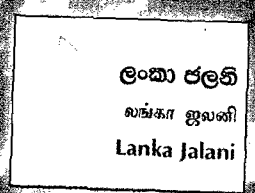
SRI LANKA WATER VISION 2025

VISION TO ACTION

PROGRAMME FOR ACTION
PHASE 1
PROCEEDINGS OF THEME WORKSHOP
&
CEO PANEL MEETING
JULY - DECEMBER 2001



LANKA JALANI
SRI LANKA NATIONAL WATER PARTNERSHIP

OBJECTIVES OF CEO PANEL

To identify the STRATEGIC ASSITANCE Needed by Sri Lanka Water Sector to achieve the Sri Lanka Water Vision 2025 and the Framework for Action

PARTNER RESPONSIBILITIES

Government

- National Water Policy committed to IWRM and to promote good governance
- An Institutional Structure that facilitates integrated management
- A Financing Structure to rationalize investments and incentives to mobilize funds from new sources and reduce the burden on the public.
- A dialogue to reconcile sectoral and local competitions and promote sharing of water.

Private Sector

- To provide state of the art technology and management expertise to hasten the process of achieving IWRM
- Mobilize resources and innovative financial instruments. (product development)
- Device Public – Private Partnerships at all levels in planning, design, development, management and monitoring IWRM progress
- Forge Strategic Alliances

Academic and Professional Organizations

- Develop Knowledge bases
- Take the lead in HRD and Capacity Building
- Health Building Networks

Communities and Partners

- Engage in a dialogue with government and the private sector and insist on good governance and IWRM
- Foster partnerships at local level
- Mobilize resources and promote self reliant partnership
- Reach out to Stakeholders.

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&

CEO PANNEL MEETING

JULY-DECEMBER 2001

-LANKA JALANI-

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INTRODUCTION

Introduction

The Global Water Partnership (GWP) in collaboration with 'World Commission on Water' pioneered and sponsored the development of a long term water vision for the 21st century that would address the pressing problems of global water scarcity. Regional and local visions served as building blocks of the Global vision.

A Regional Technical Committee i.e. South Asia Technical Advisory Committee (SASTAC) was formed in 1998 to oversee the activities of the region. In order to translate the vision to action GWP introduced an innovative institutional mechanism known as "National Water Partnership' made up of a broad spectrum of institutions representing the public and private sector interest groups, academia, civil society and NGOs in each country. SRI LANKA NATIONAL WATER PARTNERSHIP – 'LANKA JALANI' was established in the year 2000 and it serves as the focal point for GWP/SASTAC.

This report reflects the route map followed by 'Lanka Jalani' in developing a programme of action to operationalise the 'Water Vision 2025' and the framework for action and to identify strategic assistance needed for that purpose. It contains not only the proceedings of workshops and the technical papers, etc. but also documents that broadly reflect the process that was followed in developing the PFA. (Pl. see flow chart at page 3)

Action to operationalise the 'Water Vision 2025' was initiated in July 2001. The following were treated as the base documents for this purpose:

- 'Water Vision 2025' - Sri Lanka
- 'Sri Lanka water vision' – framework for action
- Lanka Jalani document on Sri Lanka National Water Partnership (SLNWP)

In order to set in motion the process of developing the programme of action several activities were undertaken. They include:

- Prepare theme papers on five critical issues relating to water sector
- Conduct a workshop for stakeholders
- Develop three synthesis papers based on theme papers and responses of stakeholders.

The findings of the theme workshop were presented before a CEO Panel comprising of senior managers in the public and private sector with a view to carrying them forward to political leaders and other decision makers. It was expected that this would facilitate the incorporation of the findings into public and public sector programmes and thus translate the vision to action.

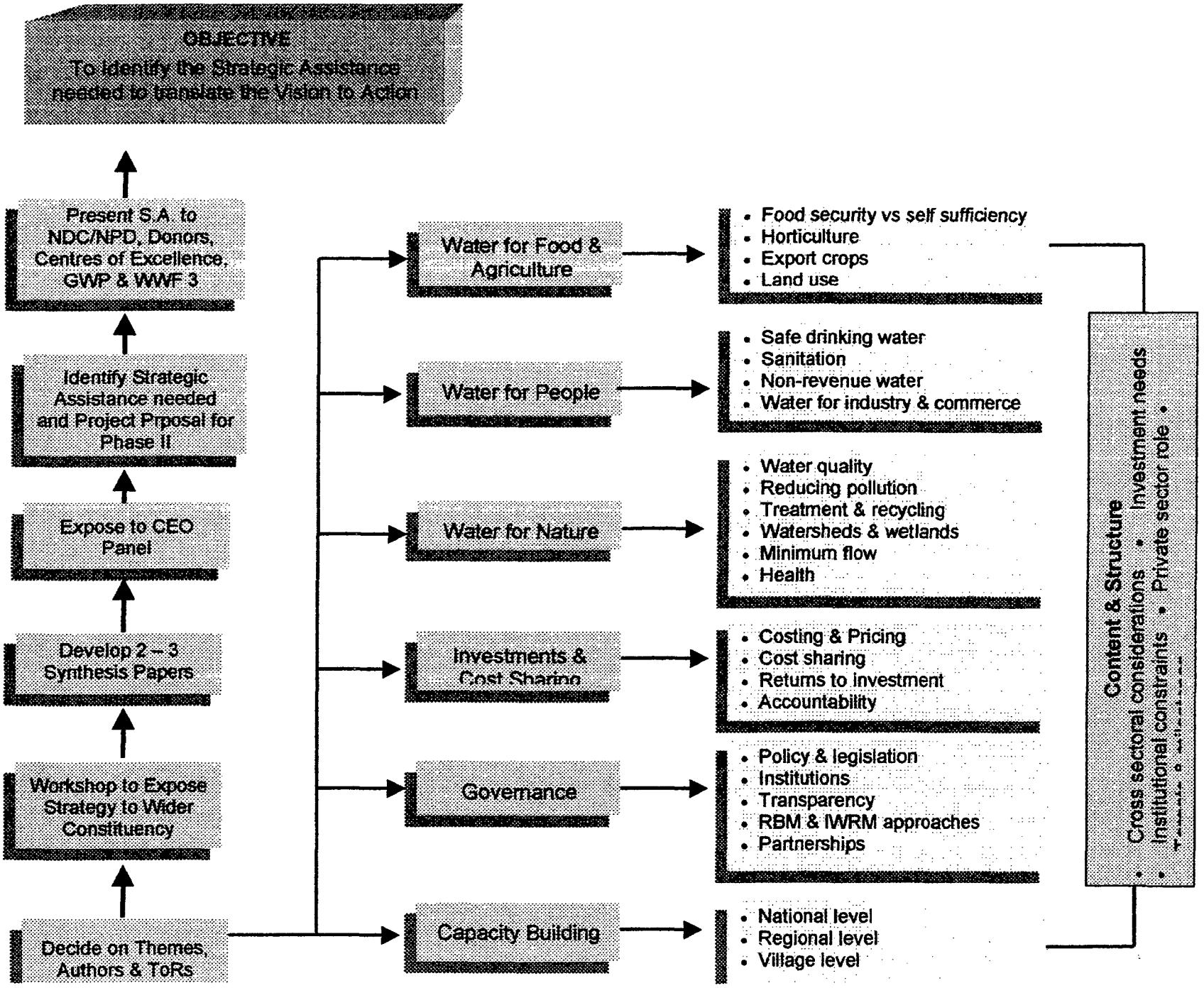
The CEO panel was expected to play an active role in coming years particularly in governance and capacity building issues. 'Lanka Jalani' is expected to work with CEOs of different sectors and disciplines in order to promote synergy and integration within and outside the sectors.

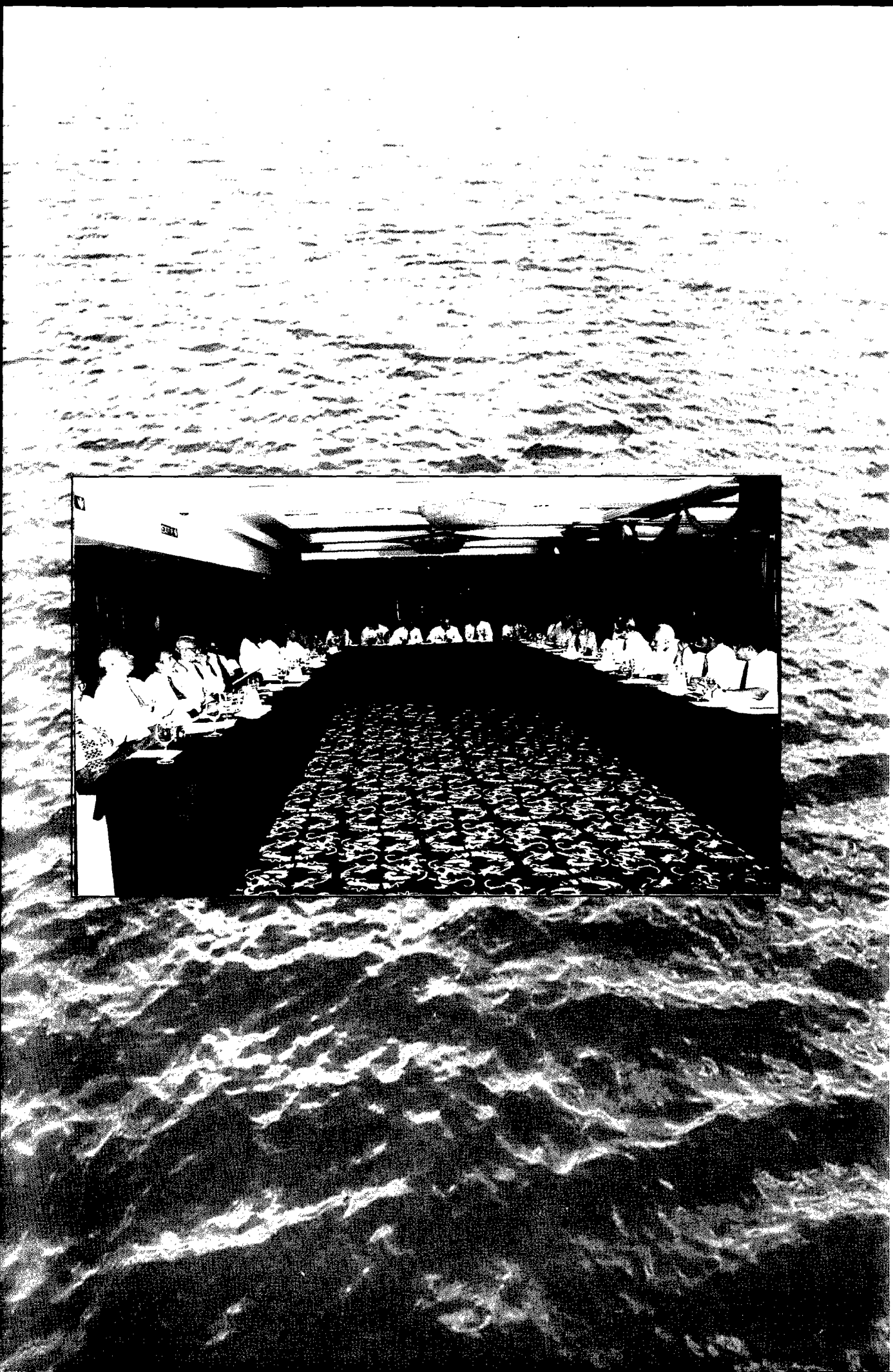
Draft PFA was presented to the tenth GWP/SASTAC meeting held in Kandy. Sri Lanka from 13th to 15th January, 2002. GWP/SASTAC while commending the initiative taken by Lanka Jalani decided that Sri Lanka will play the lead role to spearhead the PFA for the SA region on behalf of GWP/SASTAC. Lanka Jalani found the guidelines issued by GWP for preparation of PFA invaluable in the vision to action exercise. (please see annex 4 c.1

S B Niyangoda
Chairman / Lanka Jalani

N Abeywickrama
Member- GWP/SASTAC

THE PROCESS TO FORMULATE THE PROGRAMME FOR ACTION





CEO PANEL – 26th November, 2001

Background

Objective of the CEO Panel was to identify the strategic assistance needed by Sri Lanka Water Sector to achieve the objectives of Sri Lanka Water Vision 2025 and the framework for action. The following synthesis papers on Water Resources Management were presented to the panel.

- Water resources Management
- Key issues on financing water
- Principles of governance were presented to the panel

The CEO panel with its private sector expertise was expected to support a National Water Policy as well as institutions and financial structures committed to IWRM and good governance. It will provide the 'State of the Art Technology' and management expertise to hasten the IWRM process and to mobilize resources and innovative financial instruments.

The panel was expected to develop knowledge bases on IWRM, take the lead in HRD and capacity building and help build networks with the assistance of academic and professional organizations and also reach out and forge links with communities and partners to mobilize resources and to promote self reliance.

Synthesis Papers

WATER RESOURCES MANAGEMENT – Hiran D. Dias

Although on the basis of aggregate availability of water Sri Lanka has abundant water resources, it is already experiencing serious problems because of:

- Seasonal and regional availability of supply of water.
- The nature of development.
- Fragmented sectoral approach to utilizing water that makes it difficult to reconcile competing demands for water.
- Decision making relating to water being based on political rather on technical, economic and social considerations.

Changes are needed in the way we deal with water to achieve the Sri Lanka Water Vision 2025. It could be easier to introduce changes in the short-term that would lead to more significant long-term changes. Among them, it is critical to generate a 'Culture of Water' where people value water and use it with great care.

In the water scare dry zone the issue is to maximize the returns on water. While the cost of developing 1.0 ha of irrigated land is nearly Rs. 1.0 million at current costs, 85% of captured water is used for irrigation mainly to produce rice. Is this the most productive use of this water? Despite this huge investment in irrigation, there is a tendency to be unconcerned about economic returns on water due mainly to our obsession with achieving self-sufficiency in rice based on the production of rice on irrigated land. This is a major obstacle to achieving food security through alternative means. There is potential to produce 70% of our 2025 rice requirements by concentrating rice production on the most productive 60% of the current irrigated area. This would release land and water for technologically advanced market oriented commercial farming and urban industrial expansion needed for development in the dry zone.

Irrigated agriculture must release water to maintain a healthy environment, develop inland fisheries and livestock. There is shortage of fish and livestock products today to meet the national demand, Tis would increase in the next two decades with increasing population (23 million) and income (USD 2,000). We need to use less water to produce more crop and release water for these purposes. Research, policies and institutions are needed to create the enabling environment for these changes.

In the water abundant wet zone problems are connected mainly with the supply of water for domestic, industrial and other non-agricultural purposes as agriculture is rain fed. It is projected that the current utilization of 11% captured water for these purposes will more than double in the next two decades to achieve a safe water supply for all and meet the increased demand from urban expansion and industrial and service sector expansion. An important issue is whether we take towns and industries to where there is water or take water to urban-industrial development that takes place in an unplanned manner. The high concentration of urban population and industry in the Kelani ganga basin is already creating stress on water resources there while water resources in river-basins like Kalu ganga and Gin ganga basins are under utilized.

Water pollution is becoming increasingly serious among environmental problems in the agricultural areas where fertilizers and agro-chemicals pollute water. Deforestation in the wet zone increases run-off and reduces percolation It also increases soil erosion and siltation. Changes in river regimes have affected brackish water lagoons in coastal adversely. In the urban areas, pollution is caused by the concentration of industry in geographic areas without adequate safeguards against discharge of untreated industrial effluents.

While it is important to promote the multiple use of water to maximize the returns on it, the competing demands for water makes it essential to manage water resources in a holistic way through integrated water resources management at the river basin level.

SRI LANKA WATER VISION 2025 – *Programme For Action*

KEY ISSUES IN WATER FOR

FOOD & AGRICULTURE	PEOPLE	NATURE & ENVIRONMENT
➲ Agriculture uses 85% of captured water resources for irrigation. Development costs of new major irrigation are almost Rs.1.0 million per ha with annual O&M of Rs.2,500 /ha. To make this economically viable, there should be at least Rs.100,000 – 150,000 net profit annually. The productivity obtained from this water by farmers is low and they make hardly any payment for it. *How can we ensure better O&M and more productive use of this water by farmers– get More Crop per Drop?*	➲ At present, the use of water for people is 6% and industry is 5%. By 2025, the Water Sector must respond to the needs of an emerging knowledge-based society, which will demand improved health, sanitation and water quality, and a cleaner environment. *Is this consistent with the present developments in Sri Lanka?*	➲ Increasing demand for surface and ground water for agriculture, domestic needs of people, industry, tourism and other commercial uses without due concern for environmental impact has affected the environment adversely. This in turn affects the availability of water and its quality. *This calls for an integrated approach to the utilisation of water resources with appropriate priority to environmental and other needs.*
➲ Rice constitutes 70% of the cereal intake and at 100 kg/capita we are nearly self-sufficient. *What is the level of self-sufficiency (i.e., 60 / 75 / 100%) that we should aim at consistent with food security and efficient use of water resources?*	➲ Urbanisation is expected to increase to 60% by 2025. This and industrialisation are expected to generate significantly higher demand for water and this demand will be localised in specific areas. *How should Sri Lanka respond to this challenge?*	➲ Due to regional and seasonal variation in availability and demand for water, the environmental impact varies in nature and magnitude. *Solutions must be location and season specific.*
➲ 560,000 ha under irrigation (350,000 ha under major irrigation) produce 80% of total rice production. *Is using this irrigated land for rice production the best use of the costly investment?*	➲ Projected population of 5.0 million in the dry zone by 2025 requires 200 MCM for domestic needs. *An integrated approach to allocating and managing water resources is needed to meet the competing demands of water for irrigation and for people.*	➲ Urban and industrial pollution is highly location specific and would become more serious with projected increase in urbanisation and industrialisation. *Should we discourage urban-industrial development or encourage it in a planned manner?*

➲ Of 350,000 ha under major irrigation 250,000 ha of high potential produce 54% of rice production now but can produce 70%. *Is it a better option to produce 70% of our rice needs from the high potential area and use the remaining irrigated land for other high value crops / livestock?*	➲ Sri Lanka's population will grow and gradually stabilise at around 23 million people by 2025. Urbanisation trends will however increase more rapidly, with about 60% of the population living in urban areas by the year 2025. *If settlement is allowed to continue in the existing pattern of ad-hoc low-density sprawl along main arterial roads the cost of water supply will be prohibitive. Should it be guided on a planned high-density development or according to any other model t increase efficiency of water supply?*	➲ Deforestation has increased run-off and reduced ground water recharge, thus affecting river regimes, downstream siltation including reservoirs. *Reforestation and watershed management are needed urgently to reverse the situation by 2025. How can community participation and private sector play a role in this?*
➲ Only on this 250,000 ha is it possible to achieve 200% cropping intensity that can provide full employment (i.e., 240 days / year) for farmers.	➲ Industrialisation in the economy is being promoted by Government for Sri Lanka to be globally competitive. Availability of adequate and cost effective infrastructure is a sine-quo-none in this context. *What should be the role of Government in providing an economic water supply to this private sector led ventures, in the background of competing demand for the same resource from the domestic sector?*	➲ Agricultural pollution from chemical fetilisers and agro-chemicals affecting domestic water supply and inland fisheries is more serious in irrigated and plantation areas.
➲ Unless it is possible to export, it is not profitable to extend cultivation of vegetables, tubers and OFCs beyond the current extent of 70,000 ha. *How can we grow these to be competitive in the export market? Is there a role here for commercialised farming by the private sector?*	➲ The government has committed itself to providing access to adequate and affordable safe drinking water and access to adequate sanitation for all by the year 2010. *Is this goal realistic?* *Should safe drinking water be treated a basic human right or a basic human need?* *How could we prevent the use of this costly water for other purposes –e g , washing, gardening, industrial uses, etc*	➲ Water needs of wildlife, inland and brackish water fisheries and bio-diversity of wetlands do not receive adequate consideration. *Adequate priority should be given to these needs in a system of integrated management of water resources. Mechanisms to achieve this at national and local levels must be built into a decentralised system of integrated management of water resources.*

➲ Current transbasin transfers of 2,400 MCM, projected to increase 3,000 MCM by 2010 can meet crop evapotranspiration of over 200,000 ha and domestic needs in the dry zone. *Will this be enough for the development of tourism and some industry also?*	➲ Nature provides water free, but its supply costs money. *Should drinking water therefore be provided at a price based on full cost recovery?*	➲ Hydropower generation is the major non-consumptive user of captured water. At present it is used free for power generation. *How can environmental water needs be reconciled with its demand for HP generation?* *Should power generation pay something for the water it uses to generate income for environmental management programmes?*
➲ Irrigated paddy as an enterprise is viable at 4.0 tons/ha, profitable at 5.0 tons/ha and attractive at 6.0 tons/ha. Current Mahaweli yields are over 5.0 tons/ha; yield potential of current varieties is 10 tons/ha. *Is this an argument for confining paddy cultivation to the high potential irrigated areas?*	➲ Water is a finite resource and very vulnerable for misuse. It is also easily polluted. It has to be shared between domestic and economic sectors. *Should water therefore be treated as an economic good with an economic value?* *How is the social goal of safe drinking water and improved health as a public good, be accommodated within this consideration?*	➲ An important aspect of water for environment is the preservation and enhancement of the aesthetic beauty of the environment for the enjoyment of the people and for tourism. *How can this be achieved?*
➲ Likely that major irrigation under paddy/OFCs will decline from 560,000 ha to around 475,000 ha or less by 2025. This would release irrigated land for other profitable crops. *What can be grown profitably on this land – fruits / vegetables / timber / other?*	➲ It is possible to augment water supply from rainwater harvesting, recycling, etc. *How can we motivate people to do these?*	
➲ Area under new irrigation technology (drip, etc.) currently 1,000 ha has potential to increase to over 2,500 ha based on exports/niche markets. *How can this be much more?*	➲ It is important that people appreciate the value of water so that they develop attitudes favourable to using water carefully and conserving it. *How can we develop a "Water Culture" that values water and treats it with affection and respect?*	
➲ Dedicated reservoirs for domestic river regulation, etc., are needed in future, i.e., multi-purpose storage rather than only for irrigation.	➲ Water for navigation has been a neglected area that needs to receive more attention. *How can this be achieved?*	

FINANCING WATER SERVICES – Asoka Gunawardena

Approaches, strategies and methodologies for financing water have fundamental implications for the efficiency and sustainability of water use. Traditionally the State has assumed responsibility for the development of infrastructure and its operation and maintenance. Considerations of adequacy, efficiency and effectiveness call in question the ability if not the necessity for the public sector to continue to be the sole provider and supplier of water services. While the water sector constitutes a legitimate area for public policy, emerging consensus is that all aspects of service provision need not necessarily be undertaken by the public sector. Several issues arise in financing water.

Approaches:

The key issue then is the role of the public sector and who should finance which water sector investments. Public-private partnership in water services raises several questions.

- The role and extent of public finance in funding water investments.
- The extent to which water service activities can be brought under market-based operations and the implications arising there from.
- Opportunities and options for mobilizing required resources for investment.
- The nature and scope of public-private partnership in the provision of water services.

Strategies:

A shift from sole public sector financing to a mix of public-private partnership calls for several strategic consideration and actions.

- Financial re-structuring of public sector operations.
- Shift from a sectoral/agency-based system to a decentralized area-based operation to facilitate introduction of **IWRM.**
- Creating water markets and enhancing competition in service provision.
- Regulating service provision to ensure quality and standards.
- Managing equity and social objectives.

Methods:

Efficiency and effectiveness in the management of the water sector also calls for appropriate methods of financing water service operations. Water sector operations involve high sunk costs. Then tariffs should reflect long-run incremental costs of service provision.

- Cost recovery with users paying for services.
- Appropriate costing and pricing arrangements and mechanisms to take care of efficiency, effectiveness and equity.

Synthesis papers were discussed at a CEO panel comprising Secretaries of Ministries dealing with water related activities and other policy makers, decision makers, key private sector persons representing the Chambers of Commence.

GOVERNANCE – Nanda Abeywickrama

The Sri Lanka water vision 2025 has admitted the primary of 'Good Governance' as an imperative for achieving the broader goals of IWRM in the following terms.

The Framework for Action will redefine the role of government in Water Resources Management through a strong and transparent regulatory framework, incentives for effective management, and a pricing structure that will promote investments and sustainable management of water through broad-based partnership principles.

I Outcomes of Sri Lanka Water Vision Process 1999 – 2000

- Poor Governance leads to Resource degradation.
- Water Sector must respond to the needs of an emerging knowledge based society through improved health, clean water and clean environment
- Strategies are needed to achieve an orderly transition from a largely rural society to one with urban amenities.
- Society will redefine the role of Govt. in the water sector e.g. as regular and Inventive Regime Administrator.
- Government must incorporate IWRM in all investments and mobilize private sector and community resources.

The challenge today is to get the society on to a path that would, in the medium to long term, progressively reach some milestones that would reduce the distance between the state and the society, by creating fora for dialogue, by forging alliances and by building Partnerships.

II. The current situation is characterized by

- A mismatch between public sector priorities and aspirators of society.
- Institutional fragmentation to an unaccepted level.
- Competition rather than co-operation between different sectors and between different levels in the administration.
- Inconsistent Policies in general and inability to formulate a water policy acceptable to the public at large.
- Under performance of water agencies.
- Inadequate transparency and accountability in the government apparatus.
- Failure to decide on priorities for investment of scarce resources, both financial and human.

III. **To address these complex issues, the following strategy is proposed**.

- Involve the public in an open and inclusive dialogue on policy and institutional issues.
- Identify more clearly the role of the public sector as Regulator and Administrator of an Incentives Regime.
- Acknowledge that "Water is Everybody's Business" and take the public into confidence.
- Promote public-private partnership appropriate to the context of in Sri Lanka's society.
- Understand that "Everybody lives Downstream" and therefore every action affects ever other.
- Share responsibility and authority with a wide spectrum of stakeholders.

IV Challenges for the CEO Panel

- Review the Water Sector through a 'Public Interest' lens.
  eg. Why did the National Water Policy collapse?
- Analyze & debate issues objectively and truthfully
- Surface and present Policy Options
- Promote & engage in Cross Sectoral Dialogue
- Provide Strategic Advice to Govt. and other Stakeholders
- Champion the Cause – IWRM & Partnerships.

    - Promote & support:
    - Good Government via
    - Consistent Policies
    - Rational Investments
    - Decision on Making at lowest appropriate levels,
    - Discourage Micro-management and Upward delegation
    - A Clean Environment

    - Support Public-Private Partnership
    - Promote Political Round Tables at river basin, Provincial and national Levels.

Responses from the floor

- Water projects in Sri Lanka are essentially large, it requires heavy investment. The required funds cannot be obtained from local sources. Even for smaller projects, there is marked reluctance on the part of Banks to fund state organizations. Therefore, it is desirable that direct foreign investments are encouraged and the institutions that are involved are restructured, so that there would be minimal state intervention.

- What is the basis of costing water? Mahaweli Authority has provided answers to this question. It has developed farmers and the private sector in transferring water to various uses.

- There is a fundamental question in public-private partnership. Of course there is an element of risk. In order to overcome this issue, one area to be looked at is the correct government policy and the government guarantees.

- Admittedly, there are several areas closer examination is needed It is essential that all these issues should be treated not in isolation but in their totality. Perhaps, one way is unbundled the different operations and parcel them for different investments. it is necessary that the state concentrate on regulations in order to promote private sector participation, so that it will generate more competition.

- We have not yet embarked on a systems approach or an integrated approach with regard to water resources management. Basically, water is treated sector wise such as irrigation, drinking water, water supply, hydro electricity, etc.

- Secondly, Institutional arrangements have not received adequate attention which will enable water to be treated in its totality. Essentially, therefore, there is a problem of fragmented systems.

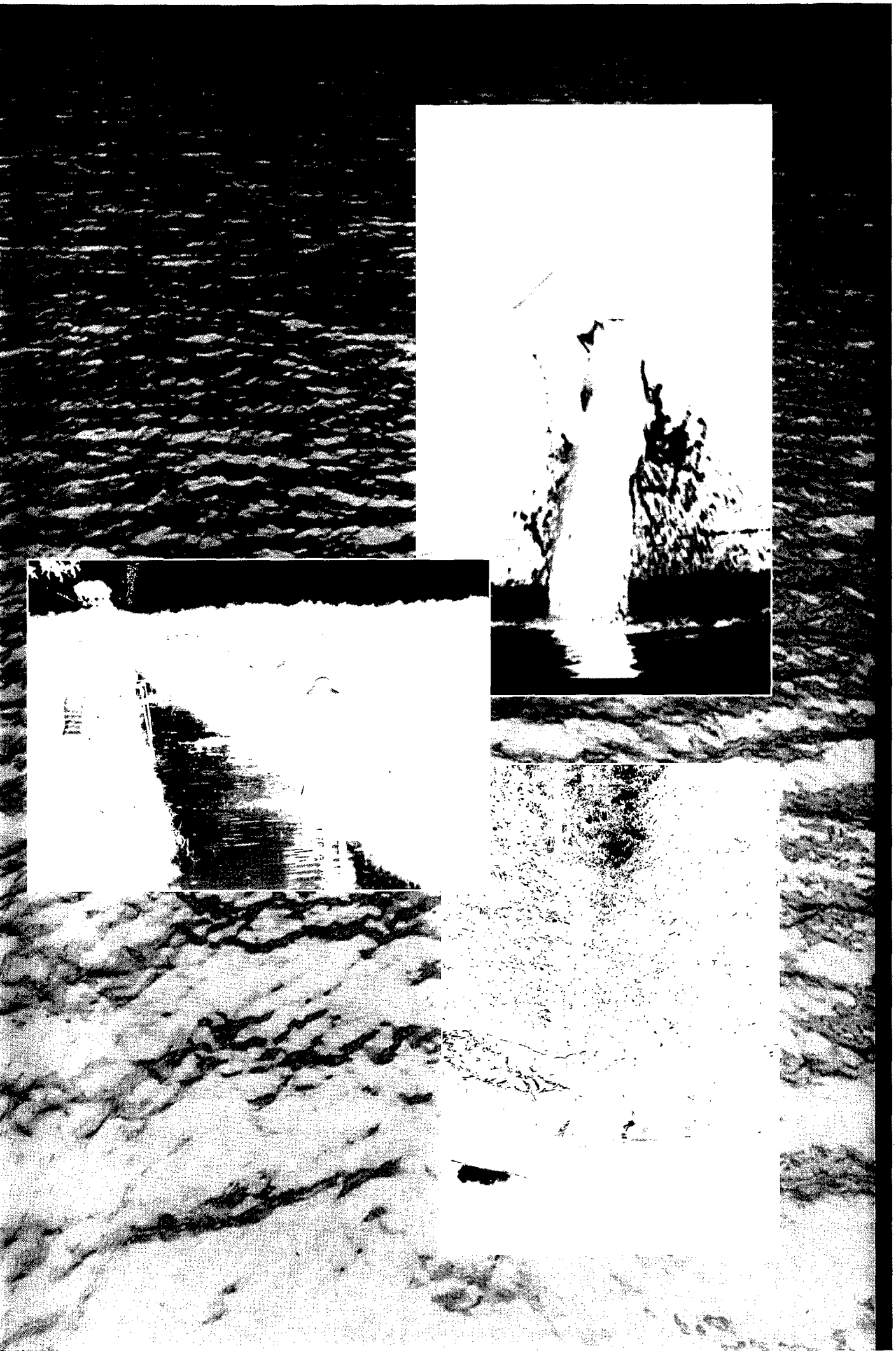
- There is also the issue concerning private interest and the public interest, the private goods and public goods. Society is moving very fast in absorbing the new technology with increased per capita income. Therefore, the public goods have often become private goods.

- While attention in drawn to social and economic developments the question of market cannot be ignored. It is desirable that and rules laws are promulgated, which will combine market forces with a regulatory framework.

- If the private sector is involved in investment and development, it is essential that the elements such as a level playing field, transparency, depoliticized institutional arrangements are kept in focus.

- For efficient use of water, issues such as ownership, transferability enforceability, divisibility which are principles of natural resource management should be examined in depth.

THEME WORKSHOP



THEME WORKSHOP – 26TH September, 2001

Background

The principal focus of the Theme workshop process was to develop strategies to translate the concepts in the ' Water Vision 2025' to action.

The process included the following:

(a) Preparation of strategic theme papers on:

- Water for Food and Agriculture
- Water for People
- Water for Environment
- Investment and Cost sharing
- Effective Water Governance.

(b) A workshop for main stakeholders comprising of state sector and private sector, academia, NGOs, media and decision makers in order to expose them to the strategies developed.

The workshop sought to achieve the following:

⇒ To review the policies, programmes and investments in the water sector
⇒ To review the potential for synergy
⇒ To identify critical cross cutting issues and suitable mechanisms to achieve the goals of IWRM and partnerships.
⇒ To reach consensus on issues that require strategic assistance .

(c) Present the findings and outcome to a CEO panel for response and follow-up.

SRI LANKA WATER VISION 2025

FRAMEWORK FOR ACTION

WATER FOR FOOD AND AGRICULTURE - SRI LANKA

By Ranjith Ratnayake

The generic and conceptual issues relating to water and food security have been addressed in Dr. Nimal Sandaratne's paper presented at the Sri Lanka Water Vision 2025 exercise in 2000. This paper attempts to assess the operational environment in which water use for irrigated agriculture is placed and approaches, strategies and issues arising.

1 CONTEXT

The World's population is expected to grow by 40% by 2025 with a resultant twofold increase in water consumption. Agriculture is estimated to require a 60% increase in water use at current use levels to provide the required food.

IWMI study shows that 25% of the worlds population or 1/3 that of developing countries will experience severe water scarcity with more than one billion people in arid regions facing absolute water scarcity by 2025. It was predicted during the 2nd World Water Forum that in future more wars will be fought over water than over land or oil.

Sri Lanka being an island nation is somewhat fortunate that the external element is absent in its water scenario and problems are of its own creation and should be within its own capacity to resolve.

Almost 25% of Sri Lanka's land area of 65610 Sq. Km is agricultural land. Around 85% of developed water resources are used for irrigated agriculture with an estimated 5% for industry, 6% for domestic and 4% for other uses. A population of 19.0 M with a 2:1 rural urban mix is expected to reach a threshold level of 23 M in 2025 with an even mix between rural and urban areas. Per capita water availability currently 2400 Cu. M would be about 1900 Cu. M still above the minimum limits of 1700 Cu. M set by FAO**. However, spatial and temporal distribution problems of a bi model monsoon rainfall regime is causing stresses on the demand/supply equilibrium and impacting on economic activities of what is still a mainly agrarian society. (Table No. 1)

Current policies on agriculture and irrigation are directed towards consolidation and increasing productivity of both land and water. Expansion of irrigated area is now taken up on equity and socio political considerations and also from a regional development perspective. Crop diversification as a strategy is being adopted where water resources are limited but other conditions are suitable.

Of Sri Lanka's rice production 80% comes from irrigation, with 21% from minor and 59% from Major Irrigation including Mahaweli.

2 FOOD SECURITY IN SRI LANKAN CONTEXT

2.1 Food Security verses self sufficiency

Socio political imperatives have driven development planners and the political leadership over the last several decades towards a goal of self sufficiency in rice. While there are several arguments on the economic front that these investments in irrigation have been misplaced and not provided commensurate returns, while continuing to be a cost to the nation in terms of provision of mostly free delivery services, it may be counter argued that trade off of greater equity, agrarian and land reform, reduction of population pressures in the wet zone, low level of rural-urban migration etc., should allow a more realistic view to be taken. It must also be considered that the entire rice production process is a peasant small holder exercise and to achieve this level of attainment with the inevitable wide variation in production and investment capability available to the peasantry is a creditable one.

**** Falkenmark et al 1989**

The concept of self sufficiency in rice has major historical and socio political connotation. As a nation constantly harking back to an ancient era when we were considered the "granary of the east" self sufficiency not only as a deeply ingrained concept in our national consciousness but also has emerged, as an attractive political platitude and is thus regularly advanced with a relentless commitment by every Government. However, the realization of the low productivity of the rice sector as presently constituted together with appreciation of the need to rationalize resource allocation together with limitations imposed by a reduced land/water resource base compounded by low produce prices are now influencing rethinking. Lack of donor interest in investing in large irrigation infrastructure projects has also to a great extent resulted in a reappraisal of the need for continuing expansion of irrigated areas.

Self sufficiency could mean sufficiency in relation to the staple diet, to cereal demand or to a basket of food items. In the latter context Sri Lanka could never be self sufficient as approx 40% of cereal consumption (wheat flour) is imported and chances of wheat being grown in Sri Lanka is minimal. Also considering the widening base of food items consumed, especially in an open economy it would be highly improbable that self sufficiency in food could be achieved.

On the other food security too many relate the staple diet, cereal intake or a basket of food items. Food security is defined by FAO as "access to the necessary food for all people at all times to achieve a healthy and productive life". It has also been called affordable self sufficiency and has to be considered in relation to access, issue of entitlements and ability to pay. Again national food security may not guarantee household food security which again is dependent on the household economy.

2.2 Food Security

Food Security which could be termed "affordable self sufficiency" needs to address issues of access to food and affordability as vital factors in determining a nations food strategy. In Sri Lanka pricing of rice out of reach of large part of 28% of the population which is termed to live below the poverty line has made us a "virtually self sufficient" nation. Reduction of almost 10 Kg per capita from 1985 cannot be attributed to convenience and better living standards resulting in changed food habits alone, considering that per capita calorific intake is 10% below requirements.

Food security is normally expressed in terms of the staple diet ie rice. However food security needs to consider a comprehensive food basket that will involve rice, other cereals such as maize, sugar, OFC, vegetables & tubers and of wheat which has to be fully imported.

In the context that Sri Lanka enjoys no comparative advantage viz a viz countries in the region in productivity of food crops other than rice (Wicremarachchi ARTI) coherent strategies need to be in place to support pragmatic programmes to ensure the nations food security. Sri Lanka reached its highest level of rice production in 1999 (98%) of requirements. There is an emerging consensus among policy makers and development planners that a production level of around 90% would keep the rice market stable and reduce vulnerability of the peasant producers to periodic gluts that depress prices..

As articulated clearly in Dr. Sandaratne's paper there may be issues related to inaccessibility to food even in the midst of global, regional or in country availability, issues of entitlements and accessibility are very real issues that need to be contended with in any plan for food security for our people. Situations of global food scarcity significantly impacted by water constraints have serious implications for poor deficit countries in their capacities to fund food imports and decisions as to an acceptable level of national food security has to take these aspects into consideration as well. In times of crises internal supplies may be monopolized or appropriated by a few and even in the event of an overall adequacy food may not be accessible or available to the poor.

2.3 Self sufficiency in rice

Government has stopped all rice imports on the premise that Sri Lanka in 2001 is self sufficient in rice. Current per capita consumption is around 100 Kg while it was around 94 Kg in the mid nineties. 113 Kg the highest was realized in 1985. Wheat consumption and other cereals on the other hand are reaching almost 50 KG per capita. It would appear that a favorable price differential towards wheat is a one reason that we are now nearly attaining "self sufficiency" with regard to rice. Wheat flour consumption over the last five years has been around 40 Kg per capita.
The highest rice production of 2.9 M Metric tons was attained in 1999. (Annex II). It is inevitable that some imports would result in future years & in order to match production shortfalls.

2.4 Food and Nutrition:

Of around 2600 Calories required per day the per capita availability is about 2300 calories or over 10% less than required. Rice constitutes 40% of the total diet and about 71% of the cereal intake with balance being met by wheat flour. Wheat flour consumption has varied between 32 and 42 Kg / capita during the last decade with highest of 43 Kg recorded in 1995.

Therefore notwithstanding "self sufficiency" there is room for wheat flour substitution even allowing for its convenience factor, by rice through pricing. This affords opportunities where threshold levels of production may be supported to ensure that the essentially small producer rice market is kept stable through adjustment for periodic gluts especially due to increases that could come from the rainfed and minor irrigation sectors in
good years. Overall it is likely that by 2025, rice could play a less significant role especially in the middle upper class diet due to changes in consumption patterns.100 kg per capita appears a reasonable threshold to aim for.

In overall terms while at national level the requirements of food may be met the issues at household level determined by ability to pay, hold stocks etc. have importance especially in view the large percentage now falling below the poverty line, notwithstanding increasing average per capita incomes.

3 FACTORS AFFECTING PRODUCTIVITY & SUSTAINABILITY OF AGRICULTURE

3.1 Agriculture and National Economy

Agriculture contributes about 18% of GDP of which irrigated agriculture accounts for about 3%. While over 65% of the population live in rural areas around 40% find employment in agriculture. The paddy sector share of employment is estimated at about 20 %.

The increased focus on industrialization is expected to attract a significant segment of the population from agriculture with a fair percentage being absorbed in the services sector. The prevailing low prices and lack of full employment in agriculture are other major factors that are now inhibiting entry into agriculture as an enterprise. It is anticipated that consolidation taking place in the paddy sector together with higher levels of mechanization of farming processes will compensate for labour already becoming a constraint through diversion to other sectors. However, what is disconcerting is that the levels of investment in industry & infrastructure anticipated with heavy private sector growth has not reached meaningful levels and the transition may be somewhat longer incoming.

3.2 Yields and Profitability

It has been estimated by the Department of Agriculture that the profitability of irrigated paddy farming is linked to increasing yields. Paddy is profitable beyond 4 tons per ha. and attractive as an investment at 6 tons per ha. Currently Mahaweli areas produce 5 tons/ ha. while major areas in general produce 4 tons per ha. with areas such as Polonnaruwa and Ampara averaging around 5 tons/ ha. National average is 3.7 tons/ ha. Yield potential of presently cultivated varieties are almost 10 tons/ Ha.

With current extents under cultivation, it is likely that a marginal increase in average yields will bring us to self sufficiency and a surplus with further expansion of area or yields. However, keeping yields at around 4 tons/ ha. will not provide adequate margins for full time farmers in major schemes if farming is to sustain as their main income source. The issue is therefore not one of marginally increasing average yields all around, but having a focused programme that will enable "full time farming" to be viable considering the major investment in Mahaweli and Major irrigation.

3.3 Full employment and paddy farming as an enterprise

Of an estimated 735,000 Ha. of asswedumized land around 560,000 is irrigated. However total areas cultivated in Maha including rain fed is around 580,000 Ha. of which about 425,000 Ha. is cultivated is under irrigation. Of this around 325,000 ha. falls under major irrigation.
From a production perspective 59% comes from major while 21% is from minor and 20% from rain fed lands. It is computed that 1 ha. of irrigated paddy requires about 110 to 120 man days per season. Accordingly if a system offers 200% cropping intensity as in most Mahaweli and some other major systems in Polonnaruwa/Amparai 240 man days of employment is possible. It is also estimated that at least 250 man days of employment in agriculture is required for full employment and to sustain irrigated farming as a continuing enterprise. In other major systems cropping intensities vary from 130% to 200% with loss of cultivation mainly in Yala. In minor systems cropping intensity varies between 90% to 130% indicating one season of paddy and other field crops during the dry season. In rain fed areas the success factor depending on the vagaries of the weather is between 30% and 90%.

A recent JICA survey of NWP irrigation (JICA 1999) has indicated that of approximately 70,000 ha. in the province about 15,000 ha. produce full employment while over 50% of farm incomes including from most major/medium/minor systems in the province come from non-farm sources. (e.g. Middle East, Forces, Trade, Employment etc.)

3.4 Paddy Production and Climate

Considering our bi model monsoonal rainfall and that a cyclic drought occurs every four/five years followed generally by a good year, has had a marked effect on paddy production. Due to limited buffer stocks, markets encourage high prices immediately after a drought year, resulting in marginal producers in rain fed/ minor systems eagerly coming into the production cycle. This results in a glut in the ensuing season, depressing prices.

3.5 Marketing and Storage of Paddy

While production costs and minimal returns keep investment in paddy by small farmers at a low level, the resulting marginal incomes are further aggravated by difficulties in marketing.

Currently the limited storage of private millers is the major buffer available and farmers are forced to retain large parts of the harvest in view of a depressed market. In many systems farmers have large stocks from the last two seasons. It must also be noted that cash flow/liquidity problems are inevitable where large sales/purchases in paddy have to be made at the end of the season and such funds are seldom e available with the sector notwithstanding some soft loans released under emergency situations by the government. Almost Rs. 15.0 Billion is required at end of Maha for purchases. Under this scenario millers have their stores full and the farmers are forced to retain stocks or sell at very low prices to speculators. In fact, it is well known that a few speculators now dominate paddy purchases in major irrigation areas. Availability of storage services even bonded services on a commercial basis could alleviate this problem and allows the private sector an opportunity to enter the paddy sector as well. Performance based incentives may attract private sector to invest in portable storage now available in varied sizes from 50 tons onwards.

In most countries in the region strategic needs dictate buffer stocks for e.g.: Philippines maintain stocks covering about one year. Therefore some rational level of stocks need to be held by Sri Lanka as well.

Such storage with a regulatory/ intervention mechanism could help stagger supplies to the market and stabilize prizes. Also such storage enables careful examination of import requirements which is not possible at the moment where imports often conflict with local production.

Regards milling the traditional low technology mills give a milling percentage of between 61% and 68% while advanced millers return 70% to 72% indicating profits and lower prices to consumers as well if this aspect is developed upon and invested on.

4 STRATEGIC & POLICY OPTIONS

4.1 The Granary Area Programme: (GAP)

Issues surrounding major irrigation areas are of grave concern especially to the Ministries of Agriculture, Mahaweli Development and Irrigation. A joint effort embodying recommendations for a focused programme for major systems has been developed by the three Ministries and their constituent agencies. Five high potential regions have been identified covering approximately 238,000 Ha.
This area currently produces around 49% of national requirements and is expected to produce about 70% in five years and projected to meeting our needs considering a population threshold of 23 M 2025. (Annex I).

A key strategy of GAP is to convert peasant based irrigated units into small holder commercial holdings and obtain the economies of scale of farm operations through " virtual land consolidation". While some consolidation will result due to land/water rights being given, it is unlikely that the small holder production base will be eroded to such extent that large operators will overwhelm the small holders. As the farmers in

the GAP areas are now very well organized in terms of decision making with regard to the agriculture programme and for water management through Farmer Organizations, obtaining and provision of services though farmer companies using professional staff is fast emerging. Farm operations such as ploughing, seeding, weedcide/pesticide spraying and the now mechanized harvesting and threshing which is fast becoming popular, if applied on the basis of hydrological units will have extra benefit in reduction in water use for land preparation due to syncronised operations.

Participatory Management Programmes starting with INMAS by IMD in 1984, Waphaula by ID in 1986 and Participatory Management Programme of MASL in 1988 have all developed the institutional base for take up of GAP.

Concomitant recommendations are being made to enable service providers of dedicated services such as plouging, harvesting threshing and investors in portable storage etc. to be given certain incentives to encourage the organized or corporate private sector to move in to this area. Investment in new high efficiency milling will also need to be encouraged. The main assumption is that paddy like in all Asia will remain a small holder crop but could be so organized that the sector derives the benefits of commercialized large scale operations where farmers as organized entities could secure efficient services on payment.

4.2 Other Field Crops:

Growing of other Field Crops (OFC) has often been advocated as a panacea for water short systems and as a means of increasing productivity of land/ water. It is estimated that around 6 kg of pulses, 16 kg of tubers and around 35 kg of vegetables are the per capita levels of consumption at present.

Through crop diversification is being actively promoted as an alternative to paddy especially in water short systems it is estimated that a threshold of 40,000 Ha. provides the full requirement of other field crop (OFC) output and about 20,000 ha. is being cultivated under Mahaweli and another 8 – 10,000 ha. under major schemes. Therefore potential for further expansion of the area under OFC is limited. More so considering that there is no comparative advantage in the region viz a viz prices of these crops, which are therefore not exportable. The only opportunity seems to lie in specialized crops and vegetables which are activities more suited to private sector enterprise rather than the small irrigated farmers in settlements especially as new technology used may involve high capital investment.

4.3 Horticulture and Export Crops

The history of horticulture development in Sri Lanka has been somewhat disappointing. A focus on food crops by researchers and by way of production support resulted in neglect. Also a per capita consumption of 8 kg has not encouraged a large scale take up of horticulture and the influx of cheap fruits from countries in the region has been an inhibiting factor. However, there are encouraging signs that crops such as bananas using bio-technology and micro irrigation methods are finding a foot hold. Floriculture and vegetables for export are increasingly being taken up by the private sector especially in proximity to the International Airport. This is beneficial to the wet zone. However, some possibilities for growing of crops such a Mango, Banana, etc., under irrigation in the dry zone seems to exist. Active consideration is now being given to develop the Kelani valley flood plain for such export oriented crops in the wet zone. Certain major schemes such as Inginimitiya/ Mahakandarawa offer opportunities for despecifying of large extent from paddy and commissioning land for other permanent/ semi permanent crops under irrigation. It is well established that fruit consumption is linked to higher income levels and this is bound to improve when we break the US$ 1000 per capita income barrier.

4.4 Land Use and Environment

Irrigated rice as a land use practice in low humic gley soils appears possibly the best option of land use sustained over several centuries. However, in the development of paddy areas especially in large settlement schemes certain soil types more suited to other crop cultivation (RBE soils) have been converted to paddy for reasons of proximity and efficient utilization of developed water resources. By and large these have now gravitated towards being reasonably effective paddy lands with formation of hard pans, thus reducing demand for high water duties. Some opportunity exists for conversion of such RBE land to non rice crops if conditions so require.

Irrigated farming is now considered to be a major pollutant of water ways in the dry zone. High levels of discharge of nitrates and phosphates and also herbicides/ insecticides are affecting water quality and threatening several species of fish and other aquatic life.

On the other hand the considerable higher levels of water use has had beneficial impacts in that helped by the heavy bi model rainfall and undulating terrain, occurrence of salinity and alkalinity have been minimal when compared to other countries in the region. However, over exploitation of water resources through over development in many of the dry zone basins has resulted in the inability to maintain minimum base flows during dry months resulting in these basins functioning as closed basins. These have had adverse impact on lagoons, wet lands etc., and affected the environment in a major way. The lack of clear institutional responsibility for management of rivers and water ways has resulted in the first casualty of over exploitation of water resources in a basin being the environment.

4.5 Paddy in the Wet zone and under Rainfed conditions

Notwithstanding availability of water and suitable conditions for paddy cultivation in the wet zone a low yield/low returns scenario is a reason for increased non cultivation of already asweddumised land. Lack of storage (reservoirs) have impacted on dry season cultivation in the wet zone (DHI -1999 Attanagalu oya, Maha oya, Kelani study). Due to the above and uncertainty of rain fall during Yala , cropping intensity is lower than Maha. Two essential requirements related to water to improve productivity viz realiabilty and timeliness cannot be achieved under rainfed conditions in Yala. However there appears to be a need for greater research into increasing rice yields in the wet zone and to exploit the potential of rainfed paddy as this would be from water not being competed for by other major uses.

4.6 Ground water for Agriculture

Use of shallow ground water from agro wells for cultivation of OFC and for conjunctive use with irrigation water from gravity systems has been encouraged over the last two decades. It is estimated that 15,000 agro wells have been provided under a subsidy scheme supported by the state. Unregulated overexploitation in several dry zone areas where well density far exceeds water availability has caused further lowering of water tables with severe consequences. In Huruluwewa a study of 84 wells (SCOR – 1996) has shown that the water table was lowered to such extent that perennial trees years old were affected as was canal flow in these areas. Evaluation of 96 wells in Palukadawela (ARTI – Ariybandu 1998) showed that less than 10% of these wells are able to provide water for Yala cultivation. Nevertheless the beneficial impact of these agro wells in reducing risk in cultivation is established. The Water Resources Board has recently started a monitoring programme in NCP/NWP to help in judicious use of this valuable resource.

Lack of clear institutional arrangements for integrating and managing water effectively has been a major reason for over exploitation. Over 50 Agencies and 40 Acts. deal with water dealing to confusion, duplication and eventually inaction in relation to its management and regulation.

4.7 Inland Fisheries

Essentially a non consumptive use of water, has tremendous potential for development both in major /minor reservoirs. Provides opportunities for off farm employment and supplementary incomes. There is now interest in fish culture in rice fields with the main or upper liyadda converted to fish ponds. Agro wells support these programmes in that during the closed season water is still available for ponding. It has had success in Indonesia and Malaysia is now being promoted in some major/minor systems in the dry zone.

Issues of high phosphates, nitrates and other chemicals in return flows have to be dealt with if such water is to be used for fish culture.

Fresh fish output is around 290,000 metric tons of which inland fisheries account for about 33,000 metric tons, which is only about 11% of the total output. Fresh fish consumption is around 9 Kg per capita a very low figure. Dried and tin fish consumption is about 5 Kg per capita and substitution with inland fisheries is a possibility. The potential exists for raising the inland fisheries output to over 100,000 tons in the short/medium term in the dry zone and this could play a significant role in the diet as well as food security.

4.8 Lift Irrigation and New Technology

Of a total of 33,000 ha.* cultivated with OFC and vegetables in the dry zone around 18,000 – 20,000 ha. of land is lift irrigated producing OFC, vegetables/potatoes etc. Most of these are individual units while around 2000 ha. are state operated community based systems. These extents compete with irrigation flows and sometimes cause reduction in flows to major reservoirs such as Huruluwewa, Kirindi Oya etc However, there is no state patronage to this informal sector which is an important producer of OFC in the Dry Zone. The private sector is now investing in drip/sprinkler and hydrophonic systems to meet requirements of export and a niche local market. Around 1000 ha. is now under improved irrigation with about 50% under timber and permanent/semi-permanent crops. Further production expansion is probable in a market driven production and it is expected that around 2500 ha. will be in production by 2025.

In the wet zone and central regions around 38,000 ha.* are cultivated under potatoes and vegetables. These extents however do not compete directly with irrigation but some environmental flows are affected.

(i) Status of Water Resources and Productivity:

Over 85% of developed water resources are being used for agriculture. With improved living standards and urbanization coupled with a gradual increase in industrial activity and services sector are being felt in the supply demand equilibrium that had hitherto existed especially in the Dry Zone. There has been much speculation that water in the dry zone will need to shift from agriculture to industry and other uses.

The probability however is that competing demands will be more from domestic water and environmental considerations. As the wet zone appears to have comparative advantage not only in relation to water but other facilities investors are unlikely to take up high water use industries in the dry zone. However, non water dependent industries and agro industries are probable in these areas but unlikely to affect the supply to agriculture in a major way. Domestic supplies to farmer communities and urban centres remain the crucial demand and main competition. However, environmental needs and greater variation in quantity and distribution of rainfall can impact on the delicate balance that exists.

Assessment of productivity and irrigation efficiency has hitherto somewhat short changed the irrigated paddy sector. The simple principle of computing sluice discharge against cultivated area has been to some extent at the least most misleading and "simple logic" to plague the paddy sector on a continuing basis. The normal project efficiency levels for gravity fed irrigation systems based on FAO criteria remains at

around 45%. It is estimated that Sri Lanka's efficiency percentages are between 30% and 40%. In large irrigation systems in the region and other parts of the world the irrigation ditch or canal command area relationship may be largely associated with cropped area. Sri Lanka however as major irrigation schemes are human settlements of many small holders, the Main/Branch and even Distribution canals support community life, homesteads, livestock, recharge of groundwater, wells etc., and therefore loading these community withdrawals to the crop is somewhat unrealistic. A more effective and rational relationship could be drawn if discharges at secondary and tertiary level are considered against cropped areas. A design assumption that only crop water requirements, evaporation and deep percolation with some conveyance losses constitute the total agricultural needs has been proved wrong in the recent programme being undertaken in Walawe where lining of canals was expected to bring in over a 1000 ha. of new land under irrigation. As construction proceeded the damage being done to the community living areas, wells, permanent crops etc has become so clear that the programme is being redesigned to mostly lining of the secondary/ tertiary system.

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* Ministry of Agriculture 2000 Production Programme.

Sri Lanka's history of irrigation development has been based on basin water resource utilization and use of return flows. It is well known that in major systems night irrigation is not practiced and over 40% of water thus returns to the stream/river as drainage as many turn out structures are also meant for continuous flow.

Further, downstream development of new areas take this into consideration and the full irrigation area in a basin has been planned to use return flows from upstream systems. Therefore from a project or system perspective the efficiency would appear low (30% to 35%) and at on a basin level most basins function as closed basins in the dry zone during some periods ie negligible flow to the sea indicating basin efficiencies of over 80% which is a very high efficiency.

For eg: if releases to system H in Mahaweli were considered on cropped area alone releases to "H" area system/project efficiency be low. However as return flows enable Rajangane (earlier major system with cropping intensity of around 1.2) now to cultivate both seasons without any water shortage, the incremental area of over 8,000 ha. need to be added including areas under Neela Bemma etc as these areas are entirely dependent on drainage from Kalawewa. Any major intervention in Kala Wewa to improve water management and reduce supplies would impact adversely on Rajangane and other downstream systems. This does not however mean that there is lack of need to improve system operation within major schemes, as issues of equity, adequacy , timelessness and reliability within systems too need addressing. However, a balance needs to be maintained in the basin as efforts at extensive reduction in water use in upstream systems may adversely impact on downstream systems. A case of literally wining battles and losing the war.

It needs appreciation that most pre 1975 major systems were designed as supplementary irrigation systems for cropping intensities of less than 150% more often around 130%. These systems have now in large measure reached cropping intensities of over 150% with expanded areas under cultivation. Therefore while internal efficiencies in system management will bring considerable improvements these have to be rationalized in relation to costs of inputs for of costs of these efficiencies both in terms of infrastructure and management taken up with overall effect within the basin and of other competing demands.

Wastage or inefficient water use is not to be encouraged as natural resources are fragile, vulnerable and limited. The fact of water resources being renewable to a degree, the opportunity cost of water saved by efficiency, and interventions has to be considered. If farmers use water for weed control and there is no competing alternate demand for that water it is an economic use of water albeit an inefficient use of water as a resource.

Unless water is being mined it should not be an obsession to foist a level of efficiency which may add to the cost structure of economic survival of essentially peasant farmers. Water as a weed control medium has implications thus for even cost avoidance in imports of weedicides and increased pollution. Rather than a generalized exhortion to high efficiency and productivity per unit of water which may seem socially correct and a desirable condition to be attained, the practicalities and affordability of these requirements have to be assessed again in terms of return to the economy and to the farmers. There is however no question that where basins are becoming closed due to over exploitation with environment the greatest victim, efficiencies in use and allocation of competing demands based on valid social and economic criteria is imperative. As the largest user, irrigated agriculture would be the first casualty in such equations and selected interventions are increasingly becoming evident in many dry zone areas. This has to be in the long term considered with IWMI projections for water scarcity especially during the dry season through continuation of the business as usual – B.A.U. principle.

Some IWMI studies on water productivity in sample schemes give the following productivity figures for

Maximum	***Minimum***	***Average (Kg/M³)***
0.7	***0.17***	***0.40***
Maximum	***Minimum***	***Average (Rs/M³)***
6.30	***1.54***	***3.57***

Sustainable management of water resources for irrigated agriculture:

The irrigation agriculture utilizes over 85% of developed water resources. Urbanization is expected to exceed 50% and a population of around 23 M by 2025 with improved living standards and increase in industrialization and services sector is likely to impact on agricultural use of water especially in the dry z

zone.

Table No. 1: *. Surface water resources:

	Wet Zone	**Dry Zone**	**Total Island**
Mean Annual Rainfall (mm)	2,424	1,450	1,937
Mean Annual Rainfall (HM)*	2.58×10^6	2.55×10^6	5.13×10^6
Run-off Rainfall Ratio (%)	65.1	35.8	40.5
Escape to Sea (HM)	2.04×10^6	1.30×10^6	3.33×10^6
Escape as a % of Run-off	**78.8**	**51.1****	**64.9**

*** Hectare meters**

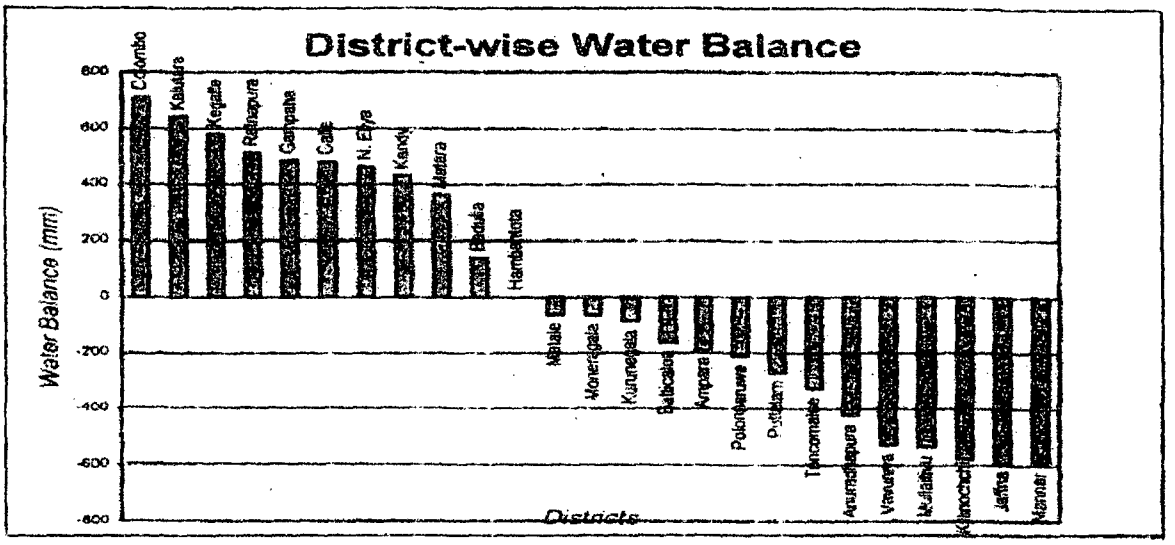
*** Ranatunge 1985 (Pre Mahaweli)**

**** Now estimated at 35%**

There is increasing evidence that domestic requirements and mandatory environmental flows will require adjustment of appropriation by agriculture in the dry zone.

IWMI projections show absolute water scarcity in 8 Districts in Maha and 11 in Yala if current trends continue. However, it is not clear how transbasin diversions have been handled in this estimation as there are large Mahaweli flows into the NCP/Uva and some to the Southern Districts. Table No. 2.

Table No. 2: * District wise water Balance



- Water balance value = 75% Probability Value of Annual Rainfall – Annual Free Water Surface Evaporation Value

* Amarasinghe 1997

Nevertheless policy makers are confronted with these competing demands that necessarily require intervention with policies and strategies that will be compatible with the predicted future macro economic environment, but still meet the requirements of these demands while allowing for sustainable use of the limited water resources.

The Granary Area Programme which will help consolidate the dry zone agricultural areas will help facilitate allocation between competing sectors to some extent. Nevertheless, competition for water within this area would still prove significant. These in turn will be affected by the general outlook of the country by 2025 where demographic and other changes will again impact on water resource use by agriculture.

The dependent population is expected to increase over the next 25 years. Number of children under 10 is expected to reduce from 18% - 12% while the population over 60 is predicted to increase from 9% to 20% at current mortality rates. Overall these two segments will increase from 4.86 M to 7.2 M ie 21% to 32% while the economy will be strained to support this dependent population through cultural and social traditions will continue to emphasize care for these segments.
Provision of food at affordable prices becomes essential if socio political problems are to be avoided. Rain fed agriculture has been decreasing since 1978 due to urbanization in the wet zone and production economics. It is expected that this extent will even out at a maximum of 200,000 Ha. by 2025. Area under irrigation would change based on policies, availability of water for cultivation (full/part employment) irrigation efficiencies and management changes.

5. USE OF PODIUM MODEL FOR STRATEGIC PLANNING

5.1 Strategy formulation using PODIUM

Future strategies and policies require appreciation of relevant factors. The International Water Management Institute developed policy dialogue model (PODIUM) for global application has relevance to adoption for our own requirements. The model estimates projected increases in demand for water resulting form population

growth, consumption patterns competing demands etc. The computation process comprises the following 3 steps;

- The first step estimates national food requirements based on assumptions concerning population growth, daily calorie intake and composition of diets.
- In the second step the projected cereal production is estimated based on the expected yields and cultivated area, under both irrigated and rain fed conditions Projected cereal production is then compared to the required production as computed in step one.
- Finally, the third step converts the projected food production into water demand The computed water demand is compared to actual water diversions in the base year 1995 and the available renewable water resources.

This model is utilized in the paper to analyze three different scenarios for the year 2025, with the base year being 1995. The three scenarios are based on the description of possible futures developed by the Scenario Panel o f the World Water Commission as part of the Vision 2025 exercise.

5.2 Agriculture: Production and Food Consumption

The PODIUM model uses cereal crops as proxy for overall food demand and supply. As rice is the major cereal crop cultivated under irrigated conditions in Sri Lanka, paddy equivalent values have been used throughout wherever cereal production, consumption and water requirements are analyzed. The paddy production, consumption and rice imports for the period 1993 to 1997 are given in Table No. 3.

Table No. 3: Rice Production and Consumption (Average values for 1993-1997)

Input (million metric tons)		Output(uses) (million metric tons)	
Domestic Production	2.472	Animal feed	0
Change in Stocks	-0.04	Seed	0.086
Imports	0.264	Waste	0.163
Exports	0.014	Availableforfood(paddy)	2.500
Total available (paddy)	2.760	Available for food (rice)	1.700

Table No. 3 shows that domestic production caters for about 90 percent of the requirements.
Based on Imbulana etal, 2000

Table No. 4: Area, Yield and Production

Type of Cultivation	Area(Ha.)	Cropping Intensity %	eld Tons/Ha
Major Irrigation	322,000	130	3.96, 3.87
Minor Irrigation	176,000	100	3.21, 2.93
Rain-fed	236,000	99	2.70

Note: Yields are based on harvested area. Irrigated yields are for Maha (rainy) and Yala (dry) seasons respectively. Data obtained from Department of Census and Statistics, 1197-a, Central Bank of Sri Lanka, 1997 and personal communication.

Table No. 4 summarizes the productivity-related data according to the type of cultivation. Net irrigated area (NIA), which includes gravity, lift and systems designed to prevent entry of salt-water to agricultural areas, amounts to approximately 560,000 ha. About 89% of this area is cultivated in rice. Average irrigation intensity is 120% giving a gross irrigated area for cereals of about 600,000 ha. Available information indicates that the total area prepared for cultivation is not fully cultivated even in Maha.

Although rice is the staple cereal, on the basis of daily per capita calorie intake, it constitutes only 40% of the total diet and about 71% of the cereal content of diet. Imported wheat flour makes up the remaining portion of cereals in the diet.

Average per capita food availability for a citizen of Sri Lanka is 2216 Cal/capita/day based on actual consumption between 1993 – 1997. The average food availability is relatively low when compare with other countries and average recommendations. However, food requirements vary with factors such as age, sex body weight and height, (Dept. of Census and Statistics, 1997 – b). The relatively low consumption of animal products in diet may b e a contributory factor to the observed low calorie level. Based on stunting of children under five years of age, 24% of the age group suffered from malnutrition (WHO, 1999). Annex II.

5.3 Water Availability and Withdrawals

Annual water resources of Sri Lanka is estimated at 43.2 Km^3 (Seckler etal 1998) with compared volume of primary water diverted from all three sectors viz. agriculture, domestic and industry estimated at 10 Km^3 (ESCAP 1999) which is about 23% of annual water resources.

5.4 Withdrawals for domestic and industrial use

Review of resources estimates of domestic water (Jayasinghe 1998 & Barker et 1999, Mosely 1994) consumption from piped supply was estimated at 0.32 Km^3. Considering predictions increase of urban population to 65% mix 50% probable from present 30% the water withdrawals would more than double. However, considering the investment capacity of the economy these figures have been limited to twice 1995 levels. FAO (1999) estimate that domestic and industrial water requirement would equal 7% and 3% total withdrawals in 2000.

5.5 Withdrawals for irrigated Agriculture

The crop types assumed for Maha (rainy) and Yala (dry) seasons were 125 day variety rice and 95 day variety rice respectively. Water diverted for irrigation was estimated based on an analysis of a sample of irrigation schemes managed by the Irrigation Department. (Table No. 5) The long term evapotranspriration values obtained at the Maha Illuppallama Research Station and the rainfall values for the DL1 agro-ecological zones (Ponrajah, 1989) were used for the analysis. Effective rainfall was assumed as 70 percent of Maha rainfall and 100 percent of Yala rainfall (Imbulana and Merrey, 1994). Recycling of irrigation water was assumed to be 25 percent of diversions.

Table No. 5: Parameters of Irrigation Water Use *

Parameter	Maha	Yala
Water diverted (at reservoir)	1100 mm	1643mm
ET (rice)	586 mm	671 mm
75 percent probability rainfall	402 mm	44 mm
Effective rainfall	282 mm	44 mm
Project Efficiency **	23%	37%

** Project Efficiency = NET/ water diverted

* Imbulana etal

6 SCENARIOS:

A. BUSINESS AS USUAL (BAU)
B. TECHNOLOGY ECONOMICS AND PRIVATE SECTOR (TEC)
C. VALUES AND LIFE STYLES (VAL)

A. BAU:

Current trends and practices will continue natural increases/ attrition due to sector based policies will continue. Additional development water resources will be limited to additions for current system consolidation and those connected with hydro power development and domestic water.

Due to lack of economic viability irrigation projects seeking to minimize in area will be for equity and regional considerations. Some irrigation areas will go out of production while overall cropping intensities and irrigation efficiencies will increase marginally or stagnate. Due to urban expansion and poor incomes rain fed area will decrease to 200,000 ha. or less. Sectoral and agency based efforts will continue with poor co-ordination and extension. With no change in policy, yields will remain static or marginally increase in irrigated areas and decline in rain fed areas. Decline in quality of drainage water and soil fertility over exploitation of ground water and reduction in base flows will contribute to environmental degradation and affect yields.

It is expected that rice production under BAU would be about 2.55 Mil MT which indicates a deficit of 0.9 Mil MT at present consumption levels that has to be imported. The trend in import prices as indicated by FPRI would give a FOB price of between US $ 300 and US $ 310 per MT requiring about US $ 300 Million for imports.

B. TEC:

Private Sector will contribute significantly to research and development of water resources. State sector will play a facilitation/ region later role and agricultural development will be guided by productivity and economic returns. Per capita food availability will increase to 2600 calories/ day (WHO recommendation) changing life styles will see reduction in rice consumption in a larger part of the population.

Concept of water as an economic good will be accepted in determining its use with respect to alternate uses. Sectoral or even inter sectoral transfers would be allowed and private ownership of water viz land and water rights will be recognized. 25% of irrigated area would be cultivated with high value crops and high rice yield areas will be supported for full employment from rice farming under Granary Programme. Any environmental costs of rapid development would be off set by economic gains.

Area under irrigation would decline and minor irrigation areas will be considered more social and community systems rather than rice production units . Yields will increase from the current 3.7/ ha. tons to average of 4.2 tons/ ha. with Granary Area yields reaching 5.5 tons to 6.0 tons/ Ha. Private sector will invest in large scale farms and research including for export crops. New technologies/ techniques will be adopted etc green house cultivation will expand and market oriented production will result. It is expected that ultimately irrigated area would decline to around 475,000 Ha. with rain fed to reducing 100,000 ha.

Overall economic status will allow for considerable variety in food imports to meet better living standards. Full cost recovery of irrigation services would be possible with a prosperous farming community able to pay and demand services. Farmer Companies and Co-operatives will take on commercial activities while Farmer Organizations will be very active in decision making and lobbying for farmer interests.

It is envisaged that total consumption of rice will be 3.0 Million MT with wheat substitution for the balance 0.4 MT. Production is estimated at 2.1 Million MT and deficit 0.9 Million MT. Imports would cost US $ 300 for rice and additional 0.4 M MT of wheat at approximately US $ 150 requiring about US $ 65 Million, totaling US $ 365 Million for imports.

C. VAL:

Government role essentially of facilitation and regulation. Management of systems will be by users using management services. Cost of irrigation services met by farmers.

Government will collaborate and solicit redefinition of national goals and objectives with respect to agriculture environment and investment. Low value crops will be weighted against their strategic importance. There would be imported technology and services side by side with local.

National policy will enable economic technical and environmental considerations irrigation efficiency will increase to a environmental acceptable levels of 24% in Maha and 40% in Yala.

Environmental flows will be allocated up front and pollution pays principle will be enforced strictly

Large investment will be made in watershed catchment management programmes.

Total rice production is estimated at 3.31 Million MT (Table No. 6) and deficit 0.6 Million MT bringing it to a total of 3.9 Million MT (increase due to shift of calorific intake from 2200 calories to 2600 and wheat flour consumption remaining the same.) Imports would cost about US $ 200 Million.

Table No. 6: Agricultural Regions and Production

Agricultural Region	Area (Ha.)	Yield (Tons/ha)	Production Mil. MT	Cropping Intensity %
High potential irrigated area	275,000	7.00	2.31	150
Low potential irrigated area	200,000	3.75	0.65	115
Total irrigated area	475,000	5.90	2.96	135
Rain-fed area	125,000	3.10	0.34	100

Note: 1. 90% of the irrigated are is cultivated by cereals.
2. Yield is based on the harvested area\

Podium outputs/ Assumptions and derived conclusions are given in Annex III. This is from a paper by Imbulana etal on Sustainable Management of Water Resources Utilized for Irrigated Agriculture in Sri Lanka, presented in 2000 in Bangkok.

7 ANTICIPATED POLICIES AND STRATEGIES FOR SUSTAINABLE IMPROVEMENTS

With global and regional agreements such as SAFTA/SAPTA coming to the fore and greater opening of the economy commercial and economic viability is likely to be the determinant of the expansion or contraction of the irrigated agricultural sector. Issues of full employment from farming, crop diversification, development of export markets are likely to bring changes to a largely insulated irrigated farming sector.

Land and Water Rights would lead to consolidation with marginal producers exiting farming. Increased mechanization would be inevitable in a high labour cost, rural labour constraining situation. Also attractiveness to youth to take up farming will be dependent use of labour saving mechanization and reasonable return to investment and effort.

Policies would need to be directed at commercialization efforts and "virtual" land consolidation etc., where collective efforts by farmers to use economies of scale through collaborative activities will become necessary. Use of management and specialized skills through institutions such as professionally managed Farmer Companies will be required.

Safety nets need to be provided to reduce rural-urban migration due to consolidation of farms etc

As in the case of animal husbandry, poultry, tobacco etc., private sector involvement with reduction of State monopoly in the input side of paddy farming will be necessary. Institutional changes will dictate that water entitlements and cultivation decisions will eventually need to relate to extent held and investment being made rather than on the equity principle which disregards land holding size and only considers ownership. The latter always influences water use and land use as determined mainly by the poorest of the cultivators.

Forward contracts will need to be promoted among group suppliers to stabilize markets.

Private sector joint efforts at introducing new technologies, improved seed and inputs, extension etc., would be encouraged.

Water will be imputed an economic value for its competing uses. If water is subsidized these will be clear and transparent and how costs are apportioned to individuals, groups or society will be clearly spelt out.

While irrigation has been subsidized by the state use extraction of water for domestic and urban supplies from reservoirs do not reflect true costs of such supplies as costs of extraction and appropriation are not accounted for ie. Irrigation subsidies the domestic supplies in the dry zone. Eventually it may be necessary to have dedicated reservoirs for domestic water supply in the dry zone.

An overarching law and institutional arrangements would be needed to support integrated water resources management. The probable investment scenario envisages a investment of about 50 Billion upto 2025 at 2000 prices as Water For Food (Lanka Water Vision .2025) with about 75% estimated to come from public sector investments with the balance from the private sector and individual investments.

Policy issues arising consequent to changes in water resource use for agriculture:

- Consolidate irrigation sector to ensure full employment and sustainability of irrigated farming (Granary Area Programme.)
- Encouraging integrated farming approaches (aquaculture, agro-forestry, livestock, etc.,) to support full employment and attaining higher incomes for farmers.
- Current focus on inputs (seed, water, fertilizer, ploughing, etc.,) needs to be extended to management of outputs as well (harvesting, storage, milling, marketing, etc.)
- Many agencies (50) and Acts. (40) dealing with water need to be brought under a single overarching law urgently for efficient allocation and regulation of water resources.
- Planned conjunctive use of ground water reduces the risk of cultivation in the dry zone especially of OFC if coupled with prudent monitoring and management.
- Policies and incentives towards use of improved technologies (milling, irrigation and mechanization) for farming operations in the context of a unpredictable and costly rural labour market
- Private sector participation in high value cropping mainly for export
- Safety net to accommodate farmers exiting from agricultural sector due to consolidation and low productivity/ low incomes.
- Managing rural-urban migration due to consolidation resulting from land/water rights.
- Issues arising from Tradable Water Rights (Sectoral and Inter Sectoral)

- Cost recovery of irrigation services and demand driven supplies and services.
- Adoption of new technology and mechanization to reduce the drudgery associated with rice farming so as to attract youth to farming.
- Need for basin level planning, monitoring and management of water resources.
  (The above are highly relevant to VAL scenario)

Two key aspects needing great political will to resolve are:

(a) Irrigation infrastructure to date is the only free public good that is disposed of to persons of unproven production capability without any criteria or evaluation. The cost of 1.0 ha of irrigated land is almost Rs. 1.0 M at current prices. Though it is agreed at policy levels that further irrigation expansion is unwarranted, this continues due to the very high political leverage at both national /local levels and thus more and more marginal areas are being developed for peasant irrigated farming (ie. paddy). A nexus that invariably develops between the local political leadership and irrigation agency staff keeps this alive and continuing.

(b) Unlike in say the "Warabandi" system in the Punjab, decisions regards allocation of water is taken on the basis of ownership. What transpires at Kanna meetings is that owners irrespective of size of holding have equal votes on use of the water resources under a system. As the number of small land holding owners being greater, the agronomic and management decisions on cultivation are biased towards the low investing very small producer who generally opts for paddy. The few larger land owners have to thus abide by these decisions and therefore productivity and efficiency suffers. It is for thus reason that in schemes such as Nachaduwa,, Giants Tank Batalagoda, Ridiyagama etc. where large lots of 10 ha. exist, production levels are no better than in the small holder units of 0.5 ha or less. The need for change to the law to allow the decisions as to the agriculture programme. water use, rotation etc. to be taken on the basis of the size of the holding is necessary.

Both these require major political will but it is hoped that some changes to the status quo will result due to pressure on resources.

8 TOWARDS FOOD SECURITY:

8.1 Global and Regional trends:

A Regional perspective on the food security situation as assessed by IFPRI 1990-2020 is given in Annex IV. While the situation for South Asia in comparison to other developing country regions (Table No. 7) is better there is still a food deficit predicted for the region in 2020 with Pakistan being the most vulnerable.

Table No. 7: IFPRI Projections for South Asia

'000M T.

	1990			2020		
	Production	Demand	Net trade	Production	Demand	Net trade
Wheat	65780	69092	-3312	126817	148121	-21303
Rice	101430	99315	2115	197617	197588	29
Maize	11455	11399	56	20572	21597	-1025
Total Cereals	207004	208176	-1176	394018	416728	-22709
Total meat	3296	3400	-104	7775	10095	-2320

(IFPRI – IMPACT)

The rice situation remains positive while there appears to be a heavy demand for imports of other cereals such as wheat/maize. A heavy deficit in meat production will require large scale imports to the region. It is also noted that on a global scale, developing countries would suffer a deficit of 188.236 Mil MT. Which appears to be counter balanced by production in the developed countries i.e. overall the global situation requires transfer of about 11% of the total world production of cereals from developed (mostly USA) to developing countries. Even though prices over the long term have been stable (wheat US$ 130-155 and Rice US$ 260-295) the ability of developing countries to fund these purchases need to be examined. These costs when translated into costs to the consumers in a situation where large segments of the population live below the poverty line and may not be able to access food in the midst of adequate stocks at national/regional & global levels has to taken into account.

8.2 Food security for Sri Lanka

The various scenarios and the assumed conclusions bring together the need for selecting suitable options in the face of a changing and increasing population on one hand and a diminishing resource base on the other.

Unless the economy is comparatively stagnant it would appear that significant changes will result in the irrigated agriculture sector even without the impetus of rapid industrial development.

On one hand:

- Wet zone/rainfed irrigation is declining and land would lie fallow. Many minor and some major systems with less than 150% to 180% cropping intensity are unable to support full time farming.
- Minor irrigation will need to be treated more as social systems conducive to part time employment in agriculture.
- Drudgery of agricultural operations and low returns pre-empt youth taking to agriculture in a major way.
- A peasant unregulated production base results in high variability in production and productivity resulting in gluts/shortages with widely fluctuating markets and prices necessitating continued state intervention when seasons are good and bad.
- Even if anticipated demand from other sectors can be met within water resources available to the dry zone, need for production rationalization and sector consolidation will require that marginal lands and marginal producers exit rice and convert to other irrigated crops or animal husbandry.

If a level of around 90% self sufficiency in rice is being aimed at, a consumption level of 100 kg /capita of rice would require a production of 3.4 mil. M.T. of paddy for a population of 23 million. The increase of 0.5 M. M.T. required above the annual highest production level of 2.9 million M.T. (15%) would need to come from improved efficiency and increased yields. (The VAL scenario assumed a level of 85% in the model). While BAU is not an option the trends suggest a VAL rather than a TEC scenario given the fact that the state would continue to play a major though different role.

There is growing awareness that the paddy sector needs to consolidate if it is to survive as a viable enterprise and need for converting marginal lands to production of cereals such as maize to support the livestock industry and O.F.C. is accepted. The Granary Area Programme (GAP)is the main strategy aimed at consolidation. It may be that still some more water resources though impounding and/or diversion may be required for such consolidation and crop security, eg. Moragahakanda, Uma Oya, Deduru Oya etc. This in turn will drive the stressed areas in the dry zone to other agriculture or non paddy cropping.

The time is now right to ensure that before issues of lack of labour, profit, water etc. could be the drivers that determine the fate of the sector, a coherent strategy for consolidation with rational water allocation based on location and comparative advantage needs to be developed. All the facts are with us and only the political will to make the right decisions are needed. Supporting institutional and legal changes are fast taking place in the water sector which may be better regulated and managed by say 2005. It is likely that by this time clear functional responsibility would have been assigned to riverine management, the lack of which has created so many issues for downstream and even riparian users and environmental flows.

In conclusion it is to be noted that the linkage of water for food & agriculture and hence food security is not merely the interaction of an input output relationship but a complex scenario in which the many social, economic, cultural, political, economic physical and environmental aspects impinge on the decision making process. It is clear that with respect to the Dry zone where the stresses are greater still, there exists no need to man panic stations as yet. The limited inter- sectoral demands which are not mutually exclusive need to be managed in an integrated, less sector oriented manner. The developing institutional and legal mechanisms which were initiated as for back as 1993 stands to our advantage and we are in the fore front of IWRM in the region. Being an island nation we are also insulated from the external dimension of international land /water boundaries. The problems are of our own creation and the solutions are also well within ourselves. If needs arise there exist the possibility of water transfers from surplus to deficit areas not only for agriculture. The time has also come to view reservoirs not as water storages for irrigation but creation of potential for meeting all water resource needs of the community be it domestic, industrial, agricultural, recreational or environmental. Dedicated storage for domestic supplies and for river regulation for environmental needs to be now considered. There is still adequate water for all our needs but sustainability of the resource base will entirely depend on our capacity and commitment to manage this vital resource for posterity.

As the areas under OFC/vegetables potatoes etc are modest in terms of land/water use it is in the aswedumissed paddy and irrigated areas that change will occur in relation to water demands in the dry zone. The probability that the irrigation sector will consolidate is very high given the current low incomes and programmes such as GAP.

By 2025 irrigated land that will provide full employment will be approximately 260,000 ha. of which 238,000 come under GAP. The total extent under major is about 360,000 ha. which leaves about 100,000 ha. providing partial employment and having cropping intensities of around 120% to 150%. In the full employment area about 15,000 ha. under Mahaweli and 10,000. under other major will cultivate OFC during Yala.. In the minor irrigation sector of around 200,000 ha. cropping intensities will stabilize at around 0.9 to 1.2 with about 15,000 ha. being cultivated in OFC during Maha/ Yala. Rainfed areas are estimated at 200,000 ha. with a Maha paddy cultivation providing supplementary incomes and about 5000 ha. cultivating OFC. By 2025 it is likely that rainfed areas will stabilize at around 120,000 ha.

About 50,000 ha. in major and 100,000 ha. in minor and about 80,000 ha. rainfed need to adopt to less water consuming agriculture ie maize, pasture, sugar cane, semi permanent/permanent crops, horticulture etc and exit from paddy. Single season cropping in other systems including minor and Maha rainfed and the GAP area would provide our rice requirements of around 3.4 million Metric Tons. With this consolidation and clear land/water rights every possibility exists to manage the water demand requirements in the dry zone. Large scale transfers of water to the NCP, Uva and SP taking place currently estimated at 2400 MCM annually and expected to rise to 2800 MCM (3000 MCM maximum) by 2010 will be a stabilizing factor in the GAP area. It has be noted that these waters are dedicated supplies to 155,000 ha. mainly for agriculture/domestic use and supplements water availability in Anuradhapura, Polonnaruwa, Trincomalee, Kandy, Matale, Badulla, Moneragala & Hambantota Districts which are identified as deficit Yala in the IIMI study (Amarasinghe 1997).

At an estimated crop water requirement of 6 mm./day around 1600 MCM is required. This leaves 800 MCM for conveyance losses and other uses indicating that in basin water in this area is mainly needed for land preparation and standing water in the field.

It is therefore sound institutional and management interventions with adequate legal back stopping that is needed in a sector which can meet not only the food security needs but also other competing demands and water for complementary uses such as environment. Natural disasters such as floods/droughts of a cyclic nature too could be mitigated through proper conservation measures.

This relieves pressure on the in basin resources for other demands and with crop diversification, a demand supply equilibrium is probable. It is estimated that about 50,000 farmers will opt out of agriculture and a safety net needs to be in place to accommodate an eventual migration from the sector.

9 AREAS FOR STRATEGIC SUPPORT

1. Notwithstanding pronouncements that irrigation consolidation not expansion is the future policy with emphasis on increasing productivity, system turnover and joint management, continued ad-hoc expansion is taking place in the irrigation sector mostly providing cropping intensities less than 150% ensuring that the beneficiaries are in fact caught in a poverty trap committing themselves to a future without full employment in agriculture. This in turn is adding to the income problems of the existing peasant farmers and can only help to sustain poverty in the paddy sector. Investment in new marginal irrigation needs to be lobbied against at the highest investment decision making and political levels. These funds are better utilized for increasing water security in existing areas through demand based management interventions, modernization of systems and system augmentation undertaken to improve supplies. The saved water would also be available for competing uses.

2. While cost recovery is a major sensitive policy issue needing great political will to implement, farmers are not averse to payment for quality delivery services as at the moment they contend with the free but invariably poor agency services. Once water rights are available there would be the possibility of demanding service levels which may require a level of payment. Currently the farmers are encouraged to accept the "free" services which do not meet best practice requirements. Awareness programmes are vital as agencies will not promote such a concept which will diminish the "power factor" in irrigation water supply.

3. The corporate private sector sees the irrigated paddy sector as purely a state sponsored non profitable sector for investment in view of lack of opportunities for operations on economies of scale. In defined areas such as GAP opportunities do exist for such investment that may benefit both the organized farming sector and private sector.

4. Programmes including safety nets need to be provided to support farmers exiting the agriculture sector so that they would not merely overload the migrant unskilled labour in urban centers.

5. Programmes promoting production for market rather than attempting to market produce after production, aspects such as forward contracts etc., essentially with joint private sector involvement will be necessary and help manage the outputs from irrigated agriculture. This is a weak area where state agencies are not yet geared to support.

6. The competing but interdependent uses for water in the dry zone can be met other than in periods of extensive drought. However, in accommodating these demands it is the water set apart for environmental and nature needs that suffer as a consequence. Awareness is required in development sector agencies to ensure that water needs of agriculture, domestic supplies agro industries etc are not at the expense of environmental requirements.

7. Workshops, seminars in the state sector are mostly project driven and target groups are linked to project requirements. Politicians, private sector, NGOO, are thus mostly left out at these deliberations. Forums providing opportunities for all such sectors to deliberate, consider issues and arrive at recommendations are essential if IWRM concepts are to be fully internalized.

8. Conservation of source areas especially the upper water sheds and immediate catchments of major reservoirs are crucial to any IWRM programme. The sector based development efforts have in large measure kept upstream /downstream demands discrete not integrated. A major effort is needed to reconcile these competing interests where state agencies continue to focus on their functional responsibilities at the expense of a holistic approach.

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Sri Lanka Water Vision 2025 - Programme for Action

WATER FOR PEOPLE · C H de Tissera

1.0 INTRODUCTION

1.1 Vision 2025:

1.1.1 Sri Lanka Water Vision 2025 – Framework for Action (2) in its reference to Water for People highlights a vision as:

" The potential for introducing technological and management innovations to provide more cost effective water supplies to a larger population is quite high. The goal for safe drinking water for all by year 2015 is achievable."

The Water Vision 2025 (1) sets out to achieve –

' A society that values the sustainable use of its water to achieve the goal of an environment conducive to balanced social and economic development '

The relevant component of the vision statement includes among others

- Access to adequate and affordable safe drinking water for all
- Access to adequate sanitation and sewerage facilities to promote personal and environmental health
- Communities aware and conscious of their rights and responsibilities with regard to conservation and the supply, use and value of water.

1.1.2 It also states that Water Vision 2025 must fit into the larger vision for Sri Lanka in 2025 underlining that:

' Given the favourable human development indices and the trends towards urbanisation and industrial development, the Sri Lanka Water Vision and the Framework for Action have to respond to the needs of an emerging knowledge based society, which will demand improved health, sanitation and water quality and a cleaner environment '.

Among the many elements that have implications for achieving this vision objectives are the following :

- population growth rate, population density and regional distribution, urbanisation pattern, the growth of the industrial commercial and service sectors, rural-urban migration, quality of life, income and income distribution, perception for the value of water as a ' free and economic good ', investments and expansion and management of water infrastructure, technological advancements in exploitation and supply of safe drinking water and sanitation.

1.2 Demographic situation:

1.2.1 Forecasts made by the Presidential Task Force on Urban Development and Housing indicate that Sri Lanka's population currently standing at around 19.0 million (1998 Annual Report of the Central Bank) will grow at a diminishing rate and stabilise at around 23.0 million by the

year 2025. The urbanisation trends in the country will increase with a 60% of the population living in urban areas and the balance in rural and plantation areas.

This population will have a higher standard of living, income and education and will have expectations for a much higher quality of water supply and sanitation services.

1.2.2 The National Water Supply and Drainage Board statistics (3) show that about 70% of the present population in Sri Lanka have access to safe drinking water. That is by supply through such means as piped systems, tube wells, protected dug wells etc. the balance population rely on unprotected dug wells, rivers, streams, and other water bodies for their requirements of drinking water. In the sanitation sector coverage, it is estimated that about 55% of the population has disposal systems through piped networks, septic tanks and soakage pits A further 30% use pit latrines. About 15% of the population has no proper sanitation facilities.

1.1.3 The average rainfall volumes in the island estimated at 132,000 million cubic meters per annum (9) and the discharge from streams and rivers generated from over 100 catchment areas estimated at 47,000 million cubic meters with a ground water recharge estimated to be between 10% to 30% is a plentiful endowment of water resources for the countries population.

In comparison the demand for domestic and industrial water presently is estimated at around 3 million cubic meters per day. This demand expected to increase to about 4.6 million cubic meters per day by 2025 (3) will not pose a serious problem to the water resources capacity in the country.

However this happy situation ends there. The overall picture of water resources quantum can be misleading, as there is a high degree of variability in the availability of water both seasonally and regionally. Impounding and storage of water discharge and transfer from surplus to deficit areas are costly and technologically challenging. They also have social and environmental impacts.

This essentially will have to be the underlying focus on the Programme of Action in the Water for People.

1.1.4 The country's GDP in 1999 estimated at Rupees 1,111.0 billion (4)at current market prices has recorded a growth rate of 4.3%. The relevant indices of human development of the population indicate (2)that life expectancy is 75 years on average, adult literacy is 90%, a 4% of the population has an income below US $ 1.0 per day and a 22% has an income below the national poverty line. The per capita income of the population was recorded as US $ 810 per year.

2.0 ROLE OF GOVERNMENT:

2.1 Government Policy:

2.1.1 The overall government policy for the sector is underlined by the following objective. That is, improvement of human health and productivity and betterment of living environment through the sustainable and effectively used water supply and sanitation systems to as many people as possible.

2.1.2 Government at present has to allocate a fair share of public sector revenues to the social welfare programmes targeted at the low-income groups and for maintaining internal security. The government has a mounting debt service commitment and a large import bill to finance.

2.1.3 In this background allocation from government budget the total funds required for capital investment in the water supply and sanitation sector will be difficult. In these circumstances the most vulnerable will be the low-income groups, and meeting their needs will need particular attention by government.

Government will necessarily have to adopt an enabling policy framework therefore to mobilise capital from external support agencies, the private sector and the community to supplement the allocation of resources by government to this sector.

2.1.4 Present policy points to a movement by government from a direct service provider to a facilitator. The rural water supply and sanitation sector is observing a diminishing role by government in direct execution of projects. But in the urban situation, at least in the short term, there are no visible signs of the government being able to decrease its participation.

2.2 Economic Forecast:

2.2.1 Due to the rapidly changing situation both domestic and global, economic development plans of government have in the past been more focussed on shorter-term targets, as those in the 6-year development plans. These plans are related to strategic thrust areas. Development of water supply and sanitation sector has been on of the thrust areas.

In terms of the latest macro economic development plan of the government, its ' Vision 2010 ', a GDP growth rate (5)ranging from 6% to 9% has been estimated for the 10 year period 2000 to 2010.The forecast for investment as a % of the GDP in the planned period is to increase from 28% to 39.7% with a share by the private sector increasing from 21% to 29.7%.

2.2.2 The investment needs projected by the Water Supply and Drainage Board (NWS&DB) in the water supply and sanitation sector up to the year 2010 is estimated (3) to be rupees 112.0 billion, out of which the requirement for the water supply sector alone is about rupees 85.0 billion. The NWS&DB expects to obtain from the present estimates up to rupees 53.6 billion over the next ten years from government including those from official development assistance from donor sources. Thus there is a real shortfall to meet the needs of the water supply and sanitation sector in excess of 50% of the requirement. This shortfall needs to be met from outside the public sector.

2.3 Urban Development:

2.3.1 Under the urban development strategy, the National Physical Plan of the government (6), will target the creation of several growth centres, with Colombo as the major centre to promote international and regional trade, commerce, and service activities. The other growth centres will include Ruhunupura, Anuradhapura, Nuwara Eliya, Trincomalee, and Jaffna. These growth centres will be linked to secondary towns in their vicinity and will be well endowed with transport infrastructure, telecommunications, electricity, water supply, hospitals, schools, and other common amenities. They will also function as service centres for their respective rural hinterlands and small towns around them.

2.4 Industry:

2.4.1 The industrial development strategy will focus on a private sector led industrial development process, where small, medium, and large industrial ventures will be promoted with enabling policy framework and incentives. As a direct intervention to facilitate national and international investment in industrial ventures (5) the government will build super class industrial estates by 2005, in Hambantota, Trincomalee and Jaffna in addition to the existing one at Seethawaka in Awissawella, to attract foreign investors. In addition the government will create 30 industrial parks on a district basis, and regional techno-parks in each province, by 2010. The government investment will be channeled for land development and providing on-site and off-site infrastructure facilities.

2.4.2 The types of industry will depend on the development needs of the area. Thus the district level industries will have a higher bias on agro-processing industries, while the major industrial estates will focus more on export oriented internationally competitive industries. They will necessarily concentrate on technologically sophisticated quality products to suit the markets in the developed world. These industrial sites and technology parks will have related infrastructure and residential facilities and will be so located to stimulate industrial dispersion and regional development.

2.5 Tourism:

2.5.1 Tourism is another sector that has relevance to the subject under discussion. This sector has emerged as the forth largest foreign exchange earner with a contribution of about 1.0% 0f GDP. At present there are 197 fully operational hotels with 12,900 rooms. Construction of 49 new hotels with a total of 2660 rooms is under way. A further 180 hotels are in the pipeline. In the strategy framework (5) the relevant matters needing attention of the water supply planners will be the proposals for attracting over 4.5 million international tourists annually. They include among others proposals for establishing small-scale quality accommodation units close to well known as well as lesser-known archeological, natural and scenic sites. Infrastructure will be provided to develop most attractive places in the western coastal belt from Marawila (including Kurunegala area) to Matara. Cities of Colombo and Kandy will be developed as model tourist destinations. Dutch Forts in Jaffna, Mannar, Trincomalee, and Elephant Pass will be included for development as places of interest.

3.0 : ASSESSMENT OF THE PROBLEM IN THE WATER SUPPLY AND SANITATION SECTORS

3.1 Population Distribution:

3.1.1 About 90% of Sri Lanka's urban population and 57% of the rural population have access to safe drinking water.

The population projections and the targets for water supply coverage as estimated by the NWS&DB (3)in the time frame is given below.

Year Population (million persons)	1999	2005	2010	2015	2025
Urban Population	5.86	7.02	8.15	9.47	13.89
Rural Population	13.05	12.60	12.08	11.58	9.27
Total Population	18.91	19.79	20.41	21.05	23.15
Urban Coverage	5.31	6.98	8.15	9.47	13.89
Rural Coverage	7.44	8.51	9.06	9.08	9.27

3.1.2 The sewerage disposal systems in Sri Lanka are categorised into on-site and off-site systems. The on-site systems consists of double pit latrines, single pit latrines and individual septic tanks. In addition individual connections and shallow sewer networks connected to:

Common septic tanks with biological filters
Common septic tanks with trenches
Connections to city networks.

are included in this category. Except those in the Last category all others depend on soakage to the ground.

The off-site systems referred to are the municipal sewer networks, and those constructed in institutions, government or private housing projects and industrial complexes, discharging to the sea or to inland waterways after treatment. While there is no official forecast for sanitation coverage, the policies imply that there will be adequate systems serving the total population by the year 2025.

The following table represents the present coverage (3).

Type	Category	Coverage by population
On- site sanitation	Septic tank and soakage pit	50%
Off-site sanitation	Municipal systems, CMC DMMC, Kollonnawa, Kataragama	4%
Off-site sanitation	Government housing, hospitals, hotels, industrial parks	1%
On-site sanitation	Pit latrines	30%
No proper sanitation		15%

3.2 Urbanisation:

3.2.1 Urbanisation is perceived as a determinant and also a consequence of economic development in contemporary Sri Lanka. Past trends in urbanisation show that in 1981 the urban population was 21.5% while in 1998 this figure was 30%. The forecasts for population distribution for Sri Lanka to the target year of 2025 shows that this trend will continue to increase and the urban population will reach nearly 60% of the overall population. About 10 million of this urban population will crowd the urban centres in the Western Province, where more than half of the urban population live today.

3.2.2 The policy document (6) of the National Physical Planning Department indicates that there are clear regional disparities in the access to pipe-borne water. The Western province and Central Province have coverage of around 20% of the population while all other provinces have less than 10% coverage. The least served province is the North Western Province with only 1.76%. The total coverage of the population with safe drinking water is only 68%.

3.2.3 The share of the urban population (6)is expected to increase from 30% in 2000 to about 45% in 2015 and to 60% in 2025. The share off the rural population correspondingly will reduce, but still will demand attention for improving their facilities in water supply and sanitation.

3.2.4 The population growth as projected and the future settlement pattern of this population has been analysed in the national physical planning policy document. Four broad spatial concepts have been analysed (6) for the possible pattern of dispersement as follows:

- Continuation of the existing pattern of ad-hoc low density urban sprawl along main arterial roads along with horizontal or dispersed rural settlements with minimum or no planning interventions.
- Sustainable urban settlements developed where about 29 urban clusters, a limited number of urban settlements of small and medium scale numbering around 100 within the agricultural area and a network of isolated rural centres integrated within intermediate protected areas.
- Concentrated high-density development within hierarchically structured urban centres together with low-density settlement areas. These will be integrated to the network of rural settlements.
- Nine major metropolitan regions with 15 mega cities. Settlements will act as an intermediate protected zone and linked with urban areas through a major communication link

3.2.5 The physical planning authorities have identified (6)that in the year 2000 there were around 300 urban centres within the 9 provinces together with more than 500 rural service centres. The estimated population in them was around 8.27 million people occupying about 8.35% of the land area. The low density dispersed rural and other types of settlements with a population of around 10.73 million occupied about 15.3% of the land area.

The projected population up to 2030 with a 605 in urban areas will require an additional 1.3 million housing units in a total housing stock of between 5.2 to 6.0 million units. The country will also need approximately 86,000 hectares of additional land for settlements and development. This will mean that around 1.0 million hectares of low yielding agricultural land, marshy and abandoned paddy lands will be used for this purpose. Also it will be necessary to restructure urban land use for high-density development.

It is premature at this stage to speculate on the eventual population distribution pattern in 2025, as to whether it will have followed the natural ad-hoc growth pattern or whether it followed a directed physical-planning pattern. In any case the water supply planners will need to establish a close dialogue with the physical planning authorities to monitor the growth patterns in order to service the water supply and sanitation needs.

It is however clear that, in either situation development will take place without being totally influenced by factors such as availability of adequate water resources in the area.

3.2.6The real growth in income and income distribution of this population will depend on how targeted the economic planning has been, and how effectively the management of the policy has been undertaken. The Vision 2010 of the government, projects a growth rate between 7-9% of GDP over the target period with a per capita income of US $ 2500 per annum by 2010. Any achievement near this figure from the present level will mean a high buying power for this population. Affordability for improved services and ability to pay for it will also improve.

3.2.7 Water consumption patterns and in turn to generation of wastewater depends on the income level of the household. The average water consumption of a family living in a fully plumbed dwelling is estimated at around 160 liters per person per day. In an intermediate stage where a family obtains one tap to the premises for their water supply needs will consume on the average about 75 liters per person per day. Where a cluster of families shares a common tap for their water needs, consumes on the average about 45 liters per person per day.

Therefore when projecting the water demand over the target period for a population having an average per capita income in excess of US $ 2000, would require estimates of average per capita consumption in excess of 75 liters per person per day and more closer to the 160 liter mark.

This would imply a much higher level of production of potable water per capita then the present levels and will also mean more realistic tariff in the domestic sector that will help to improve the viability of water supply institutions.

3.2.8 In this background domestic water supplies can be implemented as financially viable operations, and will enable more private sector participation in the sector.

The present delivery capacity of the public sector water supply institutions will not be sufficient to meet the future demand. Unlimited expansion of such capacity is also not cost effective. Efficiency in the management of capital, control of costs and utilisation of assets is higher in the private sector than in the public sector.

The foregoing analysis may argue for a case of demarcating water demand into domestic and commercial, and offer commercial water for operation by the private sector. Clearly the public sector will have to assume the responsibility for servicing the domestic water needs while maintaining operational viability.

3.3 **Institutional Arrangements:**

3.3.1 The challenge before public sector water supply institutions will be very high. They will have to at the same time be more proactive to discharge the full sector responsibility.

One option that can be considered for achieving this capability is to look at a major restructuring of the operations of such institutions. The creation of smaller commercial units within such institutions, responsible for regions or functions and making them autonomous is a possibility. This will bring more focus into servicing local needs as well as making them more financially viable. Their capacity can be augmented where necessary by permitting joint ventures or public–private partnerships. Permitting them to be shareholders of such government sponsored companies can generate employee motivation and commitment.

Capacity building, modernisation, and improving internal efficiency can be achieved by progressively divesting part ownership of such entities to private sector.

3.3.2 As private sector capital will be needed to augment the public sector investment in the water sector, enabling legislation and a suitable policy framework will be needed to attract both domestic and foreign private capital. Private sector can be invited to enter into partnerships with the public sector to operate, maintain and expand water supply systems through long-term concession contracts, lease contracts, or BOO/BOT projects.
Sanitation programmes by themselves are not commercially viable operations. Improved health is the main social and economic gain for the public sector. Improved sanitation is not only a benefit to the families who use them but also to the neighbours whose environment is thus not polluted. This added ' public good ' component is only of value to government. Therefore public sector may attempt at linking water supply projects and sanitation projects into single packages when inviting private sector participation.

3.3.3 Through an appropriately established regulatory mechanism a competitive environment can be established for private sector participation. Such a mechanism can ensure rational pricing for water, maintenance of quality and reliability of service by operators, protecting the rights of the consumer etc.

3.4 Water for Hydro-Power:

3.4.1 Energy sector in the country has a high dependence on hydropower. Hydropower is regarded as an indigenous resource and one capable of generating power cheaper than from thermal sources. Therefore there will be full attempts to exploit all possible water resources for hydropower generation. There is reported to be 20 investigated sites (2)in addition to the presently utilised sources, which have potential to be tapped for generation of hydropower.

Hydro electricity generation does not normally consume water, but storage and timing of discharge are all issues impacting on availability of such water for drinking purposes.

4.0 AUGMENTATION OF THE AVAILABILITY OF WATER:

4.1 Conservation:

4.1.1 Sri Lanka's plentiful water resources in aggregate terms, is not regarded as adequate as drinking water in the context of its implications of high variations in availability of water both seasonally and geographically. In addition the reality that although nature provides water free, its supply for use by man necessarily costs money has to be brought to focus.

Before attempts at exploring ways to augment available water sources with new ones, conservation measures and the need for prudent usage will have to be highlighted. People's mindset has to be tuned to the Vision 21 slogan for Asia (8) that, ' we are enjoying a resource of earth needed both for our survival and livelihood. We are grateful for such blessings and accept the responsibility of stewardship for the protection, management and care of such a vital resource '.

Conservation measures should have a twin thrust. One for creating public awareness for sensitising them for prudent use of this finite and vulnerable resource and for the responsibility for its care and management, while the other should aim at recognising water as an economic good having an economic value in all its competing use.

4.1.2 The first objective can be pursued by an effective public awareness campaign especially for the schoolchildren that is the generation of the future. They have to be targeted for good habit forming practices, for care and conservation of water etc. Mass media, exhibitions, schools poster campaigns may be employed for the purpose. In addition development water supply projects should be based on participatory approach involving the people to give them a stake and ownership to look after the resource. Women can always play an important role in management and safeguarding of water, as they are often more involved in the supply and use of water.

4.1.3The second objective can be achieved by implementing an appropriate charge for use of water. Water tariff can be fixed to permit affordable charges at lifeline levels of consumption with progressively higher tariffs for higher level of consumption to discourage waste. An affordable limit for domestic water is estimated at around 5% of household income in Sri Lanka at present. Industrial and commercial uses of water can be charged adequately for full cost recovery and necessary cross subsidy.

4.1.4 Making freely available for use by people, of efficient house hold equipment which conserve water and elimination of waste in distribution systems are additional responsibilities of water supply institutions in this regard.

4.1.5 Water used as a social good also has an economic value. Availability of safe drinking water at an affordable cost ensures:

- Reduction in health burden of water borne diseases.
- Reduction of time taken off work and school by ill people and their carers
- Improving nutrition due to reduced losses of nutrients through diarrhoea
- Reducing time and effort normally spent by women and children to fetch water from a distance.
- Other social benefits.

While it may be difficult to quantify these benefits in economic value, they nonetheless exist. Scarce water therefore has to be allocated to the use that has the highest value in priority.

4.1.6 When considering water as an economic good and its relative value in competing uses, the issue of non-revenue water in urban water supply schemes run by the public sector has to be addressed. It is estimated (7)that about 55% of water produced in the Greater Colombo Area and about 32% in the regional schemes of the NWS&DB do not bring revenue. This is a significant amount and effects the viability of the organisation.

Non revenue water arises from water losses in pipe systems, meter errors, short comings in meter reading and billings illegal usage, and free water supplied to some low income settlements, cultural and religious institutions. Attempts at reducing the volume of non-revenue water will no doubt go to effectively increase the volume of available water for distribution and reduce the cost of billed water.

4.2 Technology options for augmenting water sources:

4.2.1 The variation in availability of water both seasonally and regionally gives rise the many issues connected with uninterrupted supply of water. It is clear that impounding and storage of water or transfer from surplus areas to deficit areas are costly and technologically complex. They also have environmental implications. This situation prompts water supplies planners to investigate non-traditional sources of water. This requires innovative approaches to water supply situations, application of alternate technology transfer and adoption of applicable technologies from countries with similar situations.

4.2.2 Rainwater harvesting has been one of the successful applications of such technologies in some countries. Thailand, China, India, Germany are a few to be mentioned, that use this method extensively. Rain water before reaching the ground is trapped within the roof catchment and stored for later use. Such water is less polluted and eliminates the need for pumping. Sri Lanka's rural community water supply projects have been employing this method in many areas of the country successfully.

4.2.3 Deep ground water as supplementary source of drinking water is still to be investigated fully in Sri Lanka. The country has experience in the exploitation of shallow ground water for many uses. The geology of the hill country with closely spaced anticline and syncline formations, suggest that deep geological structures have extensive fissures, fractures and discontinuities, and oriented in NW –SE directions from the central hills to the plains below as continuous water bearing structures. An estimated 10% of the precipitation in the hill country is believed to recharge these deep underground

acquifers annually. It is therefore possible to locate such acquifers in some dry zone areas where the water will be available at reasonably high pressure to extract economically. This resource has to be comprehensively investigated as a source of drinking water.

4.2.4 Desalination of seawater for drinking purposes is being carried out in some countries. Being an island with abundance of sea all round, this technology looks to be an option for the future for water scarce areas. Presently used technology includes reverse osmosis, distillation and condensation for extracting sweet water from seawater. These involve high energy application and are not very feasible in the present context. More research is needed to explore the use of solar energy, wind energy or wave energy for this purpose which will make this process more feasible.

4.2.5 Recycling of treated waste water for non drinking uses would be an acceptable application in time to come when the demand on available water sources begins to reach their limits. Installation of duel pipe systems to carry drinking water and non-drinking water in high-density settlements will be necessary to implement this system.

5.0 Actions for the next five years:

5.1 Policy and Institutions:

5.1.1 The issues before the country in the provision of safe drinking water and adequate sanitation for the people by the target year will be many. By a concerted effort and by an incremental approach most of them can be resolved.

Management of Sri Lanka's water resources to supply an ever-increasing demand from the competing sectors is a real challenge. There should therefore be sound policies and effective legislative and institutional arrangement to realise this. The proposed National Water Resources Policy and the Water Resources Act developed by the Water Resources Secretariat and the associated institutions such as the National Water Resources Authority, Water Resources Council and the Water Resources Tribunals will be needed without delay.

5.1.2 It is observed that the Governments Vision 2010 envisages an integrated economic development plan, which relies upon the respective contributions from such sectors as urban development, industry and tourism as relevant to this paper. The Bureaucracy responsible for such sectors will be making their own corporate plans to achieve these targets. Unless there is an effective coordination mechanism to integrate these initiatives, there is bound to be some implications on availability of supporting infrastructure. A high level National Steering Committee may be necessary to co-ordinate this work.

5.1.3 Making public sector water supply institutions efficient and financially viable will be essential for the implementation of the proposed programmes. The proposals for institutional reforms and restructuring have to be studied along with similar experiences from comparable countries in the region.

5.1.4 Privatisation of water utilities may be a sensitive matter just now. But for the essential purpose of mobilising investment to the sector and improving the efficiency and performance level of these agencies, arrangements to encourage public-private partnerships have to be pursued in new projects and in management and operation of existing schemes. A study of the present environment and the creation of the enabling environment for the purpose have to be undertaken urgently.

5.1.5 The NWS&DB may pursue action to set up the independent regulatory mechanism by the necessary legislative and policy initiatives.

5.2 New Technology and Conservation of Water:

5.2.1 Research is necessary to develop the alternative methods to produce drinking water as outlined. External technical assistance for technology identification and transfer in the area to supplement local skills may be necessary.

5.2.2 The proposal to sensitise the public in conservation, management and prudent use of water through an extensive public awareness programme has to be implemented as a regular and on-going activity.

6.0 Strategic Assistance:

6.1 Investment:

The forecast of investment requirements for the sector up to the year 2010 is estimated at Rupees 112.0 billion. The NWS&DB expects from public sector including committed official development assistance from donor sources around Rupees 53.6 billion. Thus the apparent shortfall in excess of 505 of the investment needs has to be generated from, additional donor assistance, foreign and local private capital, and community contributions.
Concerted contact with external support agencies has to be maintained to realise additional direct funding for water supply and sanitation projects and for providing concessional debt capital for projects implemented under public-private partnerships.

6.2 Local capacity building:

The necessity for enhancing the delivery capacity and performance improvement of public sector water supply institutions is very clear.

One option is to consider restructuring these institutions into smaller, autonomous and financially viable entities. Private sector participation through divestiture of part ownership of such entities will increase their internal efficiencies. Exploring international experience in the area and a study of the best practices for possible adoption in Sri Lanka may be undertaken under a strategic assistance project with an external support agency.

6.3 New technology:

Augmentation of water supply sources is vital to meet the projected demand. Investigations, research and development into alternate technologies in the area, study of international experience and technology transfer from outside sources are areas that can be included in a strategic assistance project with an external support agency.

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WATER AND ENVIRONMENT - Tilak Hewawasam

Overview

Water, a compound of hydrogen and oxygen, is a transparent, tasteless liquid, changing from one state to another, occurring in nature as a liquid, as a solid (ice), and as a gas (water vapour). Water, one of the most precious gifts of nature, (makes) creates an environment which is conducive for life. It is believed that life began in the water some 5000 million years ago.

As much as 70%t of the earth's surface is covered with water, but 97% of that water containing in the oceans, seas, bays and coastal lagoons and wetlands is saline. Of the remainder, 1% is contained in glaciers and polar ice-caps. Even the available 2% of fresh water is not evenly distributed in time or location. Nature renews water during its passage through the hydrological cycle playing a paramount role of sustaining all life of the environment. In this complex process, water is held temporarily for use by living organisms, in the soil, in surface or ground water, in plants, trees, animals and in all living creatures laying the substratum for life in our planet. It is the most important pre-requisite for maintaining ecosystems and life supporting systems. No water in the environment means ceasing the existence of all life therein.

Water is a renewable and multi-faceted fundamental natural resource with complex multi-functional utilities essential for man and his efforts in developing the human environment. It has played an important role in navigating the path of human development throughout history and also in drawing the existing global map of the human environment.

Water: A gift of Nature and A Resource in Demand

Water, no doubt, is one of the most precious gifts of nature to Sri Lanka. Being a tropical island near the equator, located just off the southern tip of the Indian subcontinent in the Indian Ocean, Sri Lanka is endowed with abundant water resources. Rivers and streams, lakes and villus, water-holes near the surface and deep seated springs, soil water aquifers (permeable water-bearing geological formations) and coastal springs and lagoons are identified as naturally occurring water resources in the island. The predominant source of surface and ground water resources is the rainfall, the mean annual of which is around 2000mm about two and half times the world average. Mainly the Monsoon brings the rains, and the spatial and seasonal distribution of this rainfall divides the country into two zones, i.e., Wet Zone and Dry Zone. The Wet Zone receives rain almost throughout the year while rains are restricted in the so-called Dry Zone mainly to the period between October and January. Monsoon rains received by the watersheds in the central highlands are the major source of water for the main rivers, the basins of which cover about 90% of the country.

It has been estimated that the total rainfall of the island per year is about 131, 000 million m^3 and out of which about 31% directly feed the average annual river flow (40, 680 million m^3) while the balance is lost by surface evaporation and is fed for natural vegetation and for human activities. The annual ground water potential for the island is estimated at 780000 hA/m. The total amount of water available for use in the country is approximately 127 billion cu.m. per year, while surface runoff is estimated to be 50 billion cu.m. per year.

The main issue in natural water availability in Sri Lanka is not one of water scarcity but of seasonal and regional variations that cause water deficit affecting seasonally and regionally. The existing tank and irrigation network has been the direct response to this physical environmental condition. Therefore, most water bodies in the Dry Zone are man made and from ancient times it has been the practice to collect the surplus rain water precipitated during the wet season in a system of reservoirs or tanks.

Sri Lanka being rich in water resource base is highlighted, apart from 103 rivers, natural and man made water bodies plus ground water aquifers, by rich wetland systems, with more than twenty major wetlands. Many of the important wetlands are situated in the coastal belts containing blackish water. Coastal wetlands are recognized as being crucial to the ecological diversity and productivity of the area. Coastal wetland provide breeding and nursery areas for economically important fish species, and help to trap sediment and recycle nutrients. They also provide a habitat for a tremendous range of animal and plant species. However, past attitudes towards wetland, unfortunately, did not see the important role they play in the ecological balance of a region. Many were drained for industrial sites and for channel improvement.

The majority of inland wetland are floodplain wetland. These include irrigation and multipurpose reservoirs, the inland section of rivers and streams, riverine marshes like 'Villus' and seasonally flooded grasslands. Floodplain wetlands are typically small and appear unconnected, although they are often connected by and supplied from groundwater.

The eco-systems of the island nurturing forests, grasslands, wildlife and aquatic resources are the direct by products of water resources. As a resource from a human viewpoint, water is utilized in various ways. For e.g., potable water for drinking, general domestic use, and raw water for agriculture, industry, power generation and recreation. Historically, Sri Lankans have displayed marvelous skills in managing water resources with a man made network of tanks. The larger tanks were supplied by impounding the waters of the tributaries of the major rivers. The system of distribution of water from these tanks for irrigating the rice fields was a marvel of hydraulic engineering. The small village tank, the dagoba and the paddy fields were the symbols of the ancient Sinhala civilization. Post-World War 11 developments include impounding the waters of the Gal Oya to achieve flood control, generate electricity and mainly to provide water for irrigation. The Laxapana Project saw the construction of dams across the Maskeli Oya at Moussakelle and across the Kehelgamu Oya at Castlereagh to generate hydro power. The recent achievement in this field is the Accelerated Mahaweli Development Program.

The harnessing of water resources for agriculture, domestic, religious and cultural usage has been practiced in Sri Lanka from ancient times. The major uses of surface water at present are irrigated agriculture, hydro-power and domestic supplies while ground water resources are extensively used for industry and as a conjunctive water source for commercial agriculture. Power generation and manufacturing industry are the other main uses of water resources at present. About 70 % of existing power generation capacity is with the hydro-power plants and about 85 % of the total annual power supply is generated from hydro- electricity sources. Water transport of goods has decreased except for the floating of logs downstream. The fine system of canals constructed by the Dutch (rulers) administration during the eighteenth century lies neglected and little used. Water plays a very significant role not only in the physical and human environment in Sri Lanka, but also in the socio-economic and cultural environment. Furthermore, the capital investment in water related sector, mainly on irrigation, hydro power generation and water supply is very high while the annual public sector investment on water sector activities represent the share of more then 20% of the budget.

Water: Pressures and Impacts

The industrial, agricultural and urban development, economic and population growth, and growing demand for hydro-power, water supply and sanitation services and changing life style and consumer patterns of people are placing increasing pressure on water resources. These changes, especially during the last few decades, have tremendously increased the demand on water while creating acute water pollution problems caused by unplanned development activities.

The demand for water resources for food production, mainly for paddy cultivation, has dominated our economic, social and political policies from 1930. It started with the restoration of ancient tanks and irrigation systems and then focused on construction of large-scale reservoirs enabling the cultivation of nearly 700, 000 hA of paddy field. The recent development in using ground water for agriculture and domestic water supply is also increasing rapidly.

Followings are the key drivers that have put pressure on water resources;

- Population growth and its growth rates;
- Economic growth – change of life style & consumer patterns/ Income distribution
- Urbanization, rural-urban migration, metropolitan development, village expansion
- Urban & Rural Poverty / Low income settlement development
- Land use; Agricultural / Irrigation development
- Deforestation
- Industrial Development/ Mining;
- Hydro- power generation
- Development of tourism and recreation activities
- Socio-economic, political and ethnic conflict

The pressure on water mainly from the above key drivers has resulted in the emergence of a crucial problem facing the country today. It is the rapid depletion and degradation of our most precious water resources as evidenced directly, by pollution of surface and ground water, decreasing rainfall, increasing run-off with high sedimentation, and shrinking ground water resource, and indirectly; (a) by intensifying soil erosion and depletion of soil fertility, occurrence of floods, droughts, landslides, etc; (b) by reducing the carrying capacity of ecosystems and life supporting systems; (c) by degradingaesthetic value and pleasantness of environment; (d) by losing bio diversity; and (e) by depletion of coastal resources.

Deforestation, which was a result of excessive exploitation of natural forests for agriculture, human settlement, timber and development projects is one of the main causes for depletion of water resources. Soil erosion has escalated and is on the increase contributing to destabilize river flows. The implication of these changes include a greater risk of land slides, water courses and reservoir sedimentation, a greater risk of drought and floods, reduced water quality as a result of reduced low-flows, and possibly reduced ground water recharge. Studies have also revealed a steady increase of runoff/ rainfall ratios. This trend in runoff is, in turn, composed of an increase in discharge during the wet months and a decrease in during the dry months, as might be expected from deforestation of water shed areas. While there is no clear trend in precipitation on an island-wide basis, trends do exist in local areas. E.g. Nuwara Eliya has experienced a significant decline in annual rainfall during last 100 years. A number of factors may contribute to this decline, including global or regional climatic changes and deforestation of Sri Lanka's hill country.

There is also evidence of stream sedimentation, resulting from upland soil erosion and deterioration of aquatic ecosystems caused by excessive water abstraction and pollution. Environmental concerns relating to water include restraining encroachment onto hydrological sensitive areas, alleviating problems related to water quality and the impacts of irrigation, wetland conservation, storm water detention areas and industrial pollution. Sediments (soil, sand and gravel) are transported from land to waters by natural runoff process, agricultural practices, and mining and construction activities. A high sediment load may fill channels, reservoirs, interfere with water treatment process, decrease the aesthetic and recreational value of a water bodies, adversely affect aquatic organisms and reduce light penetration. Sri Lanka has a long history of problems associated with soil erosion, intensified by widespread land settlement. Sedimentation rates have been accelerated by changes in land use patterns. which have increased runoff volumes and velocities.

WATER QUALITY: Water Pollution is the key factor for degrading the quality of water. Water quality is usually governed by numerous factors including local geology, climate and land use. However, natural influences are outweighed by the effects of human activities, which include:

- ***Agricultural practices:***: including clearing and cultivation, irrigation and application of fertilizers, herbicides and pesticides. Related water quality issues include: (a) turbidity or muddiness of water; (b) salinity; (c) nutrients; and (d) bacteria and chemical contamination
- ***Urbanization:*** including cities, towns, sewage and septic tank problems, road building and other construction and industrial plants. A wide range of water quality issues are associated with these sources of contamination, including nutrient and bacteria-rich runoff, sewage effluents, and chemical pollutants – all of which reduce the suitability of water for many uses.
- ***Industrialization:*** Industrial development is one of the main causes for pollution of water Most polluting industries discharge effluents to the land and water with little or no treatment. Colombo and Gampaha are the most affected districts in the island as nearly 80% industries are located in this region. Untreated effluents discharged to the Kelanie River by industries located within the lower catchment areas of the river is the key factor for affecting the water quality. Beira and Bolgoda lakes provide examples for highly polluted water bodies with wastewater, sewer and industrial effluent and domestic waste.

Salinization, the accumulation of salt in the soil on or near the ground surface, affects the surface water quality. The primary agent causing salinisation is usually a rising groundwater level that mobilizes salt previously stored at depth in the soil and weathered rock. Rising water tables can occur under both irrigation and dry-land farming areas. In dry land (i.e. non-irrigated) farming areas, the removal of native vegetation for the development of grazing and agriculture has been the primary cause of salinisation of land. When shallow rooted annual agricultural crops replace deep-rooted perennial native forests, the reduction in evapotranspiration and interception storage results in an increase in ground water recharge. This causes the water table, which is the upper surface of the saturated material, to rise.

Although clearing of the catchment may have occurred, the topping up of ground water storage in the fractured rock aquifers probably occurs as a series of jumps in the water.

Impacts of the water quality on crop yield are :

- increasing salinity of the soil water reduces the capacity of a plant to abstract it
- specific ions in the salty water have a toxic effect on some plants
- a high proportion of sodium in relation to calcium and magnesium in saline water can lead to a breakdown of the structure of some soils, making them less penetrable to both plant root and water
- saturation of the root zone, independent of its salinity, reduces the oxygen available to plant roots – again retarding growth – and can also cause machinery access problems during cultivation and harvesting

GROUNDWATER QUALITY: The most significant factor in groundwater quality is salinity. This single factor is often the determining criterion of suitability of water for a proposed use. Salinity is not evenly distributed in the groundwater systems and care must be taken not to over pump the low salinity zones in areas of mixed groundwater types. If this were to occur, saline groundwater would be induced into the low salinity zones and, by mixing, would rapidly diminish their quality. The positive effect of pumping in high water table areas or rising water table areas is that it will lower the water table, which can help in eliminating or reducing the various problems connected with a rising water table such as salinisation and water-logging.

HEALTH PROBLEMS: Pollution of surface water, due to urban wastewater of domestic, sewer and industrial origin, is a serious problem. Unsafe water, contaminated largely by human wastes,- contributes to tens of thousands of cases of diarrhoeal illness each year and to the death of a large number of people, most of them children. Many suffer from other diseases caused by poor water and sanitation, such as typhoid fever. , amoebiasis, worm infections and sometimes, even cholera.

ECONOMIC IMPACTS: Economic cost of degradation of water resources is yet to be evaluated, and thus not known in quantifiable terms. However it has been roughly assessed that cost of degradation of natural resources due to human activities is about Rs.4000 million per annum. There is no doubt that the cost of pollution of surface and ground water, wetlands, estuaries, coastal belts, and water bodies in urban areas contribute to loss of aesthetic value, and together with the additional cost to the health budget to combat water borne deceases plus loss of other valuable resources such as land, coast, wildlife, etc., as well as the lives of our own people would be very significant and some time may go beyond any estimations.

Water, once revered for its life-giving properties with a sense of holiness, has now become a commodity and resource for human activities, and thus, often it is usually taken for granted and routinely exploited. Past expectance provide ample evidence that use (or misuse) of water has already led to dried-up and polluted rivers, lakes and groundwater resources. Quantity of water has reduced. Quality of water has degraded. Value of water resources has lowered. Potable water is becoming increasingly scarce.

Attempts in Protecting Water: A Profile of Responses

Impacts of degradation of water resources, discussed in the foregoing section, are closely linked to the social, economic, health and biological aspects and thus cannot be considered in isolation. As a result of growing concern in the environment, since the later part of 1970s there has been a general acceptance building up among policy makers, law makers & people representatives, NGOs, religious leaders and general public that clean water, ecosystems and human activities are not separate realms. The social well-being, economic stability and the natural environment are interdependent, and the time is ripe to act to see that we no longer overuse and misuse our water resources.

A wide spectrum of responses visualizing in various forms of attempts at variouslevels and sectors, mostly in non combined or integrated manner, can be seen especially since the beginning of the 1980s.These responses have emerged mainly from the fields of forestry and wild life, agriculture and irrigation, land use, urban development, coastal resource management, industrial development, environmental protection, etc, and in the manner of policy initiatives, legislative control, institutional and capacity development, behavioral and attitudinal changes, research & studies, and community involvement.

MANAGEMENT OF WATER RELATED NATURAL RESOURCES: One of the most significant responses appeared during the last two decades is the effort made to manage natural resources connected with water resources. The main objectives and salient features under each key sector are given below;

FORESTRY:

- conserve forests for posterity with particular regard to bio diversity, soil, and water as well as historical, cultural, religious and aesthetic values;
- increase the tree cover and productivity of the forests to meet the needs of present and future generations for forest products and services;
- enhance the contribution of forestry to the welfare of the rural population, and strengthen the national economy, with special attention paid to equity in economic development;
- rational exploitation of forest resources;
- regulation of the marketing of threatened forest resources;
- conservation of threatened species of flora and encouragement of citizen participation to keep the country's forest resources at maximum productivity; and
- promotion of continuing efforts on reforestation, timber stand improvement, forests protection, land classification, forest occupancy management, multiple use forests and timber management, industrial tree plantation, parks and wildlife management, and forest research.

AGRICULTURE:

provide assistance to farmers, fishermen and other agricultural workers to make the transition to more open, challenging and competitive environment;

- ensure food self reliance (giving a place of importance to rice within the entire basket of agricultural products);
- raising farmer incomes;
- diversifying portfolio of crops; and
- creating stable, profitable and sustainable rural economy that co-exists with an open economic environment.

LAND USE MANAGEMENT:

- provide a rational, orderly and efficient system for the acquisition, utilization and disposition of land and its resources; and
- encourage the prudent use and conservation of land resources in order to prevent an imbalance between the needs of the nation and such resources.

NATURAL RESOURCE MANAGEMENT AND CONSERVATION:

- *Derive the optimum benefit from the use of natural resources through efficient management and effective protection from pollution; and*
- *Preserve natural resources for future generation.*

WILD LIFE MANAGEMENT:

- *Promote rational exploitation and conservation of wildlife resources; and*
- *Encouragecitizen participation in such activities.*

FISHERIES/AQUATIC RESOURCES MANAGEMENT

- Establish a system of rational exploitation of fisheries and aquatic resources within the territorial waters of the country, within its exclusive economic zone, and within its inland water;
- Encourage citizen participation to maintain and enhance the optimum and continuos productivity of such waters; and
- Regulate marketing of threatened species of fish and other aquatic life.

SOIL CONSERVATION

- Identify and protect critical watershed areas;
- Encourage scientific farming techniques, and physical and biological means of soil conservation;
- Encourage short and long term research and technology for effective soil conservation and environmental management; and
- Determine of priority areas of environmental research.

IRRIGATION

- alleviate rural poverty and to increase nutrition;
- increase the agricultural production while providing agricultural land for the land--less; and
- develop an undeveloped areas, generating hydro-power in addition to increasing agricultural production and employment generation.

WETLAND

- Wetland ecosystem constitute a major habitat type which is one of the components of natural bio diversity
- The functions, attributes and uses of wetland ecosystems contribute significantly to the well being of the human species;
- The management of wetlands and creation of wetland where necessary, can improve the functions, attributes and uses of the wetland ecosystems;
- Ensure the conservation and sustainable use of wetlands, so as to preserve the wetlands production, function and its intrinsic value and attributes;
- Institute the necessary action to halt the deterioration of wetland ecosystem;
- Ensure sustained conservation of wetlands through good management;
- Designate major wetlands for priority conservation and where necessary restoration'
- Develop and implement a research programs to ensure the conservation of wetlands; and
- Develop and implement public awareness programs.

LEGAL AND INSTITUTIONAL: The responsibility of safeguarding water resources, at present, is divided among more than forty water related laws and about twenty public agencies. However, existing state of water resources in the island is evident that the present arrangements have failed in performing their expected role, mainly on account of enforcement deficiencies. Nevertheless, considerable attempts have been made during the last two decades to protect water resources through the adoption of mandatory

measures and setting up and straightening of institutional framework. The National Environmental Act (NEA), No. 47 of 1980, as amended by Act, No. 56 of 1988 and Act, No. 53 of 2000 is the most important piece of legislation on protecting and managing water resources. The prime objective of this Act is to minimize and control pollution caused by the discharge, deposit or emission of waste into the environment The Central Environmental Authority (CEA) was established in 1981 with the main responsibility of pollution control. Regulations have been made under the NEA to control water pollution adopting two main tools - Environmental Protection License (EPL) and Environmental Impact Assessment (EIA) to combat pollution from existing activities and to minimize adverse environmental impacts of proposed projects, respectively. All 'Prescribed Activities' gazetted under NEA should obtain the EPL and the discharge of any polluting substances to waters should meet stipulated standards and norms. There are two lists of prescribed activities and List I contain 80 activities for which the EPL is issued by the CEA. The issuing of the EPL for 45 activities included in List II has been delegated to local governmental authorities.

In addition there are several other provisions in the NEA to preserve inland water quality and to protect inland waters from pollution - " (i) No person shall discharge, deposit or emit waste into the inland waters of Sri Lanka except in accordance with such standards and criteria as may be prescribed under the NEA, and (ii). No person shall pollute any inland waters of Sri Lanka or cause or permit to cause pollution in inland waters so that the physical, chemical or biologicalcondition of the waters is so changed as to make or reasonably expect to make those waters or any part of those waters unclean, noxious, poisonous, impure, detrimental to health, welfare, safety or property of human beings, poisonous or harmful to animals, birds, wildlife, fish, plants or other forms of life or detrimental to any beneficial use made of those waters."

Apart from the NEA, there are several other main laws dealing with safeguardingwater resources, such as Thoroughfares Ordinance (1861); Water Resources Board Act (1964); National Water Supply & Drainage Board Act (1974); Forest Ordinance (1907); Fauna and Flora (Protection) Ordinance (1937); State Lands Ordinance (1947); Flood Protection Ordinance (1924); Mahaweli Authority of Sri Lanka Act (1979); Mines and Minerals Act (1992); Electricity Act (1950); Ceylon Electricity Board Act (1969); Irrigation Ordinance (1946); Coast Conservation Act (1981); Municipal Councils Ordinance (1947); Urban Councils Ordinance (1939); and Pradeshiya Sabhas Act (1987).

The key public institutions holding responsibilities for protection of water resources at national level are the CEA, UDA, NWS&DB, Water Resource Board, Depts. of Forestry, Wildlife, Irrigation, Land Development, and Coast Conservation. At regional level, the responsibility of water resources is divided among Provisional Councils, District Secretary/Government Agent, Divisional Secretary and Local Governmental Agencies.

The main issues relating to the legal and institutional framework are: (a) Fragmented and outdated water legislation; (b) Water allocation rights; (c) Ground Water Management; (d) Lack of law enforcement capacity; (e) institutional fragmentation and lack of co-ordination; (e) issues associated with devolution; and (f) water uses organization.

There is a very important ongoing attempt in addressing these issues within a broad framework of integrated water resources management involving the management, conservation and development of the resource itself in a holistic manner. The objective of the current reform in the water sector in Sri Lanka is to introduce integrated water resource management. This will involve some new directions, new concepts and new institutional arrangements. The preparation of the draft National Water Resources Policy expresses the Government's commitment to this approach to the country's inland water resources management. It presents principles and basic strategies for water allocation, demand management, groundwater management and information management. It also presents and outline of the institutional arrangements which will be used to implement the Policy.

Up to the present time most water-related policy and legislation have been oriented to specific water-using sub-sectors. Although this type of sub-sectoral water policy remains important, it should be better co-ordinated under national policy and legislation within its mandate. The draft Water Resources Act provides for the management, conservation and development of water resources in Sri Lanka and the regulation of the use of water resources. The draft also makes provision for the establishment of a national water resources authority, a water resources council and a water resources tribunal.

Trends, Issues, Challenges and Future Prospective

Current status and trends in water and environment are very clear. While accepting, with gratitude, the considerable effort made by public and Non Govemmental Agencies to safeguard the water resources by controlling the enormous pressure to minimise adverse impact on water and water related natural resources bases, it is generally accepted that, there is no visible success in controlling pollution and safeguarding Water resources. Trends in other inter related sectors such as deforestation, soil erosion, usage of chemicals in agriculture such as pesticides, sedimentation, loss of bio diversity, environmental pollution, continue as usual and are not supportive for making any positive impacts on water. Therefore;

- Surface and ground water extraction is on the increase
- Quality of water is still degrading at an increasing rate
- Quantity of water available is still reducing at an increasing rate
- Vicious Cycles/spirals still continue
- Extent of wetland is shrinking.
- Eco-systems is under threat

Throughout the island, environmentally not friendly human use of water has already led to polluted rivers, lakes and groundwater resources. Potable water is becoming increasingly scarce. It has been predicted that by the year 2025, water abstractions will increase by 50 percent in developing countries. If this trends and cycles continues, effects on natural ecosystems will be dramatic. In later part of the last century, a considerable amount of our wetlands have been lost and a large no of species currently threatened The inevitable result of further human abstraction of water on this scale and with this environmentally unfriendly manner will be resulted in catastrophic consequences to our environment, some time may be complete destruction of some of terrestrial, freshwater and coastal ecosystems that are vital to life itself.

DIRECT ISSUES: The Key direct issues in the Water Sector are listing out below;

Urban and industrial water pollution

- Pollution by industrial discharges, emissions and industrial solid waste disposal;
- Industrial hazards and risks due to poor sitting;
- Disposal of municipal waste;
- Heavy demand on urban environmental services;
- Disposal of hospital waste'
- Environmentally unacceptable land uses; and
- Land use, water and the environment.

Deforestation and Loss of Bio-diversity

- Lack of land use planning;
- Land degradation;
- Decline in land productivity;
- Land degradation under irrigation;

- Land slides;
- Reduction in sustainability and decline the quality of the agricultural environment;
- Loss of forests through logging and conversion to agriculture;
- Loss of wetland through filling and conversion to agriculture and settlements;
- Loss of coral reefs, over-exploitation and depletion of other aquatic resources and ecosystems; and
- Loss of genetic diversity in agriculture and plantation forestry through the spread of monoculture.

Policy issues

- Fragmented and outdated water legislation;
- Water allocation rights;
- Ground Water Management;
- Lack of law enforcement capacity;
- institutional fragmentation and lack of co-ordination;
- issues associated with devolution;
- Lack of reflection of global environmental policies, perspectives, conventions and programs in national environmental policies;
- Lack of comprehensive and coherent national environmental policies; and
- Lack of integration of environmental dimensions with economic development at national and local levels.

Legal Issues

- Fragmented and outdated water legislation;
- Water allocation rights;
- Ground Water Management; and
- Lack of law enforcement capacity.

Institutional Issues

- Institutional fragmentation and lack of co-ordination;
- issues associated with devolution;
- Capacity limitation of environmental agencies – National/Local;
- Multiplicity of agencies with overlapping mandates and responsibilities;
- Poor delineation of delegation of authority;
- Deficiencies in statutory provisions;
- Lack of effective monitoring, evaluating and coordination mechanisms.
- Lack of national environmental database;
- Inefficiency in enforcement capacity;
- Inadequate understanding of environmental issues provided by the educational system;
- Lack of involvement of local authorities in environmental management;
- Lack of clear-cut policy on devolution of environmental responsibilities; and
- Insufficient productive involvement of environmental NGO and community organizations in sustainable development activities.

Other issues:

Educational issues

- Lack of widespread public awareness and understanding of environmental issues;
- Poor participation of people in environmental management and protection;
- Shortage of skilled and trained manpower to meet institutional needs; and
- Shortage of competent environmental trainers and resource personnel.

Cultural and Gender issues

- Lack of understanding of linkages of culture and environment;
- Lack of appreciation of participatory techniques and their value;
- Lack of understanding of socio-religious values in environmental issues;
- Absence of fundamental rights to practice choice of livelihood; and
- Lack of recognition of the potential role of women in environmental issues.

Land and agricultural issues

- Population pressures and lack of alternatives for income and livelihood;
- Attempt to find employment through agriculture;
- Unplanned land use;
- Shifting cultivation;
- Absence of clear-cut land ownership
- Lack of funds for land improvement;
- Lack of land consolidation strategies;
- Poorly planned infrastructure development;
- Conflicting interest in sharing resources;
- lack of awareness and knowledge;
- Lack of political will to implement conservation regulations;
- Poor water management;
- Lack of drainage in agricultural lands;
- Poorly managed irrigation systems;
- Uncertain water supply;
- Poor institutional arrangement for water management;
- Lack of proper training in water use;
- No incentives for saving water;
- Poor water allocation;
- Irrigation systems inadequacies;
- Political interference in water management decision making;
- Lack of community/public participation mechanism; and
- Unsuitable agricultural practices.

Forests and bio diversity

- Loss of forest with development activities such as hydropower, irrigation and human settlement;
- Loss of forest through agricultural encroachment, illegal logging;
- Non-existence of systematic quantitative identification of the areas which need to be conserved and protected;

- Over exploitation of economically valuable plants and animals; and
- Increasing chemical pollution from agricultural and industrial activities.

Urban and industrial water pollution

- Unacceptable practices of disposal of waste water and waste;
- Inappropriate industrial sitting;
- Lack of industrial solid waste and liquid waste treatment and disposal methods;
- Inadequate resources for monitoring and regulation in environmental agencies;
- lack adequate sitting policies and guidelines;
- Lack of regulation for hazardous waste disposal:
- Lack of technical know-how and skills in designing treatment plants;
- Financial difficulties faced by industries in implementing pollution control measures; and
- Inadequate development of environmental infrastructure.

Mineral extraction

- Uncontrolled sand extraction from rivers;
- Environmental problems associated with sand extraction from river beds e. g. River bank erosion, Sea water intrusion, Coastal erosion;
- Inadequate supervision;
- Large scale use of sand in building industry; and
- Inadequate institutional capacity.

CHALLENGES: The key challenges that have to be confronted with in addressing water resources are.

- Break vicious cycles/spirals;
- Reverse degrading trends; and
- Strike the balance between development & water usage ensuring long term sustainability of water resources.

Subsidiary or Secondary challenges are:

- Obtain active commitment of all stakeholders (Mainly political, Bureaucratic/Technocratic. Private sector and public- Make all stakeholders custodians/trustees of environment);
- Establish and functioning of an effective policy and co-ordination framework;
- Set up & operationalize effective technical, legal and institutional mechanism for integrated water resources management;
- Incorporate En. dimension into planning and management of water resources and the life style of people;
- Adopt Market Based instruments;
- Develop/test innovative people based participatory integrated systems/ procedures and water sector delivery mechanisms;
- Fill knowledge gaps; establish data bases & information networks, participatory monitoring, and eco- friendly knowledge management systems; and
- Develop/implement multi-solution poverty focused holistic packages with eco-space integration.

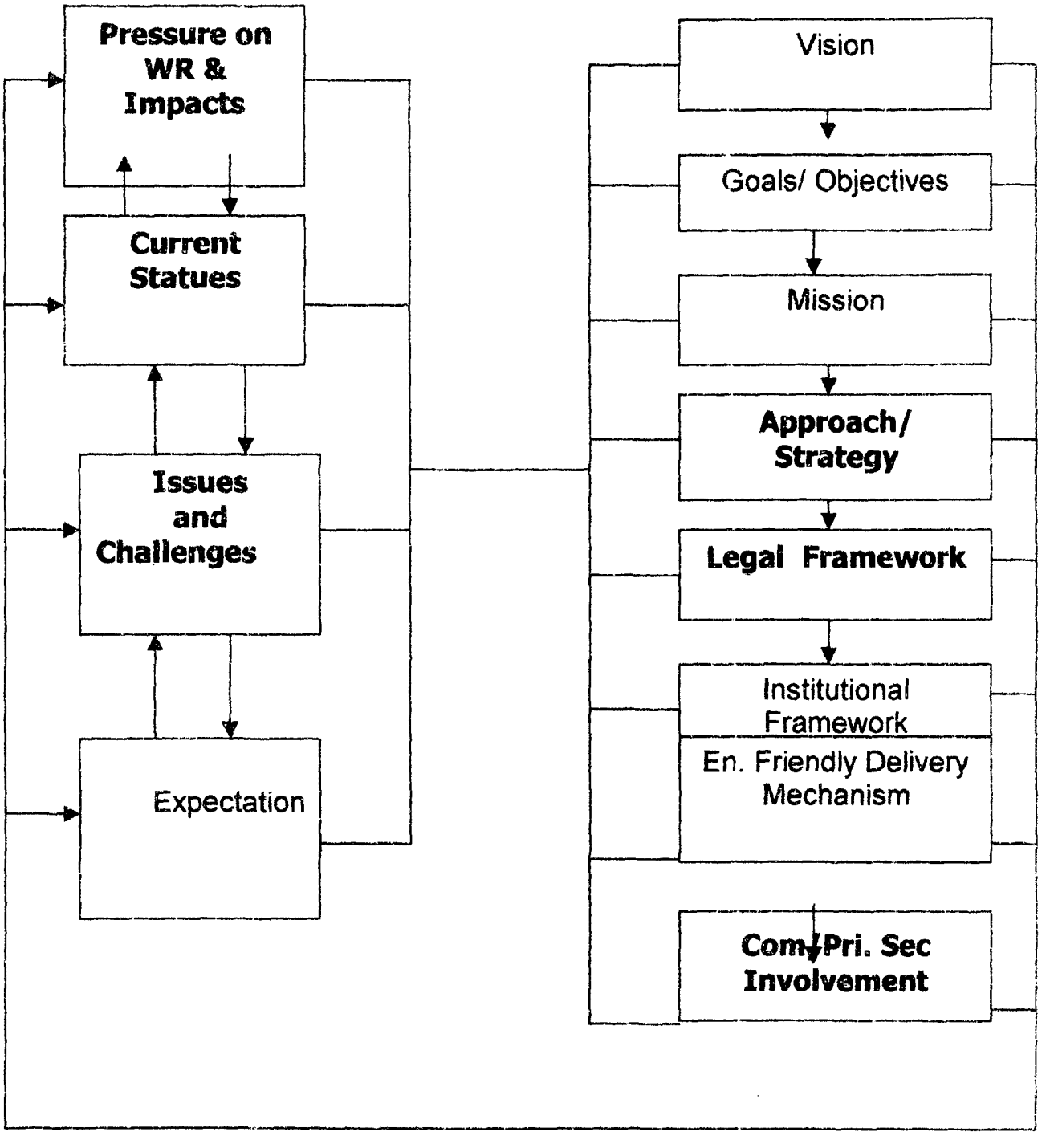
FUTURE PROSPECTIVE: Future prospective in water sector would be heavily depend on the success we would accomplish in dealing with issues and in meeting with the challenges discussed in the forgoing

sections. Water brought life to out planet. But it has now become a source of death too. In similar manner in reverse version, to day polluted water and scarcely of water pushes away the development and makes the living environment unhealthy, unpleasant, unclean and ugly. At the same time clean could play a vital role in triggering economic development ensuring long term sustainability by breaking the existing environmentally unfriendly cycles and making these prevailing vicious cycles to tem the other way round. The value of clean and healthy water in sustainable economic development is yet to be assessed. It is clear how economic activities are bloomed by providing basic infrastructure facilities. Clean water no doubt would play a similar role in economic development.

Water, Environment & Man In Harmony: The Way Forward

The framework for way forward for sustainable water resources is given in Fig 1.

Fig: 1- Framework for the Way Forward: Matching Extreme Ends



The Strategy: Inclusive Incremental Integrated Development Partnership Strategy with an aim of:

- building on the strength and minimize the weaknesses of the wide range of existing tools/mechanisms/institutions;
- developing a partnership framework within which all actors and initiatives could be accommodated and supported rather than a blueprint for action;
- Transforming public agencies as enablers/ facilitators, providing effective and transparent regulatory frameworks and facilitation for private action;
- Developing mechanism for providing incentives for conservation based on the ecosystem approach.

Approach: Salient features of the suggested approach are given below;

- Holistic, systemic based on integrated water resource management;
- Full-cost pricing of water services, with targeted subsidies for the poor;
- Institutional, technological, and financial innovation;
- Participatory inter agency coordination mechanisms;
- Consultative/Participatory;
- Community/People based;
- Integrated [Reactive and proactive; Eco-spatial integration; Technical, legal and administrative integration, Regulatory, market based and voluntary integration, National, provincial and local integration; top down and bottom up];
- Partnerships/Unions/Consortiums[Govt/LGAs/Private sector; National and Provincial; Community partnerships; NGO CBO Partnerships etc];
- Adaptive flexible planning;
- Learning Structure /'Trial and Error'; and
- Incremental/ Self-Refinement.

MAIN PROGRAMS:

PROGRAM CLUSTER 1: MAKING AN ENABLING ENVIRONMENT

This cluster of program could include programs focusing on following:

- Policy;
- Legislative Framework;
- Capacity Building / institutional structures;
- Management systems;
- Promote behavioural change by increasing awareness and capacity/ public sensitisation / building public opinion;
- Improving communications outreach;
- Formal education and training to enable people to act;
- Exchange of experience, so favouring common approaches and capacity building was accepted. In addition emphasis was placed on; and
- Establishment of the right of access by stakeholders to available information.

PROGRAM CLUSTER 2: DEVELOP / ESTABLISH INFORMATION / KNOWLEDGE BASE

This cluster of program could include programs focusing on studies/ research and collection/ dissemination of information/ knowledge on the following:

- Participatory catchment management and conservation;
- Defining and meeting ecosystem water requirements;
- Biodiversity and ecosystem monitoring and benchmarking;
- Maintenance and use of hydro-meteorological networks;
- Development and application of appropriate technologies. In addition participants urged;
- Research on ecosystem function and associated ways of conserving it;
- work to establish and demonstrate the real economic value of wetlands;
- recognition of the value of traditional knowledge, and of the need to codify and apply it;
- Study on traditional uses of nature which are often ecologically sound and flexible;
- more research on ecosystem function and associated ways of conserving it; and
- work to establish and demonstrate the real economic value of wetlands;

PROGRAM CLUSTER 3: WATER POLLUTION ABATEMENT

This cluster of program could include programs focusing on following:

- Industrial Pollution Control;
- Waste Management;
- Control of usage of agricultural chemicals/ fertilizer;
- Low Income Settlement Improvement Program;
- Eco- friendly tourism/ recreation;
- Encourage waste minimisation, clean technologies, and reduction of pollution at source through training, environmental impact assessment and pilot programmes;
- Establish and enforce environmental legislation, incentives and policy instruments;
- Introduce industrial waste exchange programs, such as those currently being piloted in Southeast Asia;
- Promote research and development of environmentally friendly agricultural industrial and household products;
- Accelerate adoption of the environmental standard (ISO Standard No. 14000) by large companies; promote certification for sound environmental management systems; and
- Improve agricultural practice through new incentives, pilot schemes and training in the application of inorganic fertilizers and pesticides.

PROGRAM CLUSTER 4: PROTECTED AREA FOR NATURE

This cluster of program could include programs focusing on:

- Develop a policy on protected areas for Nature;
- Identification of area to be protected for preservation of water and other natural resources;
- Develop legal and administrative framework; and
- Implementation of Protected areas for nature program.

PROGRAM CLUSTER 5: UPPER CATCHMENT AREA DEVELOPMENT/ RESTORATION

This cluster of program could include the expansion of existing upper catchment development programs / projects / Increase watershed management programs to protect upper catchment.

PROGRAM CLUSTER 6: RESTORATION OF DEGRADED WATER BODIES

This cluster of program could include programs for development and implementation plans/ programs for already degraded water bodies like Beare, Bolgoda, Kandy lake, Kelanie river etc.

PROGRAM CLUSTER 7: COASTAL AREA DEVELOPMENT

This cluster of program could include the expansion of existing coastal area development programs / projects.

PROGRAM CLUSTER 8: RIVER BASIN DEVELOPMENT

This cluster of program could include the re development of existing river basin development projects focussing on integrated sustainable water management and development and implementation of new programs.

PROGRAM CLUSTER 9: COMMUNITY & PRIVATE SECTOR WATER

This cluster of program could include a serious of projects and programs aiming at effective community involvement and private sector involvement in water management. Special attention is needed for the environmental improvement of low cost communities living on river and lake banks and catchment areas.

PROGRAM CLUSTER 10: ECO-SYSTEM PROTECTION AND DEVELOPMENT

This cluster of program could include:

- Development of public-private partnerships and broader stakeholder partnerships at an early stage in the development of plans for catchment management and resource development; and
- Special programs on Forests / wetland/ Coastal Eco-systems.

SRI LANKA WATER VISION

MAKING GOVERNANCE IN WATER RESOURCES

MANAGEMENT EFFECTIVE IN SRI LANKA - Ariyaratne Hewage

Purpose this paper is to examine the importance of good Governance in the context of integrated water resources management. This would include the desirable roles of the state, the private sector and the civil society and the policies, legal and institutional framework needed for proper implementation.

1. WATER GOVERNANCE

Water will become a more and more scarce resource in future due to poor management practices and haphazard human actions. The present crisis situation in water is very critical and this state of affairs can be directly attributed to the lack of good governance in water resources management with proper integration of policies and practices related to it.

In order to make water governance effective, it is quire necessary that government institutions responsible for water should establish an effective policy and legal framework to allocate and manage water. This should be done in a manner responsive to national economic and social needs of the country, while ensuring long-term sustainability of the resource base.

Effective governance therefore, is a sine-quo-nun for sustainable water resources management. Effective governance can be achieved through a genuine partnership among the State, Private Sector and the civil society in the process of decision making.

2. CONCEPTUAL FRAMEWORK OF GOVERNANCE

Governance is the exercise of political, economic and administrative authority in the management of country's affairs at all levels. Good Governance is characterized by participation, transparency, accountability, rule of law, effectiveness and equity.

Governance includes the state, but transcends it by taking in the private sector and civil society. The state creates a conducive political and legal environment. The private sector generates jobs and income, and civil society facilitates political and social interaction by mobilizing people to participate in economic social and political activities. [UNDP/Governance Policy – 2001]

2.1 Key players of Governance

To achieve the status of good governance, it is quite necessary to have an appropriate mix of these three key players; State, Private Sector and Civil Society

2.1.1 The State

- The State is composed of an elected Government and an Executive Branch. State plays the most vital role in order to achieve good governance, the state should encourage the involvement of private sector and civil society in the process.

- State includes all governing institutions; legislature, executive, judiciary and electoral bodies at all levels (national, sub-national including local and village levels).

  Some key functions of the State:

  - Establish fair legal frame work
  - Establish effective and accountable public service
  - Protection of environment
  - Establish stable macroeconomic conditions
  - Maintenance of standards of public health and safety
  - Ensuring stability and equity in the market place
  - Upholding the rights of the vulnerable groups
  - Provide essential infrastructure
  - Maintaining law and order
  - Establish security and social harmony
  - Empowering people by providing equal opportunities in social, economic and political activities including access to resources.

    State should also decentralize political and economic systems to provide more opportunities for effective participation of citizens.

2.1.2 Private Sector

- Private sector wants a more conducive environment for investment, a better balance between state and market and market forces to work smoothly. This is the primary source of opportunities for productive employment. Private enterprises should be encouraged and supported to be more transparent and competitive in the international market place.

2.1.3 Role of the State in Private Sector Development

It should be emphasized that the State should play a key role in supporting and developing a society friendly private sector. Some key roles of the state are –

- Creating a stable macroeconomic environment
- Maintaining competitive markets
- Ensuring that the poor and women have easy access to credit
- Nurturing enterprises that generate more jobs and opportunities
- Attracting investment and helping the transfer of knowledge and technologies
- Enforcing the rule of Law
- Providing incentives for human resource development
- Protecting the environment and natural resources
- Maintaining quality of goods and services and the price mechanisms

2.1.4 Civil Society

Civil Society should protect the rights of all citizens. It is the part of society that connects individuals with the public realm and the State.

Civil society organizations organize people's participation in economic and social activities, and into more powerful groups to influence public policies and gain access to resources. They can provide checks and balances on government power and monitor social abuses and maintain a good flow of information among the people.

Civil society organizations need an enabling environment including a legislation and regulatory framework that guarantees the right of association and to be involved in public policy making and implementation.

Citizens want increased accountability, responsiveness from the state and greater decentralization with more opportunities for participation.

2.1.5 Key Characteristics of Good Governance

In order to achieve good governance with proper mix of three main players [State, private Sector and Civil Society], it is necessary to ensure to include following key characteristics;

- **Participation** - All men and women should have a voice in decision making, freedom of association and speech.
- **Rule of Law** - Fair legal framework, and impartial enforcement, including maintenance of human rights.
- **Transparency** - Free flow of information accessible to those concerned
- **Responsiveness** - Institutions and processes serve all stake-holders.
- **Consensus Orientation** – Mediating the difference of interests to reach broad consensus beneficial to the society
- **Equity** - All men and women have opportunities to improve their well-being
- **Accountability** - Decision makers in State, Private sector and Civil society Organizations are accountable to the public
- **Strategic Vision** - Leaders and the public have broad and long-term perspective of good governance

None of these characteristics can stand alone and they are mutually reinforcing and inter-related.

3. REALITIES OF THE COUNTRY

3.1 Although, private sector and civil society are expected to play key roles in governance, the background and the actual conditions in Sri Lanka do not provide much opportunities for their effective involvement in the process.

3.2 Long history of feudalistic society and imperial system of government under the foreign powers had established a higher degree of dominance by the state in all aspects of social, economic and political processes.

3.3 The private sector is not very strong and does not possess a bargaining power in key decision making. Few multinational and local companies have developed a status of oligopoly. Therefore, real market forces do not work to enable the private sector to play a key role. Large number of small scale businessmen are not well-organized.

3.4 Civil society organizations are also not so strong. Many such organizations are either established with state patronage or have a strong dependence on the state. Except for a few urban based NGOO, many of the community based civil organizations are not adequately empowered.

3.5 In actual fact the state sector is "controlling" the other two sectors. All national development decisions are made by the state. Although, three players are expected to interact with each other the state dominance on other two sectors is quite visible.

3.6 Politicization of state sector decision making has led to more control-oriented, less participatory decision making. Although, there are elected representatives at different levels, lack of opportunities for poor and disadvantaged groups in decision making can be observed.

Even though, elected members are representatives of the public in theory, there is no effective system in place for the "people" to participate in decision making that affects the society at large. Top down approach and dominance by a few politicians and bureaucrats can be observed.

Approaches to water resources management in the country also do not display effective practices of governance. It can be observed that most decisions with regard to the management of water in any type of use such as irrigation, drinking water supply and industrial use are made by pubic officers. In most cases, such decisions are made as a routine exercise. Some main shortcomings from the point of view of governance in water related decision making are as follows:-

a] Allocation and management of water for different purposes is done without much concern for the integrated nature of water resources.

b] Water allocation is done by the field level officers under pressure by powerful persons.

c] No proper strategies to maintain quality and quantity of water in a given geographical area

d] The participation of the private sector in water management is almost non-existent, **and**

e] The participation of civil society organization is not really effective. [Water for the 21st Century, South Asia – 2000]

4. COMPARATIVE EXPERIENCE

4.1 Since private sector and civil society are well developed in the western countries, they play a key role in governance.

Sometimes, large private sector organizations impose pressure on governments and get the policies changed in their favour. Civil Society Organizations also are well informed, strong and organized so that they can pressurize the governments to change policies. The improved technologies and communication systems have enabled the private sector and civil society organizations to play their roles in achieving the goals of good governance. This state of affairs in the Western countries has been developed over a period of time through a system of proper evolution.

4.2 However, examples of Malaysia show that properly managed state can play a vital role in good governance. Even though the private sector is quite strong there, the state facilitates the process of national development.

A set of national principles with a long-term vision has been established in Malaysia. Irrespective of the differences of the political parties, the framework of national principles stands above all other interests. This had paved way for establishing a stable society in Malaysia.

4.3 The Malaysian public service has been modernized not only to be efficient and effective, but also it is developed as a highly professional and meritorious service as an integral part of the government and directly under the Chief Executive, the Prime Minister.

4.4 The Malaysia Incorporated Policy which has been established in 1983, stresses the importance of cooperation between the public and private sectors in order to ensure rapid economic growth and national development. The public sector has been entrusted with the responsibility of ensuring the success of the private sector. The public sector is expected to create a conducive environment that will provide a right impetus for accelerated economic growth.

"While the private sector has been entrusted with the lead role in spearheading economic development, the public sector has to play its role as equal and productive partner in ensuring overall national development." [Malaysia Incorporated – 1991]

Irrespective of the fact whether so called "democracy" exists in Malaysia, it has been able to achieve high degree of economic, social and human development without dependence of any foreign power or international agency.

5. CURRENT APPROACHES TO WATER RESOURCES MANAGEMENT

It is interesting to note that the water resources had been managed in a sustainable manner in the past, about 25 centuries ago. Human settlements were concentrated in the dry zone and the water had been used for different purposes quite effectively. Water sources were conserved and the water was used for irrigation, while been used for human and environmental purposes. Therefore, no serious problems of quality or quantity of water had been recorded in the past.

However, since the occupation of foreign powers in the country, the watersheds in the hill country areas had been cleared for plantation of cash crops and the wet zone was opened up for development. The abandoned dry zone agriculture was developed with restoration of large reservoirs.

5.1 Sectoral Approaches

Department of Irrigation was established to manage the large irrigation projects. Management of water resources was mostly concentrated on irrigated water. It has been calculated that 90 - 95% of water withdrawals from the sources is used for irrigation. Mahaweli as a multi-purpose development project which uses the water for irrigation and power generation has not paid much attention to the needs of drinking water and water for environment. Large scale irrigation canals with concrete lining do not provide water for people and environment. Little attention had been paid to the drinking water supply projects, particularly in the dry zone areas.

5.2 Dominance of the State

It was also observed that water resources management had been mainly in the hands of the state officers. Irrespective of the water use type, the state made all relevant decisions. Irrigation, drinking water supply, industrial uses were all under the dominance of public officers. Although, there had been some efforts to involve farmers in water management, it has been observed that there was great degree of dependence on the state.

5.3 Recent efforts to involve Communities

There had been several attempts to involve the farmer organizations in water management, particularly under large irrigation projects. For example, under the Kimbulwana Oya Irrigation Project, effective participation of farmers was observed in their activities particularly the decisions related to water management. Old Vidane system was used to mobilize the people for maintenance of irrigation infrastructure. However, this participatory system was collapsed after the technical officer of the Irrigation Department was transferred out of the scheme. The success depended greatly on the personal commitment of the Public Officer.

5.4 Mahaweli Farmer Organizations

Farmer Organizations have been established in all seven Mahaweli areas. In some Mahaweli Systems, the participation of farmers in water management is quite successful. For examples, some farmers' organizations in System H, have already taken over the responsibility of management of irrigated water. The farmers have agreed to collect a standard fee for a fund which will be used for meeting the cost of operations and maintenance of irrigation infrastructure.

5.5 Community Participation in Drinking Water Supply

There are successful examples of involving the members of Community who are users of drinking water supplied under special schemes.

The National Water Supply and Drainage Board and the World Bank funded Community Water Supply Project have been involved in these efforts.

A Tri-partite Memorandum of Understanding had been signed by the National Water Supply and Drainage Board [NWS&DB], Local Authority, and the Community for the purpose of performing the responsibilities assigned to each of them.

5.6 Lack of Accountability, Transparency and Equity

Since most of the decisions were made by the public officers, the information such as expenditure, quality and quantity construction of work not known to the public. The public officers spend money at their desertion and therefore, they were not accountable to the public. Amounts spent on projects, quantities completed etc., known only to the officers who were directly involved and thus the aspect of transparency was out of question.

Although, farmers participated at various levels with regard to issue of water, it has been observed that only male farmers had been present at these meetings. Since the female family members were not official members of Farmer Organization, they did not have the opportunity for participate at the meetings. Thus the equity in decision making was also non-existent.

5.7 Lack of Area-wide Planning

The interests of people are fragmented and therefore, there is no much concern on Integrated Water Resources Management [IWRM].

For example, the Farmer Organizations consider water for agriculture as the first priority. There had been instances when people suffer without drinking water, the farmers have objected to release of water for drinking purposes. The Wild Life in the Yala National Park and the religious devotees in Kataragama suffer without adequate water, because of the river diversion in the upstream for agriculture purposes.

It can be observed that different water users in a given geographical area do not interact with each other and therefore, no proper resource planning is done for conservation, allocation and management of water in any part of the country.

5.8 Successful Experience

The Water Panel established under the Mahaweli Authority is a successful example for practicing the principles of governance.

Representatives of Farmer Organizations, public officers involved in irrigation, agriculture and related activities on the areas where irrigated water is provided through Mahaweli Authority managed irrigation systems meet before the beginning of the cultivation season at the Water Panel.

Public Officers present the scientific data on the availability of water based on the forecasts at this Panel meeting. Then they suggest the proposed quantities and timing for allocation of water and request the Farmer Organizations representatives and the public officers to adhere to the time-table. The Farmer Organization representatives and other participants then discuss openly on the proposed water allocation and suggest changes in quantities and timing of water issues. After such discussions they all reach a final consensus on the allocation of water. This is an open forum where decisions are made through active participation of stakeholders.

6. FRAMEWORK FOR EFFECTIVE WATER GOVERNANCE

Policies, legal framework and management practices in water governance should be based on the principles of Integrated Water Resources Management [IWRM]. Water resources should be managed with an appropriate balance among the following uses of water.

- Water for people [drinking, sanitation]
- Water for Food [agriculture]
- Water for industries/power generation
- Water for environment [Fauna and Flora]

[GWP/IWRM – 2000]

6.1 Setting the Background for Effective Water Governance

The state should take the initiative in establishing required background for effective water governance. "It is necessary to create an enabling environment which facilitates the following: efficient private and public sector initiatives; a regulatory regime which allows clear transactions between stakeholders in a climate of trust; and shared responsibility for safeguarding river and aquifer resources whose management affects many people but at present is the responsibility of none. GWP/Towards Water Security – 2000]

6.1.1 Key Elements Required for Water Governance

Some key elements that need to be established to achieve effective water governance are given below-

- Establish water resource management policies
- Formulate laws and regulatory frameworks
- Decentralize the decision making process
- Improve the capacities of service delivery organizations
- Encourage the participation of private sector in water resource management
- Establish institutional structures based on river basins and aquifers
- Establish systems and processes to overcome conflicts over water allocation
- Establish pricing systems for water services with adequate measures to protect the poor.

[GWP/Water for the 21st century – South Asia – 2000]

6.1.2 Reforms and Development of Water Institutions

There are numerous institutions involved in water resources management and services. These institutions are fragmented and coordination among such institutions is seriously lacking. Most of these institutions are operating at national levels and therefore, the decentralization of decision making to local levels is quite poor. This state of affairs has affected the resolution of conflicts between up-stream and down-stream, urban and poor and among the different uses of water.

7. RECOMMENDATIONS FOR EFFECTIVE WATER GOVERNANCE

Some key recommendations for the improvement of the effectiveness of water governance in Sri Lanka are presented below.

7.1 Improving the Institutional capacities of three Key Players of Governance

It is very essential to improve the Institutional Capacities of the three key players of governance – The State, Civil society Organizations and the Private Sector - for the achievement of good governance.

7.1.1 Improvement of the State

At present, the state is the major player in water resources management and it plays a quite dominant role over the other two players. The State should continue to be the main player of water governance but with a different role.

- Civil service reforms, independent judiciary and electoral systems and ensuring accountability and transparency are important elements in this process.

- The public officers should change from the role of implementer to that of a facilitator. They should encourage private sector participation in economic activities and promote civil organizations for more effective involvement in the process.

- Depoliticization of the current process by establishing good systems and procedures is very essential. Elected members at all levels should focus on legislative and monitoring activities rather than directly involving in operational work. They should also encourage active participation of people in decision making through helping the strengthening of civil society organizations.

- Rapid and drastic reforms should be introduced in the public service with a view to improving it as a professional and quality service. Public sector should be entrusted with the responsibility of developing cooperation with the private sector and civil society. Public sector should therefore, take the initiative in achieving good governance with the active participation of the private sector and the civil society.

7.1.2 Private Sector Involvement in Water Resources Management

It is important to attract the private sector to invest in water resource management. The state should take an initiative to develop partnership with private sector. Steps need to be taken to privatize wherever feasible and to use mechanisms such as BOOBOT in water resources management.

At present, private contractors are involved in construction and repair activities of water related infrastructure such as irrigation canals, water supply schemes etc. However, the state officers play a dominant role in planning and management and the involvement of private sector is confined only to a role of a contractor.

Private Sector, particularly the medium and small scale private investors should be encouraged to participate at the local level decision making process on water resources management.

7.1.3 Participation of Civil Society organizations in Water Resources Management

Several approaches have been used to involve the communities in water management activities. Such approaches have been effective to some extent, particularly in irrigation management under the large irrigation projects.

Farmer Organizations have been established for distributing canal areas of large reservoirs managed by the Department of Irrigation and the Mahaweli Authority. Farmer Representatives participate in making decisions on operations and maintenance of the irrigation infrastructure in their areas. However, it has been observed that this system is not very effective and the farmers still depend to a great extent on public officers.

There are some successful examples of involving the water users in community water supply projects. A Tri-partite Memorandum of Understanding had been signed by the National Water Supply and Drainage Board, the relevant Local Authority and the Community for the purpose of performing the responsibilities assigned to each of the party.

It is necessary to use the lessons learned from successful experience and to improve the levels of participation of communities in water resources management in all steps of the process including planning, implementation and monitoring etc. The state sector should take the initiative to bring the communities to the forefront of the decision making process and the public officers should play a role of facilitator by coordinating the activities from the "second raw".

7.2 Policy and Legal Framework for Water Resources Management

National policies exist in some countries, and have been recently formulated in some others and also are being formulated in some countries. It is necessary that these policies are alinged with the principles of IWRM.

It can be observed that there is a multitude of laws and regulations relating to the Water Sector in Sri Lanka. There are numerous overlaps and inconsistencies in the legal instruments.

7.2.1 Present shortcomings of the Policies and Laws

It can be observed that there are no comprehensive national policies in Sri Lanka on water resources management. The legal framework also does not tally with the IWRM principles. It is important to have a set of broad policies and laws at macro level of planning and management.

7.2.2 Proposed National Water Resource Policy and Water Resources Authority Act

A draft policy and an Act have been developed by the Water Resources Secretariat. These two documents have been discussed at numerous fora with wider participation of water users, water management agencies and experts.

The draft policy covers wide range of aspects in water resources management such as water rights and allocation, demand management, ground water management, data and information and institutional structure. However, it can be observed that the principles of

governance and IWRM have not been adequately covered in the policy. The first statement of the draft policy reads as,

"The National Water Resources Policy is a statement of the government's intentions regarding the management of Country's inland water." [Draft Water Resources Policy – 2001].

It may be better to say that the policy contains the national principles regarding water resources management with a view to give a wider meaning. Recognition given to the private sector and the civil society for active involvement in the process to achieve effective water governance is not adequate. The IWRM principles also have not been used as the basic guide in the draft policy.

- It is desirable to use the water resources policy as the base for all macro socio-economic planning. All development planning efforts can be based on the large policy on water resources.

- The draft Water Resources Authority Act has proposed a new institutional structure for water resources management including National Water Resources Authority [NWRA], Water Resources Council and Water Resources Tribunals. The NWRA has wide powers and the Council will be an advisory body [Draft Water Resources Authority Act – 2000]

  Although it is proposed to establish River Basin Management Committees, no details given about the functions, composition and particularly the involvement of the private sector and the civil society organizations in such Committees.

- It is therefore, advisable to include details of procedures and processes including the powers and players at the decentralized entities including river basin and sub-basin level committees.

- The IWRM principles also should be explicitly included in the institutional structure for effective implementation.

7.2.3 Institutional Framework and Decenstalization

Although, several new institutions have been proposed in the draft Act, it seems like creating another set of government institutions. The new thinking on the principles of IWRM and governance have not been addressed adequately. The focus of the proposed institutional set up is only on the national level organizations. The NWRA may not create its branches at the field level, but it is necessary to spell out in detail the decentralized institutional framework.

- River Basin Management Committees to be established in identified river basins. It is not practical to set up such Committees for all 103 rivers. Therefore, clearly identified geographical areas with natural boundaries should be used for this purpose.

- The private sector and the civil society organizations should be included in the river basis management committees in addition to the public officers and experts.

- Basin wide plans should be prepared with the use of planning techniques such as Strategic Environmental Assessment with the participation of all Stakeholders.

- Sub-basin Committees and other lower level Committees should be established for identified areas under the RBM Committee with clearly identified roles and powers. The plans of sub-basin and other lower level committees should be linked to the broad river basin plan.

7.2.4 Use of Data and Information

It is very important to establish a system for collecting, analyzing and using of data in a shared manner. Today, different agencies collect data on different aspects of water without much interaction with each other. RBM Committees should be made responsible for the collection and use of data and to share data with any person who is interested in it. This can be data and information on quality and quantity of water, cost estimates and expenditure on all projects and any other relevant aspects. This process would help to maintain the transparency of the decision making which improves the water governance.

7.2.5 Partnership Approach

The current approaches to management should be transformed into an approach of partnership in true sense. Re-oriented Public officers empowered Civil Society Organizations and improved Private Sector should work together in all stages of Water Resources Management. The Public Officers should take the initiative to involve all other partners effectively. It is also important to ensure the active participation of women and the marginalized groups in the decision making process as equal partners.

8. CONSLUSION

It is very important to incorporate the elements of govemance and IWRM in all efforts of Water Resources Management to achieve the water vision effectively.

All efforts of resource planning and development planning and implementation should be based on water resources planning and management. This would enable to achieve the goals of sustainable development of the country.

Political and administrative boundaries should be amalgamated with the natural boundaries in a phased out manner and this will help the proper planning and management with real partnership with all stakeholders.

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INVESTMENT AND COST-SHARING

Asoka S Gunawardana

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FINANCING THE SUSTAINABLE USE OF WATER : Issues and Objectives

The manner of use and the kind of development of water resources have implications for people and their environment. Financing of the use and development of water resources should then be responsive, responsible, and sustainable. This introductory section will examine objectives and issues that need to be taken into account in financing the sustainable use of water.

1.0 Issues in the Sustainable Use of water:

In the long run the optimal use of water in terms of quantity and quality involves addressing two issues.

- Adequacy of provision
- Environmental sustainability of utilization

These are linked because they represent the demand for use and the demand for conservation. A water agenda cannot be concerned only with ensuring supply, but also should be concerned with environmental impacts of "misuse". Both have costs. A further issue in the use of water is competing demands for water arising from growth in population, increasing urbanization and economic expansion. Accordingly demands have arisen for newer kinds of water uses as well as the expansion of existing ones. The lack of access to water affects the quality of life as well as limits opportunities for economic development. Unmet needs have costs to the society and the economy. The poor are eventually most affected.[1]

Water thus becomes an economic good, albeit, with significant social impacts, that would need to be allocated amongst alternate uses taking both aspects into consideration. It is then necessary to enhance the functional capabilities, operational strengths, and institutional readiness of the water sector to deal with the present and future challenges. The demand for current and future needs have fundamental institutional, technological, and consequent financial implications. It is imperative that the water agenda is efficient in the use of resources allocated for the different uses while at the same time ensuring welfare needs of the citizens. A national water agenda will have costs to the user (citizen) and to the provider (the state). What costs the state will bear and what costs should or could be borne by the user is the key financing issue.

1.1 Cost Implications of Water Use:

Thus while the current demand for water continues to pose questions of what should be done, how much and by whom, new concerns have emerged concerning the harmful effects arising from the manner of exploitation and use of water resources. This is about the effects of water use on current quality of life as well as about the quality of water available for use by future generations.

In this nexus of service provision and environmental sustainability issues, efficient, effective and sustainable water agenda have several cost implications.

- Changing demographic and settlement patterns and technological feasibility of supply/delivery solutions.
- Water resource (scarcity) situation and possible mismanagement existing sources.
- Inefficiency of public sector institutional arrangements for service provision.
- Poor financial performance of public sector water agencies.
- Costs of conservation and prevention of degradation.

The emergence of a new set of demands as regards the manner of exploitation and use of water resources raises concerns for quality of life issues that have fundamental implications for nature and

[1] Serageldin, I., Water Supply, Sanitation, and Environmental Sustainability · The Financing Challenge, World Bank, 1994.

scope of user needs. The different user needs and expectations will have implications for packaging and providing of services. Accordingly pricing of water will become an important factor in providing an "acceptable" service. The user will be willing to pay for the service option that is wanted.

Further, where formal water institutions perform poorly informal private arrangements emerge to meet needs that are not adequately met. Thus there is reliance on informal supplies to augment if not provide for gaps in provision. Such supplies would eventually be met from the formal supply arrangements, with direct costs to the provider and indirect costs to economy from inadequate and unhygienic use situations. The extent of informal provision in terms of coverage of needs would vary according to the situation, but be important in under-served rural and urban situations.

The performance and sustainability of water services depends not only on the level of financing but also on the sources of such financing. It is pointed out that services are efficient and effective to the extent that the users are involved in sharing cost or providing finances for the services. Internal generation of cash flows can be significant where the relationship between the providers and users is a positive one.

1.2 Financial Sustainability:

The management of water resources and the provision of water for the different uses have remained a state responsibility. It is therefore presumed that the government has primary responsibility for managing, operating and financing services. This position holds that it is the government's responsibility to define the services to be provided, ensure accessibility to under-served, and to establish public sector agencies for the delivery of services.

However emerging consensus for managing water resources and delivering services in an efficient, effective and sustainable manner recognizes two fundamental principles.

- Water has an economic value in all its competing uses and should be recognized as an economic good.
- Water development and management should be based upon participatory approaches involving users, planners, and policymakers at all levels, with decisions taken at the lowest appropriate level.

(Dublin International Conference on Water and the Environment, 1992)

If the above principles were to be accepted, efficiency and equity considerations in the financing of water would require that private financing is used for financing private goods and public resources are used only for financing public goods. This raises a fundamental question as to the basic characteristics of water as a good when used for different purposes, i.e., whether water is consumed jointly and the excludability of potential users from consumption. Most of the uses of water would not constitute pure private goods in terms of excludability and individual consumption. However they have the general characteristics of excludability though jointly consumed. Accordingly these are goods that can be subject to market-based provision. However since these goods also have characteristics of natural monopolies it would be more economical to supply them through a single supplier. Then collective (public) action is needed to award and regulate supply concessions. An important aspect in this issue is the necessity to provide for under-served and marginalized who would not be able to access water when allocated through market mechanisms, i.e., how far they become "merit" goods from a policy point of view.

Hence long term financial sustainability should address two issues.

- Ensuring efficiency and equity in provision. Efficiency considerations require adequate supplies being provided at a reasonable cost. Equity considerations require accessibility to a choice of services at affordable prices to meet diverse needs and preferences.
- Who finances what in terms of the nature of the goods provided. This involves determining whether the provision of water should be financed through public funds or through user charges.

1.2 Towards a Framework for Financing Water:

There is growing consensus that water development and management should incorporate participatory approaches and that decisions should be taken at the lowest appropriate level. Decision levels would then extend from the household up to the national level. What is then important is to delineate the appropriate decision levels in respect of the different water use areas. Each decision level constitutes a "task network" for water supply service. Provision of water involves a hierarchy of water supply services broadly corresponding to the service operations ranging from abstraction, through transporting, storing, treating, to distributing the water. These service operations would be undertaken at the different decision-making levels. Annex 2 attempts to construct a framework for analysing water sector activities.

The levels of decision making not only delineate what is to be done and how, but also the ensuing implications of financing. The central principle here is that costs should be apportioned to the different levels in this hierarchy according to the benefits accruing at those levels. The kinds of financial instruments used for recovery of costs would be different as one moves from the household to the national level. Thus financial arrangements for cost recovery would range from user fees and contributions, at the household level, through rates, taxes and payments for local level operations, charges and fees for river basin level operations to budgetary expenditures at the provincial and national levels. Such a framework for financing water services implies the adoption of institutional

arrangements, inter alia, delineating roles, responsibilities and accountabilities of the different players at each level. It would be a system where there
is, clarity as to who is responsible for what services, accountability for provision and delivery functions, and transparency in regulating the system.

II. FINANCING THE WATER AGENDA : Investment and Finance Gap

Financing the integrated management and development of water resources is not simply a question of availability of adequate financial resources. It is about the management of a national water agenda efficiently, effectively and equitably. There are fundamental public policy issues of who should do what and how. In other words there are questions about the institutional arrangements and instruments. A fundamental premise of the policy agenda is that the state could not and should not be the sole provider. This section will review the institutions and instruments for managing the national water resources policy and programme situation from an investment and financing perspective.

2.0 National Water Agenda and the Management System:

Water Policy recognizes water to be a resource, having "an economic value". Then water should be managed to ensure its use in an "effective, efficient, and equitable manner, consistent with the social, economic and environmental needs of the present and future generations"[2]. Indeed it is important to note that water has a social value. Accordingly the allocation of water for different uses becomes a crucial policy issue.

Then two water management imperatives arise that have fundamental economic and financial implications.

- "Manage" the allocation of water amongst different uses. Water has a value.
- "Manage" the provision of water in each area of use. Water has a cost.

Hitherto water has been assumed to be free, and there has been "over-exploitation of water resources to satisfy increasing demand without due consideration to sustainability and protection of water resources", contributing to depletion and degradation of the aquatic environment of river basins[3]. The

[2] Government of Sri Lanka, Water Resources Council and Secretariat, Colombo, 2000
[3] ibid,

strategy envisaged for "managing" water is "demand management", involving measures to encourage conservation of sector-wise use of water by reducing quantities demanded and used, obtaining higher value of production from the unit of water used and preventing water from losses.

Currently the irrigation sector is said to account for 90-95% of the total freshwater withdrawn through artificial means. Whereas some part of this gets used for domestic, environmental and other purposes it is estimated that only about 40% gets actually used as crop water. Should the "efficient, effective and sustainable use of water" be worked out within the framework of the use requirements of

different purposes that would become necessary in the run up to 2025? This naturally will be an evolving one determined by technological, economic and social considerations affecting the demand for water in different use areas. However it would seem that it is only within such an analytical demand framework that the financing of specific sectoral water agendas can be examined.

A key issue that such a demand framework would need to address is the value to be placed upon different water uses, i.e., the economic cost of water as input into the different areas of production and consumption. An economic cost for water arises precisely because of possible competing alternate uses, that is the concern of water allocation. Does water have a scarcity value in the Sri Lankan context, and if so what is the opportunity cost of uses foregone. Then there will be a cost associated with the right to take water from water bodies. Should this constitute a legitimate element of the total production cost of water, and be a levy on user charges. What will be the relationship between opportunity cost and financial cost in respect of the different uses, notably irrigation and domestic supplies.

Currently the management of the provision of water is with the public sector, whether central or local. In fact the public sector produces and delivers all of the water services. In irrigation there have been efforts to involve farmer organizations in operation and maintenance at the scheme level. A traditional system of consultation continues to be practiced in respect of water issues for irrigated agriculture. However this is yet to evolve into a delivery mechanism within the overall management system for the provision of irrigation water. Accordingly irrigation water is available free of cost of provision/delivery to its users. As such provision and delivery of irrigation water for farm use continue to remain a state responsibility and expenditures in this regard a charge on state's resources.

The Presidential Task Force[4] addressed the domestic and industrial water policy agenda as a component of the development strategy for environmental infrastructure in urban development. It is a public utility and is at present managed as a public monopoly with the National Water Supply and Drainage Board (NWSDB) as the major player. It has statutory responsibility for the development, provision, operation and control of water supply for public, industrial and domestic purposes. A few local authorities (LAs) are also engaged in the operation of water supply services through purchasing bulk supplies from NWSDB. A strategic objective for provision in this sector is the encouragement of LAs to undertake distribution of water supply services, operation and maintenance, and actively participate in the capital financing through cost sharing with the Government. User charges have been introduced for domestic and industrial supplies since 1983. The NWSDB does not charge a full cost recovery price and uses the concept of "affordable tariff" or "willingness to pay" based upon the cost incurred in processing and distribution. However the tariff structure is designed to eliminate wasteful use[5].

National Policy for Rural Water Supply and Sanitation (RWSS) sets as its goal the provision of access to safe drinking water to all citizens by the year 2010. (NWS&SSFP, 2000) It recognizes the competing uses for water both as a social and economic good. The national policy on RWSS has, inter alia, enunciated the following principles.

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[4] Ministry of Housing and Urban Development, Report of the Presidiential Task Force on Housing and Urban Development, Colombo, 1998

[5] Water Resources Council and Secretariat, op cit

- The roles of the Government, Provincial Councils, and Local Government Authorities should be to regulate and facilitate in the implementation of the sector activities while the Community Based Organizations, private Sector and NGOO should be promoted as providers of services.
- Users should be promoted and encouraged to own and manage the facilities and the assets.
- Users should be promoted and encouraged to share capital investment incurred in creating the facilities.

The National Policy on Private Sector Participation in Water Supply and Sanitation Services (2000) invites the private sector to enter into partnership with Government to operate, maintain and extend water systems.

2.1 Investment and Financing : Current Status:

The Six-Year Development Programmes 1999-2004 sets out development thrust areas and proposed investments.

Irrigation –

- Sustain and increase efficiency and productivity of water.
- Assessment of water resources development potential and development of water resources in crucial areas.
- Integrated resource management of command and source areas.
- Improving profitability of irrigated agriculture.
- Establishment of joint management in all irrigation systems.

The Public Investment Programme (1999-2001) envisaged an investment of Rs 5,501 millions, for the (a) Development of a long-term strategy for the management of irrigation (Rs. 1,757 million) and (b) Construction, improvements and rehabilitation of the irrigation infrastructure (Rs 3,744 million).

Mahaweli –

- National resources management.
- Asset management.
- Management and allocation of bulk water supply
- Expansion of knowledge based data system
- Promotion and facilitation of effective participation

A total investment of Rs. 293,947 million is envisaged, with the natural resource management area accounting for Rs. 276,472 million.

The thrust areas for irrigation and mahaweli development do not explicitly envisage community participation in the management and delivery of irrigation water. Indeed the expenditure framework for the provision public finances for irrigation (Annex 1) does not explicitly provide for an area of user participation activities in the operation and maintenance of irrigation infrastructure. Accordingly irrigation would remain in the sphere of public provision both for capital as well as current expenditure requirements during the planned medium-term programme framework.

Water Supply and Sewerage –

- Improvement of service levels and reduction of unaccounted for water.
- Provision of assistance to communities in backward areas to meet safe-drinking water needs.
- Involvement of local authorities in the operation and maintenance of water supply schemes.
- Public-private partnerships in water supply and waste water management.
- Development of waste water infrastructure

Above development thrusts envisage a total investment of Rs. 61,596 million. It is significant to note that the development thrusts does not appear to have taken into account investment and financing arising from the involvement of local authorities or public-private partnerships.

2.2 Investment and Financing : Implications and Issues

Despite the recognition and acceptance of competing multiple uses for water that makes allocation amongst them an issue, planning of investment and financing thrusts would seem to continue to be made sectorally within each of the use areas. Accordingly any projection of investment and financing requirements to support the water vision 2025 at this stage would not be taking into account,

- The current shares of each use area.
- The optimally required share for each use area.

Accordingly the cost of provision cannot not take into account the economic value of use of water for the specific purpose, whether for determining the financial cost of delivery or for assessment of national economic benefits. Whether such an assessment is necessary (or even economically and politically feasible), at the national level or at the regional (river basin) level is a water policy issue that has implications for the nature, scope and type of investment and financing of the provision and delivery.

In the context of the sensitivity of the socio-cultural vis à vis the techno-economic aspects of managing water resources it is necessary to delineate the roles and responsibilities of the state, the private sector, and the community in the provision and delivery of the relevant goods and services. It would be only in that context that an investment and financing strategy and an assessment of cost-efficiency and effectiveness of outputs and outcomes could be assessed. This is also the necessary basis for working out the nature and scope of partnership in investment and financing between central, provincial, and local levels of government. Actions at the national level have social and economic fallout for provincial and local levels. These have important health and environment implications. They have cost implications for water mandates at especially the local level. Accordingly investment and financing for water cannot be approached in a segmented manner. The principle of integrated management has fundamental investment and financing implications in terms of who finances what.

2.3 Private and Community Participation: Role and Extent

Accordingly the delineation of who does what is fundamental to the effective governance of any development agenda. Delineation of the role of the state, the private sector, and of the community would need to be worked out according to the specific political, social and economic imperatives of each country. The investment and financial thrust noted above provide for private and community participation in water supply and sanitation whereas in irrigation such a role is not explicitly provided. However the current vision and policy statements do not explicitly provide for cost-sharing in the water sector.

In regard to the role of the private sector the following highlights of the National Water Policy on Private Sector Participation (PSP) would be of interest.

- Whatever the form of PSP, all major fixed assets presently belonging to water schemes would remain with the government. The asset owning institution is not specified.
- The most suitable PSP model would need to be worked out according to the specific case.
- There is an estimated 50% shortfall (approximately Rs. 40 billion) in the capacity for public funding for WSS over the next ten years. PSP is in part to attract multilateral funding.
- State resources would be targeted to make water affordable and to cushion tariff levels if necessary. The PSP framework will have to effectively administer any subsidy policy in the event of a subsidy being necessary.

- An independent regulatory body with substantial powers will be established to protect the interests of the consumer.

The PSP policy does not indicate the possible future structure of the WSS sector. However, the national policy on RWS&SS complements the above with a clearer role delineation for community based organizations (CBOs) as providers of services.

2.4 Budgeting for Water and Managing Budget Outcomes:

A government's budget is the principal instrument for the expression of state responsibilities and governance priorities. Accordingly an effective public expenditure management system can assist achieve an allocation of resources consistent with its development strategy and priorities. Further the financial management system from which the budget is first created and then maintained has a major influence upon ensuring the efficiency and effectiveness of financing service provision/delivery operations. In the context of the government continuing to be the major spender in the water sector, proper budgeting and managing budget outcomes will be crucial to bringing about financial sustainability of the water vision.

The current public expenditure programme frameworks do not incorporate in a coherent manner the purposes and activities to achieve efficient, effective and equitable use of water resources within the context of a governance partnership between the state, private sector and community organizations. A review of the "key functions" and the "project" disaggregation of expenditures does not convey the purposes or the actions and activities that should be undertaken to achieve them. It would be true to say that current public expenditure frameworks do not

address any of the crucial issues of investment and financing of the water agenda. (See Annex 2)

III APPROACHES TO FINANCING WATER : Promoting Collective Action in the Provision of Water Services

Thus the development and management of water calls for a partnership of collective action between the government, private sector and community organizations, and the users. All of these players have a role in the development and management the provision of water to people. Their collective actions are needed to ameliorate poor performance and improve financial viability of water sector activities. Some key policy related financial issues are examined in this section.

3.0 Targeted Support for the Poor:

Hitherto the government has been the major if not the sole player in the water sector. Some of the shortcomings of public sector management in service provision have been noted earlier. Yet the role of the government remains a crucial and an important one. In this regard it is useful to distinguish between provision and production of facilities and services. (Provision involves the set of decisions and actions that enable facilities and services to be made available. Production is the act of executing investment and generating services. Provision and production need not be undertaken by the same organization.) Accordingly the role of the government should be provision, and engage in production only of public goods. Government's investment commitments in producing facilities and services could well leave only minimal public resources for conservation and environmental protection.

However it is necessary to ensure that delivery arrangements, whether through market or government allocation are equitable and meet the needs of all users. Here we are thinking of not only equity between groups but also between sectors and regions. This is clearly a provider responsibility of the government. It is generally believed that any withdrawal by the government from production and delivery of services would leave the poor worse off due to their low ability to pay. It would be the responsibility of government to ensure that the poor can gain access and to provide targeted support. Indeed transfer of resources to poor is a legitimate and desirable instrument of public policy. However it is important to

ensure that such transfers do empower poor by providing them with choices. Social development funds address such needs of the poor.

3.1 Private Participation and Investment in Water:

Accordingly investment in water should be a shared one, according to the nature of facilities and services to be produced. In fact in the water sector public-private partnerships have emerged as a more promising approach to improving performance of public water utilities, expand service coverage and raise quality of service, and increase operating efficiency. From an investment and financing point of view, such partnerships provide alternate mechanisms for financing infrastructure and reducing the burden on government budgets.

However[6] experience suggests that it is unrealistic to expect the private sector in the short-term to overcome all the extant inefficiencies and come up with financing on a scale that can off-set the under investment in infrastructure development. It is also important to note that the absence of clear regulatory frameworks, proper tariff regimes, and targeted subsidies to poor constitute risks for the entry and sustainability of private sector investment.

National policy on Private Sector Participation in WS&S envisages the following public-private partnership arrangements.

- Service Contracts-

Where public authority retains responsibility for operation and maintenance of the system and limited scope of services are contracted out or out-sourced with payment to the contractor being linked to performance.

- Management Contracts:

Where public authority transfers to a private company the responsibility for the operation and maintenance of the system. The public authority will undertake capital investments and funding of the operations while payments to operators will be based upon fixed incentives for increasing efficiency.

- Lease/Concession Contracts:

Where the private operator rents the facilities from the public authority and is responsible for the operation and maintenance including investment in the system on an agreed basis to ensure desired coverage. The operator would be ensured a reasonable rate of return in investment and incentivised to increase efficiency.

It is expected that all major assets presently belonging to the water schemes would remain with the Government. The most suitable model to be adopted will be determined on a case by case basis based upon coverage objectives and acceptable levels of tariff with the government subsidizing where needed to cushion tariff levels.

3.2 Cost Recovery and Paying for Services:

The supply of water to individual users, whether households, farms, or businesses, makes it a toll good if not a private good, where, the use of which though joint, individuals can be excluded. Individualized supply carries benefits that are largely if not entirely of a private nature. The principles of public finance enunciated earlier require that users pay for the cost of such services. However as already noted NWSDB does not charge full cost recovery prices for water services provided. On the basis of "willingness to pay" the Board bases its charges on "affordable tariff". Accordingly charges are based upon the use activity of the customer rather than costs incurred in supply of service.

The principle of user participation in water service decisions enunciated at the Dublin Conference constitutes the necessary corollary to the financing dictate that the user pays for individualized services. Willingness to pay all or part of the costs therefore is a critical factor for system sustainability. Evidence suggests that users, including poor, are willing to pay to ensure a better or more reliable service. User's willingness to pay for improved services can be influenced by

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[6] Rivera, D., Private Sector Participation in the Water Supply and Waster Water Sector : Lessons From Six Developing Countries, World Bank, 1996

many factors, inter alia, Perceived Benefits, Level of Service, Service Standard, Perception of Ownership and Responsibility, Price, Transparency of Financial Management.

3.3 User Participation:

The provision of water services must be made responsive to user needs and expectations. It is a challenge especially where there are no competitive markets or if they exist are imperfect. The potential for developing participation depends upon several factors, including, scale and technological complexity of the production of service and socio-political characteristics of the groups that are affected. Participation is particularly important in service deliveries where users have hardly any alternate sources available (low potential for "exit") and do not possess the means for expressing their preferences to the suppliers (exercising "voice").

There have been many initiatives in user participation especially in irrigation and rural water supply and sanitation. What is important is to assess the extent to which they have been able to introduce appropriate incentives not only to provide a sense of responsibility for the delivery systems but also improve accountability, increase efficiency, improve financial performance and reduce burden on government budgets.

IV ENSURING EFFICIENCY, EQUITY AND SUSTAINABILITY IN PROVISION : Financing Mechanisms and Actions

How well the water sector performs depends as much on the policy as on its management. The core of a comprehensive framework for managing water sector performance is the recognition of water as an economic good (though with significant social implications) combined with decentralized management and delivery structures. Such a framework for management of the water sector should structure an incentive regime that would ensure efficiency, equity and sustainability of water use. This section examines key financial mechanisms and areas of actions in a management framework for the water sector.

4.0 Managing Risks in Water Sector Investment:

A major constraint to involving the private sector in infrastructure especially in developing countries is that private entities are not able to enter the market and that even if they can, neither foreign nor domestic private sector has sufficient interest in assuming the commercial and political risks involved Accordingly risks need to be balanced by potential rewards and by autonomy in decision making. A private firm will want to be assured that revenues will be adequate to cover costs and allow for a reasonable profit. Hence clear policies are needed in respect of setting tariff rates. Further rights and responsibilities of government and private partners need to be clearly defined.

In developing a viable private contracting industry the public sector should be able to sustain a demand for contractor's services. This would require adequate sources of financing based on tariff revenues, budgetary transfers where there is

a social justification, or foreign assistance on a declining basis to support initial stages of involvement.

4.1 Creating a Competitive Environment:

Water sector service provision activities either involve high sunk costs or services that are most efficiently provided as a natural monopoly. Contestability is low in such situations, as investments cannot be reversed. In such situations what is available for competition is the right to operate the monopoly, also referred to as "competition for the market". It is therefore important to examine the scope for contestability of the given water sector activities (in principle) and then ensure that any barriers to competition are removed. A water market is contestable to the extent that potential entrants can restrain price-setting behaviour of current producers[7].

[7] Kessides, C., Institutional Options for the Provision of Infrastructure, World Bank, 1993, pp 39

This can involve several measures. What is considered most important in exploiting contestability is to remove restrictions to entry (and exit) and enable new entrants to compete on fair terms with existing suppliers. Competition can be created through contracting out services. In contracting out such services it is important to provide for renewal of contracts or make contract periods long enough in order to provide incentives to make long-term improvements involving longer-term payoffs. Competition can also be brought about between the public sector and private suppliers (or public-public and private-private), where the market can be divided into different zones for contracting out services. It can make suppliers more accountable for the cost and quality of their services.

4.2 Ways of Financing Investments[8]

Whereas adequate financing is necessary for the sustainability of water services, the role of finance is more than to ensure that sufficient funds are in place. Ways of financing can affect incentives and goals such as equity. Usually a distinction can be made between the financing of initial infrastructure investment and subsequent operations and maintenance of the delivery system. The major sources of investment finance are the government finances, donor funds and private equity capital. Government finances would usually include own-source current revenues, borrowings. Local governments may borrow from infrastructure development banks. It should be noted that borrowings become a feasible option only if repayment could extend at least until returns start accruing. The policy for private sector investment in water supply has already been noted. However their availability will depend upon the existence of a regulatory framework, adequate rewards to risk investments, and authority to set necessary rates and fees.

Operations and maintenance (O&M) is usually financed through user fees, fund contributions from government or inter-governmental transfers from central to local governments. However it must be noted that O&M competes poorly for available general fund resources whether at central or local government levels. While user fees constitute the preferred mode, it cannot be the sole source where water services may have significant externalities. User fees can take many forms, such as price per unit of service, a proxy charge on the benefits accruing

from the consumption of services (such as enhanced rental values of land where piped water is available), or a lump sum charge for access to the service. While user fees would constitute the best source of O&M financing, it is then important to ensure that such revenues are in fact used for the purpose.

4.3 Costing and Pricing[9]:

It is important to note that the nature of pricing (i.e. tariffs or user charges) and incentives created by financing schemes affect the allocative efficiency of investments, as well as sustainability and productive efficiency of services. The key issue in pricing is being able to keep a reasonable margin for cost of capital while covering fixed and variable costs of service production. However marginal cost (generally recognized to be the efficient determination of price) is unlikely to generate sufficient revenue where high fixed costs of production are involved. Various pricing tools may be required to deal with the conflicting concerns of efficiency, cost recovery, and equity involved in most of the water services. Pricing approaches include rising block pricing (higher rates for larger volumes), congestion pricing (higher rates for services with higher demands).

An important issue is the structure of tariffs across the different services in a given sector (i.e., water use area). While it is good financial practice for the rate structure to reflect long-run incremental costs of each type of service, it is often the case for tariffs to reflect internal cross subsidies (high water tariffs for industrial uses to subsidies households). Since current approaches to restructuring infrastructure services involve "unbundling" of facilities and services and creating a competitive environment, the rate

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[8] Fox, W., *Strategic Options for Urban Infrastructure Management*, Urban Management Programme, World Bank, 1994, pp41-51

[9] Op cit., Kessides, pp 48

structure can have important implications for the incentives for investment and operation in different market segments.

In this regard social objectives such as ensuring access to essential services by the poor is more efficiently achieved by explicit budgetary subsidies than un-targeted transfer payments that may be built into tariff structures. Such subsidies should take into account "willingness to pay" for connections as opposed to volume of consumption. It is also important to take into account when liberalizing entry, the possibility of private operators "creaming off" the more profitable markets. The need to provide essential services to under-served areas may require arrangements for revenue sharing among operators in different markets, or taxation of the private providers in the more affluent areas. Such a condition would then have to be clearly established as a condition of the service contract.

4.4 Regulating Provision:

There is increasing recognition that governments should increasingly take on the role of regulator of services provided by private suppliers. It is presumed that in respect of public suppliers regulation occurs implicitly inside the administrative process unlike the overt need as is necessary for privatized firms. Whereas regulation has been seen largely as a responsibility at the central levels, the importance of sub-national levels of government engaging in regulating service provision is gaining increasing recognition. Regulation has economic, social and political objectives. Fundamental concern of regulation is the avoidance of the potential inefficiency and other harmful effects for consumers arising from monopolistic characteristics of infrastructure industries.

The major concerns of regulation are the following.

- Ensure quality of privately produced services in terms of reliability and output.
- Regulation of prices where a private firm is granted a monopoly franchise. Creating a competitive environment requires regulation

V STRATEGIC MANAGEMENT OF FINANCING THE SUSTAINABLE USE OF WATER

As already noted, adequate financing is necessary for making the national water agenda sustainable. However the role of finance, i.e., issues of investment and cost sharing, is more than ensuring that sufficient funds are in place. It is more about the framework of incentives that make for effectiveness, efficiency and equitability of the water agenda. In other words its performance. Finance is an integral element in the institutional framework for the water agenda, legal, policy and administration.

5.0 Policies, Strategies and Actions:

A financing strategy therefore cannot exist in isolation. It is an integral element posited in and arising from the legal, policy and administrative framework for water. Nor does these components of a water institutional framework exist in isolation. Rather they function and perform in their linkages and interactions[10]. Accordingly an effective, efficient and equitable financial policy/strategy would call for the formulation of following action imperatives.

- Law: notably water allocation principles, water management arrangements, accountability for use.
- Policy: especially regional/sectoral transfers, project selection criteria, pricing and cost recovery, private sector participation, user participation.
- Administration: Importantly organizational mechanisms for reducing risks, competition and regulation, costs, pricing and financing arrangements.

5.1 Capacity Building Support:

Capacity is used here to refer to the ability to perform appropriate tasks effectively, efficiently and sustainably. Then capacity building refers to improvement in the ability of public sector organizations, in partnership and cooperation with private sector and citizen organizations, to formulate policy and management implementation for delivery of services. These interactions between principals, provider agents and suppliers will take place within the framework of established rules and procedures referred to as institutions. Then key areas of capacity building assistance for an effective, efficient and equitable financial policy/strategy for water would include the following.

- Clarifying and delineating the institutional (rule and procedural) context for negotiating and deciding upon the financing of water.
- Clarifying and delineating task-networks for water sector operations and their respective financial role, responsibilities and functions.
- Creating capacity and competence in task networks for the formulation and undertaking of financial tasks of water policy and administration.
- Design and formulate public expenditure frameworks for investment and cost sharing.
- Formulate a performance improvement programme for enhancing financial and economic performance of the water sector addressing the key investment and cost-sharing performance issues, i.e., Investment Gap, Financial Gap, Pricing Gap and Incentive Gap.

[10] Saleth, R.M ., and A.Dinar., Evaluating Water Institutions and Water Sector Performance, World Bank, 1999

Framework for Financial Analysis of Water Sector Activities

Governance/ Decision Making Levels	Service/ Nature of Good	Contest ability	Facilities/ Delivery Arrangements	Costs & Who Pays	Financial Instrument
National (Inter- Provincial)					
Provincial (Inter-district) District	*Storage and Transportation/Enviro nmenta Improvement etc. (Public Good)*	Low	Primary/ Head works/ Trunk System (Provincial Authority/ River Basin Authority)	Stakeholders	Tax/Charges
Local Authorities	Water Distribution/Disposal of Waste etc. (Common pool)	Medium	Secondary/ Distributory System (Local Authority/ Company/System /Org.)	Collectively	Rates/Charges
Sub Local (Ward) Neighborhood/ Block	Water Distribution/Removal of Waste etc. (Common pool)	Medium	Tertiary/ Terminal System (Local Authority/ WUO/Company)	Collectively	Rates/Charges
Household/ Lot/Farm	On-lot Supply (Private/Toll)	High	Supply Connections (WUO/ Company)	Supply User ousehold/ ot/Farm	Charges/ User Fees

Annex I

PUBLIC PROVISION OF IRRIGATION – BUDGET FRAMEWORK

MINISTRY	DEPARTMENT
Functions: 1. Investigation, planning and development of water resources for irrigation, hydropower and other purposes. 2. Investigation, planning and designs of irrigation works including lift irrigation, ground water drainage and flood protection. 3. Management of inter-provincial irrigation systems 4. Maintenance and water management in all irrigation schemes inclusive of major lift irrigation and ground water. 5. Reclamation of low lying lands for agricultural purposes by provision of drainage facilities, flood protection and salt-water exclusion. 6. Promoting integrated water resources management and conservation of source areas especially catchments of reservoirs. 7. Conduct policy studies, research and training of officers in respect of the objectives of the Ministry. **Projects:** 1. Ministry Administration Irrigation and Settlement Management of Inter-provincial Irrigation and Development Projects	**Functions:** 1. Preparation of master plans of development for the different river basins for the optimum utilization of land and water resources. 2. Formulate and design of irrigation, drainage and flood protection and saltwater exclusion projects with due consideration for environmental factors and whenever possible providing other multiple benefits such as hydro-power and reclamation 3. Construction, rehabilitation and improvement of irrigation schemes, drainage and flood protection schemes and saltwater exclusion schemes. 4. Operation and management of irrigation schemes, drainage and flood protection schemes and saltwater exclusion schemes for optimum productivity enlisting the participation of beneficiaries. 5. Applied research in hydraulics, hydrology, soil mechanics, engineering geology, land use and irrigation technology as applied to water resources development projects. **Projects:** 1. General Administration, Planning, Design, Research and Consultancy Services. 2. Operation, Management, Construction, and Rehabilitation of irrigation Schemes and Flood Protection Schemes.

INTEGRATED WATER RESOURCE MANAGEMENT

CEO Panel Meeting 16th November, 2001

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4. a ii

Please DO NOT write your name, or sign.
Please place "X" in appropriate column and return.

An Inquiry about Perception

No	Statement	What do you think?		
		Agree Fully	Agree Partly	Dis-agree
1.	Sri Lanka does not have a water problem			
2	Water should be owned by the State			
3	Water should be managed by the State and we need to expand State institutions to improve water management			
4	Farmers are incapable of managing water for their needs			
5	Farmers do not like to meet the cost of irrigation services			
6	Government encourages participatory management			
7	Public sector should accept a declining role for the State in water management under redefined roles for State, Private Sector and Civil Society			
8	Management should be decentralized on the principle of subsidiarity(i.e. making decisions at the lowest appropriate level)			
9	Political interference is the sole reason for mismanagement of water			
10	There is a mismatch between government policies and priorities and aspirations of people			
11	We need to gather more data to manage water resources			
12	We need to integrate efforts and have a systems approach to solve water management problems			
13	Sri Lanka will continue to have an agricultural and rural economy			
14	100% self sufficiency in rice production is the only way Sri Lanka can achieve food security			
15	Sri Lanka should expand the irrigated area rapidly to achieve food security			
16	Sri Lanka should encourage dispersed urbanization with mid-size towns			
17	Water productivity in irrigation can be enhanced only through private investment in irrigation			
18	The private sector should be encouraged to play an active role in relation to providing and managing water resources			
19	It is risky to encourage private investment in water supply			
20	Returns on investment in the water sector can be maximized through multiple outputs e.g. hydro-power, fisheries, irrigation and tourism			
21	Environmental water reserves should be an important component of the new water policy			

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Notes on Panel Discussion - Mr. Nihal Fernando

Highlighted the need to shift to a multi-sectoral water conservation, management and development mode from a uni-sectoral mode.

There is common need to go for a cross-sectoral and integrated water resource management system.

Five success factors from experience in other countries in establishing a cross-sectoral dialogue was highlighted.

- Political will and commitment
- Need for a champion-either from the bureaucracy or the political scenario.
- Need to have a clear policy for regulation and procedures
- Adequate financing arrangements
- Strong communication between Public Sector, Private Sector and Civil Society.

Sri Lanka is no exception. Similar programmes based on these experiences need to be developed. In Sri Lanka the will for political commitment is doubtful. We also do not have clear champions perhaps with the exception of the one seated next to him.

Summarized the requirement in four words – Collaboration, Integration, Participation and the Private sector.

- Collaboration at all levels is necessary – donor, country and even at basin level.
- Integration at Ministry level is essential. Ministries today work as different entities. There is an opportunity now with Land, Irrigation & Power being with the same Minister.
- Initiate public awareness campaigns for all stakeholders – politicians people and media (specially)

Forming a task force is one option.

2. **Achieving IWRM at the River Basin Level** – Dr. H Manthrithilleka

Started with a definition of IWRM

Five key factors:

- Basic demand planning
- Participation in decision making
- Demand management
- Compliance with regulations and monitoring
- Sustaining the human and financial resources

It is very difficult to get people to change their mind-sets but with perseverance and continuous communications it is possible. A shared vision will help. A shared vision will help. Necessary to get the public involved who shares the improvements. Awareness by communication – need to have a different language for different stakeholders. Appropriate approaches must be chosen.

Process can be synchronized with three steps:

- Need to facilitate the knowledge base development
- Agreement of stakeholders. By facilitation and not direct teaching or imposing management on the people. Gently guiding them, analogous to training a person to ride a bike.
- Strong independent committed leadership – to mobilize the political leaders and other stakeholders.

3. **Investment in the Water Sector – Six Year Plan and Beyond** - Dr. P Alailima

In 1999 the national planning department assisted Ministries to develop individual six year plans.

This year Vision 2010 is being developed which defines where we could be in ten years and how can we get there. This document will provide a long-term framework and will take over from the six-year plan. Need to translate this to more concrete form. Similarly a strategy paper for poverty related initiatives is being developed.

A current overview of the expenditure plan was given.

Allocation for water sector activities is not much, the key component being for the Water Resources Council.

Total investment planned for the water sector from 1999-2004, the first five-year period is Rs.114B. In priority projects related to water supply, and irrigation & water management is Rs.46.082 B. The key projects were highlighted – a number of rehabilitation projects, Mau Ara and Well Oya Schemes.

From 2005-2010, the next five-year period, investment for identified projects is Rs.103b – slightly less than the first five-year period.

Future plans are still very much on sectoral lines. Because the government set up is in this manner, until the key people are made conversant the approach will continue to be sectoral.

4. **Partnership at the Local Level** - Mr. M B Adikaram

A key element of Vision to Action is partnership at local level. Partnerships will be helped by good governance, which is about Government taking note of the private sector and the NGO sector. Is this happening today? Not really. No commitment, dedication was seen in some of the Integrated activities carried out in managing the Upper Watershed of the Kotmale Project in Mahaweli.

In communicating different approaches to local people different techniques need to be adopted.

For Water Vision Development, NGOs need to be considered as a clear stakeholder and these organizations must be strengthened to establish their input at local level. Suggests learning from India and other countries.

5. **Public-Private Sector Partnership** – Mr. Samantha Lindsay

Gave a background on the Unilever Ceylon current Initiative in developing a 'Water Professionals' course with the PGIA, with the support of the SLNWP. Within a short time from germination of the idea, from April 2001 to now, it has been possible to complete the development of the course, obtain approval from the Senate and now advertise for commencement in October. This is a good example of an effective Public-Private sector partnership.

The Chairman indicated that other private sector organizations are interested for participation as well.

COMMENTS - Mr. H A Karunaratne

Development of Champions takes time. Administrative Service must allow young administrators/engineers to continue in one area for a reasonable length of time in order to become Champions.

Do we have any process for Department of National Planning to get views of NGOs.

NGOs are sometime supportive, sometimes obstructive. Norochchalai, Upper Kotmale, Water Bill etc. have been blocked by NGOs, NGOs need to act more responsibly.

Chairman's Comment:

1 The way government works always does not take other views into account adequately. For example in developing the poverty strategy, it needs to be recognized that the knowledge and experience in poverty is not mostly with the Ministries.

2 The 2010 plan has Rs.114 B for the first five years and Rs.102 B for the second. In the Vision document the investment needs were identified as Rs.340 B over the twenty-five year period. It is difficult to expect that these needs will be fully met by the public sector. Innovative avenues of funding including effective Public-Private partnerships need to be evolved.

Strategic Assistance Needed to Achieve IWRM in the Medium Term - Prof. Hiran Dias

For the task ahead in translating Vision into Action – a complete overhaul of systems is necessary, including changes in governance. It is also necessary to look for major breakthroughs in technology. Incremental changes to what we are doing will not yield results, but vision oriented stepwise changes are necessary.

A number of factors have been highlighted today:

- Change in mind-set of all stakeholders including users through improved communication; an element of marketing is necessary
- Technological changes for improved efficiency
- Research requirement – local and support from regional associations
- Capacity building – development of water professionals and a sense of activities in a wide spectrum eg. Farm management, meteorology
- Strategic assistance for change is required from NGOs, private sector, media etc.
- Financial resources – investment needs, sector donors, public-private partnerships
- Need to ensure a safety net – for affected public and vulnerable groups.

RAPPORTEUR'S COMMENTS AND RESPONSES FROM THE FLOOR

Investment & Cost Sharing - Asoka Gunawardena

Investment and Cost Sharing in providing goods and services in the water sector primarily deal with establishing a framework of incentives that can contribute towards effective, efficient and equitable use of water. Therefore investment and cost sharing constitute an integral component of the institutional framework in the water sector. Recognising water as an economic good and its management and development being based in a participatory management framework are two important considerations which have implications for the development of a Water Agenda.

Finances are needed for capital cost and also for operation and maintenance. The institutional management consisting of legal frameworks, policy issues and administrative mechanisms interactively define the context of individual and collective decision making and influence water use behaviour towards greater effectiveness, efficiency and equitability.

Provision of water has traditionally remained the responsibility of the State in order to improve water management, the private sector and the community participation are also considered important, for which different strategy may have to be worked out in choosing financing methods and instruments. In the final analysis, arrangements should also be in place to provide incentives for water users to pay for costs like the NWS&DB. However there are other issues such as responding to service expectations, quality, standards, subsidies for low-income users, and user participation in the management. Private Sector participation calls for creating opportunities and an investment climate; returns, rewards and scope for decision making in relation to rights and accountabilities. Investments could be in a partnership between the government and the private sector or by the private sector alone. Availability and accessibility to financial sources by the sub-national levels of the government to promote participation in investments and service delivery should also be addressed in an effective manner.

Policy strategies should also seek not only for adequate funds but also a strong basis to generate adequate funds by formulating medium/long-term investment and operational framework, framework for institutional development and establish organizational net works for integrated Water Resources Management.

Governance in Water Resource Management - A. Hewage

Effective governance is an essential pre-requisite for effective and sustainable water resources management. In this exercise of political, economic and administrative authority in the management of country affairs at all levels by involving the State, civil society and the private sector in the decision making process, good governance is characterized by a strategic vision, rule of law, transparency and accountability.

On account of the dominant role played by the State in development, both private sector and the civil society have not been able to develop capacities to enter into partnership with the State. Over politicization also contributed to negative development in popular participation. Western countries have created enabling environments for the private sector and the civil society organizations to contribute activity towards the establishment of good governance. In Malaysia, the government has stressed the importance of cooperation between the public and private sectors to ensure rapid economic growth and national development.

In Sri Lanka, the water sector has been a key area of large public investments and dominance by the State through its agencies. Recent developments in management improvements in irrigation schemes have shown the benefits of involving farmers through their associations in decision making and efforts have been made to assign important management roles to the farmer community.

Recent developments have shown that the authorities have made efforts to prepare draft legislation or the establishment of a National Water Resources Authority which will oversee all activities under different water-related agencies more comprehensively than ever before. But the centralized structure envisaged by the draft act does not augur well for this sector. It is necessary to ensure that centralized agencies should undertake specialized functions and create an enabling environment for farmers to work closely with officials and visit society groups in a participatory mode to develop true partnerships.

The author recommends measures for improving institution capacities of the State. Civil Society Organizations and the private sector, civil service reforms, a facilitator's role for the government, private sector involvement in water resources management and adopting decentralization policies for programme implementation.

Programme for Action (PFA)

After the presentation of the report titled "South Asia Water for the 21st Century: Vision to Action" at the Second WWF at the Hague activities to develop a supplement to Regional Draft FFA document for addressing some left-out issues have been initiated. On the basis of outputs received from various consultations and suggestions from SASTAC Countries, supplement to the regional FFA report is developed.

The next step is to develop a Programme for Action (PFA) document. Two/Three dialogues in each country have been planned for finalizing the Programme for Action in the SASTAC programme of work 2001 under output 5 –"prioritizing actions and forge alliance".

- It will list out the activities of strategic importance for IWRM in South Asia which ought to be promoted by GWP.
- To get that list various issued covered by the Vision, FFA and its supplement for South Asia will have to be analyzed further for identifying the appropriate implementing and action agencies.
- The role of Govt. agencies, the academic institutions, professional associations, voluntary agencies and the community at large will have to be clearly spelt out in respect of all these issues.
- The activities that will lead to the strengthening of IWRM but will need strategic assistance from GWP will have to be specifically highlighted.
- GWP is not expected to pursue all the issues mentioned in the Vision and FFA document.
- GWP will concentrate only on those issues which require specific assistance.
- Identification of the activities that will require specific strategic assistance is the main goal of the PFA – discussions planned in South Asia upto end of 3rd quarter pf 2001.
- After finalization the SASTAC document of PFA is to be presented at the South Asia Water Forum.
- To initiate countrywise dialogue in this respect, it will be useful if some expert who is well conversant with GWP procedures of work and the documents produced by GWP-SASTAC so far, (viz. the vision, FFA and its supplement) helps us with a preliminary statement – after listing out all the issues covered by these documents and their stating against each one of them the role expected to be played by the different actors over the next 25 years.
- Programme for Action (PFA), as per the South Asia Work Programme 2001 is coming under country activities – are to be handled by CWP in consultation with SASTAC members from that Country.