Policy Paper No. 1

Irrigated Agriculture and Irrigation Management in Sri Lanka:

Vision for the Next Decade and Beyond

IMPSA

IRRIGATION MANAGEMENT POLICY SUPPORT ACTIVITY

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Irrigation Management Policy Support Activity (IMPSA). 1991. Irrigated agriculture and irrigation management in Sri Lanka:Vision for the next decade and beyond. Colombo, Sri Lanka: Irrigation Management Policy Support Activity. viii + 15pp. (IMPSA Policy Paper No. 1)

/water resources/ irrigation management/ resources management/ crops/ diversification/ rehabilitation/ institutions/ water policy/ farmers' associations/ non-governmental organizations/ training/ research/ environment/ innovations/ rural development/ forecasting/ 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 and profitability in the 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).

IMPSA aims to develop specific policy statements and suggest implementation strategies to expand on and fill the gaps in the broad policy framework on 'participatory management in irrigation schemes' as outlined in the Cabinet Paper on this subject approved late in 1988. The proposals stated in that Paper contained only a skeletal framework establishing the main features of a joint-system of irrigation management in which farmers' organizations would be totally responsible for operation and maintenance of the smaller schemes and the distributary and field channels of the larger ones, whilst the government would manage and maintain only the headworks and main canals of the larger schemes. Though setting a clear and broad direction, the policy leaves many important issues related to implementation unresolved. IMPSA provides an opportunity for a fresh synthesis of experience and the refinement of policy to ensure the continued and timely transition to a new participatory management system.

For the execution of IMPSA, the GSL has 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 provide 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 consists of the Secretaries and State Secretaries of the relevant Ministries, together with the Heads of the Departments and Agencies under them. In order to carry out the numerous studies and activities that will have to be undertaken, IMPAC has established a 'Working Group' to manage the preparation of Policy Papers. A separate Secretariat

has also been established to facilitate the activities of the Working Group and to carry out the day-to-day work under the Programme.

Under the IMPSA Programme, ten Policy Papers are scheduled to be prepared and processed for presentation to the government within the total project period of 18 months ending December 1991. Each Policy Paper will be a concise statement of the recommendations of the IMPAC Working Group, and would be presented to IMPAC at a 'Policy Workshop' along with the related 'working papers' and a supporting presentation by the Secretariat.

This Document is the first of these ten Policy Papers. Its contents were the subject of the first IMPAC Policy Workshop held in early October, 1990, and of additional discussions afterwards. This final version was formally approved by IMPAC at a meeting on 8th March 1991.

Chapter 1

INTRODUCTION

THE PURPOSE OF this Paper is to propose an overall vision, a set of broad guidelines, principles, and objectives, for the future direction of irrigated agriculture policy in Sri Lanka, with an emphasis on irrigation management. The main focus of the vision is on irrigation management, especially the Policy for Participatory Management of Irrigation Systems. But it includes a broad look at the agriculture and water resources sectors, with special attention to the irrigated agriculture sector, in the context of the broader development of the country.

Irrigation management is the process by which the performance of the irrigated agriculture sector is enhanced on a sustainable basis through a systems approach for the development of the community, the society, and the country at large. The process encompasses six main dimensions.

i. Resources (e.g., water, land, capital, labour);

ii. Technical (e.g., assessment and acquisition, conveyance, distribution, application, removal of water);

iii. Socio-economic (e.g., income, equity, land tenure, access to resources, culture);

iv. Agricultural (e.g., productivity, crops and livestock, soil, terrain);

v. Institutional (e.g., marketing, extension, credit, training, agencies, organizations. legal system);

vi. Political (e.g., policies, legislation, regulation); and

vii. Research and training (for innovation and development).

This broad definition, the result of considerable discussion and compromise among competing versions, is the basis for the vision presented here.

Although the major focus of this vision is on irrigation management it must be seen in the context of irrigated agriculture in Sri Lanka. The irrigated agriculture sector must in turn be seen within the context of the larger agriculture sector, which in turn is embedded in the macro economy of Sri Lanka. Sri Lanka's economy in turn has a place within the larger world economy. Thus, it is necessary to make some basic assumptions about the world economic trends which impinge on Sri Lanka, about social and economic trends within Sri Lanka, and the likely trends

in the agriculture sector. The vision itself proposes certain actions to improve the irrigated agriculture sector, with particular but not exclusive reference to irrigation management.

This Paper draws from many different sources. The IMPSA Secretariat staff and the Sri Lanka Field Operations staff of IIMI exerted much effort in gathering data, thinking through issues, writing notes, and in preparing staff working papers. Further, a number of Sri Lankan and foreign consultants prepared draft staff working papers which were read, discussed, and analyzed by the IMPSA Team. Many available publications and other reports were also consulted. Members of the IMPAC Working Group participated actively in these activities. Perhaps most important, a broad cross section of interested people at all levels, from farmer representatives to scholars and agency officials, participated in a series of five consultative workshops and provided their suggestions for the vision presented in this Paper. This Paper reflects to a large degree a consensus among these various interest groups on what needs to be done to achieve a brighter future for the farmers of Sri Lanka.

Chapter 2

THE VISION

2.1. An Overview

BY THE YEAR 2000, the small farmers in Sri Lanka's irrigated agriculture sector will have made substantial progress in shifting from a state of poverty and barely meeting their subsistence needs, to increasing prosperity through the rising profitability of irrigated agriculture and complementary sources of income. They will be providing a good supply of reasonably priced food to the nation, and earning foreign exchange for the country through exports. Broadly speaking, the irrigated agriculture sector will be dynamic, diversified, efficient, equitable, productive, sustainable and participatory.

Irrigated agriculture will be dynamic in the sense that it will be characterized by rapid technological innovation, institutional evolution, and generation of increased employment and income. It will be diversified in the sense that a substantial shift will have occurred from mono-cropping of rice to diversified cropping to meet a variety of domestic and export markets; there will be a variety of new private and non-governmental organizations active in the sector, and there will be a variety of new ideas and new management styles in operation. It will be efficient and equitable in the sense that resources will be used more efficiently and productively, that there will be broad access to these resources by farmers who previously had few such opportunities and that there will be a general improvement in the quality of rural life, and more employment. It will be productive in that high yields will be a source of better incomes for farmers, and jobs for people. It will be sustainable because it will be based on a sound environmental and economic basis, and it will be socially just. And it will be participatory because it will be managed locally by people both individually and through strong local democratic organizations; people will participate in the benefits as well as in decision making and implementation.

In order to stimulate the synergy among these broad principles which would make the vision of a broadly prosperous and growing irrigated agriculture come true, there will be a number of transformations. First, a major transformation of the overall policy — the guiding principles — will be achieved. Second, based on new policies, there will be a major transformation in the institutions implementing them, a shift from administration to management; a shift from farmers dependent on the State to self-reliant small farmers organized into strong associations with the authority and ability for full management of their

resources; a decentralization and devolution of authority, control and coordination to local levels; and a shift in the role of government and private institutions from control to provision of services and support. Third, major technological innovations will be required. But these will be in response to the demand for them that will be created by the policy and institutional reforms; not imposed by the government and donors anxious for quick and large investments. And fourth, in order to make irrigated agriculture attractive to the best and brightest and spread the benefits of prosperity, greater attention to rural development, improving the overall infrastructure as well as the quality of life of the rural poor, is essential.

According to this vision, the future developments in the agriculture sector will occur in two phases. During the first phase, the remaining decade of the 1990s, two objectives will be realized:

i. Creating the conditions for an agricultural 'take-off,' to be underway before the year 2000 and to continue beyond this, by establishing the policy and institutional conditions that would enable the irrigated agriculture sector to absorb and use new technology investments profitably; and by actively encouraging applied research as a basis for identifying and adapting new technologies for the future; and

ii. Seeking immediate gains in profitability and labour absorption using the present technologies, including cost-effective modernization of irrigation schemes, and encouragement of private investment in divisible micro-technologies (for example, to exploit groundwater for high-value crops during the dry season).

The second phase will evolve major investments in new technologies to increase small farmer productivity based on applied research, and possibly a process of reorganization of production enterprises through a natural process of capitalization and consolidation, that is demand-driven, and financed by the profits of the sector itself. It could be well underway before the end of the 1990s, if the first phase process is successfully implemented. This process should be preceded by development in other sectors so as to absorb excess labour from the agriculture sector to the industrial sector.

This Paper focusses on achieving the objectives of the first phase.

2.2. Policy Transformation

THIS SECTION BRIEFLY outlines a few guiding principles that underlay and are integral to the vision. The following sections build on these, addressing institutional and technological issues slightly more specifically.

2.2.1. Water Resources

THERE IS PRESENTLY the need for a national policy, an adequate data base, adequate legal provisions, and an effective institutional framework for allocation, conservation, and use of water resources. By the end of the 1990s, there will be a

water resource law enunciating overall policy, a reliable data base, a strong effort for its continuing improvement, and a national institutional framework to provide the overall leadership required in this area. This will be addressed in greater detail in the 'Institutional Transformation' section below.

2.2.2. *Diversification of Crops and Livelihoods*

WHILE RICE WILL remain the most important crop produced in the irrigated agriculture sector, by the end of the 1990s there will have been a marked shift in cropping patterns to include a wide variety of improved traditional crops and entirely new crops that are ecologically adaptable. This will result in more intensive land use, and higher productivity of the scarce resource, water. In turn, irrigated agriculture will be a source of employment for many people, and will be sufficiently profitable so that the wages paid to agricultural workers will be more attractive than at present. Spinoffs will include a growing agro-industry presence in rural areas, adding value to the crops and creating additional employment.

The government will encourage this development through an import policy that ensures good returns for locally produced crops; through strengthened applied research and communication of the results to farmers; through incentives for competitive farmer co-operatives as well as through private firms to provide low-cost inputs, technical advice, contract farming, and purchase of produce at fair prices; and through incentives including technical advice, market information services, and tax breaks for growing export crops. The involvement of the private sector will, however, be subject to regulatory control by the government.

Attention will also be paid to the production of raw materials required for rural industry and the creation of a demand for agro-based industrial projects.

2.2.3. *Devolved Authority and Control*

BY THE END of the 1990s, the resources, particularly water and the irrigation systems conveying and delivering water, will be managed by strong, effective, and active farmers' organizations. While the State agencies will share overall control of large macro-level systems through joint-management with farmers' organizations, small and medium sized independent systems as well as sub-systems of large irrigation systems will be completely managed by locally based farmers' organizations. Coordination of necessary inputs will also be decentralized, and brought under the control of the people most in need of them. Some of the envisioned institutional arrangements are presented below, under 'Institutional Transformation.'

2.2.4. *Government Role as Facilitator and Provider of Services*

FOLLOWING FROM THE radical devolution of control, the role of the government, at all levels, will shift from direct control to facilitator, provider of services to local organizations, and regulator to ensure overall justice and fair play. Its role in regard to irrigation management will be primarily to create the necessary legal conditions and provide incentives to induce the development of responsible, strong farmers' organizations. These would manage irrigation systems and much of the input supply and sale of produce as well. The government will also provide technical services and training to local organizations; and act as a referee to ensure that the rules are followed and exploitation minimized.

The government will also take steps to increase the efficiency of its agencies responsible for the operation and maintenance of those parts of irrigation systems which will remain under the control of the government.

2.2.5. *Resource Mobilization*

BY THE END of the 1990s, farmers will be responsible for 100 percent of the operation and maintenance (O&M) costs of the portions of irrigation systems under their management. As they become more prosperous, in the long term they may begin to pay for some of the services provided by the State agencies, including O&M of main systems controlled by agencies, and technical and management services. This will be possible if by then, agriculture has become a profitable enterprise. The government will have in place provisions to assist farmers' organizations in planning and designing rehabilitation and modernization programmes, and providing services for their implementation at subsidized rates, involving long-term partial pay-back.

2.2.6. *Cost-Effective Rehabilitation and Modernization*

THE 1990S WILL be a period of completing the round of rehabilitation and modernization projects initiated in the mid-1970s. But during the 1990s, based on the lessons learned in the 1980s, these projects will be implemented so as to be cost-effective, respond to the real needs of farmers (i.e., demand-driven), contribute to developing farmers' commitment and sense of ownership toward their systems, and to act as a vehicle for building and strengthening farmers' organizations which would take over increasing management responsibility. These improvements will also lay the groundwork for the introduction of new technologies. In other words, these projects will be essential vehicles for achieving the vision for the future.

2.2.7. *Environment*

SRI LANKA WILL avoid the very serious long-term environmental problems faced by some other countries as a result of waterlogging, deteriorating watersheds, and

pollution caused by over-use of lethal chemicals. The proposed water resources policies will provide mechanisms to protect the water quality and along with a forward-looking forest policy, to protect the watersheds. Based on research and price incentives, farmers will use a minimum of chemicals for pest control, and will adopt technologies that are environmentally as well as economically sustainable.

2.2.8. Research

IT WILL BE the policy of the government to provide generous financial support to encourage basic and applied research by national research organizations in co-operation with international institutions. This will include incentives for private firms to undertake research where the State institutions cannot do so. Some of this research will be discipline-based for the development of appropriate technologies, for improved irrigation management as well as for better crop packages; and some will be multi-disciplinary applied research for solving management, sociological, economic, operational, and other problems. This will result in a firm basis for the long-term development of the agriculture sector.

2.2.9. Rural Development

IT WILL BE the policy of the government to direct a significant portion of the total public investment to rural development, so that by the end of the 1990s, rural infrastructure and rural services will provide a basis for both a prosperous agriculture sector and an improved quality of life. This policy will be consistent with the government's macro-level policy of encouraging industrialization in rural areas, to preserve Sri Lanka's decentralized residence patterns.

2.2.10. Other Issues

THERE ARE OTHER problems at present that will have been solved by the end of the 1990s. These are not directly within the present mandate of IMPSA, but they require serious attention and action to achieve the vision of a dynamic, profitable, labour-intensive irrigated agriculture sector. By the year 2000, the land tenure system will have evolved to be more flexible, with appropriate protection for small farmers; there will be a credit system that will work through farmers' organizations to provide cheap but non-subsidized credit to farmers; and a rational mechanization policy will enhance labour productivity without displacing workers.

2.3. Institutional Transformation

THE NATURE OF the most important actions that will be taken during the 1990s to achieve the vision will be institutional; indeed a new and vibrant institutional landscape is an integral part of the vision itself. The key weaknesses in the irrigated agriculture sector at present are managerial and organizational in nature. And the major achievements by the year 2000 will be in this arena. The vision includes a set of images of new institutions that will evolve from

the present institutional landscape; they will not be imposed at the expense of existing institutions.

2.3.1. Existing Government Institutions

2.3.1.1. The Irrigation Department (ID). The Irrigation Department will be strengthened and broadened, and its missions will have completed the evolution already underway in the early 1990s. The Department will have two key missions:

i. It will provide management and technical support services to the Provincial Irrigation Departments, as well as to the farmers' organizations managing irrigation systems; and

ii. It will manage, jointly with farmer representatives, the macro levels of large irrigation systems; it will also manage inter-provincial and inter-basin systems, in consultation with representatives of various water users.

It will also be the premier Department for applied research to solve practical problems of irrigation water delivery to farmers. Its applied research programmes will be linked to strong professional development programmes and to strong training programmes for managers of irrigation systems.

2.3.1.2. The Irrigation Management Division (IMD). During the remainder of the 1990s, the Irrigation Management Division will play a key role as a catalyst for bringing about the envisioned institutional transformations. In this role, it will work with the Irrigation Department, the Mahaweli Authority, provincial departments and farmers' organizations in the role of consultant and trainer, in short, as a catalyst or institutional organizer. By the year 2000, the degree to which the 'vision' will have been achieved will depend upon the effectiveness of this Division in establishing close working relationships with the agencies and farmers' organizations and strengthening them to carry out their mandates. One major implication of this vision is that the IMD will be relieved of the administration of rehabilitation projects and budget control of O&M; but its resources will be increased and its skills upgraded to be able to play the role of catalyst more effectively.

2.3.1.3. The Mahaweli Authority of Sri Lanka (MASL). The MASL will continue to play a key role throughout the 1990s, as the Mahaweli Development Programme is completed. During this period, the Irrigation Management Division will assist the MASL in implementing farmers' organizations on its systems to take over management responsibility as on other systems. By the

year 2000, as its projects mature, the MASL will transfer responsibility to the farmers' organizations at system and sub-system levels, and its macro-level management responsibilities to the ID and other relevant agencies.

2.3.1.4. *The Department of Agrarian Services (DAS).* Although the functions of the Department of Agrarian Services related to 'minor irrigation' will be reduced due to the devolution of authority to Provincial Councils, it will continue to retain responsibility, especially in respect of implementing the provisions of the Agrarian Services Act. It will also have responsibility for the development of farmers' organizations under minor irrigation systems and self-managed systems.

2.3.1.5. *The Department of Agriculture (DOA).* During the 1990s the Department of Agriculture will strengthen its own research capabilities, especially for applied adaptive research, and will develop strong linkages with national and international research institutions. To transfer increasingly productive and profitable agricultural packages to farmers, it will improve the linkage between research and extension. Extension work will be implemented through farmers' organizations to make it more cost-effective.

2.3.1.6. *The Ministries.* How to co-ordinate water and land resource policies, irrigation management, and agricultural support services is a problem few countries have solved completely. Since ministerial arrangements are often related to political considerations, the vision can only suggest broad principles. The most basic principle, given the devolution of control and shift in the government's role, is that ministries will focus on planning and policy making, and on broad supervision of the overall performance of implementing agencies. Further, the logic of the present trends is that national ministries will be smaller and can therefore focus on key issues, avoiding implementation details. Following are two of the possible directions to take. One is to reorganize the present ministries such that one ministry oversees support services for the agriculture sector (excluding tree crops), and a separate ministry oversees land and water resources. The other possible direction is for the existing ministries to evolve more effective co-ordination mechanisms to ensure a uniform and rational policy.

2.3.1.7. *The Provincial Councils (PCs).* The role of the Provincial Councils is still evolving and it is presumptuous to offer a detailed vision. But, basically, the PCs will play the same facilitating and support function, not control, as will be played by the national government. Being closer to the local level, they will be the mechanisms through which broad national policies will be adjusted to fit regional realities.

2.3.2. *New Institutions*

2.3.2.1. *Water Resources Policy and Planning Body.* The Water Resources Policy and Planning Body is intended to fill a serious gap in water resources planning and policy. The suggested Body will be a small technical secretariat at the national level, with no statutory authority to make policies or impose solutions. Rather, its business will be to:

i. Compile and manage a data base on the water resources of the country, including computer models needed for projecting alternative development scenarios; in doing this, the services of the existing relevant organizations will also be obtained;

ii. Arrange for research on key issues affecting long-term water resources conservation, allocation and use; and

iii. Advise the government on water resources policies; for example, the allocation of water among competing users, optimal uses of water in particular river basins, preservation of watersheds, and proposed trans-basin allocations of water.

This non-partisan, highly regarded technical Body will enable a rational, cost-effective policy that is fair to all regions and to the various competing users of water and that is environmentally sustainable.

2.3.2.2. *Unified Agency for Irrigation Management.* Whilst the individual irrigation agencies described above will strive to improve their efficiencies and usefulness to the farming community, the evolution of a single agency for irrigation management should be the long-term goal for the country. Although the details of such a transition cannot be worked out within the scope of the IMPSA Programme, it is suggested that this goal be held in focus in relation to all future activities within the separate agencies dealing with irrigation management.

2.3.3. *Local Institutions*

2.3.3.1. *Classification of irrigation schemes.* All irrigation schemes will fall into two categories: farmer-managed; and jointly managed. This will replace the old distinction between 'minor' and 'major.' Farmer-managed systems will be fully controlled and managed by locally based farmers' organizations. This will encompass all the schemes presently classified as 'minor' and 'medium,' and some 'major' ones that have independent water sources, or storage facilities for water delivered from a larger system.

Jointly managed irrigation systems will include very large systems which are inter-provincial or inter-basin, or in which there are technical reasons why it would be difficult for locally based organizations to manage them. Gal Oya and Walawe irrigation systems are examples. Farmers' organizations and the Irrigation Department will manage these systems jointly, with the latter taking final responsibility for the headworks and main canals. But clearly demarcated sub-systems would be controlled and managed by farmers' organizations that would obtain water in bulk from the Irrigation Department and would participate in joint-management at the macro level.

The government, through the Irrigation Department, but in consultation with representatives of water users, would continue to manage macro-level basin-based or inter-basin conveyance systems, particularly if they have multi-purpose functions. The premier example is the upstream Mahaweli facilities.

2.3.3.2. *Farmers' organizations.* The most important and central feature of the vision for the future, building on but transcending present trends, relates to the role of farmers' organizations. By the year 2000, many irrigation systems will have been turned over to farmers' organizations. There will be a legal framework to support this development, as well as clear, well-tested and effective strategies and incentives to encourage this turnover process.

Farmers' organizations will be fully responsible for the operation, maintenance, preservation, and improvement of any systems turned over for their control. They will have full financial responsibility and autonomy as well. They will be in a position to receive financial, managerial and technical assistance from the provincial or national Irrigation Departments, or from private firms. They will be responsible for planning any improvements they require, and for seeking assistance from the government for their implementation on a matching grant or on a low-interest loan basis.

These farmer-owned irrigation management organizations may choose to expand their services to members to include input supply, purchase and storage of produce, provision of credit, etc. This will be their option. As these organizations develop, they will become the key driving force creating a demand for, and using, increased investments in modern technologies.

2.3.3.3. *Local administration.* The roles of the district and divisional administrative levels are evolving. The AGA divisional level is presently becoming more important for planning and implementing agricultural activities, and it is being strengthened for this purpose. This trend may continue to the late 1990s, but as farmers' organizations expand their functions, the necessity for divisional-level support may be greatly reduced.

2.3.3.4. Non-governmental organizations (NGOs). The term NGOs refers to the various non-governmental organizations that are working with local people to assist them in social and economic development. By the year 2000, NGOs will have become even stronger than at present, and will continue to be a mechanism for experimenting with promising new social and management arrangements. They will have achieved a high level of professionalism that will attract support and enable them to continue making important contributions. The government will continue its policy of encouraging such organizations, subject to its regulatory controls.

2.3.3.5. Other local organizations. As irrigated agriculture becomes more profitable, and farmers gain experience and skills in managing organizations and commercial agriculture, various other local organizations will develop. For example, farmers may choose to revive co-operatives, form private firms for providing inputs or marketing their produce, or organize other kinds of associations for improving rural life. The government will continue to encourage the development of local initiatives.

2.3.4. Research, Training and Experimentation

TRANSFORMING SRI LANKAN agriculture into a modern, diversified, productive sector of the economy, and making it sustainable, will require strong supporting institutions for both research and training. It will also require a continuation and intensification of the spirit of experimentation that has characterized irrigation management for a decade. By the year 2000, the government will have strengthened existing national educational, training and research institutions by funding important research, providing incentives for researchers through rewards for outputs, and building excellent training programmes linked to research and practical realities for both professionals and farmers. The management institutions including 'farmers' organizations' will have developed a considerable capacity for identifying research questions, contracting for necessary research, and interpreting and adapting the results for improving performance.

2.4. Technological Innovations

THE KEY TO increasing and diversifying production, creating jobs, and raising profits, ultimately, is the application of efficient and effective technology. The policy and institutional frameworks discussed above are what make the adoption, improvement, and use of technology feasible; without these prerequisites, Sri Lanka is unlikely to be able to make the best use of modern technologies. What are the technologies most likely to contribute to achieving a prosperous, diversified, small-farmer based, irrigated agriculture sector? The vision includes a few basic focuses.

2.4.1. Raising Rice Yields on Wet-Zone and Minor Systems

BY THE YEAR 2000, the productivity of rice in wet-zone and village or minor systems will be higher than the 1990 levels. Presently, there is a gap between potential and actual yields in both wet-zone systems (which often have at least some supplementary irrigation) and in many minor irrigation systems; and the farmers in these areas have the lowest incomes. A programme of diagnostic and applied research to identify problems and practical measures to improve yields would produce immediate benefits in terms of both total rice production and raising the incomes of these disadvantaged farmers.

2.4.2. Modern Irrigation Technologies

BY THE END of the 1990s, through a programme of applied research and experimentation, Sri Lanka will have field-tested cost-effective technology packages for improving the efficiency and equity of water deliveries on gravity systems. In 1990, there were suggestions of immediate adoption of such technologies, but the one attempt at implementation was not promising. During the 1990s a research programme carried out by the Irrigation Department in collaboration with other research institutions will have solved existing problems and made an appropriate technology available. The institutional and policy initiatives of the 1990s will enable Sri Lanka to adopt these new technologies fast.

2.4.3. Crop Varieties, Soil and Water Management for Diversification

BY THE YEAR 2000, the country will have improved field-tested crop varieties and management packages that will enable farmers to take full advantage of these opportunities to modernize agricultural production. The packages will include cost-effective and environmentally safe pest and soil management techniques. The Department of Agriculture and other research agencies, including universities, will play a key role in developing and disseminating these packages.

2.4.4. Post-Harvest Technology and Agro-Based Industry

IN THE COMING years post-harvest technologies and agro-based industries will be introduced as a means of adding value to crops and also providing new employment opportunities in the rural areas. These developments will be undertaken largely by the private sector with adequate incentives and assistance provided by the government. The government will also support research in these areas in order to ensure the usefulness and sustainability of any efforts made in this direction.

2.5. Rural Development

IN THE LONG run, modernizing the agriculture sector cannot be separated from rural development and the improvement of human settlements. To make agriculture profitable and

ensure its continued expansion, the government, working with local and provincial authorities, will develop a modern infrastructure to support agriculture, including roads, electrification, and market places. But this alone is not enough: to make rural life attractive, and prevent overly rapid urbanization, the government will encourage the location of industry particularly agro-industry, in rural areas; and it will support expansion and improvement of schools, health facilities, domestic water supplies and other measures to improve the rural quality of life. The educational system will include an attractive and flexible curriculum of agriculture for aspiring farmers, and the school laboratories will be used to provide soil testing and other services to farmers, both as a service and as a training for students.

2.6. Investment Strategy to Support the Vision

THIS VISION OF the future requires an appropriate pattern of investments. In the near future, major investment in the creation of new irrigation systems should be limited. Investments during the next decade should instead focus on creating the conditions that would enable the absorption of, and achieving high returns from, future investments in modern technology. Four investment principles are suggested.

First, a major transformation of the institutions supporting irrigated agriculture is envisioned. This will require investments that support these changes, including training, development of human resources reforming the incentive structures of agencies, improved communications, and continued experimentation with various institutional options, particularly at the local level.

Second, the vision assumes that the present round of rehabilitation projects will be completed cost-effectively and in a way that contributes to achieving the policy and institutional objectives sustainably. This may require some re-allocation of planned investments between 'hardware' and 'software.'

Third, the vision requires a considerable investment in improving rural infrastructure and human settlements, and rural development works that both improve the efficiency of the agriculture sector (roads, markets, warehouses) and raise the quality of life (schools, health facilities, domestic water supplies). These should also contribute to employment creation.

Fourth, achieving the vision will require major investments in research and development, aimed at improving the research capacities of national organizations, including private firms, at developing technology and management packages for immediate gains in the field of irrigated agriculture and at testing and adapting appropriate technology packages to be implemented in the future.

By the year 2000, Sri Lanka's irrigated agriculture sector will be poised for take-off, through major new investments in modern technologies that will complete the transition, to a modern, dynamic, diversified and sustainable agriculture.

Chapter 3

CONCLUSION

SRI LANKA'S IRRIGATED agriculture sector is at the cross-roads. The goal set several decades ago, self-sufficiency in rice, has been nearly achieved and the gains made will be consolidated. A basis has been established to move forward to modernize the agriculture sector. Further progress requires a new vision, new goals, and the adoption of new policies, institutional arrangements, and technologies. This Paper has expressed a broad vision for the future as a basis for new and even more ambitious goals.

The vision is of a dynamic, prosperous, diversified, productive, and sustainable irrigated agriculture sector, which can meet domestic food needs and cater to the export market, employ large numbers of people at decent income levels, which can be an engine of growth for the modernization of Sri Lanka's economy, and which can provide the economic basis for further improving the quality of rural life so valued by the people. The central component of the vision is that farmers will be organized into strong associations to manage irrigation systems and other outputs, as well as to market their produce. The role of the government would be that of a facilitator and provider of basic services to support farmers' self-management.

The foundations for achieving these expectations have already been established. All that is required is to seize the opportunity and move forward, building on the present capacities and resources, and guided by a positive vision for the future. A productive and technologically advanced irrigated agriculture provided the economic basis for the ancient Sri Lankan civilization. It will do so again.