credit facilities but also pay back such credit given by the commercial banks. Thus, when a farmer hands over his produce to any of the collecting centres, he is given a copy of the receipt (GRN) indicating the quantity of goods he had handed over, the grade and the purchase price. Another copy of the receipt is directly forwarded to the bank by the Marketing Officer in charge as a means of restricting any fraud.

The adoption of the GRN scheme has enabled the banks to deduct loan instalment payments with the agreement of the farmer and to credit his account

with any balance or pay him cash, if he so desires. It has also ensured that the farmer will always receive a fair deal in terms of (a) Correct prices, (b) Correct weight, and (c) Correct quality standards.

The prices paid to farmers are determined according to the quality and grade of the produce that is collected from the farmer and he is encouraged to produce goods of high quality and obtain premium prices.

Conclusion

Having discussed the marketing process as it is being implemented in the field, it is now possible to sum up the marketing needs of the farmers, and how these have been attended to by the MEA and MASL.

The farmers are generally kept informed as to how best to maximize their incomes by the cultivation of the most suitable and high value crops in their respective land areas, and they are provided with the required inputs, such as,

Quality seeds and planting materials ;

Chemical fertilizers--the form, quality and timely availability ;

Ensuring the availability, adequacy and predicability of irrigation water supplies ;

Provision of required agro-chemicals, such as weedicides and insecticides ;

The arrangement of credit facilities through the bank ;

Deployment of a reliable and effective extension service covering almost all the agricultural enterprises ;

The farmers are generally given the guidance to cultivate the most profitable crops ;

Organization of an effective marketing system by the MEA so as to enable the farmers to dispose of their produce at best possible prices ;

In facilitating the foregoing, the farmers are also encouraged to produce *quality* grades of produce ;

The MEA has also created a competitive market in various project areas by encouraging the private sector to operate as well .

In addition to the foregoing there are also a number of local trading centres such as Polas (Sunday Fairs) operating within the MASL areas, thus creating many opportunities for the small-scale as well as large-scale buyers and sellers to operate in the project areas.

The Marketing Division has also taken cognisance of the fact that the Mahaweli farmer will, in the course of time, be able

to produce some agricultural crops to meet the entire requirements of the island, for example in regard to dried chillies, Soya Bean, Maize and Cowpea. Therefore in certain selected areas it has initially introduced, on a pilot scale, the production of varieties of vegetables, primarily for the export market. Special seed-material of particular vegetables such as Capsicum, Brinjal, Okra and Melons which have been imported, are being distributed among farmers e.g. in Kandalama area, for cultivation in the Yala 1983.

The Marketing Division has also sponsored the cultivation of new varieties of Sesame seed, both high-yielding and with a high oil-content, to supply exporters to meet orders in the international market. The Marketing Division has assisted in the cultivation of Passion Fruits, Sour Sop and Papaws by selected farmers (by the provision of required planting material) in their homestead allotments to supply to the canning industry, primarily for export. It is felt that in time, with the increase of production, it would be possible to establish small-scale industries to process these items and for the MEA to enter the export market in these products.

UN ASSISTANCE TO SPECIAL PROJECTS

The United Nations Organisation, working through its Specialised Agencies in Sri Lanka, is one of the many international organisations associated with the implementation of the Accelerated Mahaweli Programme.

UN co-operation in certain critical areas of activity has a significant impact on the overall Mahaweli Programme.

UNDP-FAO Master Plan

The UN has been involved in the Mahaweli Development Programme from its very inception. The Programme is based on a Master Plan prepared jointly by a UNDP-FAO Team and Sri Lankan engineers from 1964-68. The current Accelerated Mahaweli Programme has been adapted from the original Master Plan to accomplish, on a reduced scale, the development of the Mahaweli River Basin within a shorter period of time than originally provided for. From planning to implementation, the UN continues to make a valuable contribution to the

Mahaweli Programme—the largest ever development project undertaken in the country.

United Nations Development Programme

The Mahaweli Authority of Sri Lanka (MASL) established in April 1979, was made statutorily responsible for the planning, financing, implementation and co-ordination of the entire Mahaweli Programme. Total responsibility for a project allocated 30–40% of the national budget every year, covering 1/6th of the Island's land area and affecting over a million people obviously requires a strong administrative infrastructure. The need also arose for a special mechanism to monitor the progress of all components of the Programme on a continuing basis. The MASL had to ensure that the Project of the magnitude and complexity of the Mahaweli Programme should not only be completed on schedule but also that the most efficient use was made of the vast resources expended on the Project. The

UNDP-assisted Project designed to serve both these urgent needs commenced in May 1979.

Monitoring & Progress Control

Under Phase I of the Project, the administrative infrastructure was strengthened and a Monitoring and Progress Control Unit was established. The monitoring system revolves round the production of a monthly progress brief for the information of management. The progress achieved during the previous month in the construction of headworks, in downstream development and in settlement and production activities is portrayed by means of an audio-visual presentation. Whilst recording progress in the various sectors, the Management Brief highlights constraints and slippage in the programme schedule. The presentation of the brief provides an effective forum for the management of both the MASL and Executing Agencies to review progress and to take remedial measures as are found necessary. Quarterly Progress Briefs are also prepared for His Excellency, the President and the Cabinet of Ministers whilst a General Brief, regularly updated, is available for Members of Parliament and visiting delegations from donor countries and agencies.

Plan Co-ordination

Phase II of the project commenced in September 1980 as the first Government executed UNDP Project in the country. Under the second phase the Monitoring and Progress Control Unit was expanded at the beginning of 1981 to include the function of Plan Co-ordination. It is

important that there is a constant review of plans to ensure their consonance with national policies and priorities and that sectoral plans are dovetailed into an integrated Regional Plan. UNDP funds are provided for staff training, purchase of equipment and consultancy services. Funds have also been made available for national research organisations to undertake impact studies to evaluate ongoing programmes. UNDP assistance will end in December 1983 leaving a fully functional Planning & Monitoring Unit.

UNICEF

The MASL has accorded high priority to social development in the Mahaweli areas. With the construction of reservoirs and power stations, trans-basin canals and irrigation infrastructure, the social development of the Mahaweli settlers comes into focus. UNICEF collaborates with the Mahaweli Economic Agency (MEA) – the settlement arm of the MASL, in this important area of development activity. It commenced activities in 1979, in the first settlement under the Mahaweli Programme, viz., System H. Training forms an important part of the UNICEF Project. Newly recruited 3,000 farmer leaders have undergone regular training in agriculture extension and water management, who in turn upgrade the skills of fellow farmers. Some 300 Project officials have been trained in management and in their special areas of work. Seventeen Community Training Centres have been set up, equipped with teaching aids and are the focal point for the dissemination of information on health, nutrition, sanitation etc. Three more centres will be completed by 1984.

Community Health

The Community Health Programme under the UNICEF Project supplements the activities of the Department of Health, the Health Education Bureau and other Government Agencies involved in health care. Around 800 Health Volunteers, one for each group of 25 families, have been trained and are supplied with First-aid Kits and bicycles. Volunteers provide simple treatment to settlers and give advice on nutrition, sanitation and immunization programmes. A further 400 Volunteers will be trained by 1984. Drugs are also supplied to Government Hospitals in the area and transport facilities provided for health personnel.

Day-Care Centres

Seventeen Day-Care Centres, with Attendants trained by the School of Social Work are in operation to permit women to engage in cultivation and other income-generating activities. The Project target is 80 fully-equipped Centres by 1983.

Health Education

Health Education Programmes assisted by UNICEF have given an impetus to the programme for the construction of wells and latrines

Women's Bureau

The Women's Bureau is assisting the Project in special programmes for women. Around 200 women leaders have been trained and 8 income-generating activities such as bee-keeping, home gardening, poultry and dairy farming have been identified and will commence

shortly. The MEA has also set up a Home Development Centre for the training of women in Home Economics.

Upgrading Schools

The development of small schools in the area has received priority under the project and with the collaboration of the Ministry of Education a programme has been drawn up to up-grade 25 schools. Around 100 teachers have already undergone in-service training including basic health training and the development of school gardens is under way.

Nutrition Education

Nutrition is another aspect that is receiving increasing attention. The MEA, with the co-operation of Health Ministry personnel, have arranged for the routine weighing of infants and pre-schoolers. Nutrition education activities have also commenced among women's groups and national nutritional interventions such as milk feeding is undertaken at Day-care Centres and Community Training Centres.

Fish Culture

A Fisheries Station at Kalawewa is being established under the auspices of the Ministry of Fisheries for the rearing of fingerlings with a view to encouraging fish culture in tanks and channels.

Social Development—System B

A UNICEF assisted project for the social development of System-B, similar to the project arranged for System H has been prepared.

World Food Programme

The initial stages of settlement are in many ways the most difficult period faced by a new settler. Under the worker-settler programme, only the head of the household comes into the settlement area and is accommodated in camps and provided with work in channel and road construction. During the worker-settler phase, which lasts from 6-12 months, the settler is given his allotment for a rainfed cultivation and his homestead lot, to construct a temporary home. Once initial work is complete, the settler brings his family into residence and prepares for his first irrigated crop. The early stages present difficulties any pioneer faces in unfamiliar areas away from his village and kith and kin. During this period the World Food Programme (WFP) of the FAO provides food rations during the first 15 months of settlement, thereby cushioning settlers during this traumatic period. In fact prompt assistance from the WFP eased to a considerable extent, the hardship caused by the drought and the failure of the irrigated crop in Maha 1981/82.

Food for Work

The Food for Work Programme set going during the drought alleviated the distress caused by loss of harvests and also enabled the MASL to expedite work such as the desilting of channels and the construction of wells and latrines. The daily single ration under the WFP to worker-settlers consists of: 400 g of flour, 20 g of sugar, 30 g of pulses, 40 g of dried fish and 40 g of edible oil. A slightly reduced ration per family, upto 5 persons are issued once families come

into residence. In addition to supplementing their earnings in the early stages of settlement, WFP food issues also have an impact on the nutrition status of settlers by providing a more balanced diet.

In System H over 22,000 families have been beneficiaries under the food ration scheme of the WFP from 1976. WFP assistance has also been extended to System C where 16,570 families will receive rations up to 1985. Project proposals for System B and G are being processed by the WFP. Requests cover 26,840 families in System B from 1982-84 and 2,900 families in System G from 1982-86.

UNDP-FAO Aided Farm

The UNDP and FAO are associated with the MASL in establishing an Experimental and Training Farm in Aralaganwila in System B. An area of 135,000 hectares (333,450 ac) of System B will ultimately provide for the settlement of 36,000 families. Non-calciic brown soil which form a substantial part of the region, are not extensively cultivated in Sri Lanka, nor have these soils been adequately researched. Hence studies and investigations are urgently required to determine crops and cropping patterns, water management systems and land management practices suitable for the climatic and soil conditions prevailing in the area.

In addition, the farm will undertake studies in integrated crop-stock-fish farming systems, train farmers and staff in agricultural techniques and water management practices and also supply

seed and planting materials to farmers. About 202.4 ha. (500 acres) of land have been set apart for the adaptive research, training and seed production functions of the project and work commenced in late 1981. UNDP and FAO will provide required equipment and materials for the Soil Laboratory, Agronomical Laboratory and the Agro-meteorological Station which will form part of the farm. The services of a Water Management consultant will also be made available to test out alternative layouts for irrigated agriculture, establish water management practices and determine design criteria for irrigation and drainage systems. The Department of Agriculture has released specialist officers and initial trials are already under way. It must be emphasised that the activities of the farm will be mainly centered on practical research which will in turn be extended to farmers by means of intensive extension work and training. UNDP and FAO assistance amounts to US \$ 518,740 and the project duration is effective till 1986.

System G

FAO is also associated with the European Economic Community (EEC) in Integrated Small Farmer Development in System G. The objectives of the Project is to provide the MASL and the Irrigation Department—which serves as the Implementing Agency, with technical support including the services of an Irrigation Agronomist and funds for supplies, materials and equipment. System G covers an area of 5,139 hectares (12,693 ha.) of which 2178 hectares (5,380 acs.) of irrigated land has to be rehabilitated and the balance land developed. The FAO-EEC Project will

result in integrated development of the area which will result in improving farmer incomes and the overall standard of living through enhanced agricultural production. The FAO assistance amounts to US \$ 142,577.

UN Aid for Population Activities

In December 1982 another UN agency, namely UNFPA, embarked on a project in System C of the Mahaweli area. The project is designed to upgrade the skills of management, the skills of farmer leaders and women leaders. Staff of System C will be trained in special fields such as communications, community organisation and community development which would include lectures, field exercises and sensitivity training sessions. Farming skills of settlers will be developed through short-term training programmes in water management, improved agricultural techniques and leadership through field exercises and demonstrations. Women leaders will be trained in areas such as health and sanitation, nutrition, community development and income-generating activities. A programme for the training of volunteer health workers will also be inaugurated and as in System H, the health volunteers will be given a basic training in first-aid and will assist health personnel in disseminating information on health and sanitation, nutrition and in immunization programmes.

Feed Back

An important feature of the project is the in-built provision for the collection of base-line data for evaluation purposes. Nutrition indices (MRI/University of Sri

Lanka) will provide base-data on health/nutrition which would assist in the evaluation of the overall success of the project. The MASL will also commission an impact study on the management system in order to ascertain the strengths and weaknesses for remedial action. Educational materials required for community education including illustrated booklets, brochures

and leaflets on Home Science, Food Storage techniques, Home Gardening, Animal Husbandry, Health and Sanitation will be prepared in consultation with relevant institutions and distributed among settlers.

Under phase I of the project UNFPA have pledged US \$ 100,000 up to the end of the first half of 1983.

ENVIRONMENT AND HERITAGE

The Mahaweli Development Project involves the development of intensive, year-round irrigated agriculture, transbasin diversion of Mahaweli water and the re-settlement of people in presently forested project areas. The development of water resources of the Mahaweli, as any other engineering enterprise, entails the modification of the physical environment. The interference with natural conditions disturbs the existing ecological balance, with possible far-reaching consequences. These disturbances could produce effects that range from highly beneficial to dangerously harmful.

Recognising the difficulties that may be imposed by these problems, the Government sponsored a series of studies aimed at identifying possible detrimental effects on the environment. However, initial assessments of the environmental impacts of the project were made as part of the individual feasibility studies

conducted for the downstream irrigation systems. These studies were preliminary in nature, serving only to highlight major environmental issues relevant to the respective irrigation systems. Subsequently, the Government arranged with USAID to undertake a comprehensive environmental impact assessment study of the Accelerated Mahaweli Project. This study was conducted by Messrs. Tippetts-Abbett-McCarthy-Stratton (TAMS) of USA.

The TAMS Report presents a detailed analysis of the effects of the Accelerated Mahaweli Programme on the terrestrial, aquatic and human environments. Where required, an integrated approach was taken permitting an evaluation of cumulative environmental impacts common to all irrigation systems. Similarly, project impacts which could be

relevant to surrounding areas as well as those involving the upstream Mahaweli watershed were also addressed.

In the TAMS report, emphasis is given to recommendations for minimizing detrimental impacts, enhancing beneficial aspects of the project and for effective management of the natural resources pertinent to the Project. Based on the TAMS report, the Government produced an "Environmental Plan of Action", the main object being to provide the means to ameliorate potential environmental problems that may arise as a result of the implementation of the Mahaweli Project. A Technical Committee on Environment has been set up within the Mahaweli Authority comprising representatives from various Governmental and Non-Governmental Agencies connected with environmental conservation with the intent of assisting and advising the Government in implementing the Plan of Action.

Presently, the government has initiated steps to incorporate environmental safeguards in the overall planning of the scheme. A large number of projects and programmes have commenced, and newer ones will be initiated in the future, in order to achieve an environmentally sound and optimal utilization of natural resources. As such, it recognizes the necessity for the promotion of a balanced approach to the development of the natural and human resources, in an effort to sustain the development programme.

Wildlife Conservation

In order to carry forward the Mahaweli Programme, it is inevitable that large extents of forests and wildlife habitat will

have to make way for agriculture. However, careful planning has been carried out to demarcate areas which will be conserved for the future.

In the planning of the Accelerated Mahaweli Programme all reasonable means have been taken to conserve the rich and varied wildlife which will be affected by the project. Large and contiguous tracts of land have been reserved in perpetuity for the preservation of wildlife in the area. An environmentally sound and socially acceptable system of protected areas is being established and will be managed around the Accelerated Mahaweli Programme so as to maximize benefits to agriculture and settlers. A total of 190,000 hectares (469,300 acres) of protected areas will be developed as four national parks. This extent far exceeds the total new and improved agricultural land to be developed under the Accelerated Programme.

In designing the Parks system, very high priority had been placed on the upgrading and establishment of protected areas in the prime wildlife habitats, in the catchments of reservoirs, and along the major river banks of the Project area. The existing Somawathiya Sanctuary is to be extended to the east and west (to an area of 52,000 ha.-(128,400 ac.) and upgraded to National Park Status. The Wasgomuwa Strict Natural Reserve will be extended northwards to the confluence of the Amban Ganga and to the west to link with the Hurulu Forests (to an area of 76,000 ha.-(187,720 ac.) and is also to be made into a National Park. Two other major new protected areas, the Maduru

Oya National Park 50,000 ha.-(123,500 ac.) and the Flood Plain National Park 20,000 ha.-(49,400 ac.) are to be created. In addition, the establishment of a 200 meter (656 feet) reservation along all major rivers and streams will ensure the stabilization of the banks that protect important riverine habitats, which are so essential for the survival of many endangered and endemic species. These parks will be inter-linked by additional forest reserves and jungle corridors both to confer maximal, ecological and genetic resilience on the system, as well as to safeguard the routes taken by elephants between their wet season feeding and dry season watering areas. Further each park, will be bordered by buffer zones, which will be managed in such a way as to bring direct benefits to people living in the surrounding areas and prevent conflicts between humans and wildlife.

This favourable development of such a system has been brought about by a realisation of the benefits that nature conservation, through the establishment of protected area, can bring to the people.

It will ensure protection of watersheds, reduction of sedimentation rates, control of flooding, creation of opportunities for off-farm employment, promotion of tourism and the preservation of essential ecological processes and genetic diversity.

Although, this system of protected areas will provide alternate habitat for the wildlife displaced as a result of the scheme, initial conflicts must necessarily be expected, till such time as the animals

get accustomed to their new confines. Such is the case in the operational H area where wild elephants, pocketed in and around the area south of Meegalewa (H-2), were a threat to life and property. The Department of Wildlife Conservation organized a drive and successfully moved over 70 elephants to the Wilpattu National Park. In order to accommodate these new arrivals, two abandoned tanks within the Wilpattu National Park (Mahawewa and Andaragollewa) have been restored with a view to increasing the carrying capacity of the park.

The Veddha Community

In the past the land of Bintenne was all covered with mighty woods with an abundance of wildlife. In this land live a large number of Veddhas—the earliest inhabitants in the country. To the Veddhas, the jungles near Dambana have been their traditional home for centuries. However, with the recent development activities under the Mahaweli scheme, which have resulted in all the adjoining areas being cleared for settlement, the Veddhas will be completely isolated.

Realising that their very own primitive life styles cannot survive the so-called civilization ingress, the Veddhas have agreed to move to new settlement areas immediately below the Ratkinda reservoir. Seventy Veddha families from the villages of Kandeganwila, Kotabakina, Keragoda and Koteyaya have already shifted and are settling down in the new environment as Mahaweli settlers.

The new settlement area of the Veddhas at Henanigala is tucked away in a corner, in close proximity to their

earlier homeland. The Veddha families were settled down as integrated groups so that the same social cohesion that prevailed earlier would be preserved intact even in the new settlement, giving them scope to continue their traditional, cultural and religious practices.

Before they were moved out, it was considered of anthropological interest to carry out a survey and research into this community and their existing living patterns. The task of conducting this study was assigned to the Department of Sociology of the University of Peradeniya. Video tape recordings of the findings of the survey are now available. A documentary film on the re-settlement of Veddhas has been planned.

The re-settlement of the Veddhas as Mahaweli farmers has resolved a clash of interests posed by development and the need to protect the environment. The land so vacated will go back into thick jungle as a wildlife reserve designed to protect the catchment of a major reservoir project under the Mahaweli Development Scheme.

Before leaving their ancient homeland the Veddhas, devout ancestor worshippers, enacted their traditional ritual of "Kiri koraha", invoking the blessings of their departed, whose remains lie buried in the Dambana jungles.

Basic Energy Needs

Although, the major impact of the removal of forested areas will be on wildlife, yet, its effect on the energy resources of the rural population will be

of major importance. In a situation when over 90% of our population use fuelwood for domestic purposes, especially for cooking food, it would be necessary to provide energy for this in some way.

At the present rate of use of firewood, in the context of the population growth, about the turn of this century, firewood would not be available for domestic use in Sri Lanka, unless alternative measures to reforest on a large scale are undertaken.

The failure to provide fuelwood for the people would not only affect the fuel requirements for cooking, but would extend into other areas of the economy and the environment and put out of gear, the irrigation structures, including the massive Mahaweli Programme on which we are dependent for our survival.

In consequence of all the above, special steps are being taken to prevent the unnecessary elimination of forests and wastage of forestry resources. Forest clearing has been restricted to areas where very necessary. In the highland settlement areas prospective settlers are being moved in, to wooded allotments whereas in the past total clearing was advocated prior to settlements. This ensures that settlers will have at least part of their requirements of fuelwood met from the trees left on their allotments.

However, in a massive scheme, like the Mahaweli, long-term programmes to cater to the energy needs of settlers become an urgent necessity. With this in mind, large tracts of land have been reserved in close proximity to settlements

in the newer Mahaweli settlement areas. Fuelwood and utility timber plantations will be established in these areas to meet the demands of the settlers. Reforestation has already commenced in Systems C, G, & H with fast growing fuelwood and timber species. A total of nearly 303.6 hectares (750 acres) has already been planted in System C while in System H, where very little land was reserved for forestry, small reservations and avenue planting constitute the major thrust towards meeting the requirement of the settlers. It is planned to extend the scope and dimensions of these programmes in the future. Community forestry programmes are also envisaged in the coming years.

Management of Catchment Areas

The Upper Catchment of the Mahaweli Ganga is the principal source of water for the numerous hydropower and irrigation schemes in the Mahaweli Development Programme. It is therefore, vital that these multi-million dollar investments be safeguarded by a regulated supply of acceptable sediment free water.

Although the upper catchment has a large variety of land forms and covers a number of agro-ecological zones, the dominant feature affecting run-off and erosion in the very steep, often mountainous terrain. However, the extent of soil erosion overall in the Upper Catchment can be described as moderate, but becoming severe in some parts. It does seem, however, that in the absence of a considerable improvement in the standard of land management the situation is likely to deteriorate rapidly.

About 70% of the upper catchment is under some form of agricultural usage, a major extent of which is in a poorly managed state. Only 10% is presently in forest cover or designated as forest reserves. This amount is inadequate to maintain a satisfactory watershed area and meet minimal soil conservation practices.

In consequence of the above, conservation of the reservoir catchments are considered as an integral part of the programme. Effective measures are envisaged to conserve soil and water in the catchments so as to guard against erosion and siltation.

In this connection, a concerted programme for re-afforestation of the upper catchment is envisaged through the participation of the Mahaweli Authority, Forest Department, the State Plantations, the villagers and voluntary organizations.

In the Victoria Catchment area reforestation of 1,200 acres has already been accomplished in critical conservation areas and plans are being finalized for the other reservoir catchments as well. A major part of the Upper Mahaweli Watershed will be reforested by the Forest Department under an USAID funded programme.

Various ways and means of implementing soil conservation measures in the catchments are being identified at the moment. It is also proposed to formulate an integrated development plan for each of the reservoir catchments. Such a plan would assist in ensuring the protection

and utilization of the reservoir to its maximum potential and also provide for the optimum development of agricultural and other economic land uses within the area.

Immediately above the waterline of the reservoirs, a belt of vegetation would be established to protect the reservoir. Construction activities such as tourist complexes, hotels, industries, etc., will not be permitted in the immediate vicinities of the reservoirs.

In the case of areas of jungle which will be cleared for the deeper upstream reservoirs, trees will be completely removed. As a result, it will be possible to develop boating and recreational facilities and water sports on these beautiful expanses of water.

Aquatic Environment

Impoundment and subsequent transfer of Mahaweli waters to meet agricultural requirements will have a series of effects. Possibly the most significant impact of the reduced flows of the Mahaweli as a consequence of the above, will be on the floodplain marshes. These marshes or villus are seasonally revitalized by flood overflows of the rivers. However, reduced flows will probably decrease the duration and magnitude of the flooding of these marshes and thereby decrease their productive value, and hence affect the grazing potential. The creation of the Floodplain National Park should provide the mechanism to protect these marshy areas from over-grazing and degradation. An ecological survey is being planned in the floodplain area in order to determine

other suitable measures to conserve and make optimal use of the potential villu resources.

An additional concern of irrigation is the alteration of water quality in both ground water and surface water which will result from the substantial increase in the use of agro-chemicals on the regions' farmlands. The possible elevation of the ground water table may also be significant and have an effect upon soil salinization.

In connection with the above, a programme has commenced to obtain background data on present water quality conditions and pesticide levels in the project areas. This will enable subsequent monitoring to identify potential problem areas as the Accelerated Programme proceeds. This programme is designed to evaluate the quality of surface and ground water for use in irrigation supplies, domestic supplies, the protection of aquatic life and for livestock consumption.

Heritage Considerations

Concurrently a programme is underway to preserve the heritage in the areas of the Mahaweli that would be affected by the new development.

Artefacts and archaeological materials from areas that would be submerged or otherwise affected would be conserved wherever possible *in situ* or reconstructed on higher ground where necessary.



Hon. Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development during a recent

circuit in System C joined settlers under the Ulhitiya reservoir in a harvesting ceremony.



Farmers from Teldeniya re-settled in System C under the Ulhitiya reservoir have reaped a good harvest this Maha. Here they are seen with the Hon Gamini Dissanayake, Minister of Lands, Land Development and Mahaweli Development who joined them in harvesting

their Maha paddy crop. Pitch forks traditionally used in threshing and heaping paddy in Teldeniya, have been introduced by the Teldeniya farmers to System C. The Teldeniya farmers have on their own named their paddy tract Teldeniyaya.



Several centuries ago an earthen dam had been constructed at the very site now chosen for the Maduru Oya new dam. The remains of the ancient embankment on the right bank of the river about 23 meters (75.4 ft.) high and pitched with round stones along the upstream slope to break the ripple action indicate the magnitude of the reservoir constructed by our forefathers. A matted forest canopy hid the massive breached earthen embankment as it sat, spot on, where foreign and local engineering expertise, led by the UNDP-FAO Master Plan study of 1964-1968, chose to throw a dam

That these experts had the advantage of intricate surveys, sophisticated instruments, rainfall and river data etc., to make their calculations is enough testimony to the engineering ingenuity of our ancestors, who chose the same spot to straddle the river.

It is interesting to note that C. W. Nicholas and S. Paranavitane had stated in the "University History of Ceylon" of 1959 that a canal taking off from an earlier Mahaweli diversion at Kalinga-Nuwara, built to irrigate areas around Dimbulagala, and known as the Pabbatanta or Gomati canal, conveyed Mahaweli waters to this area. More interesting is the suggestion that this canal terminated in the Maduru Oya. Mahasena (271-301 AD), Dhatusena (455-473 AD) and Parakrama Bahu I (1153-1183 AD), are mentioned in this connection.

Regrettably, later historians, surveyors or engineers did not pursue this interesting suggestion or we may have discovered, not stumbled on the ancient Maduru Oya earth dam, way earlier. Actually, construction workers came upon this structure recently when work commenced on the Maduru Oya project and reported its finding to the site-engineers. A lesser known fact is however that a construction engineer assigned to the Pimburettewa Project, requested a revision of the irrigation estimate to enable him to fill a breach in a massive dam he had chanced upon in the jungle, to the south of the Pimburettewa work site. Clearly, this engineer had stumbled on the ancient Maduru Oya dam. Seeing that the relevant survey topo sheet did not show the existence of a breached dam within the co-ordinates indicated by him the Irrigation Department ignored his proposal. This was in the Sixties and that engineer is still in service.

The Maduru Oya project has attracted a great deal of interest since construction workers again chanced upon an interesting sluice structure in the old earthen dam. Measures have been taken to preserve this structure and the ancient earthen dam *in situ* as artefacts of Sri Lanka's hydraulic civilization. Academics of the University of Sri Lanka, Peradeniya and Kelaniya are expected to date this structure shortly.

The ancient "Horuwwa" (sluice) discovered in March 1981 on the old breached earthen bund on the Maduru Oya is to be conserved for posterity. Scholars will soon determine the antiquity of this structure.

A Central Mahaweli Museum is being constructed in Colombo to exhibit the artefacts of our hydraulic civilisation,

supplemented by working models of the Mahaweli reservoirs, so that the present and future generations would be aware of our heritage and learn to preserve it for all time.

Conservation of the environment and preservation of our heritage are matters receiving the highest priority of the Government, and the Government is taking positive measures in this direction.

MONITORING OF PROGRESS

To facilitate the flow of performance information the Mahaweli Authority of Sri Lanka (MASL) established a Monitoring and Progress Control Unit in 1980. In 1981, the responsibilities of the Unit were expanded to include the co-ordination of planning, an area where there were specific problems arising from the separation of responsibilities between the Mahaweli Development Board (MDB) and the Mahaweli Economic agency (MEA). Thereupon the name of the Unit was changed to Progress Control and Plan Co-ordinating Unit. A further function was also added during 1981. The Unit was asked to provide statistics and other data to the MASL. More recently Macro-planning has been made the responsibility of this Unit, now re-named again the PLANNING AND MONITORING UNIT.

Planning & Monitoring

In summary the Planning and Monitoring Unit is responsible for the

following areas :-

- Macro planning ;
- Co-ordination of implementation planning and scheduling ;
- Progress monitoring and preparation of regular progress briefs on a monthly and quarterly basis as required by the MASL.
- Maintenance of up-to-date development statistics and other information ; and
- Co-ordination of impact studies.

The Planning and Monitoring Unit has no decision-making power but is an organization established to present succinct decision-oriented information upon which the management of the MASL can arrive at decisions.

The very fact that the projects are being regularly and objectively monitored and the Unit's reports are being given

serious attention at the highest level, gives this Unit a high degree of responsibility. Considering the magnitude of the Mahaweli Development Programme and the accelerated nature of its implementation, the regular monitoring of its progress has become a necessity.

The monthly management brief is a comprehensive review for the management of the MASL in order that their policy directives may be based upon adequate current information. The presentation format acts as a convenient and regular vehicle for the management of the MASL, to meet the representatives of the implementing agencies and the engineering consultants to co-ordinate their separate activities within the MASL's overall strategic plan. The format is designed for ease of assimilation, whilst the written report and charts together with the audio-visual presentation form a historical record of progress on a monthly basis.

Two separate monthly management briefs for major Headworks Projects and Downstream Development, Settlement and Production are produced on a routine monthly basis for circulation as a written report and for presentation in an audio-visual, slide-tape form. In addition to the management briefs, general briefs are prepared quarterly for His Excellency the President, Hon. Prime Minister and the Cabinet and to be shown separately to members of Parliament and to other dignitaries who are guests of the MASL.

The Headworks Management briefs cover the projects of Kotmale, Victoria, Maduru Oya and Randenigala and the

briefs on Downstream Development, Settlement and Production cover the Right Bank Trans-basin Canal civil works, System H, C, B and G and the Draught Animal Programme.

Two Way Flow

Monthly progress reports are being sent to the Planning and Monitoring Unit by the MEA, the MDB, the CECB, the RVDB and the Project Consultants for the Kotmale, Victoria, Maduru Oya and the Randenigala Projects. A report is also received on the Draught Animal Programme. These reports are submitted to the Unit before the 7th day of the month following the reporting period, so that the Planning and Monitoring Unit is able to prepare the briefs for presentation to the management by the fifteenth. In order to ensure the accuracy of data supplied and the objectivity of comment, two special studies teams covering the engineering and socio-economic aspects respectively, are sent to the field for random checking of data, to fill gaps in data supplied and also to do short-term studies of management constraints. The Unit also makes use of information provided by other sources to supplement the data received from the above Agencies. Based on the information provided in these reports, the Planning and Monitoring Unit compiles the two monthly confidential management briefs. In compiling these briefs the Unit attempts to identify constraints, bring them to the attention of the management of the MASL and where and when possible, recommend remedial measures.

The discussions between the MASL the agency representatives and the

Consultant Engineers on the points raised in the monthly monitoring briefs are held at a meeting which opens with an audio-visual version of the brief. The written briefs are in the hands of participants a few days before this meeting, so that answers to the MASL's queries can be prepared by the relevant agencies. The text of the report is tape-recorded, average running-time being thirty minutes, charts capable of being read from a distance and easily understood, maps and site photographs are synchronised with tape and are automatically displayed using two screens simultaneously. The average management briefing presentation contains 250, 35 mm slides. The main advantages of using an audio-visual format for management presentation are as follows :

Advantages

- It eliminates the constraint upon the discussion of the participant who has not had time to read or has not adequately read and understood the brief.
- It presents facts both orally and graphically in a manner which gives the maximum impact.

- The presentation concentrates the mind on the matters to be discussed.
- Criticism which can be mentally discarded on a written report cannot be so easily avoided when the comments are heard and seen by an audience of colleagues.
- The slide-tapes make an important addition to the archives of the project and if properly kept, can be re-set and projected quicker than the report can be read.
- They can be produced relatively cheap as an in-house effort.

Through the close liaison and guidance of the implementing agencies and the field staff of the Unit, who collect and present progress data, a regular flow of pertinent and accurate management data is achieved. High professional standards are maintained in the production of the audio-visual presentations. As facilities improve, attempts will be made to make suitable presentations to the field staff on-site as a feed back and to keep them in touch with the totality of the Accelerated Mahaweli Programme.



The Department of Highways has been entrusted with the task of relocating roads that will be submerged by the Victoria Reservoir. The R.V.D.B has undertaken a

contract to hew a road through a difficult stretch from the left Bank end of the Victoria dam leading toward Mahiyangana.



A group of foreign and local journalists who toured Mahaweli work sites under a tour programme organised by the World Bank attended a Press Conference given by the Hon. Gamini Dissnayake, Minister of Lands, Land Development and Mahaweli Development at the

Operations Room of the Mahaweli Authority on February 1, 1983.

On the Minister's left is Mr. A. Shibusawa of the World Bank. Reputed foreign journalists attended the conference.



A panoramic view of the Kotmale dam-site showing the coffer dam in the centre, behind which is the opening of

the diversion tunnel. The Ramboda hills form the backdrop to this view.

THE RVDB AS A CONSTRUCTION AGENCY

The River Valleys Development Board (RVDB) continues to be an important construction agency within the Ministry of Mahaweli Development. Its performance on two of the more important projects in the Accelerated Mahaweli Programme is given below :-

Ulhitiya Oya Reservoir in System C

This reservoir was undertaken by the RVDB in mid-1979 to harness the waters of Ulhitiya Oya for the creation of a reservoir. The RVDB undertook this job on a contract basis from the MDB. Sri Lankan Engineers and various other categories of employees were deployed by the RVDB during the years 1980 and 1981 and the RVDB successfully completed the construction of the Dam by October 1981. Approximately 1,250,000 cu. m. of rolled earth fill were used for the construction of the dam. The reservoir started filling up with the Maha rains in November-December 1981 and nearly

30,000,000 cu. m. (24,500 ac. ft.) of water were impounded.

Work on the radial gated spill and sluice were also done during this period and the whole Project was completed in all respects in early 1982 at a cost of approx. Rs. 178,000,000. The sketch plan annexed shows the statistical details of the reservoir.

Construction of road system under Victoria

The RVDB also undertook in 1982 approximately 19 miles of 'A' class road construction work from the Mahaweli Authority of Sri Lanka on contract at a total value of Rs. 112,000,000. These roads have a platform width 40 ft. and carriage width 22 ft. and requires a fill volume of 629,000 cu. of earth and 70,000 cu. of metal for its construction. About 200 culverts and several retaining walls at critical locations are also required. The progress of work has been

satisfactory and it is hoped to complete this work by the end of 1983.

These roads when completed will replace the present roads which will go under water with the impounding of the Victoria reservoir.

CONSULTANCY SERVICES

The massive projects being undertaken by the Government under the Accelerated Mahaweli Development Programme has created a need for engineering expertise at an unprecedented scale. Engineers are needed to plan and formulate projects, prepare detailed designs and drawings and cost estimates for execution of the projects and finally see that these are constructed to recognized specifications. In the late sixties, when the first of the Mahaweli works commenced with the Polgolla Diversion Project, these services were provided by the Mahaweli Development Board which started with a nucleus of several senior engineers obtained on secondment from the Irrigation Department. In due course it was realized that providing engineering skills was by itself a massive undertaking and in order to serve future Mahaweli Works, the hydro-power projects proposed by the Ceylon Electricity Board (CEB) and other major projects, the Government formed the Central Engineering Consultancy Bureau (CECB) in 1973.

When the present Government initiated the Accelerated Mahaweli Development

Programme, the CECB was thrust with the task of providing Engineering Consultancy Services on an unexpected scale. The several projects to be taken up were each massive, unique and needed vastly superior multi-disciplinary skills to handle the formidable challenges in the execution of the projects speedily, as required.

The CECB is called upon to play a dual role in performing its duties for the Mahaweli Authority of Sri Lanka (MASL). This arises primarily from the nature of the funding of these large projects. Firstly, the CECB plays the traditional role of the Consulting Engineer in handling projects for the Client and secondly it monitors and assists the Mahaweli Authority in supervising the activities of overseas consultants being retained by the Client and Donor Governments for the individual projects. Although the presence of foreign consultants was largely due to requirements of funding agreements, the exodus of experienced Sri Lankan engineers to the West, Middle East and Africa also contributed to the scarcity of skills obtainable in the country. In fact, the CECB has had to recruit engineers from India under the Technical Co-operation between Developing Countries (TCDC) Scheme for its urgent needs but is hopeful this situation improve soon.