

AGRICULTURAL SETTLEMENT UNDER THE MAHAWELI PROGRAMME IN SRI LANKA

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INTRODUCTION

The Sri Lankan public service has more than half a century of experience of combined land colonisation and irrigation development projects in the Dry Zone. A considerable fund of expertise has been built up. Most of the policy issues raised below have been widely debated within the country, and in some cases alternative methods and procedures have been tested. It follows that the scope for doing things better is not always as large as it appears at first sight. A great deal of effort could be wasted in ignoring both the lessons of experience and the narrow constraints imposed by political circumstances. It has been the authors' intention to provide a summary of the issues and a realistic assessment of both the degree of need and the prospects for policy changes in the subject areas discussed.

1. BACKGROUND AND OBJECTIVES

Sri Lanka's population is heavily concentrated in the southwestern corner of the Island known as the Wet Zone.¹ This has been the case for some centuries, and was exacerbated by the location in the same area of the tea, rubber and coconut plantations which formed the basis of the Island's relative material prosperity in the earlier decades of this century. In the 1930s the state began in earnest large-scale irrigation development in the Dry Zone. The near-conquest of malaria in the late 1940s provided a major boost to this process.

The main initial motive for promoting colonisation, was the perceived social and political costs of growing rural landlessness in the Wet Zone. The attempt to reduce heavy dependence on imported rice was also a motive, but not dominant. The repopulation of the historic heartland of Sinhalese civilisation was and remains a prominent ideological theme.²

In the 1960s, Sri Lanka entered a period of permanent chronic balance of payments and unemployment problems. Increasing attention was given to boosting the disappointing economic returns from Dry Zone colonisation schemes, but this has not been very successful,

largely because of the poor use of irrigation water detailed below.

There has been over the years a gradual shift in the physical nature of new projects and the purposes for which they were built. The earlier projects were purely irrigation/colonisation projects. Physically they were relatively small - irrigating less than 8000 hectares - and self-contained, characteristically comprising an earth barrier ('bund') across a natural watercourse and the storage of water in the artificial lake ('tank') so created. Most involved the reconstruction of projects built by the Sinhalese kings more than a thousand years before. The two major projects which preceded the Mahaweli project - the Gal Oya and Uda Walawe projects - were however larger than anything attempted before, built on virgin sites and, above all, intended both for power generation and irrigation purposes. It is relevant to later discussion that, as irrigation projects, they have both performed extremely poorly and yielded very low returns on investment. Large areas receive no irrigation water at all. The more recent of the two, the Uda Walawe project, was scheduled to irrigate 33,000 hectares, but is in fact only irrigating about 7,000 hectares. It is officially still unfinished, but the lack of water has meant that further land development has proceeded very slowly.

The current Mahaweli project represents an accentuation of earlier trends in two senses. In the first place it is primarily concerned with power generation, in the sense that the dams (especially Kotmale and Victoria) have been given priority and represent the soundest element of the total package in terms of the benefit-cost ratio.³ In the second place it aims to irrigate very large acreages. Here different sources of figures can be very confusing, because the term 'the Mahaweli project' is used in a wide variety of ways. In its broadest sense the term refers to a network of power and irrigation projects all involving the use of the water flowing in Sri Lanka's main river, the Mahaweli. Elements of the total programme envisaged have however already been completed or are under construction. Having promised in 1977 to complete the whole of the outstanding programme in six

rather than thirty years, the Sri Lankan government has continually scaled down its targets to levels more feasible in economic and physical terms. The original UNDP/FAO Master Plan (1965-68) envisaged providing new or more reliable irrigation for 365,000 hectares - nearly 6% of Sri Lanka's land area. Work on 90,000 hectares is completed or under construction. It is unlikely, given continual downward revisions in targets, that this figure will be dramatically raised in the next five years.

The distinctive physical feature of the Mahaweli project is that it involves the linking of a number of water basins by canal and tunnel and the transshipment of water for irrigation purposes over long distances. The headworks are mainly in the hills some distance from the area of irrigation and settlement.

2. SETTLERS

a. Place of Origin⁴

The original purpose of Dry Zone settlement was the relief of Wet Zone landlessness. In those days the Dry Zone was very sparsely populated and unused land freely available. The situation has however changed considerably. The Dry Zone has become a much more attractive place since the apparent conquest of malaria some twenty years ago - until its recent resurgence ! - and with the provision of public transport, education and health services and other facilities. A second or even third generation lives on the earlier colonisation schemes, and there has been considerable independent individual settlement in undeveloped areas. There are powerful demands for allotments on new settlement schemes from two categories of Dry Zone residents:-

(i) Those already resident in the project area. Their numbers have been enhanced by deliberate anticipatory encroachment in project areas once details of future development plans become known.

(ii) Allottees on existing Dry Zone schemes, who complain about what is generally known as the 'second generation problem' - the fact that allotments are allegedly too small to divide

among sons.

Even before the above two categories those people physically displaced from their homes by the Kotmale and Victoria dams have priority in land allocations in the Mahaweli scheme.

No classification of the actual or anticipated allottees by place of origin is available. It is however likely that at best only a small proportion will come from the Wet Zone. The reasons are political and pressing. The result is however unfortunate from the point of view of both the national economy and the Wet Zone landless. For the general characterisation of the Wet Zone as a densely populated/intensive agriculture/low agricultural wage area and the Dry Zone as a lightly populated/extensive agriculture/high wage area remains valid. The amount of extra output generated by additional labour (and complementary inputs such as draft power and fertiliser) is much higher in the Dry Zone than in the Wet Zone. A net transfer of labour to the Dry Zone should both help to boost Wet Zone wage rates and, more importantly, increase the total availability and use of labour in Dry Zone agriculture and increase agricultural output. It is thus in the national economic interest that the population of the older settlement schemes, most of them recipients of relatively large holdings - originally five acres of rice land and three of non-irrigated 'highland' - be encouraged to sub-divide their holdings among children and adopt labour-using and output-increasing production practices such as transplanting and weeding.

b. Individual Characteristics

Most settlers on the original schemes appear to have been genuinely landless, partly because the Dry Zone was then so unpleasant that few other people could be persuaded to go or remain there. There have however been persistent criticisms that the persons chosen did not make good farmers. The increasing emphasis on obtaining an economic return from investment has led to the establishment of a formal 'points system' to assist in settler selection. The system attaches high priority to such factors as: agricultural experience; formal agricultural training; educational attainment; and participation in local

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organisations. There is no evidence that these criteria actually select good farmers, while it is clear that they almost completely exclude the 'bottom 40%' of village populations - the barely-literate landless labourers concerned to obtain a living on a day-to-day basis.⁵ A further complication is that Members of Parliament now play a major role in choosing among applicants for allotments. It is likely that their preferences in large part overrule any 'points system', although their choices too are almost certainly biased towards the less poor political activists.

Mahaweli settlers are recipients of large subsidies which, if not paid from foreign grants, are ultimately borne, via heavy taxes on tea exports, by the very poor tea estate labourers. These subsidies are not generally going to the poorest, although, equally, they do not benefit the rich. In general, it is the 'middling' rural strata who benefit.

THERE ARE REASONS TO BE CONCERNED ABOUT THE WAY SETTLERS ARE SELECTED. AT THE SAME TIME, PROSPECTS FOR EFFECTING ANY CHANGE ARE NOT GOOD.

3. THE SETTLEMENT PROCESS

The extent to which settlers are provided on arrival with already-constructed houses and wells and already-levelled and developed land has always been a matter of balancing two main sets of imperatives: the desire to provide settlers with a 'good start' in order that they do not fall into disillusion, debt, etc; and pressures to minimise costs. There have been continual shifts in policy over the years, particularly with regard to the extent to which settlers have to clear, level and develop their own land. The provision of a house has remained standard policy. The current phase of the Mahaweli scheme is characterised both by a sense of urgency and a new spirit of experimentation induced by the involvement of so many expatriates and external aid donors. In preparing for the arrival of settlers practice appears both flexible and continually changing.

There is some evidence that haste is leading to poor coordination

of arrangements to receive new settlers, and unnecessary suffering and stress.

4. THE PHYSICAL DESIGN OF SETTLEMENT SCHEMES

a. Location of houses

An issue which has exercised the minds of many observers is whether settlers' houses should be scattered and located as near paddy fields as possible, as on existing schemes, or whether they should be nucleated in some way. The proponents of nucleation argue (i) that this will help induce a sense of 'community' and social involvement which seems to have been so conspicuously lacking on existing schemes and (ii) that this is the only way in which it will become economically possible to provide settlers with electricity and separate domestic water supplies (see below). On the other hand, those concerned with the efficiency of agricultural and irrigation management stress the need for the farmer to live as near to his paddy land as possible, especially if continuous rotations of irrigation water are to be practised. There is no evidence that settlers on existing schemes feel the lack of 'community involvement' which worries outside observers. The extent to which these alternative emphases can be accommodated depends in part on local topography in the settlement areas. A general policy decision has been taken in favour of nucleated units in future settlements areas, and controlled experiments with different arrangements are underway in the 'H' area of the Mahaweli Project.⁵

b. 'Tops and tails'

Although allottees start with equal land allotments and relative economic equality, considerable inequalities quickly develop. One cause lies in spatial factors. One aspect of the enormous range of difficulties faced in irrigation water management (see below) is that those with land at the heads of irrigation channels ('top-enders') receive much more abundant and reliable supplies of water than those at the ends ('tail-enders'). This is a problem in many countries apart from Sri Lanka and cannot easily be solved. The economic inequality to which it gives rise is exacerbated by

the physical location of roads and public offices on settlement schemes. These are typically at or near the top end of the main canal. This then leads to a number of vicious circles for 'tail-enders'. 'Top-enders' are much closer to public offices and in closer contact with government officers. They find it easier to obtain publicly-provided scarce resources such as fertilisers and credit, and easier to get their particular problems with regard to irrigation water solved. Government officials buy or rent rice land at the 'top-end' near their offices and homes, and thus have a vested interest in ensuring that the top end gets priority in the distribution of water. Tractor owners plough and thresh for 'top-enders' first because their land is closer and the roads are better. Visitors see only the 'top-ends', and so do not appreciate the problems of 'tail-enders'.

THIS PROBLEM COULD BE CONSIDERABLY ALLEVIATED IN NEW SCHEMES BY LOCATING MAIN ROADS AND PUBLIC OFFICES AT 'TAIL-ENDS'.

5. IRRIGATION

THERE IS NO DOUBT THAT IRRIGATION AND WATER MANAGEMENT CONSTITUTES THE SINGLE MOST IMPORTANT PROBLEM FOR MAHAWELI.

The technical and economic feasibility of Mahaweli depends on attaining much more efficient use of water than on existing schemes. Previous attempts to improve efficiency on other schemes have failed. Rates of irrigation water use vary considerably, but are generally between three and six metres per year over the irrigated area (as measured by issues from the storage reservoir). The major recent feasibility study of Mahaweli (the NEDECO Report), indicates that this will have to be reduced to an average of $2\frac{1}{4}$ metres per year if there is to be adequate water to irrigate the planned acreage.⁷ The achievement of this target depends crucially on persuading farmers to grow large acreages of crops which require less water than rice. A separate network of irrigation channels to non-rice areas is likely to be provided for this purpose.

The issues associated with irrigation and water management are difficult and both technical and political. An introduction to those currently relevant to Mahaweli is provided in an attached paper.⁸ It is possible here only to summarise the main points:

- (i) There is in a technical sense an enormous scope for improving water management. The rates of use quoted above are in anyone's terms excessive for an environment in which the average annual rainfall is generally between 130 and 200 centimetres. Experimental projects demonstrate this.
- (ii) Although the causes of poor water management are complex and difficult to solve, there seems little doubt that they lie to an important degree within that section of the public service responsible for operating irrigation systems.⁹ Among the more obvious problems are: lack of adaptation of practices and procedures evolved in past decades (and in part in the last century) to contemporary conditions; the placing of irrigation projects in the charge of professional civil engineers with scarcely any training or interest in irrigation and agriculture, and no prospect of remaining for long on water management duties; the very temporary nature of the postings of engineers to irrigation projects, and their general preference for being in Colombo; the lack of recognition or exploitation of the skills and abilities of the subordinate irrigation staff who are attached to projects for years at a time and who in practice manage them on a day-to-day basis.
- (iii) The considerable criticisms of water management practices which has been voiced in the past has led to more attention being focused on this issue in Mahaweli than in previous developments. The most evident result is a more dense administrative framework. There are three parallel lines of field level administration in the Mahaweli areas, covering agriculture, community development and irrigation respectively. However, more

fundamental issues have not been tackled, and experience to date with water management on the newly-settled 'H' area of Mahaweli is not very encouraging.

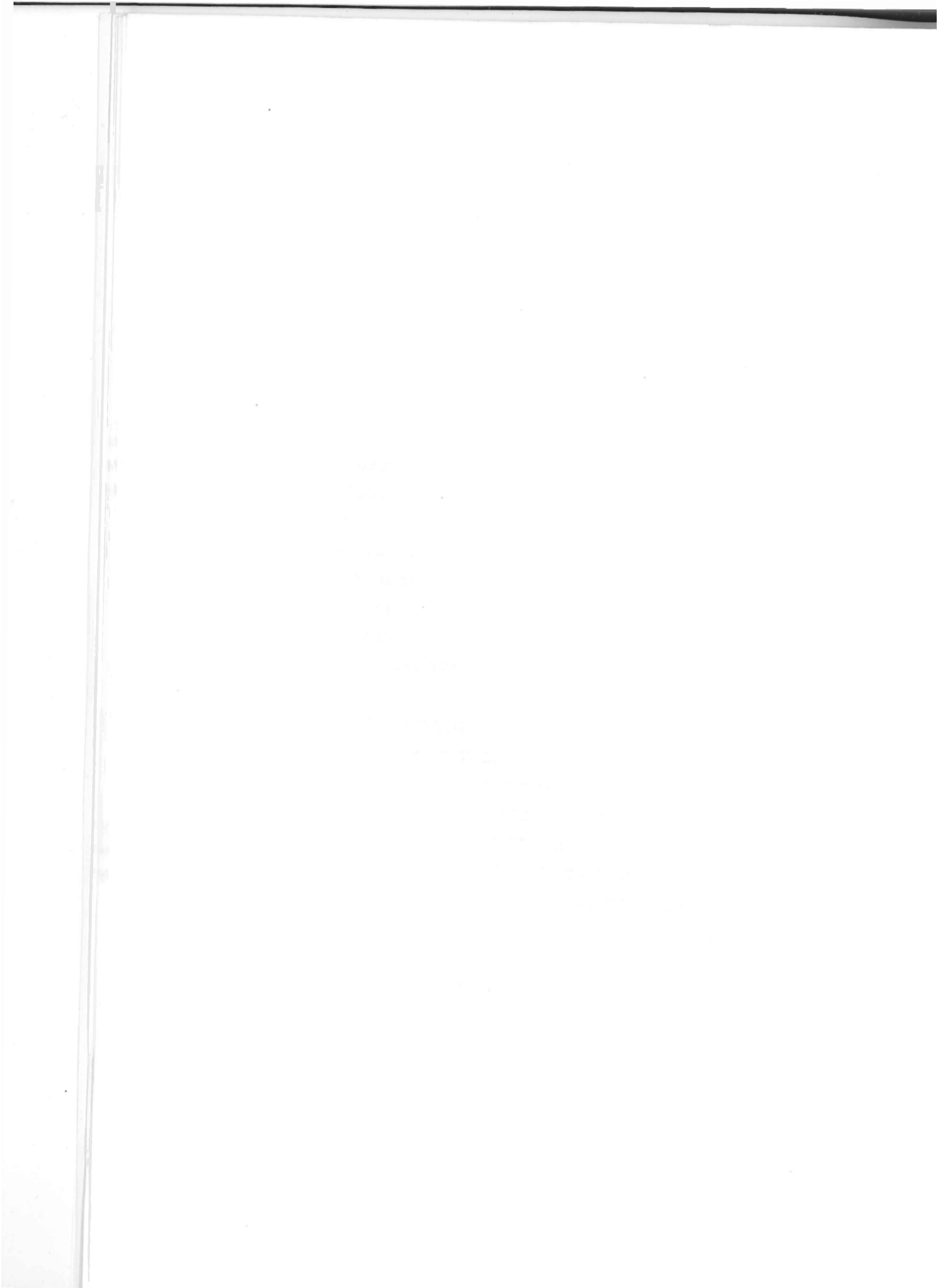
- (iv) The main single response to water management is to establish 'farmer groups' of various kinds at different levels. The influence of the fashion in development circles for 'participation' is strong here. While there is some scope and need for farmer participation, this is necessarily limited when one is dealing with a resource like water which is scarce, easy to steal difficult to control. 'Participation' must take place within a context of clear and enforced procedures for the management of total systems. Past experience in Sri Lanka of farmer group involvement in water management is not encouraging. Currently in Sri Lanka the idea of participation in water management is unlikely to be very successful, and may even be counter-productive, unless combined with more urgent complementary reforms of the total management system. In the first place, the considerable activity put into setting up farmer groups probably diverts attention from more basic problems. In the second place, the idea seems to support the erroneous but convenient view widespread among irrigation staff that it is largely farmers who are to blame for poor water management, and that solutions must therefore be found at the level of farmer behaviour, rather than at the level of irrigation system management.
- (v) External engineers have considerable doubts about the wisdom of aspects of the design of irrigation systems in Sri Lanka. In particular, the practice of having no intermediate storage between the main storage reservoir/canal and the farmer's field is widely questioned.¹⁰
- (vi) One of the most basic problems is likely to be as intractable in Mahaweli as in existing schemes. Top end farmers receive abundant water in the early stages of

development. Typically, headworks and the upper reaches of canals are complete before the tail end is settled and needs water. Top end farmers and staff become accustomed to almost unlimited water issues, and farmers flood their fields and grow paddy. Often flooding takes place on porous upland soils with heavy percolation losses. The expectations and habits developed at this stage by both staff and farmers make it difficult subsequently to issue less water and change to less thirsty, and more suitable but managerially more difficult crops. In consequence, less water is available for the tail end than planned, and there is a shortfall in the area irrigated. Parts of the H are of Mahaweli already appear locked into this syndrome. To break it is difficult. The problem is competition for water. Any effective solution probably requires two components: political, through representing the interests of tailenders in decision-making about water allocations; and managerial, in tightening discipline and effectiveness in the irrigation organisation.

EXAGGERATED HOPES ABOUT FUTURE IMPROVEMENTS IN WATER USE HAVE BEEN A FEATURE OF ALL RECENT MAJOR IRRIGATION SCHEMES. IT IS UNLIKELY THAT THE LEVELS OF WATER USE EFFICIENCY REQUIRED ON MAHAWELI WILL BE ATTAINED WITHOUT RADICAL CHANGES IN OPERATION AND MANAGEMENT NOT YET IN PROSPECT. IN THAT EVENT THE LEAST DAMAGING OUTCOME WOULD BE A CURTAILEMENT OF THE PLANS FOR SETTLEMENT AND A REDUCTION IN THE ECONOMIC RETURNS. A WORSE OUTCOME WOULD BE FOR LARGE NUMBERS OF PEOPLE TO BE SETTLED IN AREAS WHICH RARELY OR NEVER RECEIVED IRRIGATION WATER.¹¹

6. CROP PRODUCTION

It is intended to grow crops other than rice over a large fraction of the Mahaweli area. The most urgent reason for doing this is to reduce irrigation water requirements. There is still considerable scope for expanding production of grains, mainly rice, to



substitute for wheat imports. Sri Lanka was historically heavily dependent on imported rice. Gradual progress is being made towards self-sufficiency in rice, and the target may well be attained in the next few years. However, the contribution of imported wheat flour to the total cereal intake has increased steadily in the last two decades, and imported wheat now accounts for about a quarter of total cereal consumption. There is considerable scope for the expansion of local rice production to substitute for this.

Whether or not Mahaweli settlers can be persuaded to grow pulses, vegetables, sugarcane, soya beans, oil seeds, onions, etc., instead of rice depends above all on their relative profitability. This is almost completely determined by government policy, above all by the extent to which it permits, through exchange rate and trade policies, the import of competing foreign produce. Between 1968 and 1977 production of many of these non-rice crops grew rapidly because imports were severely restricted and producer prices remunerative. Since the present government liberalised foreign trade in 1977, imports have severely cut the profitability and level of local production. The present government has taken steps to extend the system of guaranteed agricultural prices to non-rice crops and develop agro-processing industries in the Mahaweli area. It remains to be seen whether further support for the prices on non-rice crops will become necessary and whether a reliable marketing system can be created and maintained.

7. ADMINISTRATION

a. Management Structure

It is the normal practice in Sri Lanka for areas under new settlement schemes to be directly administered by the development agency during the period of construction and settlement, and then to revert to normal administrative status. While the authors are not aware of any explicit policy statement on this subject in relation to Mahaweli, it would seem to be the intention for the Mahaweli Authority to maintain very wide-ranging administrative

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control of the project areas for a considerable period of time. More attention has been paid to establishing a permanent field administration network than has been the case in other projects. The three parallel lines of authority covering agriculture, community development and water management, are much fewer than in areas under ordinary administration. However one view is that three lines are too many, and that a unitary management structure is required at the local level.¹² Whether the advantages of such a change would outweigh the inevitable costs is a question which only experience could answer.

b. Staffing

On existing Dry Zone settlement schemes, there is a persistent problem that skilled and experienced people of all kinds, especially, but not only, in the public service, dislike to work and live there. They prefer the areas of the Wet Zone, especially Colombo, where so many have their families, and where life is better in almost every sense. Public servants posted to the Dry Zone very often leave their families elsewhere, strive for transfer to a more congenial spot, and try to spend as much time as possible at home. Special incentives are not given to compensate for the disadvantages of Dry Zone postings. It is not clear how far the additional facilities and 'life' associated with Mahaweli development will offset the disadvantages of the Dry Zone.

8. LIVELIHOODS AND WELFARE

The social consequences of existing settlement schemes have often seemed disappointing both to outside observers and to many of the settlers themselves. Some of the main concerns are:

a. Social inequality

Apart from differences in the assets which they bring with them, settlers start off on equal terms with the same amount of land.¹³ In the early settlement schemes this was five acres of irrigated paddy land and three acres of highland per family.¹⁴ This has been progressively reduced over the years as new land has become more scarce. The allocation for Mahaweli settlers is two and a half acres of irrigated land and half an acre of highland. In-

equalities, however, quickly develop. Apart from what might be described as 'inevitable' causes of inequality, there seem to be two which operate in particular on settlement schemes. The first is the disadvantageous position of 'tailender' discussed above. The second is the almost complete dependence of the settler population on agriculture, and lack of alternative employment. Crop failure can easily drive an allottee into a vicious spiral of debt and mortgaging land. Although the sub-division, renting and mortgaging of allotments is illegal, it is in practice - and quite sensibly - tolerated. Within a few years of settlement a substantial fraction of land seems to be cultivated by someone other than the allottee. The provision of non-agricultural employment should help alleviate this and other problems associated with the 'economic imbalance' of the settlement areas. The present government appears well aware of this issue, although it is not clear how far they are likely to be able to solve it. The settlement areas are relatively remote from ports and large population concentrations. Paddy cultivation generates relatively little demand for ancillary services such as processing, transport, retailing, etc.

b. Exploitation

The most notorious figures on some of the older settlement schemes are tractor owners who have gradually built up their power and assets such that they cultivate large holdings, amounting at least to dozens of acres. They are, however, especially prominent in areas where land is relatively abundant - mortgages may be obtained easily and non-irrigated state land ploughed up (illegally) for rain-fed cultivation. These opportunities will be fewer in the Mahaweli areas because of the small allotments, dense populations, and the apparent trend in favour of small two-wheeled tractors as a result of the increasing cost of purchasing four-wheelers. Measures to make use of buffaloes more attractive than tractors still remain very desirable. They have often been talked of, but little action has been taken.

c. The 'second generation problem'

Second generation settlers on existing schemes may feel that they have a right to additional allotments to accommodate growing numbers. This problem may be even more acute under Mahaweli because of the small size of allotments. THE NATIONAL ECONOMIC INTEREST HOWEVER REQUIRES THAT THE DEMANDS OF SECOND GENERATION SETTLERS NOT BE HEEDDED, AND THAT THEY BE ENCOURAGED TO DIVIDE THE LAND THEY HAVE AND FARM IT MORE INTENSIVELY.

d. Landless labour

Dry Zone allotments are not 'family farms' in the strict sense of the term. Almost all farmers, even those growing only two or three acres of rice, require additional hired labour in peak seasons. This requirement is considerable if they transplant paddy to increase yields, and will be even higher for many of the non-rice crops planned for the Mahaweli area. At present there is considerable seasonal migration of agricultural labour both between different parts of the Dry Zone and from Wet to Dry Zones. No attempt is made to accommodate landless labourers on settlement schemes. They are not, for example, provided with house sites. Yet if the planned cropping pattern is achieved, much more hired labour will be required than is either used at present or anticipated officially.¹⁵

THE PROVISION OF HOUSING AND SMALL VEGETABLE PLOTS FOR LABOURERS WOULD HELP MEET THE NEED FOR ADDITIONAL LABOUR AND FREE THEM FROM DEPENDENCE ON EMPLOYERS FOR FOOD AND SHELTER.

e. Drinking Water

Provision of drinking water supplies - and domestic water more generally - is not good on existing schemes. Settlers depend heavily for both on canal water, at an obvious cost in ill-health. The government seems to recognise this difficult problem. It has also been ^{given} priority in the recent report on the Environmental Impact of the Mahaweli Scheme. There are, however, doubts as to whether the planned piped system represents a cost-effective way of providing clean drinking water.

THE DRINKING WATER PROBLEM IS URGENT, BOTH ON NEW AND EXISTING SCHEMES.

9. COSTS AND BENEFITS

There appears to be little doubt about the economic feasibility of the power generation aspects of the Mahaweli project, especially the Kotmale and Victoria dams. However, assessment of the emigration and settlement aspects is not easy. Even before examining the economic feasibility analyses which have been conducted there are two important points to consider:

- (i) There are good reasons for believing that many of the economic resources invested in Mahaweli could be better used in (a) rehabilitating existing irrigation schemes; and (b) in promoting agricultural production in the densely-populated Wet Zone, especially through small-scale irrigation and drainage and crop breeding. The counter to this argument is that it is administratively and politically easier to start on something new.
- (ii) The results of any economic appraisal will depend heavily on the monetary value attributed to future production of rice and other food. Yet future world market food prices can only be guessed at, and there is a wide range of views as to the premium Sri Lanka ought to be prepared to pay for the relative security of self-sufficiency in cereals rather than dependence on imports.

There are three main ways in which the benefit-cost analyses carried out are likely to produce figures which are too optimistic:

- (i) Overestimates of the area that will be irrigated. In our view, many factors, including demands by top enders for liberal water supplies, flooding paddy on porous upland soils, and water losses during conveyance, often over long distances, are very likely to mean that much less than the planned area will receive water.

- (ii) Overestimates of the number of families that can be settled. This follows from (i). In addition, especially in the absence of any other effective compensation for land taken for the project, it would not be surprising if influential local residents were receiving additional irrigation plots in the names of relatives or children. To the extent that this occurs, it will further reduce the already rather small numbers who can be settled from the Wet Zone.
- (iii) Diversion of attention and resources from other opportunities for rural development. Mahaweli takes priority for finance, as well as for engineers, works supervisors, and administrative support. Other projects can be expected to lag as a result.

On the other hand, there are some actual or potential benefits to Sri Lanka which do not figure in conventional cost-benefit analysis:

- (i) Mahaweli attracts foreign concessional or grant funds which might not otherwise be available to Sri Lanka.
- (ii) Conventional social cost-benefit analysis underestimates the value of a long-term shift upwards in production through a permanent physical change. Providing no long-term process like siltation becomes serious, Mahaweli should mean livelihoods and production for decades, if not centuries, ahead.
- (iii) The priority accorded to Mahaweli, combined with donor interest and participation, could lead to changes in management and more efficient water allocation and use; and such changes might then spread to other irrigation schemes in the Dry Zone. We are, however, not too hopeful that this will occur.
- (iv) For all its problems and deficiencies, the Mahaweli Project has a historical and symbolic national importance which technical appraisals tend to overlook.

Footnotes

1. In round figures, two-thirds of the total population lives in one third of the surface area of the country.
2. The Dry Zone was the location of a highly-developed irrigation-based Sinhalese civilisation between a thousand and two thousand years ago. This was based above all on the current cultural-cum-tourist sites of Anuradhapura and Polonnaruwa.
3. The Bowatenna power project is completed, work is underway on the Kotmale and Victoria power projects, and preparatory work for the Randenigala/Rantembe project is in progress. The acceleration in the demand for electricity since the liberalisation of the economy in 1977 has made the completion of the Kotmale and Victoria dams more urgent.
4. For the general background to this section see Chapter 1 of Moore and Wickremesinghe's Agriculture and Society in the Low Country (attached).
5. Although the rural population of Sri Lanka is often described as a 'peasantry', a majority, even outside the plantation sector, have either no land or such a small amount that it provides only a fraction of their income. A substantial proportion of these are poor rural labourers.
6. A discussion of these issues and description of the experiments may be found in some of the reports prepared by Huntings Ltd. in Colombo, consultants in the preparation of plans for System C.
7. The situation is somewhat worse than these figures imply for, unlike those on current rates of use, the figures for the Mahaweli Project must be reduced to make some allowance for losses of water in long-distance transit between different water basins, and anyway already assume a certain amount of re-use of water. The figures used here are given in Sri Lanka, Mahaweli Ganga Development Program, Status Statement 3, prepared by the Government of Sri Lanka and the World Bank for the Sri Lanka Aid Group Meeting, Paris, May 1980. Prior to this major doubt about the adequacy of the irrigation water

supply had been raised by an ex-public servant formerly involved in planning the Mahaweli Project - see G. Iriyagolle, The Truth about the Mahaweli, Colombo, 1978.

8. M. P. Moore, Approaches to Improving Water Management on Large-Scale Irrigation Schemes in Sri Lanka (attached).
9. In addition to the reference given in note 8, see also M. P. Moore, The Management of Irrigation Systems in Sri Lanka: A Study in Practical Sociology (attached).
10. See, for example, A. Laycock, Design of Cross Regulators and the Need for Intermediate Storage in Sri Lankan Irrigation Schemes, (attached).
11. Some such areas are to be found on many existing schemes. In the case of the two large schemes - Gal Oya and Uda Walawe - they comprise a large fraction of the acreage intended to be irrigated.
12. See A. Laycock Unit Management - A New Approach for Large Irrigation Projects in Sri Lanka, (attached)
13. In the Mahaweli area existing cultivators are compensated for the land acquired from them, but no family is supposed to obtain more than a single allotment. There is some evidence that this rule has been breached, and that larger landholders have been allocated more than one new allotment. The extent of this practice is unknown.
14. There were also so-called 'Middle Class Allotments' of 20-25 acres in earlier schemes, but land is no longer allotted in this way.
15. On the basis of information on labour use in other parts of Sri Lanka, it has been estimated, in relation only to paddy in the Mahaweli project, that "the input of hired labour per farm will probably have to be more than 50% higher than is at present envisaged". "For the whole project, it was found that even with quite an ambitious estimate of the number of days which an individual worker can work in a season, the (annual) requirement for hired labourers will, if output targets are to be met, be around 400,000 for the Accelerated Programme (R.S.Fieldson and J. Farrington, "Labour

Supply for Small Farm Development in the Dry Zone: Recent Patterns and Future Prospects", Paper presented at seminar on Research, Development and Rural Workers, Agrarian Research and Training Institute, Colombo, April 1980).

Additional Sources of Information

Apart from those sources cited in the footnotes the main authoritative document is the NEDECO Report. Huntings Ltd. in the Ministry of Mahaweli Development in Colombo can provide up-to-date reports on the experiments related to irrigation and settlement which they are conducting. The classic study of the Dry Zone and its development, still in many ways surprisingly relevant despite having been published in 1957, is B.H. Farmer, Pioneer Peasant Colonization in Ceylon, Oxford University Press. The following publications of the Agrarian Research and Training Institute, Colombo, may be useful:

- (i) Research Study No. 23 (1979), An Analysis of the Pre-Mahaweli Situation in the H4 and H5 Areas in Kala-Oya Basin.
- (ii) On conditions in existing settlement schemes - Research Studies No. 29 (on the Minipe scheme) and No. 31 (on the Mahakandarawa scheme).

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