

Policy Paper No. 9

Macro Irrigation Investment Policy

IMPSA

IRRIGATION MANAGEMENT POLICY SUPPORT ACTIVITY

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Please direct inquiries and comments to:

Irrigation Management Policy Support Activity Secretariat
107, Havelock Road
Colombo
Sri Lanka

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Preface

THIS PAPER IS a product of the Irrigation Management Policy Support Activity (IMPSA). IMPSA is a programme to assist the Government of Sri Lanka (GSL) in the implementation of its accepted policy of participatory management in irrigation and settlement schemes, in order to improve productivity, profitability and equity in the irrigated agriculture sector.

IMPSA was initiated by the Ministry of Lands, Irrigation and Mahaweli Development in association with the Ministry of Agricultural Development and Research. It is sponsored and financed by the United States Agency for International Development (USAID), through the Irrigation Support Project for Asia and the Near East (ISPAN) and is assisted by the International Irrigation Management Institute (IIMI).

For the execution of IMPSA, the GSL set up an inter-ministerial advisory committee, the Irrigation Management Policy Advisory Committee (IMPAC), to provide broad guidance for the implementation of IMPSA and to institute a mechanism to achieve consensus among the Divisions and Departments of the concerned Ministries on the recommendations to be adopted and implemented by the GSL. IMPAC is chaired by the Secretary, Ministry of Lands, Irrigation and Mahaweli Development, and comprises of the Secretaries of State of the relevant Ministries, together with the Heads of the Departments and Agencies under them. IMPAC is assisted by a Working Committee, the IMPAC Working Group, which consists of some of the IMPAC members as well as several other officials drawn from the relevant Ministries and Agencies.

Under the IMPSA Programme, ten Policy Papers are scheduled to be prepared and processed for presentation to the government. Each Policy Paper will be a concise statement of the recommendations of the IMPAC Working Group.

Chapter 1

INTRODUCTION

1.1. Purpose of the Paper

THIS DOCUMENT IS the ninth in the series of ten Policy Papers to be prepared under the IMPSA Programme. It is based primarily on three Staff Working Papers on the issues related to the topic and two studies conducted on future irrigation investment trends, needs and options, one conducted by IIMI and the other under the World Bank-funded Public Sector Restructuring Project.

The IMPSA Policy Paper No. 1 titled 'Irrigated Agriculture and Irrigation Management in Sri Lanka: Vision for The Next Decade and Beyond' lays out the direction in which the future irrigated agriculture sub-sector should be steered to be dynamic, diversified, efficient, equitable, productive, sustainable and participatory. The subsequent IMPSA Policy Papers elaborate the policies and strategies required to achieve the vision. The successful implementation of many of these short-term and long-term policies and the realization of the vision depends on the availability of financial support following a phased-out investment strategy and plan for the future.

The purpose of this Policy Paper is to outline the key areas where future investments will be essential to achieve the vision; spell out the priorities of future investments and the roles of public and private sectors in fulfilling the priority needs; and estimate approximately, the levels of investments required for the major components of the policy interventions envisaged in the immediate period ahead.

The future growth and development of the irrigated agriculture sector will occur in two phases. The first phase, which covers the remaining period of the current decade, will establish the conditions required for a major 'agricultural take-off' that will occur in the second phase beyond the year 2000. Investments during the next decade should therefore focus on creating the conditions that would enable the absorption of, and achieving high returns from, investments in the follow-up phase. This paper identifies the investment needs, options, opportunities, priorities, levels and strategies in the remaining decade of the 1990s.

1.2. Methodology

THE FOLLOWING METHODS were used in the development of this Paper.

- i. Review of the recent studies on future investment options and strategies. The two major studies reviewed are:
 - a. P.B. Aluvihare and M. Kikuchi. 1991. Irrigation investment trends in Sri Lanka: New construction and beyond. IIMI. Colombo.
 - b. Shand et al. 1990. Future directions in irrigation investment and agricultural diversification in Sri Lanka. Report from the Public Sector Restructuring Project. Colombo.
- ii. Information obtained from the recommendations of a national workshop on 'Future directions for irrigation investment in Sri Lanka' held in January 1991 in Colombo.
- iii. Information and feedback obtained from consultative workshops held by IMPSA for selected groups of experts drawn from various public institutions.
- iv. Discussions between the IMPSA Secretariat and IIMI/SLFO staff in the IMPSA Team.
- v. The recommendations of three Staff Working Papers (SWPs 9.1, 9.2 and 9.3) and two supportive reports prepared by two expatriate consultants employed by IMPSA.

Chapter 2

FUTURE MACRO-ECONOMIC AND INVESTMENT POLICY FRAMEWORK

2.1. Past Investment Pattern and Present Trends

THE IRRIGATED AGRICULTURE sector in the past has received the lion's share of public investment funds among various sectors of the economy of the country. In the early 1950s, irrigation investment, defined as the investments required to build, improve and maintain the irrigation infrastructure, was as high as 40 percent of the total public investments and around 90 percent of the total public investments in agriculture. This is a reflection of the government policy that has put emphasis on agricultural development in general and irrigated agriculture in particular. In 1982, during the peak of the investments on the Accelerated Mahaweli Development Programme, the level of public investments on the irrigation sector was around 43 of the total public investments and 84 percent of the public investments in agriculture, respectively.

However, a notable change in the capital expenditure of the government during the last decade is the sharp decline in the share of agriculture in the total capital investment programme. Although agriculture and irrigation together absorbed more than 50 percent of the total public investments in 1982, their share declined to around 20 percent by 1989. The recent Public Investment Plans (PIPs) of the government clearly indicate the declining trend in capital expenditure for agriculture.

At present, the irrigated agriculture sector is in a transition stage from a 'construction phase' to a 'management phase,' the latter phase being supported by a package of new policies and strategies. Even in this climate, the total public financial commitment for irrigation in 1990, as indicated in the Public Investment Plans (PIPs) of the government, is 13 percent of the total public investments and 60 percent of the total public investments in the agriculture sector.

2.2. Future Trends

A PROPER UNDERSTANDING of the macro policies of the government for promoting future social and economic growth, the relative importance of agriculture in general and irrigated agriculture in particular, and the proposed future public investments in irrigation is a necessary pre-requisite for the formulation of future irrigation investment policies. This

understanding, coupled with the analysis of the policy recommendations that have emerged through the IMPSA Programme and the recommendations of the studies mentioned above, provides a basis for identifying the investment needs, priorities and levels in the irrigated agriculture sector for the future.

2.2.1. Macro-Economic Policy Framework

In SRI LANKA, there is an established tradition for the government to play a leadership and catalyst role in economic development. However, in the last decade, after the economic policy reforms of 1977, the entrepreneurship role of the government has been repeatedly questioned. It has been suggested that the country would be better off if a larger role in the management of resources is in the hands of the private sector including farmers' organizations. This view has already been accepted by government. Thus, in the new policy framework that is taking shape, where the emphasis is on liberalization, the role of the government is changing rapidly. The general policy framework of the government now places increasing reliance on market forces and mechanisms and minimizes direct government intervention. This is an important aspect of the 'structural adjustment' effort, which has become synonymous with the economic development of the country. As a result, there is a definite trend toward 'less government,' and consequently, the public investment programme is becoming smaller in relation to the total investments of the economy.

2.2.2. Public Investment Policies

AN IMPORTANT DECISION taken by the government on the subject of investment priorities in February 1984 has continued to influence the character of the public investment programme ever since. This represents one of the earliest declarations by the government of its intention to steer away from commercial or profit-oriented activities: to abandon the role of entrepreneur in preference to that of facilitator. A number of other decisions taken subsequently on related issues led to the evolution of the present policy on public investment.

The government policy on public investment currently being followed may be summarized as follows:

- a. The size of the total programme will be kept within a limit, consistent with prudent public financial management. The target for the next 4 - 5 years is about 9 percent of the GDF. In absolute terms, this amounts to about Rs. 40 billion in 1992, which will gradually increase to about Rs. 57 billion by 1995.
- b. Public investment will concentrate on building, or where appropriate, rehabilitating economic and social infrastructure, these being vital to a rapid

expansion of economic activities in the medium term. Economic infrastructure facilities include irrigation, power, highways, telecommunications and water supply.

- c. Education, health and nutrition, the main branches of human resources development, are considered primarily the responsibility of the government. However, the private sector is encouraged to share in an increased part of this responsibility.
- d. The government will continue to follow a policy of not investing in ventures which are profit-oriented or commercial in nature. The present programme of peoplization is also consistent with the same objective.
- e. Selection of agricultural projects will be guided by the two sector strategies already prepared, one of which is the Agriculture, Food and Nutrition Strategy, and the other, the Medium-Term Investment Programme for the Plantation Sector.
- f. Increased attention is paid to achieving the aim of sustainable development. Thus, environmental considerations and conservation are treated as integral components in the development effort.
- g. Special emphasis is being placed on poverty alleviation and rural development by the government.

2.2.3. *Priorities in Public Expenditure*

A GOVERNMENT DECISION made in February 1984 spells out the priorities in public expenditure as follows.

Basic issues. In the specific context of Sri Lanka, three important factors are considered in determining a set of investment priorities.

- i. Economic objectives,
- ii. Non-economic objectives, and
- iii. Provincial objectives vis-a-vis national objectives.

All schemes of priorities implicitly give the highest weight to economic objectives. However, for practical reasons the scheme should be flexible enough to admit non-economic objectives. The provincial dimension is a new development. A large share of investible resources hitherto handled by the National Government will now be in the hands of the Provincial Councils. This fact gives an added importance

to the question of priorities. The "demands" arising from the provincial viewpoint are not yet clear. It may take a few years before a definite pattern emerges.

Investment priorities. The tight resource situation calls for a very strict adherence to a system of priorities in the admission of new projects into the Public Investment Programme. These priorities must reflect the goals of economic and social development to which the government is committed. In a broad sense, the goals have been expressed as the achievement of rapid rates of economic growth, employment creation, improvement in living standards and better income distribution while maintaining financial and economic stabilities.

The government's declared intention at present is to allocate more resources for the operation and maintenance (O&M) of existing capital assets instead of creating new assets. These include, inter alia, repair and maintenance of existing roads, buildings, irrigation channels, infrastructure for water supply, sewerage, education, health, electricity and telecommunication services. O&M of existing assets have been neglected to a very great extent in the past. This has resulted in the decline in some of the services, and unless this aspect is adequately looked after, massive capital investments will be required to simply replace worn out existing assets. The highest priority, therefore, will be given to O&M expenditure in the period ahead.

New projects in the future will concentrate on:

- a. quick-yielding production-oriented projects which would reduce the problem of the balance of payments and which the private sector cannot undertake on its own;
- b. essential infrastructure needs in power, irrigation, transport and communications; and
- c. urgent needs in improving health, education, housing and nutritional standards of the people.

In this macro-economic climate, the present indications are that the share of investment in agriculture and irrigation may decline to about 15 percent of the total PIP in the next few years. This is approximately 1 percent of the GDP, as the target PIP investment is about 9 percent of the GDP in the next few years. Of this, approximately one half is likely to be allocated to irrigation development projects.

Chapter 3

A FRAMEWORK FOR FUTURE IRRIGATION INVESTMENT POLICIES

THE MACRO-ECONOMIC POLICY framework of the government and its investment principles and priorities for future growth and development, as indicated in the previous chapter, provide a guide for determining the investment policies in the irrigated agriculture sector. The macro-economic policies and investment priorities, in combination with the policy recommendations of IMPSA, provide a basic framework for identifying the investment options, priorities and levels in the irrigated agriculture sector for the future.

3.1. Investment Principles

INVESTMENT SHOULD BE seen on a continuum ranging from "expenditure," which is expected to produce only present benefits, to "investment," which is supposed to yield future streams of benefit. The concept of investment which is followed in this paper is concerned with both "expenditure" and "investment," that will raise future levels of productivity in the irrigated agriculture sector.

Investment is often identified with the capital budget, rather than with recurrent expenditure. But a capital bias should be avoided in decision making on investments. It is now recognized that investment in "software" can be more productive than investment in "hardware," especially when investment in the latter has already been made without creating the former.

One difficulty with assessing investments is that there are often important synergistic effects among them. Investments in organizing farmers or in marketing, for example, can increase the payoff from other investments, e.g., in monitoring and evaluation or in crop research. There are, thus, indirect as well as direct benefits to be weighed, although such benefits are usually difficult to quantify and measure satisfactorily. Therefore, an investment strategy should seek optimizing packages that capitalize on mutually reinforcing effects, rather than consider isolated components for investment.

Investment should not be viewed as the sole responsibility of the government. In considering the need and the potential for investment in irrigated agriculture, the role of the private sector should be duly recognized. In this regard, it is useful to divide the 'private sector' into two major groups. The first group comprises private companies, both national

and multinational. The second group comprises farmers, or more specifically farmers' organizations, acting in their individual and collective capacities as allocators of investment resources among farm enterprises.

As Sri Lanka moves from a "construction" phase to a "management" phase, the level of public sector investment can be reduced, because most of the costly "hardware" investments have already been made. On the other hand, it will be possible to mobilize private sector investments in irrigated agriculture, particularly in the areas of production, marketing, processing, and value-adding techniques. But, there is still a need for an adequate level of continuing investment by the government, both to maintain facilities in productive form and to utilize them to the best advantage of the economy and the society.

Also, as the country moves into a new era, it is important that it gets beyond the previously separated categories of investment in "irrigation" and "agriculture." Some of the investment in the latter will not be for irrigated agriculture and should have its own support and rationale. But in the future, investment should be planned for the "irrigated agriculture sector," within the agriculture sector.

It may be possible to perceive a broader view of investment for irrigated agriculture than was found in the past. One could include all investments that contribute to the productivity of irrigated agriculture, such as human resources development, education, health, infrastructure development and other objects of expenditure. Some of these would be made by the government irrespective of whether the beneficiaries are the farmers or not. This Paper focusses on investments directly bearing on agricultural performance. But it must be remembered that such supplementary investments -- particularly education and health -- have an impact on sector productivity and should not be neglected in other investment planning where they are more appropriately considered.

In formulating investment strategies and policies, the government should be concerned with the incremental investment of resources that can produce the optimum benefit from Sri Lanka's land, water, human and capital resources. The target level of investments proposed in this document is the "investment civil minimum," the level which is needed to create and maintain an infrastructural and institutional framework sufficient to make irrigation schemes perform efficiently and to make irrigated agriculture a productive and sustainable enterprise.

3.2. Overview of the Investment Strategy for Irrigated Agriculture

3.2.1. Investment Priorities

THE COST OF new irrigation has been rising exponentially in recent years. This trend, combined with a lower world market price of rice, makes new investments economically less attractive than in the past. The analysis of benefits and costs from alternative kinds of irrigation investments in the studies mentioned in section 1.2 above shows how booms in irrigation investment have correlated closely with periods of a high world market price of rice. The study also shows how the returns

to investment in physical infrastructure have depended very much on the levels of productivity which were made possible by advances in agricultural research, as old, and then new improved paddy varieties have pushed the production possibility frontiers outward.

Investments in water management improvement, with minimum expenditure on capital structures, yield very attractive benefit-cost ratios. This reflects the extent to which inadequate management, from the main system to the farm level, has held actual production levels below their potential. A major part of water management improvement efforts has been directed toward the formation and strengthening of farmers' organizations for participatory joint management of irrigation systems and training of both farmers and officials.

The conclusion of the study mentioned above is that the irrigation sector in Sri Lanka should enter into a "management" stage, with most new construction held in abeyance until such time as there are major cost-reducing construction technologies and/or substantial increases in the world market price of rice (or other irrigated crops) that can justify new construction. It should be kept in view that the economic benefit-cost ratio concept used here includes social and environmental aspects as well.

Under these circumstances, the following priorities are recommended.

- * First priority should be given to funding both O&M as well as institutional strengthening of existing irrigation systems including training, agency reorganization, and supporting farmers' organizations. These two aspects reinforce each other.
- * Second priority should be given to funding research and development (R&D).
- * Third priority should be given to the completion of ongoing projects so that the returns could begin to flow as soon as possible. This investment category would decline rapidly as projects are completed.
- * Fourth priority should be given to formulating and implementing demand-driven system rehabilitation. The investment in rehabilitation could be further reduced as improved maintenance begins lengthening the life of rehabilitated projects.
- * Fifth priority should be given to new projects, both for the modernization of existing systems and for the development of new areas based on research information. This would include introduction of modern technologies, new

practices and institutional support for a more profitable diversified agriculture.

An important supporting activity will be human resources development including training both agency officials and farmers, to upgrade the productivity of the human resources associated with irrigated agriculture. This would be an important item of expenditure to be given specific attention in an investment strategy. Although not included in the investment levels proposed in this Paper another category will be some special projects and programmes to help institutionalize the new policies and strategies for participatory management. Funding for such special programmes should be included in the public investment programmes. It would be desirable to negotiate with some donor agency to seek foreign funding.

One category of investment which the government must keep in mind concerns forest, soil and water conservation. This has not been included as part of irrigation or agriculture, because the scope of activities in forest, soil and water conservation extends beyond the domain of the irrigated agriculture sector. But it is very clear that irrigation systems cannot be managed or maintained in isolation from environmental dynamics. There is a direct linkage between maintaining the forest cover and stabilizing the soil in upstream watershed catchment areas and reservoirs and rivers serving irrigated areas downstream. Forest losses and soil erosion increase silt loads and flood hazards, reduce soil fertility and crop yields, raise maintenance costs and lower the productivity and sustainability of the natural ecosystem as well as of the irrigation schemes.

It is difficult, at present, to estimate the investment cost of natural resources conservation required for the long-term sustainability of irrigated agriculture in Sri Lanka. Also, the benefits of such conservation go beyond the irrigated agriculture sector, and therefore, cannot be regarded as a cost that is exclusively attached to irrigated agriculture. But this is an area which should not be ignored in planning the development strategies for future irrigated agriculture, and adequate investments should be made in the future PIPs for conserving land and water resources that serve the irrigated agriculture sector of the country.

3.2.2. *Level of Public Investment for Irrigated Agriculture*

O&M SHOULD BE given the highest priority of all types of investments and expenditure on the irrigation sector. The present fund allocation practice, whereby O&M funds are determined as a residual after all the other investment needs have been met will be discontinued. The funds necessary for O&M should be set aside first in the allocation of funds available to the sector.

A fact that should be kept in mind is that qualitative factors are more important than absolute amounts of investment. The choice of projects and the way in which they are implemented will have more impact on long-term development than their magnitude, since large amounts of funds can be expended without much benefit if used unwisely or haphazardly. The participatory irrigation management approach is expected to create dynamics for more careful use of funds in this sector. The aim of irrigated agriculture sector investment policy is to maintain and increase the long-term productivity of the sector so that its ability to contribute to the rest of the Sri Lankan economy is increased.

As indicated earlier in this paper, a decade ago, investments in irrigation and agriculture together formed the largest category, amounting to 55 percent of the total public investment in 1982, the peak year for construction. The share of agriculture (including plantation agriculture) and irrigation (including the activities under the Mahaweli Programme) investment declined to 20 percent by 1989. Discounting the Mahaweli Programme, the share declined from 46 percent in 1982 to 10 percent by 1989.

Given the decline in profitability of new investments in irrigation since the early 1980s, this shift in the pattern of investment is defensible. But since there are other kinds of irrigation sector investments that are quite profitable, as noted above, this decline should not continue further. The government's investment plan expects total irrigation investments (Mahaweli and other projects) to range between 13 percent and 10 percent through 1994. This level, representing about 1 percent of the GDP, is considered an appropriate benchmark, especially if a more inclusive definition of investment, which includes O&M expenditures, is taken. The investment programme proposed in this Paper lies within this range, and is less than a fraction of the levels prevailing ten years ago.

Chapter 4

OPTIONS FOR PUBLIC SECTOR INVESTMENT IN IRRIGATED AGRICULTURE

4.1. Introduction

THE BASIC GUIDELINES, principles and priorities of investment have been presented in the previous sections. This chapter presents the public investment requirements of the irrigated agriculture sector for the current decade. The basic assumptions that underlie the estimation of investment levels are briefly outlined in the respective sections. The public investment needs are estimated for two years in the current decade: 1995 and 2000. The year 1995 is chosen because most of the ongoing projects will be completed by then as indicated in the latest PIP, so that new investment decisions in the sector could be made. The year 2000 is chosen because almost all the ongoing projects will be completed and the total irrigated area will virtually be stabilized by then. It is also presumed that by the year 2000, the conditions required for a major subsequent 'agricultural take-off' will have been established as a result of an investment package designed to create such conditions.

4.2. Operation and Maintenance

THE PRESENT SYSTEM of financing irrigation has deprived O&M, as government funds have become increasingly limited. The participatory irrigation management approach which shares responsibility with farmers is expected to place O&M on a more sound footing.

As farmers' organizations progressively assume more O&M responsibility for distributary and field channels, it is expected that the government O&M costs will be reduced. This depends in part on having made sufficient investments in strengthening farmers' organizations. Therefore, the proposed investments should be divided between funds intended for the O&M of distributary and field channels, including institutional strengthening, and funds required for the O&M of head works and the main system. The latter category of funds would remain static in real terms during the remainder of the decade. As the participatory management policy of the government is implemented, and as the farmers' organizations take increasing responsibilities for O&M of the distributary and below, and perhaps of the head works and main systems, these investments should be phased out to suit the actual needs.

Past studies conducted in various major irrigation schemes suggest a technically desirable O&M level around Rs. 1,000 per hectare. This rate is allocated on the basis of 30 percent for operation and 70 percent for maintenance, and 60 percent for headworks and the main system and 40 percent for the distributary and below. It is reasonable to assume that the government bears the O&M cost of the head works and the main system throughout the current decade and 50 percent of the labour cost and 100 percent of the cost of material required for O&M of the distributary and below until about the mid-1990s and making only material contributions by the year 2000. Under such assumptions the annual amounts required for the O&M of both major and minor irrigation are Rs. 264 million in 1995 and Rs. 192 million in the year 2000 (all figures are in constant 1989 rupees). This Paper recommends, more conservatively, Rs. 300 million for 1995 and Rs. 200 million for the year 2000.

This Paper does not attempt to divide allocations between the National Government and Provincial Councils. It should also be emphasized that the O&M needs vary tremendously among systems, e.g., between systems in the hills and those on plains. Therefore, the O&M costs calculated as cost per hectare should not be used automatically for estimating aggregate amounts assigned to each scheme. Depending on conditions, higher and lower allocations should be made. Allocations should also depend on the extent of self-help and participation.

These recommendations represent an initial increase in O&M expenditure. It should be noted that the basic O&M costs adopted for the projections are based on the estimates prepared by various consultants and government departments. These norms are not to be interpreted as a recommendation to continue funding inadequate levels of O&M; rather it is a suggestion that the assumptions behind the various O&M cost studies be checked and verified to ensure that the O&M standards envisaged for the future are consistent with the cost-effective changes outlined in the IMPSA Policy Papers. The levels of investment in O&M in the future should be adjusted to suit the justifiable levels, when more understanding and information become available through research.

4.3. Institutional Development

SRI LANKA HAS had a decade of experience now with investing in "software," particularly in farmers' organizations (FOs), to improve the efficiency of rehabilitation, O&M, water distribution, etc. Although, benefit-cost studies on the impact of farmers' organizations on the overall improvement of efficiency, productivity and profitability in irrigated crop production are few, there is agreement that these investments have been cost-effective. To the extent that they permit the government to reduce its O&M expenditure there is direct and measurable benefit resulting, apart from other gains such as more efficient water use and increased crop yields.

Investment in institutional development requires a phased strategy for the deployment of catalysts to facilitate the promotion and development of FOs and the turnover process.

Based on this strategy and the intensity of deployment of the catalysts in each phase, and taking into account the wages of the catalysts, cost of training, supervision, control and monitoring etc., the total estimate would be around Rs. 156 million in 1995 and Rs. 150 million in 2000. For estimating sector investments, given the importance of this component, the paper recommends Rs. 200 million in each of these years, assuming a period of phased expansion from 1992 to 1995. This is still a very small amount, only 6 to 7.5 percent of the proposed investment in improving irrigated agriculture.

4.4. Research and Development (R&D)

THE INTERNATIONAL EXPERIENCE suggests that developing countries invest about 2 percent of the value of their agricultural production in R&D, including monitoring and evaluation, to further increase production. IMPSA Policy Paper No. 5 recommends that 2 percent of funds for the country's irrigation-related Agricultural Gross Domestic Product (AGDP) be allocated to irrigated agriculture research. If irrigated agriculture contributes one-quarter of the total agricultural output in Sri Lanka, this means that 0.5 percent of the value of a GDP should be devoted to R&D for modernizing, expanding and upgrading this sector's operation.

Such a target suggests that Rs. 350 million should be devoted to R&D of irrigated agriculture in 1995 and Rs. 410 million in the year 2000. There are many promising areas in which applied research could produce handsome returns. However, the absorptive capacity of Sri Lanka to use such a massive investment productively in the near future, which is more than what would be allocated for O&M alone, is questionable as one compares the number of research institutions and experienced professionals locally available.

Therefore, it is recommended to reduce by half, the estimated requirement based on the target recommended by the World Bank. This would amount to Rs. 175 million and Rs. 200 million for R&D and M&E in the years 1995 and 2000. With recognition of the importance of R&D to a country's future in an increasingly interdependent and competitive world economy, there could and should be some capacity-building undertaken to meet such a goal. The level proposed, already reduced by 50 percent, is quite justifiable in a strategic planning exercise like this. However, as the capacity of the country to undertake more research tasks increases in the future, the level of investment should also be proportionately increased.

This investment should be made specifically to achieve efficient and sustainable production increases. It would not necessarily be carried out through public sector agencies. Much research could and should be carried out in close collaboration with universities, research institutions, consulting agencies and private researchers. Most of the research should be applied interdisciplinary research involving some combination of engineers, agricultural scientists, economists and other social scientists engaged in experimentation and evaluation. It should be carried out in a participatory way, consistent with the overall policy for this sector, because this promises better results and quicker dissemination of results. There should be private sector inputs, from farmers as well as other producers and

distributors, in setting out R&D priorities. IMPSA Policy Paper No. 5 provides broad policies and strategies to plan specific R&D priorities and programmes in the future.

4.5. Completion of Current Projects

ON-GOING PROJECTS SHOULD be completed as substantial sunk investments are involved. The Public Investment Plan for 1990-94 shows Rs. 780 million planned for investment in 1995 in on-going projects. This paper rounds this figure up to Rs. 800 million. As those projects should be completed by the year 2000, no further investment is expected for them at that time.

4.6. Rehabilitation and Modernization (R&M)

ALTHOUGH IT IS expected that improved O&M under the proposed strategies of the IMPSA Policy Recommendations will improve the sustainability of irrigation schemes and reduce the need for system rehabilitation in the future, there will need to be some continuing investments in this area. The National Agriculture, Food and Nutrition Strategy report assumes that major schemes would need to be rehabilitated every 25 years, and minor schemes every 15 years.

It is envisioned that part of the cost of rehabilitation-cum-modernization will be borne by farmer-beneficiaries, so this would provide some of the resources that could be used for modernization expenditures. Based on the R&M cost of Rs. 20,000 and Rs.10,000 per hectare for major and minor schemes, respectively, the figures suggested are Rs. 368 million and 376 million for 1995 and 2000, which are rounded off to Rs. 400 million for each of these calendric years. This level of investment will presumably absorb the cost of additional structural facilities and modifications that are to be incorporated in the existing gravity-irrigated, rice-based irrigation systems to accommodate the promotion of non-rice, import-substitution and export-oriented crops.

It should also be noted that a major share of the R&M investments has been for the upkeep and rehabilitation of the physical irrigation infrastructure. There has been no substantial provision of funds to improve infrastructure facilities such as irrigation roads and storage facilities, that are complementary to the promotion of self-management by the FOs. It is, therefore, important to allocate a reasonable share of the investment on R&M to the improvements in the other basic infrastructure facilities in the irrigation schemes.

4.7. New Projects

AS DISCUSSED EARLIER, there is less economic justification for new construction projects now than in the past. However, one cannot know the future with any certainty, particularly the world market price of rice. The 1990-94 PIP projects Rs. 1,500 million for new projects in 1995. This figure is adopted in this paper, assuming that this is already a commitment (it has 70 percent foreign funding). The same level of expenditure is used for the year 2000, assuming that some similar level of investment is likely and might be justified. Even this

modest figure would consume about half of the resources proposed for investment for irrigated agriculture in 1995 and 2000. This reflects both how costly new construction is and how relatively inexpensive the other productive activities being proposed are.

New projects must be carefully examined and approved on the basis of economic viability and returns. If the amount of new construction provided for here is not judged economically justifiable, these resources could be expended on the modernization of existing systems, which is likely to have higher rates of return.

4.8. Diversification and Modernization of Irrigated Agriculture

SOME SPECIFIC PROVISION should be made for investment in these aspects of irrigated agriculture. It is recognized that most of the investment in improving irrigated agriculture will be private, coming from farmers and firms, from processors and other entrepreneurs such as constructing cold chains. There will need to be some complementary investments made by the government in a variety of activities -- roads, communication, market information, research, extension outreach, agro-based industries, etc. to encourage and support private investment.

Such investment cannot be estimated at this time due to lack of adequate data. However, the investment required for the improvements and modernization of irrigation systems and for research and development for promoting other crops have been included in the suggested levels of investment for R&M and R&D, respectively. There are no systematic estimates as to the appropriate level of public investment for this purpose. It is recommended that an amount equal to that suggested above for R&D be devoted specifically to modernization and diversification of irrigated agriculture -- Rs. 175 million in 1995 and Rs. 200 million in 2000.

Moving to year-round irrigated cultivation will require infrastructure investment, experimentation and considerable R&D, e.g., for development of groundwater and making conjunctive use efficient. In some places, this new approach to irrigated agriculture will integrate "highlands" into this sector. The government should invest in the acquisition, analysis and dissemination of market information and should take any necessary steps to ensure that marketing is reliable, efficient and competitive. Marketing is probably the single greatest constraint on developing more diversified agriculture in Sri Lanka.

4.9. Human Resources Development

THIS IS AN area where novel ideas and techniques plus creative and dedicated instruction are probably more important than the amount of expenditure. Training for farmers or officials or the private sector should be more innovative and participatory than in the past. Still, some financial resources are needed. We suggest Rs. 25 and 50 million for 1995 and 2000, respectively, under this heading. This is mostly for human resources development of government and private sector personnel since farmer training is included under 'institutional development.'

4.10.Land and Water Conservation

A COMPLEMENTARY INVESTMENT needed for the long-term sustainability of irrigated agriculture is in upgrading and protecting watersheds and reducing loss of topsoil, benefiting from the water cycle as efficiently as possible. This is an area where the government and experts are only beginning to gain some macro-sectoral overview. The irrigated agriculture sector should be prepared to share some of the costs of these measures, which are important for the whole country and not just for farmers. Hitherto, there has been no tradition to allocate a specific level of investment in the government PIPs for land and water conservation, although a few watershed management and forestry programmes have been and are being undertaken as special projects under donor assistance and support. This Paper recommends that Ministries and Agencies dealing with land and water conservation should ensure that proposals are submitted for inclusion in the PIP.

Chapter 5

OPTIONS FOR PRIVATE SECTOR INVESTMENT IN IRRIGATED AGRICULTURE

5.1. Role of the Private Sector

THE INCREASING ROLE of the private sector in promoting national development and growth has been clearly spelled out in the macro-economic policy statements and investment strategies of the government. In irrigated agriculture, where a great shift in productivity and profitability is envisaged in the future, the private sector, in partnership with the public sector, has to play a key role in promoting the expected growth and development in the sector.

However, the government's overall objective is to ensure public welfare and justice and fair play to the citizens. While the private sector is encouraged to take a leading role in irrigated agriculture to promote national development and growth through various investment options, the government should, continue to play a regulatory role to ensure that private sector activities do not jeopardize the public welfare both in the short and the long run.

Many specific areas in production, value adding and marketing, where private sector investments are feasible, can be recognized. These opportunities range from investments for the provision of goods and services which directly support existing agricultural enterprises; agricultural diversification; processing of agricultural products; research and development; human resources development; development of complementary infrastructure; and rehabilitation and modernization of the existing irrigation infrastructure. However, as in public sector investment, it is difficult to estimate the quantum of investments that would be generated from the private sector over the next years. Only the areas in which a potential for private sector investment exists or the areas where the private sector should be encouraged to invest can be discussed here.

5.2. Investment Options

5.2.1. *Provision of Goods and Services*

WHERE COMPETITIVE MARKETS exist, the private sector has been more responsive, innovative and efficient in the provision of goods and services which directly

support existing agricultural enterprises in irrigated agriculture. This is particularly true in cases where agricultural enterprises are serviced by a decentralized system of small and medium-sized entrepreneurs interacting directly with producers. In such situations, the private sector can effectively service the full gamut of commercial services demanded by producers and consumers in an agricultural production system.

Since the majority of the irrigated crop production system is so heavily oriented toward rice, the majority share of the private sector input supply and marketing will continue to be in this area in the foreseeable future. This trend will continue as rice will remain a major crop due to its importance in food security. However, the rice sector must be served with increasingly efficient marketing systems if production costs per unit of output are to be lowered in the future. A great potential exists to improve the efficiency of the marketing systems for rice, which is presently being handled by the informal private sector.

Given the fact that the government is progressively withdrawing from commercial marketing of agricultural inputs and is divesting itself of a series of public companies, one would expect that a major share of the new private investment in irrigated agriculture would go into expanded private networks to fill the gaps left by the government withdrawal in the distribution of essential agricultural inputs and outputs.

5.2.2. Agricultural Diversification

GIVEN THE NATIONAL emphasis on agricultural diversification and industrial development, the potential for private partnership in promoting technological changes required for agricultural diversification and agro-industrial development is increasing. It appears that the role of the private sector is best in two particular contexts. First, with respect to diversification and production of high value commodities for the fresh market trade and second, in processing of commodities to add value where production exceeds demand for fresh market sales or where processing is required before sale. The production and preparation of agricultural produce for domestic markets will constitute another area of involvement by the private sector.

5.2.3. Research and Development (R&D)

HITHERTO, THE DEVELOPMENT and dissemination of new agricultural technologies have been the responsibility of the public institutions. There has been commendable progress made by the public sector in expanding the productive capacity of the irrigated agriculture sector.

However, the private sector involvement in R&D for food crops other than rice appears to have been more intensive. This is evident from the fact that much of the

R&D for promoting certain field crops has apparently been carried out by the private sector in collaboration with expatriate specialists available through donor assistance and projects. Two distinct patterns of private sector investment in R&D in the future can be recognized.

First, the private sector will show an increasing interest in R&D for high value crops and the input/output supporting systems needed to maximize the returns from those crops. These R&D investments would focus on an integrated system of input supply, production, commodity preparation, processing and marketing, where the private sector can exercise control over all stages of the integrated system and where marketing channels are narrow but well-defined.

Second, when certain field crops are grown by a large number of farmers and marketed through many different marketing channels, the private sector interest in R&D will be outside direct production activities and would focus on developing new products to enlarge their shares of input markets. This pattern of private sector investment has already begun to emerge. Over the next decade, if the government continues to divest itself of public agencies involved in input supply and output processing and the Department of Agriculture broadens the scope of its research programme, one would expect to see a modest rate of increase of private investment in R&D on more efficient input use tailored to the high-value crops, and handling of commodities beyond the farm gate.

In order to obtain the best results of the efforts of the public and private sector in R&D, it is necessary to build and maintain effective collaboration between the two sectors in the future. This collaboration should ensure, as far as possible, that the research and development activities of the two sectors are mutually beneficial and contribute to the promotion of irrigated agriculture in the country.

5.2.4. *Human Resources Development*

DEVELOPMENT OF HUMAN resources needed in the management of agricultural enterprises will be essential as agricultural diversification proceeds during the current decade. There is a shortage of skilled personnel for managing and operating new infrastructure -- for management, R&D, specialized commodity preparation, processing, domestic and international market analyses, and operating input distribution networks -- to meet the demands of the diversified irrigated agriculture sector.

Given the condition of agro-industrial and agribusiness development in the irrigated areas, however, it seems unlikely that there will be much private sector support for more broadly based educational programmes in basic skill development for personnel and public agencies. In the longer term, it would be essential to develop active collaboration and partnership between the private sector, universities

and the public agencies to design and conduct training programmes tailored to the needs of a growing irrigated agriculture sector.

5.2.5. Complementary Infrastructure

SUBSTANTIAL DIRECT INVESTMENT participation of the private sector in the development of the complementary infrastructure needed to support irrigation-based agro-industries is unlikely in the medium term. However, the provision of basic infrastructure facilities in the irrigated settlement areas will be an incentive for the private sector and will induce more enterprise-specific investments in the settlements. Failure to create such infrastructure facilities will jeopardize the prospects for optimal utilization of the irrigated agricultural potential of the country. Under these circumstances, the investments in the basic infrastructure development will remain a responsibility of the government, at least in the current decade.

5.3. Conditions Required to Attract Private Investment

5.3.1. The Macro-Economic Level

- a. Security and economic stability.* Demonstrated security from civil unrest and national economic stability are two essential pre-requisites to promote private sector investment in irrigated agriculture.
- b. Coherent and integrated economic policies.* The government must demonstrate its responsiveness to the private sector concerns and technical competence in dealing with trade, tariff, taxation investment and foreign exchange policies, such that they are periodically reviewed and adjusted commensurate with national economic development objectives and changing market situations.
- c. Competitive markets.* The government should take appropriate measures to establish and maintain factor and product markets which are free and competitive and remove barriers against the participation of all market agents. In the present context, such measures are particularly important for encouraging investments by smaller commercial companies, farmers' organizations, and rural cooperatives that do not have the resources to sustain their activities in the face of such impediments as lengthy and complicated licensing and permit procedures, indifference of public officials, and preferential exemptions of certain participants from general rules, procedures and fee schedules.

5.3.2. *The Agriculture Sector Level*

- a. *Setting clear sectoral objectives.* The government must develop and communicate a clear, comprehensive and well-articulated plan for the development of the agriculture sector as the basis for rational planning and response from the private sector. Such a plan must set out in an unambiguous manner public investment priorities and levels and set the overall directions of policy and programmes for the medium and long term.
- b. *Rigorous implementation of agreed sectoral programmes.* Once a comprehensive sectoral plan is promulgated, the government must ensure public agency adherence to the development policies and programmes enunciated and must take effective measures to coordinate implementation among relevant public authorities.
- c. *Government policy on 'food security.'* The government should clearly spell out its policy on 'food security' vis-a-vis its 'crop diversification' policy. This policy should elaborate the implementation strategies as to whether food security is to be attained primarily through increasing rice yields per unit of land and water utilized or through bringing more land under paddy production or by both means. The present ambiguity in this regard is a disincentive for private sector investment.
- d. *Implementing "peoplization" and "privatization."* Many businessmen believe that the government should show progress with its "peoplization" program as a tangible demonstration to the private sector that it is serious about withdrawing from commercial activities and turning responsibilities in this area over to the private entrepreneurs.
- e. *Coordination and support mechanisms.* There are two major areas where coordination and support mechanisms need to be improved. The first is with respect to a more convenient mechanism for communicating all necessary information on investment conditions and prospects related to irrigated agriculture. The second is an organized forum where private sector representatives can present their legitimate concerns and problems to senior government officials on a regular basis and then work directly with those officials to resolve those problems.

The first constraint could be solved by organizing a 'one-stop information centre,' where potential investors could obtain all the information they need in making their investment decisions. Such a centre should also be at the disposal of current investors so that they could obtain current information on external buyers interested in Sri Lankan agricultural commodities; tariff schedule, non-tariff and regulatory procedures in export recipient countries; and technical information on

items like acceptable packaging and labelling requirements in different export markets.

Resolution of the second restraint probably requires the establishment of a coordination mechanism at a higher level. Politicians and senior bureaucrats alike need to hear and react directly to the legitimate concern of the business community. And, conversely, a direct and candid dialogue with senior government officials is needed to better inform the private sector as to what public development actions are feasible and what are not, in the medium term.

Chapter 6

RECOMMENDATIONS

6.1. Future Macro-Economic and Investment Policy Framework

- i. Although public investment in the irrigated agriculture sector has been enormous in the recent past, there is a declining trend of investment at present which will be continued in the future.
- ii. The target of PIP for the next 4-5 years is about 9 percent of the GDP, which amounts to about Rs. 57 billion in 1995.
- iii. The priority of public investment allocation will be for the O&M of existing capital assets, before embarking on new projects.
- iv. However, in the case of those areas which the private sector cannot undertake on its own, due to lack of capital or technology, public investments will seek to fill the gaps.

6.2. A Framework for Future Irrigation Investment Policies

- i. Investment in complementary 'software' can be more productive than that in 'hardware' alone.
- ii. Investment should not be viewed solely as the responsibility of the government. The potential role of the private sector in investment should be duly recognized and encouraged.
- iii. As the country is now moving from a 'construction' phase to a 'management phase,' the level of public sector investments can be reduced, allowing the private sector including the farmers' organizations to invest in management, production, processing and marketing ventures that will improve the utility, productivity and profitability of the irrigation infrastructure already created by the government.
- iv. In the future, the investments should be planned for the 'irrigated agriculture sector' as a key component of the agriculture sector.
- v. The government public investment plan for irrigated agriculture will be about 9 percent of the GDP in the next few years. As the total public investment will range from 10

to 13 percent of the GDP through 1994, the investment for the irrigated agriculture sector will be about 1 percent GDP, which is an acceptable level.

6.3. Public Investment Priorities

- i. Investments required to achieve the modernization programme of the irrigated agriculture sector will not demand an increase in the level of public funding. Instead, what will be necessary is a re-allocation of the total available funds for the sector according to the order of priorities as indicated in para 3.2.1.

In addition to the direct investments in the irrigation sector, funds will also be required to improve and develop the necessary infrastructural facilities such as roads, bridges, telecommunication, housing, water supply and sanitation, for which funds will have to be provided outside the budgetary provision for the irrigation sector.

- ii. Complementary funds will be necessary for investment and this should be available from the private sector. One component of this requirement in respect of O&M and system rehabilitation will come from farmers' contributions. Commercial firms could contribute to the provision of infrastructure and for operation and maintenance or rehabilitation of irrigation systems in which they are given an opportunity to participate on a commercial basis.
- iii. In future, allocation of public funds for irrigation should be made in a manner that would clearly itemize specific programmes such as human resources development, institutional strengthening, modernization, research and development, etc., rather than allowing provision for these activities to be "included" in the main project estimates. The allocation should follow the prioritization of investments as described in sub-para (i) above.

6.4. Land and Water Conservation

A COMPLEMENTARY INVESTMENT needed for the long-term sustainability of irrigated agriculture is in upgrading and protecting watersheds. It is recommended that ministries and agencies dealing with land and water conservation should ensure that necessary proposals are formulated and submitted to the government for appropriate funding.

6.5. Private Investments

- i. The major options available for private sector investments are: provision of goods and services which directly support existing agricultural enterprises; processing of agriculture products; agricultural diversification; research and development; O&M and rehabilitation of existing irrigation schemes; and human resources development.
- ii. Substantial direct investment participation by the private sector in the development of the complementary infrastructure appears to be unlikely in the immediate future. This area of investment, therefore, will have to be borne by the government.

- iii. The government should create appropriate conditions at the levels of macro economy and agriculture sector to attract private investments.
- iv. At the macro-economic level, the government should demonstrate its capability to provide not only security from civil unrest but national economic stability; it should also be responsive to the private sector in dealing with trade and fiscal policies. The government should also establish conditions for free and competitive markets and remove impediments to investments by the private-sector parties, including farmers' organizations.
- v. The government should develop and communicate to the private sector a well-articulated plan for the development of the agriculture sector. It should also take effective measures to coordinate the implementation of the plan through the establishment of a "one-stop information center" and a coordinating mechanism to ensure collaboration between the public and the private sector in determining policies.
- vi. The government should clearly spell out its policy on food security vis-a-vis its crop diversification policy and elaborate strategies to implement it.