VISION OF IRRIGATION MANAGEMENT IN THE YEAR 2000

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Irrigation Management

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

(i) resources (water, land, capital, labor);

(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)

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

Irrigation management must be seen in the context of irrigated agriculture. The irrigated agricultural sector must, in turn, be seen within the context of the larger agricultural sector. The agricultural sector is a vital component of the macro-economy of the country which, again, is closely linked to the world economy. Thus, it is necessary to consider irrigation management not only in the context of purely local conditions, but also in relation to world economic trends which impinge on Sri Lanka.

Irrigation Management Policy Support Activity (IMPSA)

IMPSA is a programme to assist the Government of Sri Lanka in the implementation of it's accepted policy of participatory management in irrigation and settlement schemes, in order to improve productivity and profitability in the agricultural sector. It is a project initiated by the Ministry of Lands, Irrigation, and Mahaveli Development. It is sponsored and financed by USAID, and assisted by the Irrigation Support Project for Asia and the Near East (ISPAN) and 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 existing broad policy framework on "participatory management in irrigation schemes", as outlined in a Cabinet Paper on this subject approved in late 1988. The proposals state in that Paper contained only a skeletal framework establishing the main features of a joint system of irrigation management in which farmer organisations would be totally responsible for operation and maintenance of the smaller schemes and the Distributary and Field Canals of the larger ones, whilst the government would manage and maintain only the headworks and main canals of the large 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 concensus among the Divisions and Department 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 Mahaveli Development, and consists of the Secretaries and State Secretaries of the relevant Ministries, together, with the Heads of the Departments and Agencies under them. A seperate Secretariat has also been established to facilitate the activities of IMPAC, and to carry out the day-to-day work under the Project.

This Article is based on the first draft Policy Paper, which is now under consideration by IMPAC. It proposes 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 agricultural and water resources sectors, with special attention to the irrigated agricultural subsector, in the context of the broader development of the country.

Why A Vision?

In the past, there was no clear vision of how the irrigated agricultural sector should develop, especially in relation to the other sectors of economy. This has led, in many instances, to a fragmented and often contradictory set of policies and institutions that sometimes work at cross purposes. On the other hand, Sri Lanka has had more than a decade of important experimentation and research that has suggested the directions that the sector could take for the future.

The word "vision" in english has three meanings: the first is straightforward –

actual sight. The second refers to imagination, in the sense of unusual foresight or discernment. The third is something seen otherwise than by ordinary sight, through ecstacy or dreams, or revealed by a prophet – "Utopia" expresses this connotation. When we try to project a positive vision of what irrigated agriculture would be like by the end of this decade, and into the next century, we are indulging in a little bit of all three forms of "vision".

Human beings have been successfully and positively inspired by visionaries who proved to be prophets as well. And a vision providing a positive set of goals established through a combination of realistic analysis and imaginative thinking can make a major difference by channeling and inspiring efforts to work towards these goals. The vision presented here is the result, not of revelations during states of ecstacy or dreams, but of an attempt to think positively, imaginatively, but realistically.

A vision should not be constrained by present conditions. It should express what could be desirable and provide an overall direction, within which more detailed policies and implementation strategies can be established and pursued. It should also build on the positive trends and lessons learnt in the past, as well as seek ways to reverse any negative trends. The positive goals must be clearly accepted by all parties, and must then provide the reference point for all action taken to achieve them. Consensus, compromise and consultation must be the hallmarks of such an exercise. The development of such a "vision" should be preceded by an examination of the various issues, constraints, changes and trends related to the subject of irrigation management.

Changing Role of the Irrigation Sector

Development efforts in the post-independence period have been directed to the agricultural sector of the econmy, and especially to the rice subsector. After four decades of massive investments in the form of irrigation, research, and subsidies, the country reached near self-sufficiency in rice by the mid-1980s. Now that the long standing policy target of rice self-sufficiency is in close reach, agriculture is at a crossroads.

The future direction of the agricultural sector should considered in, at least, the following contexts. First, the macro-economic context. The economy envisages further, and accelerated, structural transformation. Without a healthy agriculture sector, particularly the food subsector it is difficult for an economy to attain long run economic development. With a well established base for food production, however, not only the food sector itself, but also the economy as a whole needs to be diversified. Sri Lanka has come to this stage of development. The existence of labor productivity disparities between the agricultural and non-agricultural sectors at this stage makes economy-wide diversification imperative. An important role of agriculture in economic development is to supply resources, financial as well as human, to the rest of the economy. Now that the food production base, particularly the irrigated land base, is well established, the food subsector, the irrigation sector in particular, is expected to contribute, rather than continue to absorb resources from the other sectors.

Second, within the agricultural sector, emphasis should be place on both the tree and food crop subsectors. The tree crop sector will continue to perform an important role in earning foreign exchange, notwithstanding the continuing weakness in international terms of trade. Third, within the irrigated sector, it is fortunate that the country was able to attain rice self-sufficiency just when the development potential of the irrigation land base has reached its practical limit.

The massive investments in irrigation construction in the past four decades have almost exhausted the potential for creating new irrigated land. Costly large-scale water resource development projects are unlikely to be economically feasible in the near future. However, this does not mean the future prospects of the sector are dim.

Although Sri Lanka has been successful in increasing rice production by rapidly expanding the irrigated land base, the performance of irrigation schemes constructed thus far has been far less than expected. Available evidence indicates that there is ample scope to improve this performance through better irrigation management. Given the irrigated land base presently in place, a considerable additional extent of crop area could be brought under cultivation for rice and other non-rice crops if the cropping intensity were increased from the present levels. Thus, the foremost effort in the irrigation sector should be directed to improving the performance of existing schemes.

This shift in emphasis is consistent with the role of this sector in the macro-economic context. Since the new efforts will mainly take the form of human and organizational improvement, the financial resources required are far less as compared to the construction phase, releasing substantial capital funds for the rest of the economy. An important role of this sector will be to supply food to the expanding non-agricultural sectors at reasonable prices. Rapid industrialization critically depends on the cost of labor. In addition to staple foods, the demand for non-staple (higher value) food items will increase. The irrigation-sector must, and can, fulfill these new demands. Further, the sector can earn foreign exchange by producing export crops to contribute to the country's balance of trade. All these demands on the sector should be managed within the irrigated land base now in place through enhancing of performance of existing irrigation schemes and the productivity of irrigated agriculture.

Finally, the new direction to be pursued by the irrigation sector must be consistent with the broad policy framework mentioned earlier. The future process of structural transformation in the country will be the diversification of the economy, including crop diversification in the irrigated sector. What is needed in this diversification is **flexibility**, which can only be provided by well functioning markets. In spite of many loopholes inherent in the market mechanism, it is the only way to deal with a diversified economy effectively. Any economic policy must make the best use of this mechanism, while rectifying its short-

comings, by encouraging entrepreneurship in the private sector, including among farmers. Since the irrigation schemes and their service have inherent characteristics of public goods, how to establish future policies that reconcile these two countervailing factors will be the most challenging field in the irrigated agriculture sector.

Rice Self-Sufficiency

Observing the long term trend until the mid-1980s, Sri Lanka had attained near self-sufficiency in rice. Since then, rice production has been stagnant, or even declined slightly; after reaching the record high level of 2.9 million metric tons in 1985, total rice production in the subsequent years has been less than this level, and an estimate for the 1989 production is 2.1 million mt. One immediate cause for this stagnation in rice production has been the stagnant yield at around 3.5 mt/ha. The basic reasons for such stagnation are not clear, but possibilities include low rice prices relative to input prices, unfavourable climate, and social unrest. The real causes need to be studied carefully. However, it is unlikely that this stagnation represents a systematic long term trend. Because of the stagnation in rice production in the late 1980s, the rice self-sufficiency rate declined from a high of 98% in 1984 to about 80% in 1989. One may argue that rice self-sufficiency is still far away. However, given the relatively low population growth rate, and the potential of rice production, it does not seem difficult to attain rice self-sufficiency.

A more important question is whether 100% rice self-sufficiency should be attained at all. Even if possible, it may not be wise to target full self-sufficiency for all years, which may result in an accumulation of undesirable rice surplus, given the large year-to- year fluctuations in production due to climatic conditions. A feasible approach is to target a range of, say 90-100%, and to manage marginal deficits through import and reserve stock operations. In any case, it is important to establish a clear and firm (but not rigid) rice policy: since rice holds, in the food agricultural/ irrigation sector, an overwhelmingly important position decision making in the sector will be restricted significantly without a clear rice policy.

Crop Diversification

Crop diversification has become increasingly important since the rice sector hit near self-sufficiency in the mid-1980s. Also, this was the time when the relative price of rice hit a historic low. The entire economy needs to be diversified as the structural transformation goes on; therefore, crop diversification is a necessity. However, several points must be made clear.

First, crop diversification in the irrigated sector must be considered in relation to rice policy. Second, crop diversification is a never ending process in which the target is always moving. The choice of non-rice crops for replacing rice depends on the relative return from the crops, which in turn depends on prices. As prices change, farmers have to shift quickly from one crop to another. Thus, diversified cropping is in sharp contrast with rice monoculture where a policy target, such as rice self-sufficiency, can be a clear-cut, stationary one.

Third, this nature of crop diversification requires flexibility in farming both in obtaining necessary inputs and in marketing outputs, flexibility that only an efficient market system can provide. The success of crop diversification critically depends on evolving such a market system. Flexibility must also replace rigidities presently characteristic of irrigation scheme management.

Fourth, as long as crop diversification in the irrigation sector is with, instead of totally away from, rice it is handicapped in terms of exploiting comparative advantage and scale economies that virtically or horizontally specialized systems can enjoy.

Fifth, although it is said that non-rice crops give higher returns than rice, the list of such crops is short many traditional food crops, such as maize and legumes, generally perform poorer than rice planted under good irrigated conditions. To introduce these traditional crops into irrigation schemes to increase agricultural income, it is necessary to increase cropping intensity substantially through saving irrigation water. There are high value non-rice crops, such as chili and onion among traditional crops and gherkins and asparagus among exportable crops, that perform better than rice. These high value crops are generally extemely capital and labor intensive.

Finally although for both policy makers and farmers there is a temptation to rely on price supports and subsidies in pursuing diversification, neither the basic policy framework nor government budget austerity are consistent with this idea, except for some measures to minimize risks inherent in non-rice crop production including tariff measures.

In sum, crop diversification in the irrigation sector is inevitable, but there are many difficulties in promoting it. Without serious efforts to overcome these difficulties, successful crop diversification in the long run will never be attained. Crop diversification in the irrigated sector is nothing but the structural transformation of the sector. This transformation is intrinsically a time consuming process. One may not expect that the process will result in instant success; it will evolve over time.

Rehabilitation and O & M of Major Irrigation Schemes

As already noted, the performance of the major irrigation schemes has been less than expected. This has been due largely to inadequate operation and maintenance (O & M) of the schemes after construction. Since the 1950s, the share of O & M expenditures in the total irrigation investments has remained at about 4%. Thus , inadequate mobilization of resources is one serious dimension of this problem. There are now a large number of research reports showing that attention to improved water management could result in very significant improvements in the performance of irrigation systems. In addition to improved water management, it is clear that the level of maintenance has been inadequate for preventing deterioration of the systems.

Contd on page 38

Contd from page 9

The rapid deterioration of irrigation systems has led to a need for their rehabilitation much earlier than expected. Since the late 1970s, many rehabilitation projects have been implemented, and the share of rehabilitation in the total irrigation investments has increased to 15-20 percent. Sri Lanka has been a pioneer in experimenting with cost-effective improvement strategies, and using rehabilitation projects as vehicles for institution building.

Although returns to rehabilitation investments are generally considered better than new construction investments at present, some rehabilitation projects have not been successful and have been too costly compared to the benefits. On the other hand, the experience of the first successful major rehabilitation project, on the Gal Oya Left Bank, clearly indicates that attention to institution building during project implementation and to O & M after the project are critical to the success of rehabilitation. Currently, the Irrigation Systems Management Project and others are building on these lessons, and attempting to promote strong farmers' organizations which would work in partnership with the agencies for improved joint management of irrigation systems. Investments in cost effective rehabilitation for sustainable O & M will be of central importance to improving the performance of irrigated agriculture during the next decade.

After a long period during which the state had assumed the financial responsibility for system O & M, attempts have been made to mobilize resources from farmers in the form of irrigation fees since the late-1970s, without success. It is said that the fee collection scheme does not fit into Sri Lanka's socio-cultural context. There exists, however, a consensus that the farmers must contribute to O & M; farmers also agree to this principle. The present efforts at turning over distributory systems to farmers's organizations is part of a broad effort to induce farmers to share the costs of O & M. Further programmes will build on these important efforts.

Research & Extension

Sri Lanka can be proud of her past accomplishments in research as far as rice, particularly, its breeding program, is concerned. New rice seeds, starting from old improved varieties, the first of which was released as early as 1957, coupled with increasing fertilizer application and irrigation development, have brought the country to near self-sufficiency in rice. Rice research will continue to be important, but with a slightly different emphasis. Research to bring about further breakthroughs by applying new bio-technology, is needed for increasing yield potential.However, of more practical importance, and more cost effective, will be adaptive research which focuses on developing specific technology by which the productivity of rice in different agro-climatic regions in the country can be increased and the yield gap between the potential and actual can be reduced.

Research on irrigation management has been burgeoning in the last decade or so. Further advances can be expected in this field, both in engineering and institutional aspects, particularly the latter. As repeatedly pointed out, it is imperative to increase the productivity of irrigated agriculture through improving the performance of existing irrigation schemes, particularly cropping intensity. How far the irrigation sector can satisfy this need critically depends on research; and this in turn depends on improving national capacity for doing the research.

Effective agricultural extension is as important as research. It has done a good job in the case of rice. As the diffusion stage of rice technology is still going on with more location specific features, the role to be played by the extension service will be even more important than in the past. The needs for crop diversification and better water management with farmers' participation will demand intensive, effective and specialized extension services.

Water Resources

A specific area requiring urgent attention in relation to water resources development is watershed management. This can have a very significant impact on the quantity, timing and quality of runoff available for downstream uses. At present there is evidence of severe deterioration and mis-use of some watersheds. As demands for water increase, the supply will become increasingly erratic unless there is an integrated sustained effort to formulate and implement appropriate policies, carry out applied research on alternative solutions, and monitor and evaluate the results of interventions.

The quantity of water used for domestic consumption is relatively small compared to other demands such as irrigation supply. But it is difficult to provide this supply at the place and time it is required. Presently, reliable estimates of the water used for different purposes (drinking, industries, irrigation, hydropower, etc.) are not readily available. A major constraint to evolving sound policies for water resources development and utilization is that reliable data are not available for assessment of water availability and present patterns and practices of water use. One of the first priorities in the water sector will be to update the data base on present availability and utilization. Data collection, verification and processing, preservation, and computerization of the data, are of vital importance and should receive foremost consideration. The importance of assessing water quality is also increasingly felt due to the increase in human activities related to water quality, use of fertilizer, chemicals, erosion, sedimentation, etc.

Water can no loger be considered a free commodity; with increaed use of water, a practical and pragmatic water policy is very important. At present, there is no water policy to provide guidelines, and no organizational and institutional principles to determine and prescribe how water resources should be explored, managed, allocated, and used. The water policy so formulated must be consistent with overall socio-economic and environmental policies in general, and in particular with the sector policies directly related to land and water use. Water legislation is also needed as a means of enforcing policy and for regulating implementation decisions. There is no central organization responsible for controlling or coordinating water.

resources activities. A central water policy and planning institution at national level for policy formulation and allocation of water between competing sectors and regions could ensure an integrated and co-ordinated approach towards allocation and development of water resources.

Sri Lanka also has no "master plan" for water resources at present. Such a plan should cover the entire island, take into account the water availability (surplus/deficit) in each of the river basins, and provide a long-term perspective using available modern technology, constantly revised and updated. In preparing the plan, the socio-economic and environmental dimensions as well as the cultural system of the people should be taken into consideration in addition to sectoral and regional interests in formulating this plan.

Irrigation management Institutions

The irrigtion management institutions can be categorized as (1) government agencies and (2) non-government organizations (NGOs) and farmers' organizations. The major government agencies involved in irrigation management are: the Irrigation Department; Irrigation Management Division; Mahaweli Authority of Sri Lanka (especially the Mahaweli Economic Agency); Department of Agriculture; and Department of Agrarian Services.

The term "farmers' organizations" as used here refers to those established for irrigation management purposes. Establishing organizations focused on solving water problems, with the freedom for the group to choose to tackle other problems once it has gained some experience, seems to be an effective strategy in most cases. The experience of the last decade demonstrates clearly that when coupled with some bureaucratic reorientation so that officials work with and support the organizations, and when the farmers can see real benefits from participating, farmers' organizations can play a critical role in improving irrigation management and more broadly, productivity and profitability of agriculture. The major impediments to progress now are: the lack of a legal framework to legitimize their existence and roles; the shortage of trained catalysts; the need to further reorient departments to work with farmers organizations effectively; and the need for more training of farmer representatives in management skills. In order to overcome these and other constraints it will be important to establish a clear vision of what the role of farmers' organizations is to be in future, how they would relate to government and private agencies of various kinds, and based on these, what should be the implementation strategy to achieve the objectives.

The subject of Irrigation Management Institutions has also been dealt with exhaustively in another Paper in this issue, authored by Dr Douglas Merrey, Head, Sri Lanka Field Operations, International Irrigation Management Institute.

The vision of the future

By the year 2000 the small farmers in Sri Lanka's irrigated agricultural 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 agricultural sector will be dynamic, diversified, efficient and 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, 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 effeciently and productively, there will be broad access to these resources by people who had previously had few such opportunities, and there will be a general improvement in the quality of rural life. 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 have 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 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, a number of transformations will have taken place. First, a major transformation of overall policy – the guiding principles – wil be achieved. Second, based on the 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 organizations 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 government and donors anxious for quick and large investments. And fourth, in order both to make irrigated agriculture attractive to the best and brightest, as well as spread the benefits of prosperity, greater attention to rural development, improving the overall infrastructure as well as the quality of life for the rural poor, is essential.

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