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THE MAHAWELI GANGA DEVELOPMENT PROJECT A SOLUTION TO SRI LANKA'S ENERGY AND FOOD PROBLEMS?

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1. THE ECONOMIC BACKGROUND

Sri Lanka's economy has been in a delicate situation during the past decade. Although the government always prided itself on fulfilling the basic needs of the population, especially in the fields of education, health and nutrition, no major progress has been made in reaching a greater economic independence and fighting un- and underemployment. The economy, in fact, had arrived at an impasse by the mid-seventies.

Agriculture is still absorbing the major part of the labour force, providing over 50 % of the total employment. More than three quarters of all export earnings derive from agriculture, this mainly through tea and rubber proceeds. But the country is as far as ever from reaching nutritional self-sufficiency. Annually, large amounts of rice, sugar and subsidiary food crops have to be imported. Moreover, the bill for importing wheat and wheat flour, which are not produced in the country, is growing from year to year. However, production of the main staple-food rice, which showed a strong downward trend during the major part of the seventies, has increased again since 1977.

Industrialization in Sri Lanka is still in the beginnings, and the standard of local production of even simple consumer goods is very low. The present Government has given much attention to the development of a high-technology industrial complex within a Free Trade Zone near Colombo. Although a good number of foreign investors have been attracted it will take time until major effects on the national economy will be felt. Recent increases of oil prices have strongly impeded the overall development chances of the country which has no mineral energy sources. The present as well as previous governments

have committed themselves to the development of hydro-electric power. Present shortages show the necessity for further expansion as well as the search for other, regenerative energy sources.

Unemployment is high in Sri Lanka. Although no official figures are known, it may be more than 1 million. Each year about 100 000 new jobs would have to be created in order to give employment to all those young men and women who join the labour force.

When the UNP-Government of Junius Jayawardene followed the SLFP-Government of Mrs. S. Bandaranaike in 1977 the economy policy, which had been on a socialist course, was drastically changed. The national economy was largely liberalized, an impetus was given to the development of industry by programming the afore-mentioned Free Trade Zone, and plans for the Mahaweli Ganga Development Programme, which is to provide hydro-electric power as well as land and irrigation development, were essentially revised.

2. HISTORY OF THE MAHAWELI GANGA DEVELOPMENT PROJECT

The river Mahaweli Ganga, which flows over many hundred kilometers from the southern parts of the Sri Lanka mountains in northern and north-eastern direction into the Ocean south of Trincomale, is Sri Lanka's main river. Over centuries plans had been developed to make use of its potential to irrigate major parts of the dry zone in the northern half of the island. In fact, the first diversion of its waters was achieved during the reign of ancient Singhalese kings. Under Dhatusena (455-473 A. D.), the large Kalawewa reservoir complete with a 86 km canal had been built, and it is believed that the irrigation systems included the damming of the Mahaweli at Minipe. During the 19th and early 20th century, the colonial power took up the idea of a Mahaweli diversion a number of times. However, while some of the ancient irrigation works were restored during the colonial period detailed planning for the usage of the Mahaweli water resources did not start until after independence.

In 1968, a UNDP/FAO team submitted a so-called 'Master Plan' for the Mahaweli Ganga Development. It envisaged the development of 360 000 ha of irrigated land - including improved water supply for 98 000 ha already under irrigation - as well as the installment of a hydro-electric capacity of 507 megawatts (MW)[1]. The total project was to be completed within 30 years, from 1970 onwards. It would "extend over 39 % of Sri Lanka's total land area and 55 % of its dry zone"[2]. The Master Plan identified altogether 16 projects for irrigation development. Thirteen of these included also hydropower units. In order to increase the irrigation potential it was proposed to utilize not only

the water resources of the Mahaweli Ganga and its tributaries but also water from adjacent basins, especially the Maduru Oya and other basins on the eastern side of the island. Recent calculations have shown that the Mahaweli water would contribute 84 % of the total run-off of 9910 million m^3/year in the total project area.

The first stage of the project, the transbasin diversion from the Mahaweli Ganga at Polgolla near Kandy was commenced in 1972. With the construction of a dam and a tunnel of 8 km length the irrigation head works were completed in 1977. The Polgolla complex includes a power station at Bowatenna generating 40 MW of electric power. Stage II, comprising construction of irrigation canals and land settlement mainly in the Kala Oya basin south and south-west of Anuradhapura, the so-called Mahaweli H-system, started in 1974 and is to be completed in 1981. The Mahaweli H-area has a pilot function in the total Mahaweli scheme. The afore-mentioned irrigation works provided supplementary water to 52 630 ha of existing paddy lands and allowed irrigation of 28 300 ha of new lands. Between 1977 and spring 1980, 9 770 farm families have been settled, each of them being allotted 1 ha of irrigated land and 0.2 ha for a homestead. Another 13 800 ha on the Right Bank are being settled during 1980. Altogether, approx. 40 000 farm families (including 14 080 new settlers) will be settled in the H-area. In addition, a service population of 20 000 families is expected to find gainful employment in this first part of the total project.

3. PLANS FOR AN ACCELERATED PROGRAMME

In 1977, the new Government took a dramatic decision in shortening the project period considerably by setting up an "Accelerated Programme" (AP), in which major parts of the total project were to be completed within 5 years. Certainly this was a political decision aiming at increased domestic and foreign support for the Government. There were, however, not only political, but also economic reasons for a revision of the former plans. As outlined above, the food, energy and employment situation of the country made strongly increased efforts necessary: "By 1977 Sri Lanka's economy had ground to a virtual standstill ... large sections of the country's productive apparatus showed signs of deterioration through lack of adequate maintenance"[3]. The readiness of Western countries to assist Sri Lanka economically had become rather small.

There is no doubt that a success of the AP could relieve many of the urgent economic and social problems of the country. The fast development of new lands will help to decrease food imports and create permanent employment for

hundred thousands of people in areas which are thinly populated so far. The supply of hydro-electric power will for a long period satisfy the demand of industry, and at the same time enable the continuation of the rural electrification programme and decrease imports of scarce fuels. The strong demand for construction labour will further contribute to a decrease in unemployment and provide new skills within the construction sector.

By mid 1980, the intention to regain the support of the international assistance community has been highly successful. Several major international lending institutions, international organizations and many Western countries have indicated their readiness to assist through financial and technical cooperation. At present, feasibility studies are being prepared for some projects within the AP, in some cases final agreements have been reached and auspices are good that the international community will contribute largely to covering the immense costs of the programme.

4. OBJECTIONS RAISED

On the other hand, the AP has attracted some critique not only from the political opposition in Sri Lanka but also from independent experts. Most of the points made against the AP refer to the insufficient data base, lack of proper planning and shortage of financial and manpower resources. G. IRIYAGOLLE e.g., expressed his critique rather vehemently in a provocative publication widely discussed in Sri Lanka in 1979. According to him the UNDP/FAO Master Plan "... was an outline rather than a plan ... while the location and the dimensions of the major construction units were identified at reconnaisance level, the acreages to be developed were mere arithmetical figures allocated to each vast irrigation area. Neither the lands nor the proposed channel system ... within each area were even roughly located"[4]. The decision to go ahead with the AP was taken before feasibility studies for all projects had been submitted.

Another point seriously questioned by many observers are the assumptions for the balance between water supply and water requirements. According to IRIYAGOLLE the underestimation of water requirements will lead to a reduction of newly irrigated and developed land from 264 660 ha (Master Plan) to 143 300 ha (his figure).

Much concern has also been expressed about the financial burden of this project to the country. Detailed cost figures for the total project have never been given, most likely because it is not possible to make a sufficiently reliable overall calculation of costs as well as of benefits. Only in connection with the

ongoing feasibility studies for different parts of the AP a clearer picture is emerging. They show that the investment cost for the AP alone may be almost three times higher than the tentative cost estimate of 6,700 million Rs. for the total project made in 1968[5].

Some experts deplore the insufficient knowledge about the impact of irrigation of vast new areas on the water table and soil conditions in the dry zone. Due to the speeding up of project planning it was sometimes not possible to carry out detailed studies on the impact of damming large new reservoirs and on the suitability of soils for irrigated farming. It is feared that lack of care for this problem may lead to loss of much productive capacity in the long run.

Another question, which is puzzling even supporters of the programme, is that of finding a sufficient number of qualified manpower for implementation. A brain drain both of engineering expertise as well as of skilled workers to West Asia has been felt in Sri Lanka even before the start of most project components.

In addition, the administration is already overburdened with development tasks and the implementation of the AP will coincide with that of a number of other important development projects.

5. DETAILS OF THE ACCELERATED PROGRAMME (AP)

By the end of 1977, the World Bank agreed to assist the Government of Sri Lanka in financing an implementation strategy to review the Master Plan of 1968. A Dutch consultant firm, NEDECO, was commissioned to carry out this important study and submitted their main report in September 1979. Although the Government apparently has not accepted all conclusions drawn, the report forms at present the most authoritative source available. The following presentation is largely based on the NEDECO report, which concentrates on the AP and deals only briefly with those parts of the project to be implemented later on in the so-called NCP (North Central Province) area.

It was recognized that a completion of the total project, as outlined in the 1968 Master Plan, was absolutely impossible within the time horizon of 5 years. The intention is now to delimit the AP, apart from completion of system H, to the systems C, B, D 1, D 2 and A. The net irrigation area after completion of works in these areas (including H) will amount to 197 800 ha. The rest of the total project (systems E, F, G, I, J, K, L and M) with 155 100 ha would be taken up only after 1984. Three or four major dams and reservoirs, beginning with Kotmale and Victoria, will be under construction in the period 1980-1985[6].

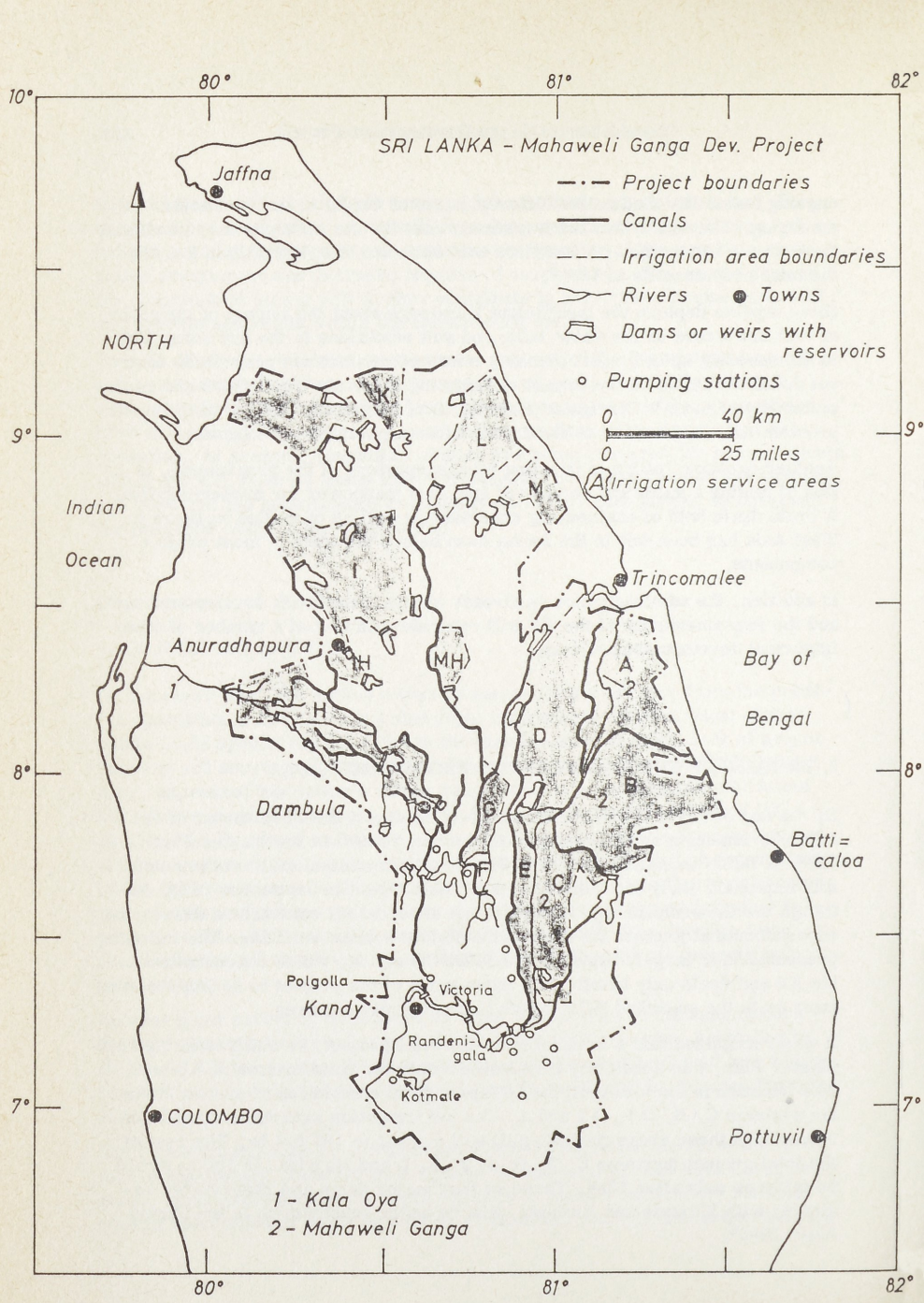
SRI LANKA – Mahaweli Ganga Dev. Project
Project boundaries
Canals
Irrigation area boundaries
Rivers
Towns
Dams or weirs with reservoirs
Pumping stations
0 40 km
0 25 miles
Irrigation service areas
NORTH
Jaffna
Indian Ocean
Anuradhapura
Trincomalee
Bay of Bengal
Dambula
Batti=caloa
Polgolla
Victoria
Kandy
Randeni-gala
Kotmale
COLOMBO
Pottuvil
1 – Kala Oya
2 – Mahaweli Ganga
80°
81°
82°
10°
9°
8°
7°

Table 1: Mahaweli Ganga Development: Net Irrigation Area per System (in ha)

System	Areas completed or presently under construction	New land and existing land[a]			Grand total
		new	existing	total	
A	0	30 500	5 700	36 200	36 200
B	0	47 800	2 700	50 500	50 500
C	0	21 400	0	21 400	21 400
D 1	25 500	11 300	0	11 300	36 800
D 2	7 700	3 700	0	3 700	11 400
E	6 100	0	0	0	6 100
F	0	3 300	200	3 500	3 500
G	1 900	2 600	0	2 600	4 500
H	41 500	0	0	0	41 500
I	3 700	35 500	17 400	52 900	56 600
J	0	19 900	2 900	22 800	22 800
K	0	7 900	200	8 100	8 100
L	0	30 900	8 100	39 000	39 000
M	3 200	10 100	1 200	11 300	14 500
Total	89 600	224 900	38 400	263 300	352 900

a) Existing land = present irrigation areas

Source: NEDECO, op. cit., p. 24.

It should be noted, then, that the NEDECO plan for an "Accelerated Programme" is not to be confused with the original Government AP of 1977. Table 1 gives an overview over the planned irrigation area. From these data, one can assume that, once all project components (H-area, AP, NCP area) are completed, up to 350 000 families could farm viable holdings.

A major aim of the project is, as indicated, the increase in the electric energy generation. NEDECO assumes a strong increase of the overall electricity demand in Sri Lanka, amounting to 10.5 % p.a. until 1985 and of 9 % thereafter. This should be met by the forthcoming installation of hydropower in the Kotmale, Victoria and Randenigala dams. The Kotmale dam, which has been under construction since 1979 and should be ready by the end of 1983, will yield a capacity of 112 MW. The Victoria dam, co-financed mainly by the British Government and under construction since 1980, will contribute 149 MW from 1984 onwards. The Randenigala dam and reservoir, to be co-financed by the Federal Republic of Germany, will be completed by 1988 and does not form part of the AP. It will contribute 79 MW. Another dam, scheduled at Moragahakanda for a later stage, will serve mainly irrigation purposes; its power benefits will be rather small (about 40 MW).

NEDECO confirms that the water supply for irrigation from the Kotmale and Victoria dams, together with water from Maduru Oya reservoir, will be sufficient for the totel AP[7]. The Kotmale reservoir will serve mainly the water requirements of systems H, D 1, D 2 and G. The Right Bank Canal, presently under construction will irrigate system C without major storage development. In system B, 16 000 ha can receive water from the Maduru Oya reservoir and another 20 000 ha of water from the natural river flow of the Mahaweli, together with a connection between Right Bank Canal and Maduru Oya. The Victoria reservoir, finally, will serve the remaining part of system B and of system A.

It remains to be seen whether the recent controversial discussion on the water supply gap will come to an end with NEDECO's findings. If the statement is accepted that the water supply programme outlined above will be sufficient for the total AP, the question still remains open for the NCP area. The irrigation water for the systems in the northern part of the island: I, M, L, J, K - this is the development sequence proposed by the NEDECO - will come mainly from 3 new reservoirs: Angamedilla, Rotalawela and Randenigala. Apparently, no clear results are available as to whether the total water supply will be sufficient for the Mahaweli project at large.

It is clear, however, that water transport costs for the NCP area will be much higher than for the AP, endangering critically the economic success of this part of the project. In addition, the NEDECO study is largely based on the 1968 Master Plan with regard to soil qualities and fertility. As long as detailed surveys of the latter do not exist, water requirement calculations contain speculative elements.

6. ECONOMIC ASPECTS OF THE PROJECT

Surprisingly little is known about the economics of the Mahaweli project, which is the largest development project ever undertaken in Sri Lanke. Even for larger countries a project of this size would mean a tremendous effort. It is clear that the island can cope with it only by mobilizing all domestic resources as well as calling for major external assistance.

The UNDP/FAO study of 1968 had estimated the total costs of the project at Rs. 6,700 mill. By 1977 it had become clear that the actual costs would be considerably higher. NEDECO has not published a total cost figure, but has given only the investment costs for the development of the AP, expressed in mid-1978 prices, at Rs. 18 billion (= US $ 1.11 billion). This figure does not include costs related to the service sector, such as investment in farm equipment; nor does it contain costs of operation and management. Also, the costs of the H-system and other completed project parts are not included. Originally the total figure for all components of the AP was to be Rs. 15 billion (in 1979), later revised to Rs. 18 billion[8].

NEDECO has also submitted cost-benefit calculations[9]. They arrived at an internal rate of return of about 10,7 % for the whole of the AP. If a discount rate of 10 %, as used officially in Sri Lanka, is applied, the net result (present value of 1980) is positive (Rs. 708 million). If a discount rate of 12 % is used - which NEDECO apparently takes to be more realistic -, the net result becomes negative (- Rs. 1 296 million). The consultants consider this, however, as acceptable, "this the more so as it is believed that foreign financial participation ... will especially be forthcoming on the basis of its main goals, i.e. the rapid provision of employment and an uplift for the rural areas with the main benefits of the programme reaching the poorer sections of the population"[10].

Cost-benefit calculations for the NCP area necessarily are speculative in view of the lack of well-based feasibility studies and the long time span until this part of the project will be completed. NEDECO[11] arrived at a much lower internal rate of return for the NCP area than for the AP area, namely of 7. 3 %. Whatever discount rate between 8 % and 14 % is applied, the total net benefit turns out to be negative. Using a discount rate of 10 % the total net benefit, expressed in present values of the first year of operations, amounts to -Rs. 3 023 million. In case of a discount rate of 12 %, the net benefit is in the range of -Rs. 4 307 million. This result shows the dubious economic value of the second part of the project. Only if higher agricultural returns could be reached than assumed in the feasibility studies and major progress was made in water management, the NCP area development would be justified economically.

The findings underline the importance of quickly reaching a high agricultural

productivity in the settlements. The experiences made in this field during the recent past are however not very encouraging. On the other hand, preconditions for success do exist, and it will depend largely on the readiness of the settlers for hard and efficient work and on the performance of agricultural support services in how far the Mahaweli project can become a success in strict economic terms.

7. QUANTITATIVE SETTLEMENT TARGETS

Considering the amount of consultancy work that has gone into the Mahaweli project, it is surprising that few exact figures are available with regard to the planned number of settlers. The fact that even after the start of the AP at least three "scenarios" are being discussed reflects the lack of in-depth knowledge with regard to the settlements potential.

The following is a summary of statements with regard to land area and settlement figures:

1968	master plan	360 000 ha and 500 000 families "benefitted" by 2 000 (350 000 farm families, 150 000 families service population)
1977	Government of Sri Lanka's original proposal for AP (cf. footnote 1)	120 000 ha and 840 000 people settled by 1984
1979	NEDECO Scenario for revised AP	40 000 ha and 250 000 people settled by 1984[12] 105 000 ha and 660 000 people settled by 1989[13]
1979	Mahaweli Development Board Scenario for revised AP	110 000 ha and 690 000 people settled by 1983
1979	Government Scenario for revised AP	105 000 ha and 660 000 people settled by 1985

The comparably cautious NEDECO projection starts with a development of 6 000 ha and 4 285 settlers in 1980, increasing the acreage from year to year up to 1989, when the annual development is put at 15 000 ha and 10 700 settlers. It should be noted that this target is to be achieved with a heavy foreign construction input: "On the basis of traditional local construction practices, it

will be hard to keep the downstream works moving at the pace achieved in the recent past (about 5 000 ha/year)"[14].

8. SETTLERS' ORIGIN

Apart from the quantitative side, the issue of who is going to settle in these areas seems to need great attention. Interestingly enough, the planned composition of the settlers however is not being stated in recent publications. Experiences from the H-area, which has been developed since 1974 and covers a total of 44 000 ha, help to pin-point some of the problems: Upon project completion, four main groups of farmers will have been settled: (1) farmers from the traditional purana villages of the area, (2) farmers from previous colonization schemes, (3) encroachers, i.e. "illegal" settlers, (4) legally settled farmers from outside the project area. A few words are to be said here on the four categories.

1. Purana Villages

The purana (= old, traditional) village system consists of a number of elements which make it well adjusted to dry-zone production conditions. Paddy fields are irrigated by the adjoining village tank with the residential area close by, all three forming a composite unit. Highland (= rainfed) lands and chena lands utilized under shifting cultivation are at some distance from the actual village area. It is obvious that for former purana villagers re-settlement constitutes a serious cesure in their social and economic system. The attachment to tradition is exemplified most clearly by the fact that villagers tend to choose their old plots once resettlement procedures start - regardless of land quality. On the other hand, redistribution ensures a minimum of viability for all holdings. Equal distribution of holdings introduces an equity element, which enables landless and small peasants to obtain land rights and credit on concessionary terms.

2. Colonization Villages

Colonization within the Mahaweli H-area started in 1946 in connection with the Kalawewa reservoir scheme. Three additional schemes followed until 1964. The population in these older schemes represents about one-third of the total population in the area (45 000 in 1972). Though recruitment for these

schemes had included a large number of families from purana villages, it is said that - besides constituting separate ecological and social units - the major difference to purana villages "... is the cosmopolitan character of the population of almost all the colonization schemes"[15].

Land allotment under previous schemes has decreased considerably over time. Starting in the 1940's with 2 ha of irrigable land plus 1.2 ha of non-irrigable land, it is now as low as 1 and 0.2 ha. Land distributed under settlement schemes may be inherited but not subdivided. This ensures viability of the holdings but at the same time forces children of settlers to find occupation outside the village or agriculture. Some of the settlers have considerable experience in land development, many of them were settled before completion of the actual irrigation infrastructure. Earlier, the government had attempted to keep settlement costs as low as possible - by making the construction of field channels a responsibility of the colonists. Experiences were, however, negative and today only homestead construction is left to the settlers.

3. Encroachment

Encroachment, meaning the spontaneous migration to and illegal occupation of state land, is a major problem in all settlements of Sri Lanka and will definitely be a problem in the areas of the Mahaweli scheme. It has been alleviated to some degree by a government decision to treat encroachers who have settled before June 1, 1970 on equal terms with villagers legally cultivating lands. The remaining group nevertheless is considerable. It constitutes, for example, about 9 % of the present farming population in the H-area.

Encroachers have little experience with the management of irrigation plots - excepting those who may have worked as agricultural labourers or as family labour - as they practice shifting cultivation on rainfeld land only. Little appears to be known about the social composition of this group, both of old and recent encroachers. In 1971, a survey by the Mahaweli Development Board showed that 24 % of all families in the H-area were encroachers; of these, 64 % came from outside the North Central Province[16]. Other observers maintain "... that a significant number of encroachers are the children of settlers who have begun pioneering on their own because of the inability of their parents' allotment to support them after they have grown up and started families of their own"[17].

The dilemma faced by the government is that of making a distinction between genuine (though illegal) settlers and land speculators who send encroachers to occupy land in the project area hoping to obtain valuable irrigation plots. Though in a 1972 feasibility study the authors had warned that "... the problem is severe ... [and will] ... seriously interfere with project activities",

it is only now - with the AP enhancing the scope for land speculation - that the issue has been taken up again by developing selection procedures which acknowledge the expertise and 'pioneering spirit' of potential settlers.

4. Selection of settlers from outside

It can be assumed that the demand for settlement holdings of people from outside the settlement areas will largely surpass the supply of new lands. The main reason is that the income a settler can expect will be above the average agricultural incomes in Sri Lanka. In view of the strong interest of villagers, from dry and wet zones as well, to get a holding in one of the Mahaweli areas the governmental authorities can apply rather strict criteria in order to get well qualified settlers. The selection is, on principle, based on the experiences made in other settlement projects in Sri Lanka. It applies a detailed points system, with the highest weight being given to agricultural experience. Other criteria are: age, marital status, family size, other professional experience.

In view of the imperative economic necessity to quickly reach a high agricultural productivity, the agricultural competence is rightly regarded as most important. There are, of course, difficulties to judge this capability, and even confirmations of authorities from the home places of applicants may not always be helpful to get a clear picture. Moreover, the respective members of parliament have a major influence on the selection, beside the agricultural authorities, which means that party membership can be more important than professional qualification.

Part of the settlers will come from densely populated areas of the wet zone, another part from places in the dry zone near to the new settlement. The respective quotas are fixed before the selection starts. In order not to interrupt completely the existing social ties, settlers originating from the same locality are settled neighbouring each other.

9. SETTLEMENT PROCEDURES

All privately owned lands - including homesteads - within the Mahaweli Development Project areas are acquired by the government against compensation and redistributed once the irrigation infrastructure has been eompleted. Previous inhabitants of the area are given first choice in selecting their new plots. The plot size for the H-area has been 1 ha in one unit of irrigated

lowland and 0.2 ha for the homestead. About 20 farmers are grouped together around one irrigation 'turnout', i.e. the water outlet of the field channel. Homesteads are located on elevations which cannot be irrigated (seldomly in the form of coherent villages), and the distances from the farmhouse to the paddy field are thus often quite long.

The compensation paid to former landowners was set in 1975 at Rs. 740 per ha of paddy land, Rs. 494 per ha of upland, with the homestead being assessed individually. In return, the settler has to pay an overall Rs. 8 880 for his 1.2 ha farm (1977 prices), which has been calculated as follows:

1 ha of farmland plus 0.2 ha of homestead plot[18]

Value of undeveloped land	600 Rs.
Jungle clearing and stumping	2 500 Rs.
Levelling and farm layout	1 300 Rs.
Field channels	3 800 Rs.
Special assistance (building material, seeds, tools, money allowance)	680 Rs.
Total	8 880 Rs.

The lot may be purchased either by paying the full price or in equal installments over a 20 year period with 4 % interest p.a. Controversies over the size of plots have never ceased. With the allotted land decreasing steadily during the history of settlement in Sri Lanka, the 1.2 ha farm of the H-area constitutes a rather low limit. Recent discussion - especially the 'rediscovery' of draft animals as an alternative to two- and four-wheel tractors - has resulted in plans to increase at least homestead plots to 0.4 ha in other areas, yet this does not constitute a definite solution to the fodder problem.

10. LAND USE PATTERN

The government's general emphasis on paddy production (expressed also in the preferential price policy for paddy) coincides with the preference of all farmers for this crop. As far as water is available, settlers grow paddy on irrigated land in both seasons (Maha = major = wet season and Yala = minor = dry season). Paddy will remain the main crop on irrigated land also in the new settlements, whereas minor crops, vegetables and fruits are grown on the homestead plots.

Recently, the government has started to promote crop diversification also on

irrigated lands. National agricultural targets demand the cultivation of more "subsidiary food crops" such as pulses, onions, chillies and vegetables. The Mahaweli scheme is expected to contribute largely towards such plans. Moreover, not all lowland soils in the settlement areas are typical paddy soils. For instance, 40 % of the new irrigated lands in the H-area are well drained Reddish Brown Earth soils, which are better suited for upland crops than for paddy. Due to the high permeability of these RBE-soils, paddy cultivation requires much more water than upland crops. This is felt especially during Yala season when water is scarce. Efforts to convince the settlers to change over to cultivation of other crops than paddy have, so far, been rather unsuccessful. The targets could only be reached by a different agricultural extension strategy and changes in the price and market policy.

Other problems are posed by the fact that no place is left within the allotted holdings for keeping big animals as farm power or for milk and meat production. The homestead land is far too small to provide sufficient fodder for a pair of buffaloes, nor would it be economic to set irrigated land apart for forage production. There are, therefore, several reasons for reviewing the farm power problem of the settlement schemes. It may not be feasible to prepare all the land for cultivation by human labour. Hoe-ploughing is very hard work and hired labour has become expensive recently. Several well-to-do settlers own four- or two-wheel tractors, which they hire out to other settlers. Due to the increasing fuel prices contract-ploughing by tractors is, however, becoming more and more costly. Buffalo-ploughing has therefore improved its competitive position, but it is provided for largely by contractors who come from outside the projects and may exert an unwelcome external economic influence. In planning new settlement projects it should therefore be considered to make settlers more independent with respect to farm power.

11. CONCLUDING REMARKS

For a country of the size and development level of Sri Lanka, the Mahaweli Ganga Development scheme represents a century work. Considering the major development problems, as food supply, unemployment , energy, the concentration on this project appears to be justified. Also, the much criticized acceleration of project implementation by the present government seems to be strongly indicated.

It has, however, become very clear that the promises of 1977 to complete the Mahaweli project within 5 years is far from being kept. Even the "Accelerated Programme" (which covers only part of the total scheme and is on the whole the economically more promising part) will not be completed before 1986.

However, success or failure should not be judged in terms of the time dimension alone. The project will be carried out, and there is good reason to assume that its major objectives can be reached. The basic question, in our opinion, is: how efficient will the project implementation be and how can irreversible damage, for example with respect to ecological aspects, be avoided?

It must also be asked whether it would not have been better to start several small development projects instead of this gigantic work. Inevitably, the Mahaweli Ganga project will strain the scarce personnel and material resources of Sri Lanka to the utmost and consume a major proportion of the external assistance. Already now, in the starting phase, complaints can be heard that other development activities are being neglected, and this problem will become more serious as soon as full implementation starts. Another important aspect is that some regions of the island which cannot benefit from the project will fall back in their relative development position.

The major practical difficulties may not be in financing and constructing dams and reservoirs but in the downstream development. As indicated in the NEDECO-study, the economic viability of the project will largely depend on speedy settlement and on the level of agricultural productivity reached in the first years after settlement. If one considers that the maximum number of families ever settled in Sri Lanka per year was 5 000 and that within the Mahaweli project a yearly settlement is scheduled increasing from 6 000 to 10 000 settlers one has some reasons for scepticism.

The agricultural productivity level will depend not only on skill and readiness for hard work of settlers but also on an efficient agricultural service system and on economical water management. Regarding both these aspects weaknesses are already apparent at present. Agricultural research is not sufficiently broad-based to cope with the many problems coming up during a dynamic development process. Efforts to improve the extension and credit services have led only to limited success. The performance of the government controlled cooperative marketing services has been rather unimpressive. As in most other Asian countries, in Sri Lanka the government is also meeting major difficulties to convince the farmers that irrigation water must and can be used much more economically. Efforts to reduce the excessive water utilization in irrigated settlement projects have largely failed.

The Sri Lanka Government has, above all expectations, succeeded in attracting bi- and multilateral foreign assistance for the Mahaweli Ganga scheme. The project is of the type which mobilizes easily foreign resources. However, it will depend on the project development in the very next years whether this readiness for assistance will continue over the project implementation period.

Notes:

1) Mahaweli Development Board, Mahaweli Ganga Development, Sri Lanka. Summary Report on Projects, Colombo, November 1977, p. 1 (in the following quoted as SRP).

2) D. V. W. Abeygunawardene, Employment and Output in the Mahaweli Settlements. Paper presented at the Seminar "Employment Resource Mobilization and Basic Needs through Local Level Planning", May 15-18, 1979, A. R. T. I., Colombo, p. 2.

3) Ministry of Mahaweli Development / Netherlands Engineering Consultants (NEDECO), Mahaweli Ganga Development Programme Implementation Strategy Study (mimeogr.), September 1979, p. 15 (in the following quoted as NEDECO).

4) Gamini Iriyagolle, The Truth about Mahaweli, Nugegoda, 1978, p. 1.

5) NEDECO, p. 8.

6) ibid., p. 43.

7) ibid., p. 3.

8) ibid., p. 8, and SRP, Message from the Prime Minister. - For an assessment of the size of costs of the A. P. it may be mentioned that the total expenses in the 1977 budget of the Government of Sri Lanka amounted to Rs. 8,2 billion, of which Rs. 550 million were spent on agriculture and irrigation. - Source: Statistisches Bundesamt, Länderkurzbericht, Sri Lanka 1979, Stuttgart, 1979, p. 28.

9) NEDECO, p. 55.

10) ibid., p. 7.

11) ibid., p. 60 ff.

12) 1.4 families per ha, including service population, NEDECO, p. 48.

13) 6.25 members per family, according to NEDECO proposal; last two scenarios as quoted by NEDECO, p. 51.

14) NEDECO, p. 43. MDB is apparently contemplating to keep down anticipated costs by asking the future settlers to participate in the construction work beyond the branch canals.

15) SOGREAH, Mahaweli Ganga Development Feasibility Study for Stage II, Vol. VII - Settlement Planning and Development (mimeogr.), Colombo, 1972, p. 6.

16) ibid., p. 13.

17) Thayer Scudder, Evaluatory Report on Mission to Sri Lankan Settlement Projects: A Discussion of Some Basic Issues (mimeogr.), May 1979, p. 27 (data on the basis of oral information).

18) World Bank, Sri Lanka: Appraisal of Mahaweli Ganga Development Project II, Washington, March 1977, p. 118.