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# SHARED CONTROL OF NATURAL RESOURCES

- An Integrated Watershed Management Approach  
to Optimize Production and Protection -



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# SHARED CONTROL OF NATURAL RESOURCES

## - An Integrated Watershed Management Approach to Optimize Production and Protection -

- C.M. WIJAYARATNA<sup>1</sup> -

### INTRODUCTION

In Sri Lanka, there is an urgent need for more intensive, but environmentally appropriate, utilization of its natural resources base, particularly land and water resources, for profitable and sustainable agricultural and related industrial production. Many efforts at fulfilling this need are already underway. There is an increasing body of evidence from Sri Lanka and other Asian countries that farmers, even those with very small holdings make production responses to the economic environment within which they carry out their agricultural activities. These responses are influenced by the degree of control the farmers can exercise over their means of production, and the availability of information about market conditions and opportunities, and the necessary supporting services. In Sri Lanka, even the modest increase in control over water achieved by the farmer groups in projects such as the Gal Oya Water Management Project (GOWMP), the Integrated Management of Irrigation Systems (INMAS) Project and the Irrigation Systems Management Project (ISMP) through their group participation in Management has resulted in significant increases in agricultural production and greater efficiency in the use of land and water resources. Increasing the users' share of control over natural resources through group action and their active participation in making management decisions are, therefore, widely recognized to be vital pre-requisites to improve management of these resources, and interventions aimed at improving natural resources management through local control are known to yield high rates of return.

This paper will briefly examine a conceptual framework and strategies built into a novel approach to enhance the share of user control over natural resources (land and water) through state-user partnerships that contribute to intensified and sustainable agricultural production while protecting the physical, biological and social environments. These concepts and strategies were developed through a unique participatory project design process spearheaded by a core group of senior government officials who are closely associated with the management of land and water resources of Sri Lanka, and nominated by the Ministry of Lands, Irrigation and Mahaweli

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The concepts and strategies presented in this paper had been developed jointly by a team of experts employed by IIMI and a core group of senior government staff, in consultation with a large number of farmer beneficiaries, government, NGO and private sector groups at different levels. IIMI-SLFO facilitated this process and the financial assistance was provided by USAID. Please refer Annex 1 for details of the design process.

Development (MLIMD). The process was designed and facilitated by the International Irrigation Management Institute (IIMI) and financed by the United States Agency for International Development (USAID). The three month design process included a review of past experiences in the management of natural resources in Sri Lanka and elsewhere, a series of consultations with a cross section of resources user groups, government officials, development banks, representatives of non-governmental organizations at all levels in two selected provinces, viz. the North Central and the Southern Provinces, two participatory project design workshops for provincial officials, two workshops for national/provincial level policy makers and selected resource consultants and technical assistance from IIMI staff and three international resource consultants. (Please refer Annex 1 for details).

The SCOR design was built on the progress already made in Sri Lanka in Irrigation Management and in social forestry. It applies an organizational approach on a watershed basis and the appropriateness of the approach will be tested and demonstrated in two watersheds (namely Huruluwewa in the North Central Province and Nilwala in the Southern Province) chosen for their differing social, agricultural and environmental characteristics.

In order to discuss the concepts and strategies of SCOR, the paper is organized into five sections. Following this introduction, the Section II will briefly examine the major constraints to natural resources management and sustainable productivity in agriculture. Even though the activities planned (for the pilot test of SCOR strategy) cover a broad spectrum, four integrating themes can be identified:

- a) improving the incentive and institutional context in which natural resources - based economic activities take place;
- b) encouraging the combination of productivity and sustainability and fostering the internalization of environmental considerations into decision making;
- c) enhancing governmental, group and individuals' information and understanding about environmental problems and potentials; and
- d) improving co-ordination and integration of projects/activities involving land and water management within watersheds.

The constraints analysis has facilitated the identification of these integrating themes and the potential for improving the management of the natural resources base. This in turn has helped define the goals, objectives, approaches, strategies and activities proposed for SCOR. These are outlined in section III.

A brief account on the assessment and evaluation of selected benefits and costs is included in Section IV. Ex-ante economic analysis of projects like SCOR is far from straightforward. Even the financial cost-benefit analysis, which ignores shadow pricing, externalities and other indirect and intangible costs and benefits, cannot be used in such projects

because the value of some important benefit streams is difficult to predict and estimate. Improving user rights and participation in the control and management of natural resources is different from supplying them with irrigation infrastructure, inputs, etc; hence the link between project inputs and results is an indirect one. A detailed analysis of costs and expected benefits is beyond the scope of this paper and Section IV will only identify the major benefit areas of the SCOR strategy. Section V presents a Summary.

## 2. CONSTRAINTS TO SUSTAINABLE INCREASES IN PRODUCTIVITY IN THE WATERSHEDS

A participatory analysis of constraints to and potential for sustainable increases in productivity in the watersheds had paved the way to SCOR design. Four types of major constraints have been identified in relation to the environmentally appropriate increase in production:

- a) The lack of a production environment that motivates the resources user to effectively manage the combination of resources essential to maximize economic production;
- b) The lack of an effective combination of education, incentives and mechanisms to enforce penalties that encourage internalization of environmental considerations into management decisions;
- c) The lack of adequate information about the land and water resources management, at appropriate levels.
- d) Institutional constraints including inadequate co-ordination between projects/activities of land and water resources development.

### 2.1 An Inappropriate Production Environment

Sri Lankan farmers' response to economic incentives and disincentives is clear, as evidenced by the change in farmer cropping practices, in Mahaweli System H and certain other areas taking comparative advantages from dry season rice planting on well-drained red-brown soils to the production of chili, when the Government policy of importing chili to maintain a low consumer price was modified to permit a greater profit to domestic producers. In these soils, the shift to the more suitable other field crops (OFCs), has resulted in a much more efficient use of the valuable irrigation water, as well as an improved fertilizer efficiency. The latter has also undoubtedly, resulted in substantially reduced leaching of nitrates to the groundwater, providing an important environmental benefit.

However, it is also clear that in many countries there are disincentives associated with a number of practices designed for environmental protection. In some cases the disincentives are economic while in others they are institutional. For example, when physical works such as terraces and protected waterways, or tree planting are required, the time necessary to recover the costs usually is too long for the resources user to bear. The customary way to reduce this economic disincentive is to pay some or all of the cost incurred in following this practice. In the U.S., conservation payments are made for a wide range of environmentally beneficial practices. Local communities make the decision on the type of practices which should receive payments in their communities, thereby reflecting local knowledge and priorities. (Levine, 1992)

Another factor essential to sustainable production is sufficient security of tenure for farmers to utilize specific areas of land over an extended period. This reduces the temptation for exploitative land use, and permits recovery of investment in production and environment protection practices that takes relatively long cost-recovery periods. Security of tenure is usually assured by ownership title, but other mechanisms are available to provide effective security. Settlement schemes offer de facto security, as do various types of traditional tenancy.

However, the security of tenure alone is not sufficient to ensure that farmers will make economically and environmentally sound decisions. The size of the operating holding should permit viable and sustainable production. While there is evidence that there are individual small holdings which are or could be made economically viable, very small fragmented holdings are, generally, not conducive to either optimization of agricultural practices or to the application of environmental protection practices. Large operating holdings could permit a reasonable degree of optimization in the use of the available natural and human resources. However, the resources of individual holdings could be pooled together to bring about the same advantages without changes in tenurial rights.

There must be a supportive production environment. Production inputs, such as credit, seeds, fertilizer and technical information must be available at reasonable effort and cost. The total costs to farmers, particularly small holders, often include a high proportion of "transaction costs", those monetary and non-monetary payments that are associated with obtaining necessary approvals, ensuring timely availability of inputs, etc. These costs frequently result in decisions significantly different from those that would result if they did not constitute a factor.

Some of these input constraints may be reduced through organized group action. This is important in respect of two aspects, (1) the impact on the ability to organize for group economic activity and (2) the availability of supporting services. Small landholders and other individual resources users experience significant difficulties when they attempt to expand and/or modify their economic activities. Even when they have reasonable security of tenure, they find it difficult to obtain adequate financing, to gain from economies of scale, and to benefit from available professional services. Under such circumstances, organizing into groups with appropriate legal rights provides an effective mechanism for overcoming these difficulties. The experience in Sri Lanka indicates that although some groups have been able to overcome some

of the credit and scale constraints even without appropriate legal rights, this result is much more difficult to achieve. The SCOR Project will build on past experience of group economic activities - notably of the water user groups in major irrigation schemes - and promote group efforts in water and land use in the watersheds.

## 2.2 Failure to Consider Environmental Impacts

Sri Lanka has a long history of cultural sensitivity to the environment. Unfortunately, the combination of increased population pressure, the push for development and modernization, and inappropriate government policies has seriously eroded this sensitivity. The impact of this loss, expressed in accelerated environmental degradation, is difficult to address in the agriculture sector, especially in the small-holder subsector. The typical processes used for environmental protection in the industrial sector -- establishment of environmental standards, monitoring of impacts, and enforcement of rules -- can be effective because most of the environmental-impacting practices can be identified with the individual producer. In the agriculture sector, particularly in farming, adverse impacts are usually the result of the **cumulative** effects of the actions of many, and cannot be identified with individuals against whom corrective actions can be taken. These problems, typically of a non-point source, cannot be effectively dealt with using the point source control mechanisms. These cumulative effects, such as erosion resulting from inappropriate cultivation practices, pesticide and nitrate contamination of groundwater and nitrate or phosphorous eutrophication of tanks and streams, are the result of decisions made in the normal course of farming. Unless those actors are informed by the knowledge of potential impact, and unless reasonable alternatives exist for these cultivation practices and the management of those chemicals, environmentally inappropriate decisions will continue to be made (Levine, 1992).

Other environmental impacts may be the result of failure to use appropriate protection practices because they are technically too difficult or too expensive. Erosion control practices that require physical structures are illustrative. In this case, to reflect and protect public interest, and to encourage its adoption considerable technical assistance, training and new incentive structures may be necessary.

While most agricultural environmental impacts are from non-point sources, some, such as those resulting from inappropriate irrigation or accelerated erosion resulting from inappropriate (or illegal) cutting of trees on fragile lands can be identified with individuals. In these cases, more often than not, penalties are proposed to generate corrective action. However, education, training and technical assistance, understanding of alternative use, incentive structures, reduction in pressures to utilize environmentally fragile lands and participatory protection of natural resources are usually much more effective in internalizing environmental considerations into agricultural decision making.

Customary economic incentives, such as product prices and market stability must also be such that production of resource appropriate crops can be profitable. Government policies

on price fixing, property rights, importation of agricultural products, and other forms of regulation of agriculture and natural resources influence farmer decisions. These influences can produce positive or negative effects on the utility of the natural resources.

### **2.3 Inadequate Resource Information**

To understand environmental cause and effect relationships, and to evaluate their physical, economic, and social impacts, information on the environment must be available at a scale that permits appropriate decision making. For this information to be available, data must be collected, processed, analyzed and made accessible in usable form by the decision makers and users. Unfortunately, there is a serious lack of this basic information, particularly at the level of detail necessary for agricultural and resource utilization planning. In addition, even the available data are not conveniently available to those who could best benefit from them.

To assist in the identification of potential opportunities, the information must encompass a wider range. Information on technology, infrastructure, water sources, population centers, marketing, etc., become important when attempting to discover new economic potentials.

Computer-based data handling systems are now available to quickly and efficiently manage spatially defined data, and to permit their combination according to different criteria. The resulting combinations can be displayed readily as maps, charts, tables, or other forms of dissemination. These Geographic Information Systems (GIS) are being adopted rapidly by planning agencies, private firms and others involved with natural resources management and utilization. In Sri Lanka, the Land Use Policy Planning Division with ADB support is developing a major land use GIS data base, which could, and probably should be the foundation for a much more inclusive data base.

### **2.4 Institutional Constraints**

The Natural Resources and Environmental Policy Project (NAREPP) Paper (USAID, 1990) identifies four major institutional constraints relating generally to the management of environmental resources in Sri Lanka:

- a) weak institutional capacities for natural resource management in the public and private sectors;
- b) limited on-the-ground experience with alternative public-private partnerships in natural resources management;
- c) insufficient numbers and quality of personnel in and out of government, trained in basic skills of impact assessment;

- d) limited opportunities for public review of government plans and decisions and for informed public participation.

In addition to these general institutional constraints, to which NAREPP is responding, primarily in relation to the needs of the government at the center and formal private sector (with specific emphasis on the coastal zones and the urban-industrial sector), there are other institutional constraints of special relevance to the rural agricultural sector:

- a) inadequate institutional environment to foster new, sustainable production opportunities;
- b) user groups nonexistent or too weak to participate in planning, management and control of natural resources;
- c) resource tenure arrangements that inhibit adoption of sustainable production and conservation practices;
- d) a lack of coordination among agencies, donors, projects, levels of government and resource users with respect to the use of natural resources;
- e) a lack of supporting services for the identification and implementation of sustainable production and protection practices;
- f) inadequate environmental consciousness with respect to potential impacts of agricultural and nonagricultural production decisions at various levels.

The SCOR strategies are directly aimed at reducing and/or removing these constraints.

## 2.5 Inadequate Co-ordination Between Projects/Activities

Many past efforts, with their emphasis on immediate gains and centralized, but poorly co-ordinated, have inadequately addressed the need to manage and utilize the natural resources that are the basis for continued production and development, more efficiently, effectively, and in a sustainable manner. Moreover, the number and variety of projects currently underway to improve the agricultural production sector, to rehabilitate and improve irrigation infrastructure, to enhance the capacity for appropriate planning and implementation of natural resources-based activities, and to increase awareness of environmental problems are such that the potential for overlap, duplication, and conflict, as well as for synergistic benefits exists. Effective communication and cooperation as well as co-ordination and integration of activities involving the management of natural resources are necessary to maximize benefits, to reduce costs and to avoid conflicts.

Local or community control of water and land resources in the watersheds should, therefore, enhance the efficiency of monitoring and imposing penalties.

### 3. SCOR - OBJECTIVES AND APPROACH

SCOR is built on the progress already made in Sri Lanka in participatory irrigation management and in social forestry and on similar experiences elsewhere. The focus on watersheds as basic planning, co-ordinating and implementation units is a unique feature of the SCOR project. For project purposes, watersheds are defined as comprising the catchment, reservoir, command and drainage areas. The project will promote integrated planning for land and water resources utilization in these areas, gradually transforming the strategy of development of the resources from "project" mode to a "programme" mode. In order to facilitate this process of internalization, the project will help strengthen the capacity of the provincial administration, Divisional Secretariats and line agencies at those levels.

The project's goal is to increase the sustainable productivity of the natural resources base in Sri Lanka in ways that will improve people's livelihoods beneficially and equitably now and in the future with due regard for the environment.

The purpose of SCOR is to increase the share of users' control over land and water resources in selected watersheds through state-user partnerships based on formal agreements that contribute to intensified and sustainable agricultural production while conserving the physical, biological, and social environments. The project is designed to strike a balance between "production" and "protection" in relation to the utilization of land and water resources in selected pilot watersheds through the intensification and institutionalization of participatory processes coupled with appropriate technologies.

The project activities are designed to contribute to its goal and to achieve its purpose and are planned to be mutually reinforcing. The specific SCOR objectives are:

- a) To improve the incentive and institutional context in which land and water related activities are undertaken in pilot watersheds (Huruluwewa and Nilwala) through appropriate modes of production and state-user partnerships so as to ensure both productivity and sustainability of these resources;
- b) To get resources user groups and managers to consider environmental implications of land and water use more explicitly and to internalize environmental considerations in decision making and implementation at all levels;
- c) To enhance governmental, group and individuals' information and understanding about potentials of and prospects for natural resources (land and water) base for production and protection; and

- d) To strengthen the capacity of the Provincial/Divisional level government authorities in planning for land and water resources utilization in an integrated manner, gradually transforming the strategy of development of land and water resources from a "project" mode to a "program mode".

A logical framework, relating SCOR inputs to expected outputs, effects and impact, is presented in Figure 1. SCOR project has been designed to take a 6-year cycle - after an initial one year period of participatory planning and organization, the experimentation and replication will take about two years. Consolidation and institutionalization phases will take about three years.

### 3.1 Project Approach And Implementation Strategy

The project activities will be implemented in selected areas of two pre-selected pilot watersheds - Huruluwewa and Nilwala River basin, located in the North Central and Southern Provinces respectively.

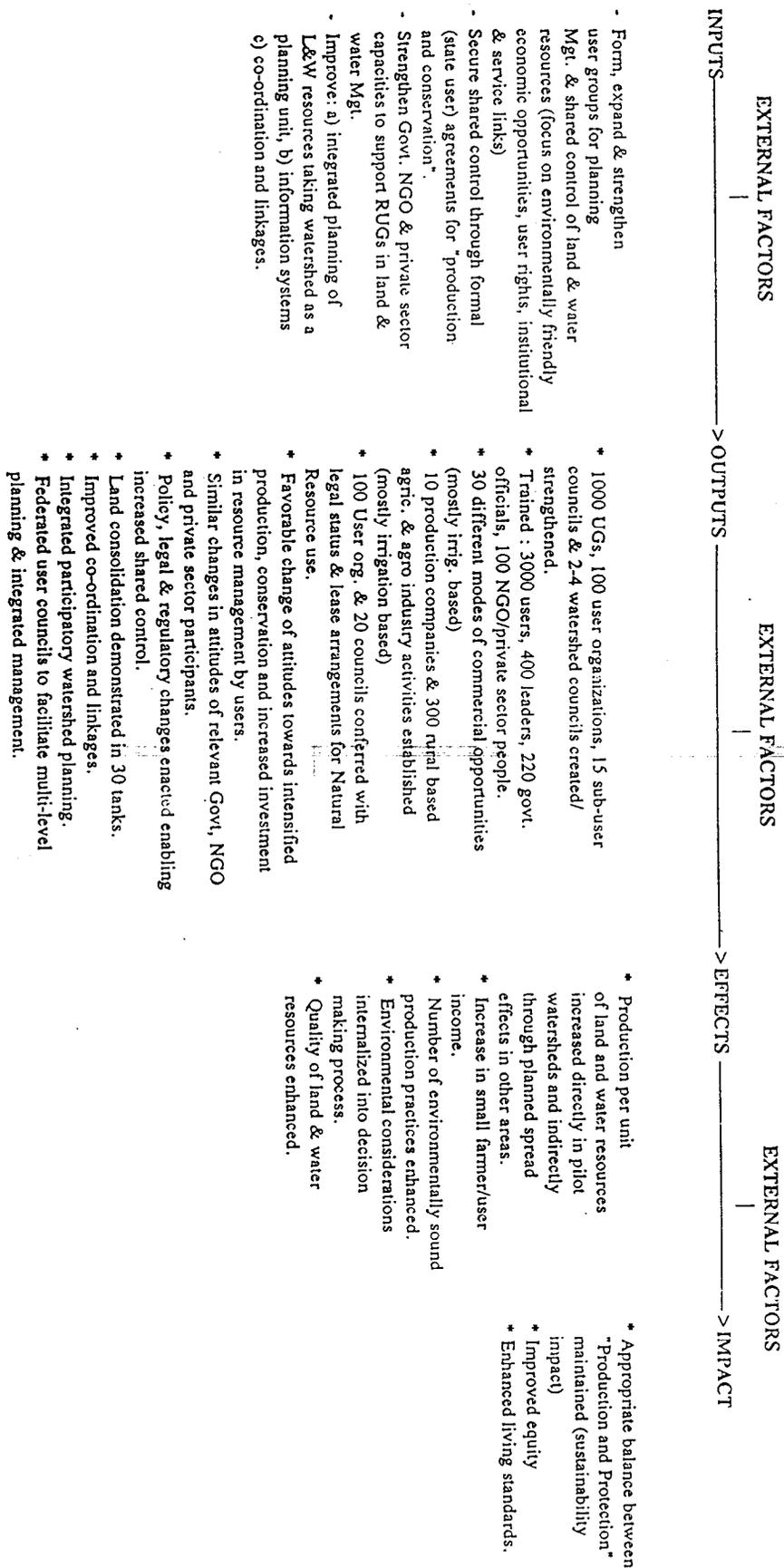
In the first few months of operation, the project will conduct a participatory assessment of the present land and water use patterns, capabilities of resources user groups, government agencies, NGOs etc. in the selected watersheds. Based on this assessment, the project will develop an integrated plan to improve land and water resources management in these areas, again, through a participatory approach. Planning will focus on efforts to intensify the utilization of existing resources through known technologies, and also to augment the resources base. Examples include (i) improving production through management changes; (ii) supplementary irrigation for high value cash crops in the highlands. Here the technologies to be tried may include exploitation of ground water for cash cropping, and the use of sprinkler and drip irrigation; (iii) linking user groups with markets and vertical integration of product disposal; and (iv) extracting of non-wood forest resources while ecologically restoring the forest resources base.

The project will then seek to intensify action to strengthen the user groups, assist them to experiment with innovative "production and protection modes" developed at the planning stage and implement the planned activities. User groups will be assisted to establish production companies. They will be linked to credit institutions for purposes of obtaining loans for their new ventures, and the project will support them with matching grants, to a limited extent.

The above efforts will be supported with a substantial package of dissemination of new knowledge, development of skills, and reorientation programs for user groups as well as for governmental and other institutions.

The project activities will be carried out through watershed working groups comprising the project's technical personnel, concerned government officials at different levels, and representatives of user groups, User Organizations/ Federations/ Councils. Provincial steering

Figure 1 - SCOR PROJECT - FROM INPUTS TO IMPACT (6 - YEAR PERIOD)



committees chaired by the Provincial Chief Secretaries, and co-ordinating bodies at the divisional level will provide guidance to the working groups and ensure inter-disciplinary and inter-project collaboration. At the national level, a steering committee consisting of representatives of the several relevant government ministries, non-governmental organizations, implementing organizations' representatives and USAID officers will provide a guidance and monitor the progress of SCOR project.

A rigorous monitoring and evaluation process will accompany project implementation. This will include participatory self evaluation methods and analytical techniques such as Geographic Information Systems. The project activities are listed below:

- i. Strengthening the Capabilities of Resources User Groups**
  - a) Survey of Existing Local Organizations (in pilot areas)
  - b) Constraints Analysis (in pilot areas)
  - c) User Group Creation (in pilot areas)
  - d) Legal Status and Powers for User Groups including formal agreements between user groups and state
  - e) Skill Development and Training for User Groups and Trainers
  - f) Environmentally sound Economic Opportunities for User Groups
  - g) Supporting Services and Facilities for User Groups
  - h) Establish Production Companies (for advanced user groups)
- ii. Improving Land and Other Resources Tenure Arrangements**
  - a) Regulatory and Legal Mechanisms
  - b) Resources Access and Tenurial Arrangements
  - c) Policy and Process Reform (long term)
  - d) Land Titling
  - e) Land Consolidation
- iii. Strengthening Government, NGO and Private Sector Capacities to Support User Groups through Participatory Land and Water Management, Training and Skill Development**
  - a) Information Systems
  - b) National Departments and Agencies
  - c) Provincial Councils and Staffs
  - d) Divisional Offices and Line Agency Staffs
  - e) Strengthening of NGOs
  - f) Strengthening of the Private Sector and Banks

#### iv. Improving Coordination and Linkage for Land and Water Resource Management

- a) Coordination among Projects, Programs and Activities
- b) Coordinate and Improve Provincial and Divisional Planning and Implementation
- c) Coordinate the activities of different Government Agencies and Donors
- d) Administrative and Coordination Mechanisms for Watersheds (in pilot areas)
- e) Multi-Level Planning (in pilot areas)
- f) User Group Federations in Watersheds (in pilot areas)
- g) Establishment of Information System

### 3.2 Salient features of the SCOR Approach

#### Sequential:

The majority of the Project's activities will be carried out sequentially within a limited number of selected watersheds within the North Central Province (dry zone) and the Southern Province (wet zone). In each watershed the set of activities proceeds from the identification and analysis of the existing situation, to the generation of additional knowledge essential to continuing actions, to experimentation and then to wider-scale application. The type and extent of knowledge generation required will differ in the two provinces, and in the different components of the watersheds. There will be an explicit emphasis on learning during the process of implementation of the individual activities, through process documentation and frequent feedback to the users, the professional staff and the steering committees.

#### User-oriented/participatory:

The strategy is designed to be user-oriented and participatory. This means that much of the emphasis and activity of the Project will be at the field level in the selected watersheds. The approach will be to increase the share of control of the natural resources of the watershed by the users and to support them as they attempt to intensify, expand or move into new economic activities. To achieve economies of scale, and to utilize group solidarity to promote responsible behavior, the Project is based upon group action as a primary vehicle for Project implementation.

As constraints to group activities are identified, the Project will assist in the removal of the constraints. When the constraints are the result of policies, rules, regulations, or actions of a higher level, the Project will work at those levels to achieve the purposes of the Project. Demand-driven changes are likely to be more expeditiously addressed than recommendations for change from above. The Project structure, including Steering Committees in each of the provinces and at the national level will facilitate the process of inducing change.

The Project's participatory mode, starting with the design process, in which officials, resources user group representative and others from the national, provincial,

district and divisional levels played important roles, through to implementation should facilitate both the identification of problems and constraints and their solutions.

#### Multi-level:

While the Project will focus the majority of its activities at the local level, with the watershed as the basic unit, other activities will take place at the divisional, district, provincial and national levels. The specific activities at the intermediate levels will be determined in the process of dealing with the problems and constraints identified in the selected watershed. It is anticipated that these activities will be those that strengthen the ability of the government and others to more adequately provide supporting services to the user groups, and to assist in the reorientation of the government agencies to a client-centered mode.

At the National level, the primary emphasis will be on strengthening the capacity to deliver appropriate information on natural resources to the broad community that can benefit from that information. In addition, primarily based on the results of the Projects action-research activity, certain policy and process reforms will be promoted at this level.

#### Watershed-based:

The rationale for using the watershed as the basic unit for integrated planning of resources utilization is clear. The watershed is a physical entity geographically defined by an important natural resource, water; the ways in which the water in the upper parts of the watershed are used affect the ways in which it can be used downstream, and they ~~affect the associated land resource.~~ Thus, the various parts of the watershed are physically and operationally linked in important ways, and the potential benefits from integrated use can be large. However, the people in the different components of the watershed having access to different aspects of the natural resources base, may be engaged in different economic activities, and may be of different social and/or cultural backgrounds. People in the upper catchment areas have very different environmental, economic and social conditions from those in associated irrigated commands and those in downstream areas of the irrigated areas. Thus, the personal and economic interests in the different areas do not necessarily coincide, introducing problems for planning and implementation.

Moreover, the physical boundaries of the watershed are rarely congruent with the boundaries of the administrative or constituent political entities. This situation complicates the processes of planning and implementation.

In order to overcome these problems, the Project emphasizes an integrated participatory approach, and will make a substantial investment in linkage and

coordination. Experience in the major irrigated commands, in Sri Lanka, has shown that the combination of the use of catalysts, sharing of information, and reasonable administrative and political support can bring divergent groups into successful cooperative activity. While the process will be more difficult in the context of the full watershed, there is a reasonable probability of success, and the potential for major benefit.

#### Inter-Project/Activity Co-ordination

In the pilot watersheds, SCOR project will take the leadership in bringing the activities (projects, programs, etc.) based on land and water resources into closer co-ordination. The project will strengthen the capacity of the provincial and Divisional Secretariats in integrated planning for the utilization of land and water resources in the watersheds. The institutionalization of such an approach will shift the strategy of development of land and water resources (in the watersheds) from an uncoordinated "project mode" to a well co-ordinated "program mode".

#### 4. ECONOMIC ANALYSIS

Following the traditions, an indepth assessment of project costs and expected benefits was conducted. In the strict sense, this was not a complete economic analysis for various reasons. For example, the analysis did not quantify the transfer of benefits and costs such as some of the benefits which would be captured by farmers which are at present, are enjoyed by the intermediaries. One classic example is the fertilizer trade where the organized farmers have already captured much of the unjustifiable profits now going to traders. Additionally, a large number of benefits accrued to the Project are intangible which, therefore, cannot be evaluated correctly. Examples are the downstream benefits such as impact on natural resources management resulting from the group action of users in the upstream areas.

It is customary that when ex-ante evaluations are conducted the computations of benefits and costs depend on assumptions about the area that could be irrigated or cultivated, crop yields that can be obtained when the project is in place, value added due to reduced erosion or improved quality of run-off/drainage, and above all. Extent to which benefits are expected to correlate with a particular projects' inputs, and so forth. Hence, despite the fact that benefit-cost analysis has some merit in comparing and contrasting the inputs and outputs, the general application of this technique is characterized by several deficiencies. These include the following:

- i. Ambiguous evaluations of benefit and costs, such as those derived from making assumptions about perfect markets or from confusion between "with-project" and "without-project" yields, prices, etc.,
- ii. Debatable choice of discount rates, and

- iii. Difficulty in the separation of project and non-project effects such as the influence of weather, complexity of externalities and linkage effects.

Ex-ante economic analysis of projects like SCOR is far from straightforward. Even the financial cost-benefit analysis, which ignores shadow pricing, externalities and other indirect and intangible costs and benefits, cannot be used in such projects because the value of most of the benefits is essentially unknowable. As stated earlier, improving user rights and participation in the control and management of natural resources is different from supplying them with irrigation infrastructure, inputs, etc; hence the link between project inputs and results is an indirect one.

Much of the SCOR Project will be devoted to experimentation and replication, enhancing spread effects and institutionalization, none of which lend themselves to ex-ante economic analysis. Even the number of years over which Project benefits are expected to accrue cannot be specified in the absence of concrete knowledge about what sorts of interventions the Project will have.

It should be highlighted that a project such as SCOR which would concentrate on management changes will have far-reaching benefits compared to the projects with direct benefits from tree planting or soil improvement practices. The several manifold benefits attributable to SCOR could be due to; a) establishment of institutional mechanisms for land and water resources management which would continue the management process beyond the life span of the project; b) strengthening user groups and improvement of their capacity to undertake sustainable land and water management practices that will continue to provide benefits beyond the life span of the project; and c) spread effects which are augmented by specific mechanisms built into the SCOR Project. All these would help institutionalize the project approaches which, in turn, will lead to **sustainable management** of land and water resources.

Experiences of most of the tree planting projects in Sri Lanka show that government agencies have failed to protect fully the reforested areas, after those projects, due mainly to lack of cooperation by the "users." Hence, a project aimed at the **introduction and institutionalization of participatory processes** to achieve a proper balance between **production and protection** should yield much higher socio-economic and financial benefits. Most of these benefits, however, cannot be evaluated adequately using the conventional tools of economic analysis. Hence, the "economic analysis" conducted for SCOR may be considered as a partial analysis which would "underestimate" the total benefits of the Project.

#### 4.1 Project Benefits

The Project benefits are evaluated under the following 11 main categories;

- a) Decreased government expenditure on natural resources systems;
- b) Improved protection of the environment;

- c) Increased user income through expanded agricultural production;
- d) Increased user income due to new economic production;
- e) Increased income due to new employment opportunities;
- f) Increased income due to better marketing;
- g) Decreased cost of agricultural production;
- h) Increased farmer savings and investments;
- i) Enhanced sustainability in the management of land and water resources;
- j) Improved coordination, policy reform and awareness-building among agency staff; and
- k) Tenure alternatives.

Based on the qualification of the benefits and costs of some selected categories of benefits alone, the estimated benefit-cost ratio at 10% discount rate is 1.43. The IRR of SCOR Project is 19%. If all the benefit streams which are not quantifiable are included, the IRR could be much higher. It can, therefore, be concluded that the investment on the SCOR Project is highly beneficial.

## 5. SUMMARY

Major constraints inhibiting efforts at intensifying the utilization of Sri Lanka's natural resources base, particularly land and water, while securing profitability, sustainability and environmental conservation, were identified through a novel participatory project design process. Participants comprised a cross section of stake holders of land and water use covering national, provincial, divisional and user levels.

This constraints analysis facilitated the identification of four integrating themes on which the SCOR project's approaches, strategies and activities were based. These four themes are:

- i. To improve in the incentive and institutional context in which agriculture and other commercial activities are undertaken in the selected watersheds, so as to ensure both productivity and sustainability;
- ii. To get resource user groups and managers to consider **environmental implications** of land and water use more explicitly and to internalize environmental considerations in decision-making and implementation at all levels;
- iii. To enhance governmental, group and individuals' **information and understanding** about potentials of and prospects for natural resources base for production and protection; and
- iv. To strengthen the capacity of the Provincial /Divisional level government authorities in **planning for land and water resources utilization in an integrated manner**, gradually transforming the strategy of development of land and water resources **FROM A "PROJECT MODE" TO A "PROGRAM MODE"**.

The key elements of the Project approach are outlined below:

- a. The basic planning, coordination and implementation units for project operations will be the Watersheds in the two pilot areas selected for project operation, viz. the NCP and the SP.
- b. All project activities will be geared to strengthen the concept of shared productive control of land and water resources through state/user partnership.
- c. The participatory planning and implementation approach involving resource user groups, agencies of government and private sector will be intensified and institutionalized.
- d. Users' capacity and capability to exercise shared control will be enhanced through strengthening user groups. Activities such as assisting in creating economic and commercial opportunities, improving access to information, improving resource tenure, promoting legal recognition and powers, and improving regulatory and legal mechanisms will be undertaken as these are required for strengthening user groups. Effective links between user groups and private agencies (including NGOs) will be promoted.
- e. Assistance will be provided to (i) users to increase their technical and organizational ability to interact effectively with agencies and enterprises and (ii) agencies to improve their capacity to serve the users adequately.
- f. The capability of government agencies, at different levels, for planning, co-ordination and implementation of land and water management programmes in an integrated manner will be enhanced.
- g. The Project will work concurrently at three different levels:
  - i. At the National level to improve policies and processes and to support the implementation of programs where an adequate knowledge base exists.
  - ii. At Provincial and Divisional levels in the two selected provinces to strengthen institutional capabilities.
  - iii. At watershed levels to develop practical field-tested methods of organization, planning, execution, monitoring and evaluation.

However, the Project will commence implementation from the watershed level, and policy/legal reforms will be undertaken at higher levels, if they are found to be obstacles to field level activities.

- h. The Project will have a **phased-withdrawal of external assistance** while ensuring a high degree of **internalization of processes and practices** which will have proven qualities of sustainability.
- i. The Project will have mechanisms to **augment/expand the spread-effects** of its tested innovations.

The conventional project appraisal are not easily amenable to evaluating the benefits of a project of this nature. However, some selected tangible benefit streams have been evaluated. The results suggest that a project aimed at the introduction and institutionalization of participatory processes to achieve a paper balance between production and protection should yield higher socio-economic and financial benefits.

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## THE SCOR DESIGN PROCESS

SCOR is the product of a novel participatory project design process spearheaded by a Core Group of Senior Government officials closely involved in the management of land and water resources of Sri Lanka. The design process (which commenced in May 1992 and completed in September 1992) was facilitated by a 4-member Core Design Team set up by the Sri Lanka Field Operations of the International Irrigation Management Institute (IIMI/SLFO), supported by three short term consultants from the University of Cornell and the Land Tenure Centre, Wisconsin University. (See list of Project Design Teams annexed.) The process was funded by the United States Agency for International Development (USAID).

Consultations were held with senior officials of national level governmental and non-governmental agencies concerned with the management of land and water resources, provincial, divisional and field level officials, banking and other private sector representatives and also with resources user groups to obtain inputs into the design process. The IIMI Core Design Team and the three international resources consultants worked together to prepare draft proposals for the project paper on the basis of the above consultations, past experiences, analyses of constraints in the management of natural resources, and literature reviews. Four integrating/cross-cutting themes, possible goals, objectives and activity areas were tentatively developed for presentation and discussion at the Core Group of Senior Government Officials. The first meeting was held on June 11, 1992. Following this, 08 more meetings of the Group were held at which the Project Design was developed in stages with the active participation of the members. Consultations, referred to earlier, were continued during this process.

~~A decision was made during these discussions that the Project would concentrate its activities in two pilot areas selected on a sample basis. Accordingly, the North Central Province and the Southern Province were selected, as pilot areas of project operation.~~

A Field trip to the North Central Province was organized for June 24-27, 1992. During this trip consultations were held with several user groups and officials ending with a Workshop for Provincial/Divisional officers on June 25/26, 1992. Similarly, a field trip to the Southern Province was also organized. Consultations were held with the user groups and officials ending with a workshop for provincial level officials on July 10/11, 1992. The information and knowledge gathered from these field trips provided valuable inputs into the design process.

Following the North Central Province field trip and the workshop, a national-level workshop was organized on July 3/4, 1992. At this workshop, the Project goals, themes and activity areas presented by the Design Team were intensely reviewed by Small Groups and at plenary sessions. At subsequent meetings of the Core Group, the revised draft was further modified and presented at the final national level workshop held on August 7-8, 1992.

The Project proposals were further reviewed during meetings with the USAID and also with the Core Group. Following these reviews a second field trip to the NCP and SP were made from August 31, 1992 to September 4, 1992. The final draft incorporated the modifications made consequent upon the reviews and field studies.

The participatory design process provided the most important evidence on the technical feasibility (as well as economic, social and administrative feasibility) of the SCOR Project. A cross section of "stakeholders" of land and water use, covering national, provincial, divisional and user levels actively participated in the design process. Among other things the design process achieved the following results:

- a) Senior policymakers of the key ministries and their departments "accepted", and commended the project's concept, and strategies.
- b) User interests have been incorporated and the project ideas discussed with a large sample of user groups in the two provinces selected for project implementation. Hence, one may conveniently assume a high degree of participation in project implementation, resulting in an increase in shared control,
- c) The fact that stakeholders had participated in the project design would give them the feeling that the project belonged to them. Hence, a high degree of "implementability" may be expected.
- d) Last, but not least, the constraints as well as the potential (both technical and otherwise) were analyzed using a participatory approach, involving users, government officials at various levels, and representatives from the private sector. Hence, the activities and approaches proposed in the SCOR Project should be much closer to the ideal solution ~~resulting in technical feasibility.~~

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