

# Integrated River Basin Planning

## Developing a Roadmap for the Pamba river



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## List of abbreviations

APSF	Action Plan Support Facility
CBO	Community Based Organization
CPCB	Central Pollution Control Board
CWRDM	Centre for Water Resources Development & Management
EU	European Union
GOK	Government of Kerala
GOI	Government of India
GP	Gram Panchayat
GWD	Groundwater Department
GWP	Global Water Partnership
HIS	Hydrology Information System
IWRM	Integrated Water Resources Management
KRWSA	Kerala Rural Water Supply Agency
KSPCB	Kerala State Pollution Control Board
KWA	Kerala Water Authority
LSG	Local Self Governance
MDGs	Millennium Development Goals
MOEF	Ministry of Environment & Forests
NGO	Non-Governmental Organization
NRCD	National Rivers Conservation Directorate
NRCP	National Rivers Conservation Plan
O&M	Operation & Maintenance
PRBA	Pamba River Basin Authority
RBO	River Basin Organization
SIP	Stakeholder Involvement Plan
SPV	Special Purpose Vehicle
STPs	Sewage Treatment Plants
UNEP	United Nations Environmental Program
ULB	Urban Local Body
WIS	Water Information System
WRIAM	Water Resources Issues Assessment Method
WRM	Water Resources Management

# Summary

Kerala has been practicing traditional water resources management along sectoral lines, centralized by government public departments or institutions with limited stakeholders' participation. These traditional water resources management practices have proved to be unsustainable. Integrated Water Resources Management (IWRM) is still in its embryonic stage in Kerala but important steps towards a commitment have been taken by the Government through the establishment of a first River Basin Authority in the state for *“the management of the activities connected with the conservation of water resources in the Pamba River and its basins as an integral unit”*... . The Pamba Pilot Project has developed a Roadmap for the implementation of priority actions to be taken to integrate an IWRM perspective in its planning processes. The Roadmap has been developed in collaboration with stakeholders from various sectors of the GOK, the Centre for Water Resources Development & Management (CWRDM) and the civil society represented by NGOs active in the Basin.

This activity, “Policy Support to Integrated River Basin Management” under the EU-India Action Plan Support Facility (APSF) project aims to contribute to the continuing EU-India policy dialogue in the water sector by providing support inter alia in project definition, stakeholder relations and integrated water management to new river basin authorities in various parts of India. The identified Pamba Pilot Project seeks to ensure that these authorities have access to current international best practice on integrated river basin management. The output from the activity will contribute to a model for river basin management for other small river basins in India.

The Pamba basin was selected for the pilot project after a focus group discussion at central level and identified as a suitable location for a pilot as the Pamba River is a relatively small river running only in one State. The overall goal of the project has been to facilitate a process for the development of an IWRM Roadmap for the Pamba River and, at the same time, to support the newly set up Pamba River Basing Authority in devising a management plan for future priority actions.

A ‘Roadmap’ is the transition to a sustainable water resources management practice which is cross sectoral, decentralized, and considers the entire catchment of a river basin as a single management unit. A first attempt to integrate public participation in the creation of an Action Plan for the Pamba River was carried out by the Kerala State Pollution Control Board (KSPCB) in 2002. A comprehensive Action Plan was developed for pollution abatement for the River Pamba. The document is a good attempt towards solving pollution issues in the River Basin but according to IWRM principles, this is a piece meal approach. In order to come to an integrated management plan for the Pamba River, various factors have been considered. The various issues in need of attention have been explored in this document.

The Government of Kerala has expressed a desire for developing the water sector through the application of IWRM principles and practices. The current project has provided first of all, a framework for exploring the following questions:

1. where is the state (Kerala) in the IWRM planning process?
2. what are the constraints in the state to the planning process?
3. which actions should be taken to reach the IWRM plan for the Pamba River Basin?
4. what will the actions require?



The Pamba Pilot Project analyzed water resources management practices currently being applied in the state according to the 3 IWRM pillars: (1) the existence of appropriate policies, strategies and legislation for sustainable water resources development and management; (2) putting in place the institutional framework through which to implement the policies, strategies and legislation; and (3) setting up the management instruments required by these institutions to do their job. Bearing this in mind, and using the IWRM planning framework (cycle), it has been determined that Kerala needs considerable efforts to address the capacity building of key water managers and decision makers on IWRM planning and also the empowerment of institutions to spearhead the implementation of IWRM plans.

IWRM in Kerala is far more advanced than in other states in India. Kerala already has a vision which is encapsulated in the Water Policy of 2008 and the enactment of the Pamba River Basin Authority which is represented by stakeholders from 11 different governmental sectors as well as autonomous research institutes. However, water management is still sectoral and inclined towards service delivery with a bias towards the strong irrigation sector. Stakeholder participation is starting to exist with the recent resurrection of the Pamba River Basin Authority that has been called back into existence in the past year.

Water related issues identified were accounted to the increase of pilgrims travelling to the area during the Sabarimala annual pilgrimage, to which an estimated 45–50 million devotees come every year, lack of awareness, continuous increase of contamination due to urban waste, sand mining, encroachment and sedimentation. On the other hand, management problems were identified to ranging from legislations and policies not being enacted, lack of enforcement of existing legal framework, adjustment of existing legal water framework for Kerala state, setting-up a sustainable monitoring and evaluation system for water resources management and establishment of an information system on water resources.

This Roadmap constitutes a blueprint for action that moves Kerala closer to its IWRM vision, starting with immediate suggested actions to develop towards implementation of IWRM in its operations. The Roadmap is constituted of next steps, milestones and indicators for implementation of actions. The main actions identified in the Roadmap are the immediate need for operationalization of the Pamba River Basin Authority followed by adequate and thorough capacity building at state and local level in IWRM practices and the development of a full IWRM Action Plan for the River Pamba.

Fair amount of work is needed to align Pamba's River Basin Authority and its working structure to support the development and implementation of IWRM plans in the future as well as its constraints to water resources development. Another limitation is the insufficient definition of institutional roles and responsibilities, especially in the newly set up Pamba River Basin Authority. Lack of sharing of data and coordination between departments to constitute baseline data required for planning and decision-making is another identified weakness.

# 1 Introduction

## 1.1 Background of the Pamba Pilot Project

The proposed Integrated Water Resources Management (IWRM) Roadmap for the Pamba River Basin has been developed under the APSF (Action Plan Support Facility) Project financed by the European Union. The Pamba Pilot Project's aim is to deliver "Policy Support to Integrated River Basin Management" and contributes to the continuing EU-India policy dialogue in the water sector.

The Pamba Pilot Project has been produced in a common format to allow for easy comparison with other states within India, with the following themes considered:

- problems of water resources management that need to be addressed;
- context in which the problems and solutions need to take place;
- decisions and actions taken in order to execute the roadmap process;
- outcomes of the decisions and actions taken;
- lessons learnt that will be of value to others involved in similar situation.

IWRM is a tool for achieving the Millennium Development Goals (MDGs) which recognises the role of water to achieve development goals. The Plan of Implementation adopted at the World Summit on Sustainable Development in Johannesburg in 2002 called for countries to "develop Integrated Water Resources Management and Water Efficiency Plans by 2005". These "plans" are milestones in recurring and long-term national water strategy processes.

The implementation of a policy of integrated management of water resources is now a universally recognized goal. It is in this context that the Government of Kerala has developed "*an Act to provide for the constitution of an Authority in the State for the conservation of water resources of the Pampa River and its basins as an integral unit and for the management of allied activities and matters connected therewith or incidental thereto.*" The Pampa River Basin Authority Act of 2009 goes further by recognizing the need for a "*Pampa Action Plan*" by the Government of Kerala "*for the conservation of the Pampa River and its reservoirs by averting pollution through the projects undertaking integrated planning, monitoring, Management and development of water sources*".

The development of the Authority is supported by an ambitious Water Policy that identifies the need to "*create greater social awareness about the rights and responsibilities in the use of water and to put in place better management practices in the utilization of this invaluable resource. It is also necessary to ensure people's participation in water sector within the framework of decentralized democratic institutions and to evolve suitable frameworks and strategies for the continual up-gradation of water environment*".

IWRM provides the means of balancing and meeting the needs for use of water resources in such a way as to ensure the equitable and sustainable use of the water resource. It is based on the principle that, in order to maximise the benefits of the water resource and to ensure equitable use of water, you must balance the needs of all the water users (and discharges) in the catchment. In achieving the above, the following results were aimed at:

1. increased awareness on importance of environmental approach and considerations in IWRM;

2. increased access to relevant IWRM information and tools;
3. targeted training for key managers and decision makers in the water sector;
4. development of a Roadmap for the implementation of IWRM concepts in future planning processes;
5. guide the Pamba River Basin Authority to spearhead the implementation of IWRM plans and inclusion of IWRM in decision making;
6. prospect for implementation of a baseline study for the development of an IWRM Action Plan by local specialized organisation;
7. documentation on best practises, case studies and guidelines to enhance replication.

The Pamba Pilot Project strives to promote and support this process by guiding and giving support to the development and implementation of an IWRM plan for the Pamba River Basin by developing a Roadmap towards this purpose. The approach of the Pilot project respects the widely acknowledged approach that IWRM, based on effective stakeholder engagement, provides a direct link to MDGs addressing poverty, hunger, gender equality, health, education and environmental degradation.

Concisely, 12 priority actions have been developed under this pilot project. Those are actions considered necessary to make the transition from current management practices to a fully-fledged IWRM plan, which is nothing other than the Kerala's IWRM Roadmap. Those are grouped in Chapter 7. In a final workshop held in October, which brought together the GOK, the European Union as well as a variety of stakeholders, the Minister of Water Resources voiced the intention and interest in taking further the process initiated throughout this pilot by discussing options for funding a full IWRM Action Plan for the Pamba River.

The complete Roadmap is presented under Annex 1 of this document.

## 1.2 Approach

The pilot project has encouraged and used a participative approach to develop identification of issues and outcomes to formulate and establish consensus on visions, strategies, outputs, activities and external factors for the different components of the project as well as formulating and identifying the various factors influencing the long-term sustainability of the program. Workshop facilitation was provided by team members, who are highly experienced and qualified water management experts. To promote joint ownership of this work, stakeholders were motivated to act upon the conclusions and recommendations during a final event organized by the team to expose and discuss identified actions and recommendations based on analysis of outcomes assembled throughout the Pilot Project.

At the beginning of the project, the Consultant developed an overall Stakeholder Involvement Plan (SIP), which started with a stakeholder mapping exercise (Annex 3). The SIP tackled involvement of stakeholders on the regional and local level for the duration of the project. The SIP was produced with the aim to including specific objectives for stakeholder participation at the different project stages; appropriate levels of participation for the various target groups (information provision, consultation, or active involvement); tailored to the contexts, needs and characteristics of each working session;

The Pamba Pilot Project has been implemented through six workshops guiding the participants through a process of identifying the main issues related to water as well as the main issues related to the management of water resources by different institutions. The workshops addressed the following:

- Workshop 1 (10 February 2010) - Inauguration of the Pamba Pilot Project and general introduction to Integrated Water Resources Management

- Workshop 2 (25 May 2010) - Assessment of water issues of the Pamba River through application of the WRIAM (Water Resources Issues Assessment Method) - Tool
- Workshop 3 (27 May 2010) - Presentation and discussion of the outcomes of the WRIAM tool
- Workshop 4 (22 July 2010) - Exploring management constraints and identification of possible actions for managing the Pamba River
- Workshop 5 (27 September 2010) - Consultation workshop on water related issues identified by local stakeholders
- Workshop 6 (29 October 2010) - Final Dialogue on IWRM of the Pamba River Basin and agreement on actions proposed

Analysis was conducted taking the Pamba river basin as one single entity. The sessions conducted ensured wide participation from different government sectors as well as the public sector represented by NGOs culminating in a consultation session held in Chengannur at the banks of the Pamba River in September 2010.

The objective of the different sessions held over a period of 10 months were to identify and engage main stakeholders and to provide the participants with an increased insight in IWRM and to share the use of relevant IWRM tools for action planning. The situation of water uses and water resources management were discussed. Moreover, participants provided input to the IWRM situation analysis in Pamba and identified main elements for consideration to be included in the Pamba IWRM Roadmap.

The Pamba Pilot project implementation was launched and inaugurated in February 10, 2010 to present the EU – India Action Plan Support Facility Project, the proposed Pamba Pilot Project and to identify main stakeholders related to water management in Kerala and more specifically, the Pamba River. This workshop indicated the need for a large scale IWRM training for a group of non-specialists for both government and non-governmental organisations. The second and third workshops were organized on 25th and 27th May 2010 with the aim to develop a situation analysis of the water resources issues the Pamba River is facing and secondly to roll out the main principles of IWRM to a larger non specialist group of stakeholders. A specific tool called WRIAM - Water Resources Issues Assessment Method, was used to explore the issues and ranked those according to their importance. Consequently, the outcomes were presented in next day's workshop attended by local Panchayat representatives as well as local NGO's and a consensus was reached on the prioritized issues.

Following the inaugural workshop and two successive stakeholder consultation workshops in May 2010, the Action Plan Support Facility (APSF) TA team organized a one-day working session on identification of water management and institutional constraints and possible actions for remediation. The APSF team, supported by CWRDM (Centre for Water Resources Development & Management) presented the key features of the existing Pamba Action Plan developed in 2002 and opportunities for updating it in accordance to the IWRM framework.

Group work was facilitated by APSF to identify and agree on priority issues and consensus building on management problems and possible actions by using the "three pillars" of IWRM principles to represent identified solutions. The work group sessions during this workshop were structured under two broad headings: Issues related to Quantity and Quality. The group then discussed the issues and placed all needed actions under the three pillars of IWRM i.e. i) Enabling Environment ii) Institutional Framework and iii) Management Instruments. A final workshop was held on the 27th of September in Chengannur on the banks of the Pamba River with overwhelming participation of local stakeholders. Project findings of previous sessions were presented and discussed followed up by an open discussion on extraordinary

issues identified by local stakeholders and water users (Annex 7). Outcomes of the workshops conducted throughout the year have formed the basis for the development of strategies and priority actions presented in the current Roadmap.

The Roadmap sets out clear and coherent objectives as well as a timetable for implementation of priority actions and identified responsible bodies for implementation. The plans indicate implementation responsibility and activities prioritised on clear short-, medium- and long-term. As well as the governmental authorities and institutions, the Roadmap ensures means for public participation and engagement in civil society in the prioritization of actions.

In general, the IWRM Roadmap serves as a tool to stay oriented and avoid obstacles whilst moving toward identifiable landmarks/milestones. In this regard, the IWRM Roadmap represents a key document when mobilising funds for managing the transition and monitoring implementation of the future IWRM Action Plan identified under the Roadmap. The GOK could use the Roadmap to update, fine-tune and target their technical and financial support to water sector reforms.

The Pamba Pilot Project report comprises of 10 Chapters and 9 Annexes. Chapter 3 follows general data on geographical distribution of water resources and its varied uses, demography, economy, climate and social development figures. Those have been found in secondary data as current figures were not available to the consultant. However results and outputs from the participatory sessions on exploration of water management and perceived water resources related issues covered in Chapters 5, 6, 7 and 8 gave the team valuable data to develop the current Roadmap as well as to recommend future actions based on experience from various river basin plans developed abroad.

Observations arising from this assessment constitute the basis for priority actions presented under Chapter 7 and the IWRM Roadmap by extension. A SWOT analysis is presented in Chapter 6 of major institutional strengths weaknesses affecting the success of incorporation of IWRM planning and discussed against the backdrop of constraints and opportunities. Annexes presented in this document cover all reports of workshop held in 2010, the stakeholder map identified and used, tools applied throughout the project as well as a suggested approach (Table of Contents) for the future to be developed IWRM Action Plan for the Pamba River Basin.

## 2 IWRM principles and planning processes

According to the Global Water Partnership (GWP) and other sources, many countries are experiencing water-related problems that are proving intractable to conventional, single-sector approaches. Some possible examples: drought, flooding, groundwater overdraft, water-borne diseases, land and water degradation, on-going damage to ecosystems, chronic poverty in rural areas, and escalating conflicts over water. The solutions to such problems may fall outside of the normal purview of the agencies tasked with addressing them, and usually require cooperation from multiple sectors. In such cases, an Integrated Water Resources Management (IWRM) approach makes identifying and implanting effective solutions much easier. It also avoids the all too common situation where solving one problem creates another.

The basis of IWRM is that different uses of water are interdependent. Additional benefits can be derived when different user groups are consulted in the planning and management of water management programs as such users are likely to apply local self-regulation in relation to issues such as water conservation and catchment protection far more effectively than central regulation and surveillance can achieve.

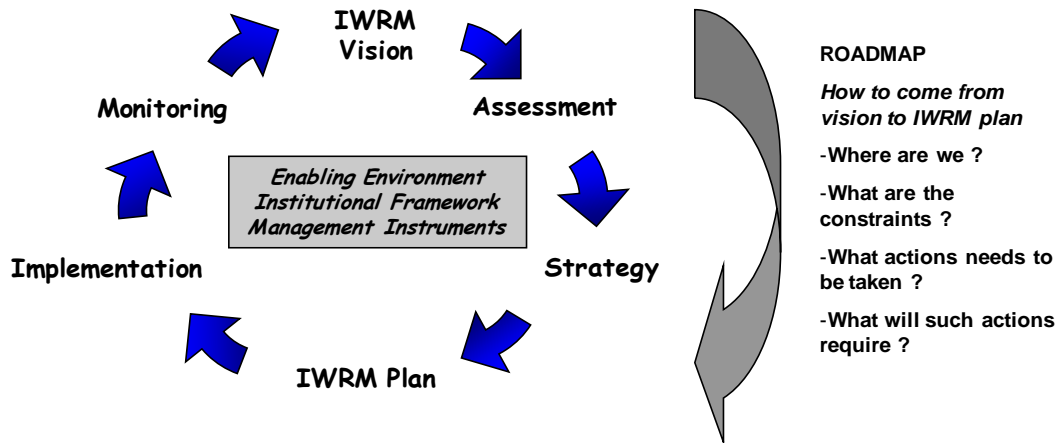
IWRM is an important instrument to address poverty reduction. Good water governance, the objective of IWRM, and the objective of any "IWRM plan", is to ensure wise water governance which contributes to the economic development, social equity and environmental sustainability of the society (the "three e's, or, the three pillars"). Implementing an IWRM process is a question of getting the "three pillars" right: (1) moving towards an enabling environment of appropriate policies, strategies and legislation for sustainable water resources development and management; (2) putting in place the institutional framework through which to implement the policies, strategies and legislation; and (3) setting up the management instruments required by these institutions to do their job.

*A roadmap for IWRM is as a process leading from a vision about the future development related to water resources use, conservation and protection to an actual IWRM plan. Roadmaps are concerned with accelerating the IWRM process from the IWRM status towards building commitment, analyzing gaps and preparing a strategy and action plan.*

A country's roadmap contributes to the improvement of water resources management and access of its people to water supply and sanitation services. The IWRM approach facilitates mainstreaming water issues in the political economy, as it focuses on better allocation of water to different water user groups and in so doing stresses the importance of involving all stakeholders in the decision-making process. In the process to move from an IWRM vision to the IWRM plan, it is useful at the outset to establish a roadmap with specific goals and milestones. This is particularly important for countries at the very beginning of the IWRM cycle, so that their achievement of the IWRM 2005 target can be reached through an orderly and well-structure process.

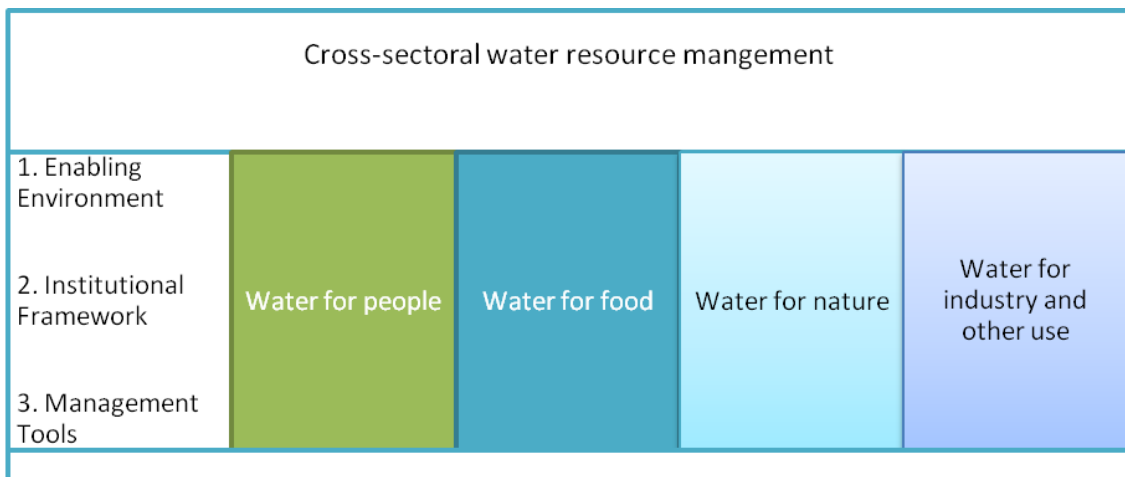
If a country is well advanced in the IWRM cycle, the IWRM Roadmap may address present weaknesses in the existing assessments, policies, strategies and plans and map a road forward for addressing these weaknesses. The roadmap “maps” the road, but does not travel to the actual “milestones”.

**The CYCLE**



**Figure 1 IWRM planning cycle**

In the context of international development co-operation IWRM is increasingly being recognised as a suitable approach to achieve water security for people and the environment and thus as an important step on the road towards integrating water into overall sustainable socio-economic development.



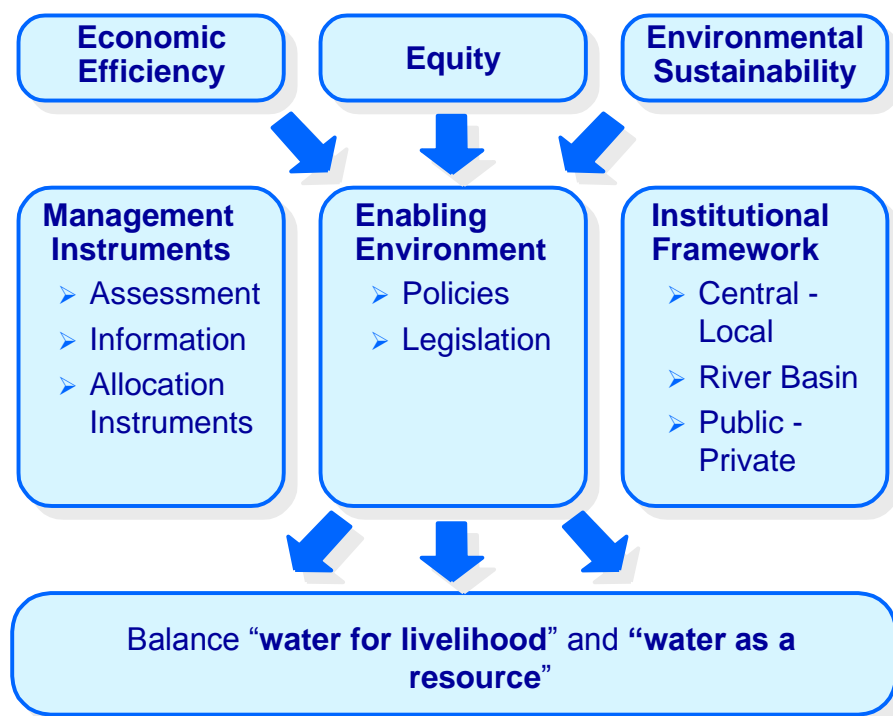
**Figure 2 Cross-sectoral water resources management**

IWRM is the “integrating handle” leading from sub-sectoral towards cross-sectoral water resources management and at the same time providing a framework for provision of water services.

The following definition by GWP has proven to be a useful definition of IWRM widely supported in an international context: “IWRM is a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems”. An important aspect of IWRM is to enhance cross-sectoral water resources management in order to replace what is considered to be inefficient sub-sectoral management within the different individual water use sectors.

IWRM is not a goal in itself. The specific goals, interest and challenges will vary from place to place depending on the specific ecological, social and economic situation. IWRM is the process of balancing and making trade-offs, in a practical scientifically sound way, between: economic efficiency in water use; social justice and equity concerns; and environmental and ecological sustainability. The specific details of these goals will have to be balanced in the IWRM process. Implementing IWRM is a political process that involves allocating resources between competing uses and users. Sometimes it is possible to come up with win-win solutions. However, more often compromises and trade-offs will have to be negotiated. Agreeing to social, economic and ecosystem sustainability goals and finding the right balance between them lie at the heart of this process.

As illustrated in **Error! Reference source not found.** concurrent development and strengthening of three elements is needed in order to pursue IWRM: an enabling **environment, appropriate institutional roles, and practical management instruments.**



**Figure 3 The three IWRM Pillars**

The enabling environment sets the rules, the institutional roles and functions define the players who make use of the management instruments.

IWRM must not be interpreted as a universal blueprint for water resources management worldwide. Certain basic principles underlying IWRM may be commonly applicable, but they must be seen in the specific context and stage of economic or social development. The nature, character and severity of water problems, human resources, institutional capacities, the relative strengths and characteristics of the public and private sectors, the cultural setting, natural conditions and many other factors differ greatly between countries and regions. Practical implementation must reflect such variations in local conditions and should, consequently, take a variety of forms. The most appropriate mix of IWRM elements will change over time for a specific country and region due to internal or external developments.



IWRM involves managing water resources at the basin or watershed scale, managing demand and optimizing supply including assessments of available surface and groundwater supplies and evaluating the environmental impacts of distribution and use options. IWRM principles are based on equitable access to water resources, broad stakeholder participation, an inter-sectoral approach to decision making based on sound science and usually require establishment of adequate regulatory and institutional frameworks. The planning process should result in an IWRM plan endorsed and implemented by government, more or less detailed depending on the situation and needs of the country.

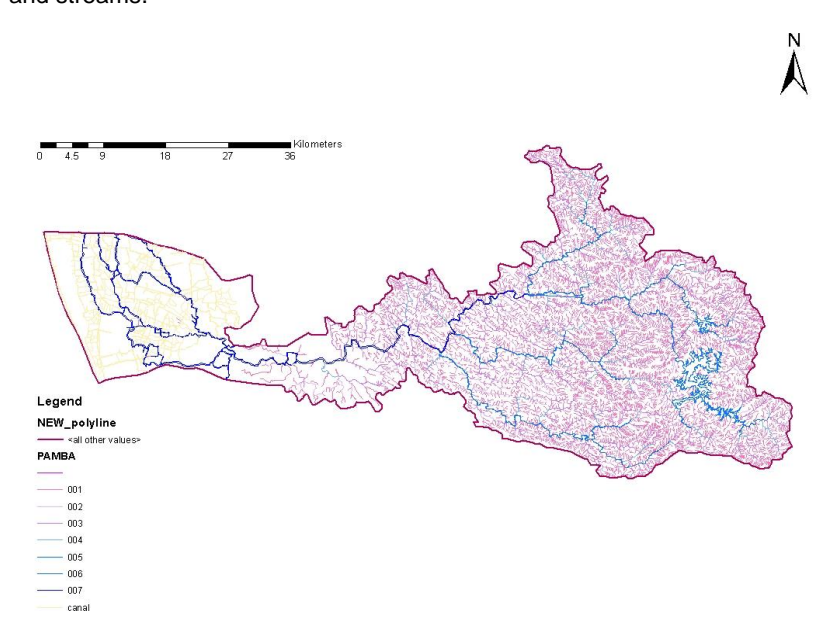
The institutional arrangements needed to bring IWRM into effect include:

- water resources management based on hydrological boundaries;
- a gender-balanced consortium of decision-makers representing all stakeholders, reflecting society's responsibility for water management;
- organizational structures at basin and sub-basin levels to enable decision making at the lowest appropriate level, rather than a centralized decision-making model;
- government coordinating the national management of water resources across water use sectors.

## 3 The Pamba River Basin

### 3.1 Physical context

Pamba River is the third largest river in Kerala. It has a length of about 176 km and a catchment area of about 2235 km<sup>2</sup>. The river has its origin in Pulachimala in the Western Ghats at an altitude of about 1650 m above msl and flows through highly varied geologic and geomorphic provinces of the state. Figure 4 shows the extent of Pamba river basin. River Pamba, at its upper reaches was charged by 288 rivulets and streams.



**Figure 4 Drainage Map of the Pamba river basin**

Kerala is blessed with a pleasant and equable climate through out the year, despite being in close proximity to the equator. This is because of the long coastal cover and the protection the Western Ghats provide on the east from hot winds blowing in. Kerala receives good rainfall (average 3000 mm). The temperature normally ranges from 28° to 32° C on the plains but drops to about 20° C in the upper reaches.

Kerala is experiencing a paradoxical situation of scarcity in the midst of plenty in water availability. Blessed with abundant rainfall of about 3000 millimetres on an average annually, there is significant variation and shortage of safe drinking water in many places of the state. Even though, it varies across the region. The average rainfall in the low land region ranges from 900 mm in the south to 3,500 mm in the north; in the middle region it ranges from 1,400 mm in the south to 4,000 mm in the north and in the high lands from 2,500 mm in the south to 5,500 mm in the north.

Over 90 per cent of the annual rainfall is received during the south-west monsoon which sets in by June and extends up to September and also from the north-east monsoons during October to December. However, because of the terrain condition in Kerala rainfall runoff is very high. Over 60 percent of the geographical area of the state is covered by laterites and lateritic soil, allowing little infiltration (Agarwal

and Narain 1997). Therefore, the state experiences severe summer from January to May when the rainfall is minimum. As rainfall is the main source of water availability in the state, any failure in the southwest or northeast monsoon will affect the availability of drinking water, electricity production and agriculture and hence the livelihood of the population. Owing to its diversity in geographical features, the climatic condition in Kerala is diverse and divided into four season viz. winter, summer, south-west monsoon and north-east monsoon.

## 3.2 Socioeconomic context

Kerala lies in the south-western coastal region and is one of the smaller states, corresponding to less than 1 % of the land area of India. At an average of 819 persons per square km, it is three times more densely settled compared to the rest of India. With a population of about 32 million, Kerala is home to 3.4% of its total population. However, the population growth rate of Kerala is lower than the national average of 2.1%. The density of population ranges from as low of 250 persons per square kilometer in Pathanamthitta (which lies in the Pamba river basin) and Idukki districts to as high of 1500 persons per square km in Trivandrum and Alappuza districts (Pamba river drains into the sea in this district).

Economists estimate that the per-capita income of Kerala is less than \$ 300 per year, which is lower than some other more industrialized states in India. Nevertheless, Kerala stands at the top of the pyramid in India with respect to social development indices such as primary education, maternal mortality, infant mortality, life expectancy and healthcare. Life expectancy of population in Kerala is estimated to be 73 years. These figures compare favourably with developed countries. Because of these unique social achievements, despite sub-optimal economic growth, Kerala is tagged as 'unusual India' by development thinkers.

Table 1 indicates how Kerala stands out differently from the national average in all aspects of social development. In the ten-year period between 1991 and 2001, the all India average decadal growth rate logged at a high of 21.34, whereas Kerala recorded 9.42, close to the developed world. Similarly sex ratio in Kerala stands clearly in favour of women at 1058. With 90.92%, the literacy rate of Kerala is highest in the country.

**Table 1 Social Development Indices**

	Population 2001	Decadal growth (1991-2001)	Sex ratio	Density	Literacy
All India	1,027,015,247	21.34	933	324	65.38
Kerala	31,838,619	9.42	1058	819	90.92

Source: *Census 2001*

## 3.3 Status of the water resources

It is generally observed that Kerala suffers less of environmental problems than most other regions in the country, such as groundwater depletion (WRI 1994; CSE 1985). However, recently, environmental problems have become more apparent and have started to affect sustainability. For example, Water conservation was the most neglected part of water resource development, but nowadays it gathered attraction in both administrative and academic policy frames.

### 3.4 Water uses

Pamba is one of the most important rivers in the South Western Hills of Kerala. The famous shrine of Sabarimala is situated in the hills of Pamba plateau. It is one of the most popular pilgrim centres in South India and millions of pilgrims visit the shrine especially during the winter season, starting in mid November and ending in mid-January. The gathering of very large crowd over a short period of time every year, in an ecologically sensitive area has given rise to various environmental problems.

The Pamba River originates from the Western Ghat and flows westerly and drains into Vembanad Lake. A survey conducted by the Central Pollution Control Board in collaboration with Kerala State Pollution Control Board revealed that solid waste and sewage generated at Pamba during festival season causes severe pollution of Pamba River. Lack of sanitary latrines, lack of facilities for sewage collection and treatment and the accumulation of wastes discharged from hotels and commercial establishment located at Sabarimala are the major sources of the pollution of Pamba River. To overcome this, construction of a series of check dams upstream on the two branches of the river has been taken up. The purpose is to store sufficient water and release it during the summer months, especially during the Sabarimala festival and provide more sanitary and water supply facilities to the pilgrims during festival season (CPCB, Annual Report 2000).

Various studies have recorded considerable changes in the land use especially around Sabarimala shrine, during the past two decades. Considerable degradation has also been observed around Pamba and Kakki reservoirs. The changes were mainly in the form of conversion and degradation of forests into forest plantations and other non-forest activities, due to human activities. Remarkable differences also noted in three major zones mainly based on the level of human intervention. In the first zone, major changes are from forest to forest plantations whereas in Zone II considerable amount of degradation has been noticed. The third zone is more or less unaffected as compared to other zones. It has been recorded in the past two decades that the actual forest area has been reduced considerably; the percentage of reduction in forest covers reaching around 10.5 %. The plantation area has also increased considerably during this period and rubber plantation shows about 51% of increase.

Although no formal water use studies are available, a general assessment by experts in the field indicates that measured by volume, close to 50% of water is utilized for irrigation, domestic water (including drinking) stands approximately at 10 to 25%. Water use for power generation and other use (commercial) are estimated to be about 30 to 35% and 10 to 15% respectively. It is also estimated that water for domestic purpose and commercial purpose records substantial increase during the peak pilgrim season (mid-November to mid-January).

The Pamba River from the immediate upstream of Sabarimala to lower reaches is highly polluted especially during the festival seasons due to the huge quantity of waste generated by millions of pilgrims visiting the area. The pollution is mainly due to human excreta and biodegradable waste like used leaves, vegetable wastes, discarded clothes, food wastes etc. Indiscriminate disposal of used plastic bottles forms the major portion of the non-biodegradable waste.



Sabarimala base camp, December 2009

### 3.5 Domestic water use

The drinking water system in Kerala can be broadly classified into two categories. The first one is the schemes owned and operated by the state government. Second one is family managed drinking water supply which includes individual families creating their own drinking water resources by constructing wells on their house compounds and managing the water supply source by themselves. Family managed drinking water supply system in Kerala has a substantial role in the water supply scenario especially in rural areas.

The provision of piped water supply in rural areas is the responsibility of the state government and funds have been provided in the state budgets right from the commencement of first five-year plan. National Water Supply and Sanitation programme was introduced in social welfare sector in 1954. The states gradually build up the Public Health Engineering Departments to address the problems of water supply and sanitation. In 1972 - 73, Government of India introduced the Accelerated Rural Water Supply Programme to assist the states and union territories with 100 percent grants in aid to implement schemes in problem villages. As a part of it, in 1970s, more than 450 piped rural systems were launched in Kerala. During 1980s, as part of the Drinking Water Supply and Sanitation Decade Programme, several projects were launched with the support of bilateral and multilateral agencies.

Among the states, Kerala has conventionally placed as 'water safe' economy. However, despite heavy annual rainfall, high 'well density' and numerous rivers and ponds, the state of Kerala is paradoxically situated among the country's lowest per capita ground water availing state. A few numbers of site-specific studies explained the 'scarcity in the midst of plenty' due to several reasons such as high rain water runoff, loss of forest cover, sand mining, reclamation of paddy fields, etc. (State Planning Board 2002). It was observed that even under the normal rainfall conditions the cities in lowland area of the state experience severe floods more often than in the earlier times. Also, many household wells in the Kerala were drying and need to be dug deeper and deeper to obtain water. Thus, even with abundant availability of water in the state, its beneficial use is constrained by many factors.

There are variations in quality of water between coastal, midland and highland areas of Kerala with chloride and iron being the major problems in many of the pockets. Wells near to the coastal belt of Kollam, Trivandrum, Alappuzha districts, some part of Ernakulam districts and entire Malappuram region is rich in iron. The Indian standards on drinking water prescribe a desirable limit of 0.3mg/liter and in the absence of alternate source 1.0mg/liter is permissible.

There are many isolated pockets in Kerala with iron concentration above 1 mg/liter, which affects the taste and appearance and has adverse effects on domestic use and water supply structures and promote iron bacteria. Besides metallic contamination, surface waters in rivers are polluted by municipal and industrial discharges. Widespread biological and bacterial contamination as well as application of pesticides largely affects the water quality.

With almost all the rivers in Kerala being rain-fed, any reduction in the rainfall affects the water level. Declining water level in turn affects the availability of piped water supply. A majority of the households depend on open wells for drinking water. So declining water table has a consequence on the family managed drinking water supply.

Table 2 provides the breakdown of source dependency of rural households for drinking water, and how Kerala ranks against all India average. At 58.8% well dependency is very high in Kerala, which stands in total contrast to the all India average which is a low of 21.3%. This has significant implication for IWRM in terms of water use, accessibility and equity.

**Table 2 Source dependency for drinking water in rural area (% of households)**

Principal Source	All India	Kerala
Tap	14.8%	7.63%
Tube well/Hand Pump	46.5%	1.15%
Well	21.3%	58.8%
Tank/Pond restricted for drinking	0.9%	1.1%
Other Tank/Pond	0.5%	0.4%
River/Canal/Lake	1.04%	0.07%
Spring	1.6%	0.2%
Tanker	0.2%	-
Others	0.18%	0.21%

Source: NSSO, 54th Round

Percentage of the household having sufficient drinking water throughout the year is also low in Kerala compared to all India and other major Indian states. If sufficiency of drinking water throughout the year also takes into consideration, the coverage of piped water supply in Kerala is merely 8.78 per cent (taps and tube wells). Majority of the household in Kerala traditionally depended on open wells for their household water supply needs. In another NSSO report, it has been estimated that Kerala has the highest percentage (30.4%) of household suffering from insufficiency of drinking water in some part of the year. They had to find alternative sources of water supply for their domestic water needs. This seasonality in water availability is an important dimension of water supply problem in Kerala and has major implication to IWRM.

### 3.6 Water for agriculture

The agro-climatic conditions suit the cultivation of a variety of seasonal and perennial crops. The net area sown in Kerala is estimated to be about 21,11,471 hectares. Fifteen principle crops (Rice, pulses, coconut, rubber, tea, coffee, pepper, cardamom, areca nut, ginger, nutmeg, cinnamon, paddy, tapioca and other plantations) are cultivated in the state, mainly by marginal or small farmers.

The key agricultural crop of Kerala is paddy. In fact, the Kuttanad region that falls in the Pamba river basin is known as the 'rice bowl of the state'. While paddy is mainly grown for own consumption by many households, wide spread cultivation of coconut and rubber production constitute the principal source of agricultural income. The state has a substantial share in the four plantation crops viz. rubber, tea, coffee and cardamom. These four crops together occupy six lakh ha, accounting for 31.4 percent of the net cropped area in the state. Kerala accounts for 92 percent of the total production of rubber, 76 percent of cardamom, 21 percent of coffee and six percent of tea in the country. The changes in cropping pattern during the past two decades were in favour of these crops.

The major items of export of spices from Kerala are pepper, ginger and nutmeg. Kerala continues to enjoy a near monopoly in the area and production of pepper accounting for 98 percent in the country. The

productivity of pepper had achieved its peak of 376 Kg per ha during 1998-99. But in 2006-07 it had declined to about 286 Kg per ha.

Table 3 presents the gross agricultural income and the percentage share of agriculture income to the gross income. It is evident from the table that, although the overall agricultural income has recorded about 18% increase between 2002 and 2007 (with the exception of 2003-04), the share of agriculture income to the gross income has shown a steady declining trend i.e. from 16.4% in 2002-03 to 14.6% in 2006-07.

**Table 3 Agricultural income to gross income**

Year	Agricultural income	Percentage to gross income
2002-03	13132 crores	16.4% crores
2003-04	12819 crores	15.1% crores
2004-05	13762 crores	14.9% crores
2005-06	14673 crores	14.8% crores
2006-07	15539 crores	14.6% crores

Year                      Agricultural income (Rs)                      % contribution to gross income (Rs)

Source: Directorate of Economics and Statistics

### 3.7 Water for irrigation

Kerala has a wide network of river, rivulets and springs spread over the entire geographical area. Out of the net cropped area of the state only 18 percent is irrigated. The net area irrigated had declined from 3.99 lakh ha during 2005-06 to 3.85 lakh ha (decline of about 4%) in the year 2006-07. The major source of irrigation is wells (30%), government canals (26%), tanks (11%) and private canals (1.1%) respectively. The total annual yield of all the rivers together is 78.041 Million Cubic Meters (MCM) of which 70,323 is in Kerala. The peculiarity of the rivers flowing across Kerala is short length of the river and the elevation difference between the high and the low land leading to quick flow of water collected from the river basin and quickly discharged into the sea, a typical feature that reflects the Pamba River. The major portion of the runoff through the rivers occurs during the monsoon seasons. 67.29% of the surface water area of 3.61 lakh hectares is constituted by brackish water lakes, backwaters and estuaries.

Irrigation development in Kerala is mainly centered on the development of surface water resources i.e. development of major and minor irrigation projects. About 60 to 70 percent of the investment in each plan of the state was earmarked for major and medium irrigation. During the tenth plan period (2002-2007) an amount of Rs. 930 crores was set apart for the irrigation sector. In the preceding ninth plan the outlay was Rs. 1028 crores. The decline of 98 crores allocation was mainly due to the transfer of minor irrigation schemes to the local bodies and limited scope for the development of major projects. This has clear implications to IWRM planning i.e. i) recognition of expanding roles of local bodies in water resource management and ii) decreasing space for conventional irrigation development projects.

Irrigation in Kerala mainly uses surface water resources. The development approach of water resources and its management aims to conserve natural resources including rainwater through appropriate intervention and to ensure their optimal utilization. It also envisages optimum utilization of the potential already created by introducing appropriate participatory management suitable to the systems and social groups. The Irrigation Department has completed eighteen major projects for water resource development and management such as Mangalam, Peechi, Neyyar, Pamba, Periyar valley, Kanjirapujha project etc. The engineering activities undertaken by the department are construction of field channels and farm

channels, introduction of warabandhi system, construction of drainage channels, construction of farm roads and improvements of existing tanks.

### 3.8 Groundwater

Groundwater has been the mainstay for meeting the domestic needs of more than 80% of rural and 50% of urban population besides, fulfilling the irrigation needs of around 50%. The ease and simplicity of its extraction has played an important role in its development. However, problems of decline in water table, contamination of groundwater, seawater intrusion etc. are being increasingly reported at many places. Along the hill ranges, the crystalline rocks are covered by thin weathered zone. Thick zones of weathered crystalline are seen along midland region. The depth to water level in the weathered crystalline in the midland area ranges from 3 to 16mbgl. The midland area sustains medium capacity dug wells for irrigation. Mostly dug wells that can cater to domestic needs are feasible along topographic lows. Bore wells tapping deeper fractured aquifer are feasible along potential fractures in the midland and hill ranges. Potential fractures are seen down to 240m and the most productive zone is between 60 and 175m and the discharge of bore wells range between 36,000 and 1, 25,000 lph. The aquifers are largely developed in and around Alleppey and in Kuttanad area, which mainly fall in the Pamba river basin.

The ground water potential of Kerala is very low as compared to that of many other states in the country. The estimated ground water balance is 5590 cubic mm. Dug wells are the major ground water extraction structure in Kerala. The dug wells have a maximum depth of about 10 to 15 meters and have a diameter of about one to two meters in coastal region and two to six meters in the midland and high land, including Pamba river basin. The open well density at an average of 70 to 200 wells per sq km, Kerala is perhaps the highest in the country. The ground water withdrawal is estimated as 980 cubic mm and the State Ground Water Department calculate the effective recharge as 8134 cubic sqm. The ground water level receding drastically during the summer months and drying up of wells are common features of the ground water levels in many parts, including the Pamba river basin. The depth of water level in Kerala state varies from few cm bgl to 56 M bgl and most of the area fall under 0-20 M bgl. The depth of the water level in the weathered crystalline of midland areas in Kerala varies from 3- 16 M bgl. The midland area sustains medium capacity dug wells. Along the coastal plains the ground water occurs at depth ranging from less than a meter to 6 mbgl.

### 3.9 Trends

Traditionally, water has been revered in India and treating water as an equitable community resource is deeply embedded in Indian socio-cultural milieu. The practice of community ownership of water was handed down by tradition and it provided equal access to all, water allocation was even amongst community members, distribution was community managed. There is enough empirical evidence to show that the model had worked well and the demand-supply situation was well balanced. As documented many studies, water economies in many states, including Kerala is largely informal with little interface with any public institution. Reform efforts were focussed mainly on direct regulation and management with the assumption that there exists a capacity within the government to influence water use patterns. On the contrary, ground realities indicate that water use and water management in the state is mainly informal in nature and the influence of the government in stimulating change in the use patterns is only marginal.

In Kerala water users, mainly domestic users in the rural and peri-urban communities depend on self-provision and local community institutions that are not under the direct influence of formal public



institutions (Source: IWRM Challenges in Developing Countries, Lessons from India and Elsewhere, International Water Management Institute, Colombo).

With the increased pressure on demand on water, the spirit of community management was 'watered' down. As villages turned into semi-urban and urban hubs, the transformation became more prominent. The rights of water management (domestic and non-domestic) were 'taken over' by the elected governments. Several distinguishing characteristics that were integral to community ownership slowly degenerated- equal access quickly became in-equal, need based turned out to be supply based, community managed system deteriorated into government controlled and the new system failed to cope with the demands. Efficiency improvement through induction of new irrigation technology and infusion of finances in large quantities became the norm. Consequently, the degeneration started manifesting in i) access becoming increasingly restricted ii) need based management clearly deteriorated into supply based control iii) increased emphasis on institutionalized sector management and legislation.

The formal institutionalization of water management in India thus commenced about five to six decades ago and Kerala was not excluded from this change. With the increased 'control' by the government, proclamation of policies and enactment of acts, rules and regulations became necessary. Given the federal structure of governance in India, water is in the 'state' list, in the sense that enacting water laws falls in the domain of state governments, with some in-built safeguards to address inter-state river disputes by the elected government at the centre. Pamba river basin flows entirely in the state of Kerala and does not transcend the state boundaries. Therefore, the onus on making laws, rules and regulations related to Pamba river basin lies entirely with the Government of Kerala, with the government at the centre playing only facilitation and funding support role. This sets the institutional context and governance reference for water management, policies, legislation and institutions for the Pamba river basin in Kerala.



Pilgrims bathing at the banks of the Pamba, Sabarimala, December 2009

# 4 Water policy, legislation, management and institutions in Kerala

## 4.1 Kerala water policy and legislation

The IWRM initiatives in Kerala are primarily guided by the existing water policy. Kerala has enacted the State Water Policy in 2008, along the lines of National Water Policy 2002. Both the policies have set priorities of water allocation in unambiguous terms. Figure 5 presents the comparative picture of the two policies.

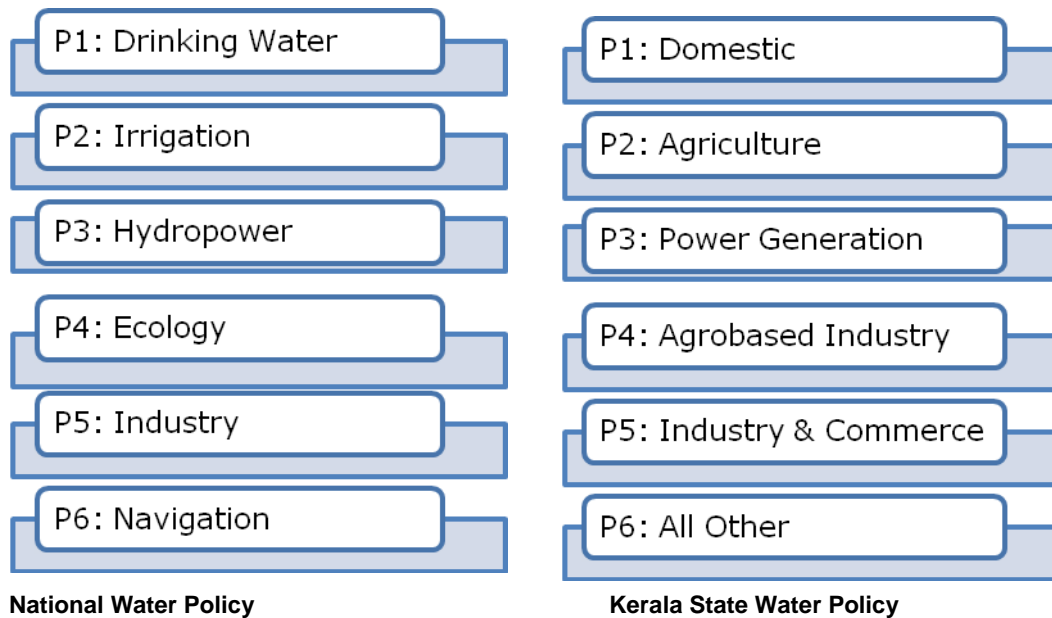


Figure 5 Comparative figures of water policy priorities at national and state level

Table 4 Kerala state level institutions managing water

Institutions	Functions
Ministry of Water Resources (MoWR), Ministry of Forests, Ministry of Agriculture, Ministry of Local Self Government	State Level Policies, Guidelines, Proposing Legislation
Irrigation Department (ID), Kerala Rural Water Supply Agency (KRWSA), Department of Forests, Department of Local Self Government	Defining Procedures, Setting Priorities, Implementation of Schemes and Programs
Kerala Water Authority (KWA), State Pollution Control Board (SPCB), Urban Local Bodies (ULBs), Gram Panchyats (GPs)	Defining state-specific norms, Monitoring, Ensuring Compliance

The national policy and the state policy are broadly comparable in their priority setting, with drinking water getting the top order priority and industry and other uses getting lower order priorities. However, the Kerala state water policy is defined broadly under Priority 1 to bracket drinking water within domestic needs. The National Water Policy defines meeting irrigation needs as Priority 2, whereas the corresponding priority in Kerala's state water policy is broader to include all agricultural needs (e.g. household agro-processing industry or animal husbandry). The existing irrigation act (The Kerala Irrigation and Water Conservation Act, 2003) is limited in its scope to provide for construction, maintenance, distribution of water and levy of taxes. Therefore, the scope of IWRM in Pamba basin and the functions of the Pamba river basin organization would have to extend beyond the application of the existing irrigation act alone.

In a departure from the national water policy, the state water policy does not make any specific reference to ecological needs or navigational needs (priority 4 and 6 respectively under the national water policy). They are set as agro based industry and all other needs. The priorities thus set differently have different implications at both the levels. The state water policy places emphasis on creating social awareness on rights and responsibilities and gives specific reference to the institutional mechanism of decentralized system of governance in Kerala. Some of the unique features of the state policy that have far reaching implications to Pamba river basin planning are:

- micro-water sheds have been considered as a basic unit for managing water with river basins as integrated units of micro-water sheds;
- enabling appropriate institutional mechanisms and legal measures for sustainable water resource development and management;
- participation of local self governments in perspective planning and implementation. Given the advanced level of local self government institutions in Kerala, this gains specific meaning to Pamba River Basin Authority;
- the state will establish a well-defined and transparent system for water entitlements and commercial exploitation and use and transaction of water by private establishments will be regulated. Again, this empowers the Pamba River Basin Authority to propose appropriate laws to ensure the principles of IWRM are adhered to.

Some other national level policy documents, acts and institutional set ups that are relevant to the Pamba river basin initiative are i) National Water Mission under National Action Plan on Climate Change ii) Irrigation Act iii) Central Ground Water Authority iv) Water pollution norms set by the Central Pollution Control Board.

Constitutionally water is a state subject in the sense that individual states are directly mandated to define policies, discharge service delivery functions and enforce legislation. However, because of fragmented responsibilities at the state level and beyond, there are significant overlaps and gaps in water management and service delivery. Water regulation is determined by state departments. Functions of state level regulatory bodies include allocation of water, water use balance and environmental management, water quality, land use planning, tariff determination etc. Local bodies (such as ULBs and GPs) are responsible for direct program implementation. In addition, technical bodies such as Kerala Water Authority (KWA), Kerala Rural Water Supply Agency (KRWSA) provide technical solutions to ULBs and GPs as well as take up O&M works. The constitutional amendments made in 1986 (73rd and 74th amendment) empower the ULBs and GPs to undertake water service delivery. This arrangement is yet to evolve fully, although Kerala is pioneer state in this regard. In Pamba river basin for example, urban drinking water service delivery and waste management are managed by respective ULBs and rural drinking water services is the responsibility of the respective GPs, with technical and O&M support from

KWA and KRWSA. The irrigation services in the basin are managed by the Irrigation wing of the Water Resources Department.

Similar to other states, water regulation in Kerala is characterized by the absence of an umbrella framework. A large number of different principles, rules and acts adopted over many decades co-exist and overlap with each other. In terms of statutory development, irrigation laws constitute historically the most developed part of water law. This is due to the promotion of government owned irrigation infrastructure. As a result, some of the basic principles of water law applicable today in India derive from irrigation acts. The Government of India Act, 1935 has in principle given power to the states to legislate water related provisions. For example, Kerala legislature has enacted legislations to regulate water supplies, irrigation and canals, water supply, groundwater use, rainwater harvesting, protection of riverbanks etc. The Key features of some of the important pieces of legislation in Kerala and their significance to IWRM are described in Table 5.

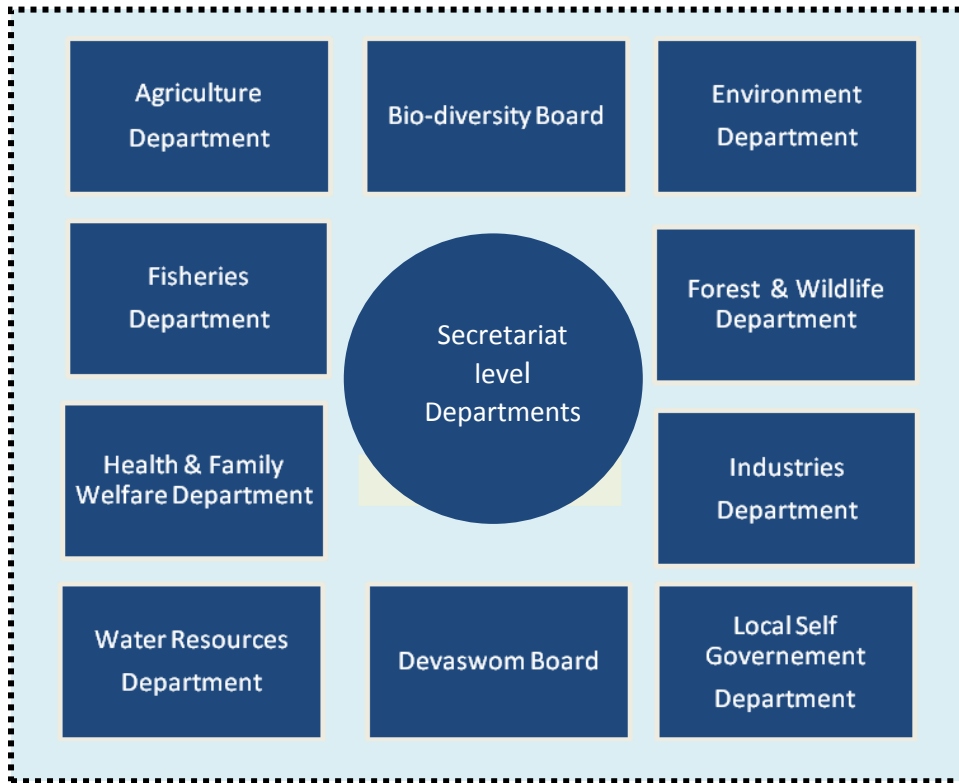
**Table 5 Kerala State Level Acts and their importance to IWRM**

Acts	Key Features	Importance to IWRM and the Pamba River Basin Authority
<b>Kerala Municipal Buildings Rules, 1999 (Rain Water Harvesting)</b>	This is one of the pioneering Acts in the country with regulations for roof water harvesting in residential, industrial and office buildings for the purpose of groundwater recharge. The capacity of the storage tank is well defined in the Act and it applies to all towns in the state.	The concerned municipality is the authority to ensure compliance. There are several small and medium sized towns in Pamba river basin. Quantitative reduction of groundwater resources has been ranked as one of the problematic issues during this study tool and therefore, it has direct implication to IWRM in Pamba. <b><i>The groundwater component of the Pamba River Basin Authority will have coordinating responsibilities with the state groundwater department and urban local bodies in this context.</i></b>
	This Act provides provisions for protecting river banks and river beds from large scale dredging of river sand and to protect their biophysical environment system and regulate indiscriminate mining of river sand. The District Collector and the concerned local governments have the power to regulate sand mining.	Unregulated sand mining in Pamba river basin has been repeatedly mentioned by many participants during this study as a major reason for reduced flow in Pamba river, although it did not figure prominently in the applied WRIAM tool applied in this pilot project (Chapter 5). Nevertheless, this has an implication to IWRM in Pamba. <b><i>The provisions of the Act can be leveraged by the Pamba River Basin Authority to ensure mining is regulated.</i></b>
	This Act provides legal provisions to construct irrigation works, conserve and distribute water for the purpose of irrigation and levy water taxes on lands benefited by irrigation works in the state and to provide for involvement of farmers in water utilization system	<b><i>Stimulating farmer participation in water management is one of the most important implications of this Act to IWRM in Pamba.</i></b> Ensuring water equity through balanced water allocation rights is another implication.
<b>Kerala State Water Policy, 2008</b>	Promulgated in 2008, along the lines of the National Water Policy. Kerala has been a late starter in this regard. The key features include well defined	This sets the context for introducing IWRM in Kerala. <b><i>Pamba River Basin Authority can take pioneering initiatives by</i></b>

	rationale, emphasis on micro water shed approach leading to river basin approach, promotion of integrated water management practices, developing systems for transparent system for water entitlements etc.	<b>leveraging specific policy promulgations laid out in the state water policy.</b>
<b>The Kerala Ground Water (Control and Regulation) Act, 2002</b>	This Act provides for the conservation of groundwater and for the regulation and control of its extraction and use. The State Ground Water Authority, along the lines of Central Ground Water Authority has been set up for this purpose. The Authority comprises members drawn from various government departments and nominated members. All those desiring to dig a well or to convert the existing well into pumping well, in the notified area are required to obtain permission from the Authority. Permission will be granted subject to certain provision specified in the Act. The Act also specifies the requirement of registration of existing wells.	This is particularly relevant to the control and management of groundwater in the Pamba river basin. <b>It is possible for the Pamba river basin to regulate ground water extraction in the basin using provisions under Act.</b>
<b>The Kerala Forests (Vesting and Management of Ecologically Fragile Lands) Act, 2003</b>	This Act provides the power to control the exploitation of ecologically fragile lands and for the management of such lands with a view to maintaining ecological balance and conserving the biodiversity.	Damage to biodiversity in the Pamba river basin due to various factors such as sand mining, deforestation etc, has been expressed as one of the important concerns by the participants during stakeholder consultation workshops under this pilot project. Water demand for eco systems has been ranked very high (a score of 72) in WRIAM tool. Therefore, the relevance of this Act to IWRM in Pamba cannot be undermined.
<b>The Kerala Conservation of Paddy Land and Wet Land Act, 2008</b>	This is an Act that aims to conserve the paddy land and wetland and to restrict the conversion or reclamation in order to promote growth in the agricultural sector and to sustain the ecological system.	In Kuttanad area, paddy is grown extensively and it falls in the Pamba river basin. In the past decade or so, Kuttanad has witnessed extensive decline in paddy cultivation, inadequate flow of water in the river being one of the contributing factors. This Act, therefore, holds high significance to IWRM in the Pamba basin.
<b>The Pamba River Basin Authority Act, 2009</b>	This is the first of its kind that has been constituted in Kerala. The Act provides arrangements for the management of activities connected with the conservation of water resources in the Pamba river basin.	<b>This has very specific relevance to IWRM in Pamba. The Authority has been set up at the state level. As a next logical step of institutionalizing IWRM, Pamba River Basin Organization (RBO) needs to be established with all operational responsibilities vested in it at basin level. The RBO then becomes the operational body that manages river basin planning and management.</b>

## 4.2 Water management and institutions in Kerala

Water resources management is presently operated at two administrative levels as illustrated below. One is the Secretariat level which assists respective ministers and secondly at the field level, which generally operates at the districts.



**Figure 6 Water Resources Management at Secretariat level**



**Figure 7 Water Resources Management at district level**

A description of the major institutions and agencies within the Water Resources department involved in WRM management and their role is given below.

#### 4.2.1 Kerala Water Authority

The Kerala Water Authority (KWA) was established on 1st April 1984 as an autonomous body of the Government of Kerala. It has been developed from the parent institution Public Health Engineering Department, for the development and regulation of water supply and wastewater collection and disposal in the state of Kerala.

Though community managed traditional water supplies in the form of open dug wells and ponds have been in existence for generations, the first form of protected water supply system in Kerala was started at Ernakulum in 1914. Another protected pipe water system for Thiruvananthapuram started in the 1930s by the erstwhile Travancore State. After the formation of the present Kerala State, various urban and rural piped water supply schemes were initiated. In tune with the national thinking, Kerala has adopted a comprehensive State Water Policy. The State Government has set a target of expanding water supply coverage to all districts. The Authority works for design, execution, promotion, operation, maintenance and financing of schemes for the supply of water and for the collection and disposal of the wastewater. It renders the necessary services to the Government in relating to water supply and collection and disposal of the wastewater in the State of Kerala. Kerala Water Authority is also responsible for the collection of wastewater and disposal in the State of Kerala.

#### 4.2.2 Ground Water Department

The Ground Water Department (GWD) is the nodal department in the state for the monitoring and management of the Groundwater. Department collects and processes monthly data at State Data Centre

for 871 stations. These data are computerized and processed. Under Hydrology II Project funded by the World Bank these data are being processed at river basin scale. Data are collected for baseline and trend status analysis. Ground water quality meets the BIS standards for drinking purpose in most stations except a few locations (Palaghat, Aleppey).

The GWD has three water quality testing laboratories, at Thiruvananthapuram, Ernakulum and Calicut. The department provides training to staff from time to time for data management practices. In the Hydrology Project-I, training was provided extensively. The department also helps in awareness of public. They educate school children on rain water harvesting and water quality testing. The Groundwater Department collects ground water samples for testing parameters such as pH, electrical conductivity, total dissolved solids, carbonate, bicarbonate, alkalinity, total hardness, calcium, magnesium, potassium, silica, chloride, fluoride and arsenic at few locations. From 1997 water quantity and quality data at district and taluka (lower administrative unit) level are being collected. Water quality data are collected four times a year and water level is collected monthly.

### 4.2.3 Irrigation Department

The Irrigation Department is aimed at providing a most efficient Irrigation system to the state of Kerala, which functions as the backbone for the improvement of agriculture in the state. Canals provide safe drinking water, water for irrigation and navigation. In order to improve the irrigation potential, innovative minor irrigation schemes have also been implemented in almost all parts of the state in the form of lift irrigation schemes, improvement of existing lakes and ponds, diversion schemes for natural streams, prevention of salinity intrusion in rivers, drainage works to paddy fields, construction of check dams, vented cross bars, sluices. Construction of sea walls, flood damage control works including side protection works of natural streams and channels, etc. are other major areas of activities under the Irrigation Department. River water comes under jurisdiction of Irrigation Department.

### 4.2.4 Kerala State Pollution Control Board

The Kerala State Pollution Control Board is entrusted with the responsibility of controlling pollution, restoring and maintaining the wholesomeness of environment and implementation of statute aimed at protecting the environment in the State. It also advises the State Government on any matter concerning prevention, control or abatement of pollution. Regarding water quality monitoring, the KSPCB is carrying out two major schemes: National Ambient Water Quality Programme (NWMP): 64 stations; State Ambient water Quality Programme: 119 stations in 21 rivers. Digitization of data has been started. Department also keeps geo-reference records of data. They provide data to CPCB for environmental data bank for data management.

For river Pamba data is collected mainly at downstream level. Pamba River flows through Pathanamthitta, Thiruvalla, Kuttanadu, and Ambalappuzha and finally falls into the Vembanad Lake. The monitoring stations are located at Parumala, Chenganoor and Thakazhy for trend analysis. Monitoring frequency is quarterly for these locations.

### 4.2.5 Pamba River Basin Authority

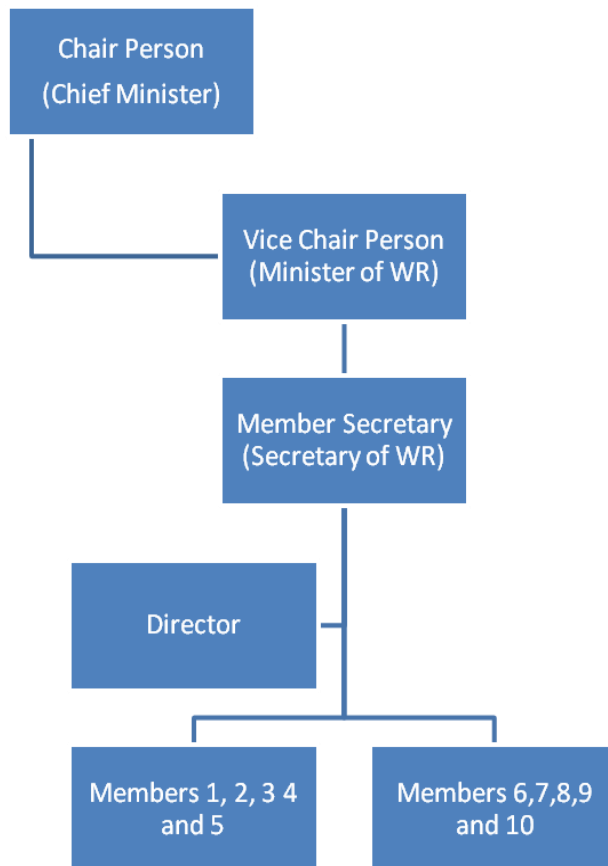
On the basis of the water quality data of the State Pollution Control Board and severity of the environmental problem in the Pamba basin, an Action Plan was prepared by state and approved by MoEF for reducing the level of pollution in the Pamba River. This document does not address other issues



affecting the river Pamba. Ministry of Water Resources took the initiative for the formation of The Pamba River Basin Authority for the implementation of the Action Plan. Pamba River Basin Authority has 15 members and is chaired by the chief minister. The water resources minister is its vice-chairman. The water resources secretary is member secretary. Other members include secretaries of various departments such as Revenue, Forest, Local Self-government, Health, Science and Technology and Environment, Finance, Power and Devaswom. The chairman of the Kerala State Pollution Control Board is also a member. Two water sector experts have been nominated by the government to the Authority.

The Pamba River Basin Authority Bill, 2009, established an authority in the state as a statutory body for the conservation of water resources in the Pamba River and its basin as an integral unit. According to the Bill’s Preamble, “the government is bound to ensure the quality of water in the river and to take measures to prevent pollution and to undertake integrated planning, monitoring, management and development of water resources in the river with the river basins as an integral unit.” The intention is that the Authority will formulate policies and projects for sustainable development of water resources and river basins of the Pamba River, and for scientific management to protect the area’s ecosystems and its genetic variety and biodiversity. It has the power to impose controls or restrictions over the exploitation of natural resources or encroachments that have an impact on the water resources and the basins of the Pamba River.

At present, Irrigation Department is the main functionary for the Pamba River Basin Authority.



**Figure 8 Organogram of the Pamba River Basin Authority**

The members represented in the Authority represent various sectors of the GOK, ranging from the irrigation department, to forestry, health, sanitation, as well as the local self government.

## 5 Prioritisation of issues

### 5.1 Methodology

The general philosophy in the process towards Integrated Water Resources Management (IWRM) is, under the given conditions, to establish a balance between the requirements relating to water, of the economic/social environment and of the effects of these human activities on the water resource.

This balance will be established through a system of management functions (IWRM) targeted to solve the identified problems of the resource with respect to their importance. Thus, there is a problem level, which starts with the basic problems to be managed in a future system. With a technical description of the current situation of the resources and their exploitation (availability/quality/demand/pollution), a general analysis of the current problems of the various management levels as well as a systematic analysis of the importance of the basic problems, it will be possible to identify relevant measures for establishment/improvement of the management functions which will form the contents of an action plan.

In short: *«Knowing where you are in order to find out where you are going or where you can go».*

In order to prioritise the water resources issues for the Pamba Basin the Water Resources Assessment Method (WRIAM) was applied during a stakeholder working session conducted in May 2010. The WRIAM method was developed as part of a project concerning IWRM in Burkina Faso and has since been applied in more than 20 countries as part of their IWRM process. The method has been conceived to allow the attribution of reasonably qualified quantitative values to more or less subjective judgements, thus, offering at the same time a monitoring system which can be used again in the future to re-examine the problems and importantly to measure the effects of actions taken to address the problems

The state is subdivided into hydrographical basins, but the method can also be used to assess the issues at the national level as a whole. Relevant issues are then assessed and ranked (prioritised) against a set of predefined criteria used to assess the importance of a given situation. In order to structure the issues the method operates with impact issues relating to quantity and quality of the resource, user requirement issues and risks imposed by the resource.

This tool was used in Pamba river basin to reach a consensus on the priority issues through extended dialogues and discussions. Representatives drawn from the water resource department (irrigation, ground water), agriculture department, forestry, pollution control board, water service delivery agencies (Kerala Water Authority), electricity department, local self government departments, district collectors, other technical departments, bio-diversity board, NGOs and CBOs across the basin discussed various issues that are relevant to IWRM and ranked them based on their experience. The participants were taken through the nature key issues described in the tool and they were asked to consider the cause of the problem based on their first-hand experience and collectively rank them on a five-step scale (Light Problem, Problem, Important Problem, Very Important Problem and Major Problem). The open debate and collective ranking process neutralized the probability of individual biases influencing the ranking. A total of 104 water resources issues were ranked and thereby prioritised as part of a participatory consultation session performed in May 2010. Out of the 104 issues ranked 51 issues were assessed to be of different

degree of importance. The results are given in the following sections and a full list of the 104 issues ranked is given in Annex 2.

## 5.2 Impact issues affecting quantity and quality of the Pamba water resources

Table 7 below shows the identified and ranked impact issues to be of importance in the Pamba Basin. With respect to surface waters it appears that issues of major problems in the basin consist of reduced availability, water loss, turbidity, pathogenic contamination and organic pollution caused by sandmining, encroachment, sedimentation of reservoirs and excreta. Impact issues of importance for groundwater consist of reduced availability due to climate change and contamination of the quality of the resource due to excreta.

## 5.3 User requirement issues in the Pamba River Basin

A clear picture was seen with respect whether the resource can meet the user demand in terms of quantity and quality. The highest ranked issues were seen to be that the surface water resource could not meet demands for ecosystem, pilgrims, urban and rural water supply. It is noted that the quantity of groundwater were assessed to be sufficient to meet user requirements and the quality needed for different users were an issue of minor importance.

## 5.4 Risks

Besides of the two types of issues above the resource itself can cause a risk. The ranked issues of this type were soil erosion, loss of crops and risk for accidents (e.g. drowning and dam breaks) mainly due to the heavy monsoon.

## 5.5 Synthesis of water resources issues in the Pamba Basin

The most urgent identified and prioritised water resources issues that must be addressed by management in the Pamba Basin are summarised in the Table 6 table below.

**Table 6 Water resources issues and causes**

Water Resource Issues
Reduced availability and loss of the water resource Turbidity Pathogenic and organic pollution Resource availability and quality do not meet the demand for Ecosystems and Pilgrims Soil erosion and loss of crops
Causes
Sand mining Encroachment

Sedimentation of reservoirs  
Contamination from excreta  
Climate change  
Floods and intensive pluviometry

To assure that the above identified issues are those that urgently need attention a broader stakeholder consultation was held in Chengannur in September 2010. Approximately 80 participants representing a broad range of local stakeholders were consulted on the water resources issues and a working session was conducted in order to allow the participants to identify and rank the issues stakeholders face in the Pamba Basin. The outcome from this consultation (Annex 7) showed an overall agreement with the prioritised issues from the WRIAM session. Moreover, the stakeholders raised that water resources issues of importance also include impacts on the quality of the resource due to chemicals and pesticide pollution as well as solid waste, such as plastics.



Pamba Pilot Project Inauguration, Feb 2010



Pamba Pilot Project, Public Consultation, Chengannur, September 2010

Table 7 Ranked impact issues affecting the quantity and quality of the water

Nature of issue	Cause	ES	Severity				
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>A - SURFACE WATER RESOURCES - Pamba Basin</b>							
<i>Quantitative reduction of surface water resources - Pamba Basin</i>							
Reduced availability	Impact from sandmining	81	■	■	■	■	■
Reduced availability	Encroachment	72	■	■	■	■	■
Water loss	Sedimentation of reservoirs	72	■	■	■	■	■
Reduced availability	Abstraction for urban water supply	42	■	■	■	■	■
Reduced availability	Long term climatic changes	30	■	■	■	■	■
Reduced availability	Abstraction for rural water supply	28	■	■	■	■	■
Perturbation of runoff	Infrastructures	27	■	■	■	■	■
Reduced availability	Impact from upstream dams	18	■	■	■	■	■
Reduced availability	Abstraction for irrigation	14	■	■	■	■	■
Perturbation of runoff	Urbanisation	14	■	■	■	■	■
Reduced availability	Short term variability of precipitation	14	■	■	■	■	■
Water loss	Excessive evaporation	14	■	■	■	■	■
Perturbation of runoff	Modification of soils	5	■	■	■	■	■
Reduced availability	Abstraction for livestock	3	■	■	■	■	■
<i>Qualitative degradation of water quality resources - Pamba Basin</i>							
Turbidity	Sandmining	72	■	■	■	■	■
Pathogenic contamination	Excreta	63	■	■	■	■	■
Organic pollution	Excreta	63	■	■	■	■	■
Organic pollution	Urban waste	63	■	■	■	■	■
Other pollution	Waste - plastic	54	■	■	■	■	■
Pesticide pollution	Agricultural cropping	42	■	■	■	■	■
Other chemical pollution	Urban waste	24	■	■	■	■	■
Eutrophication	Agricultural cropping	12	■	■	■	■	■
Turbidity	Erosion	12	■	■	■	■	■
Organic pollution	Livestock	6	■	■	■	■	■
Eutrophication	Excreta	6	■	■	■	■	■
Other chemical pollution	Energy/transport	6	■	■	■	■	■
<b>B - GROUNDWATER RESOURCES - Pamba Basin</b>							
<i>Quantitative reduction of groundwater resources - Pamba Basin</i>							
Reduced availability	Long term climatic changes	48	■	■	■	■	■
Perturbation of infiltration	Urbanisation	18	■	■	■	■	■
Reduced availability	Short term variability of precipitation	8	■	■	■	■	■
Reduced availability	Abstraction for rural water supply	4	■	■	■	■	■
<i>Qualitative degradation of groundwater resources - Pamba Basin</i>							
Pathogenic contamination	Excreta	81	■	■	■	■	■
Organic pollution	Excreta	81	■	■	■	■	■
Pesticide pollution	Agricultural cropping	7	■	■	■	■	■

**Table 8 Ranked user requirement issues**

Nature of issue	Cause	ES					
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>A - SURFACE WATER RESOURCES - Pamba Basin</b>							
<i>Match between demand and availability of surface water resources - Pamba Basin</i>							
Demand for ecosystems	Insufficient water availability	72	■	■	■	■	■
Pilgrims & Tourism	Insufficient water availability	36	■	■	■	■	■
Tot. demand/exploitable res.	Insufficient water availability	36	■	■	■	■	■
Demand for urban water supply	Insufficient water availability	24	■	■	■	■	■
Demand for rural water supply	Insufficient water availability	24	■	■	■	■	■
Demand for hydropower	Insufficient water availability	18	■	■	■	■	■
Fisheries	Insufficient water availability	18	■	■	■	■	■
Demand for terrestrial wildlife	Insufficient water availability	12	■	■	■	■	■
<i>Match between water quality needs and the available water quality of surface water resources - Pamba Basin</i>							
Demand for urban water supply	Insufficient water quality	48	■	■	■	■	■
Demand for rural water supply	Insufficient water quality	48	■	■	■	■	■
Demand for environment	Insufficient water quality	24	■	■	■	■	■
Demand from fisheries	Insufficient water quality	24	■	■	■	■	■
Demand for hydropower	Insufficient water quality	6	■	■	■	■	■
<b>B - GROUNDWATER RESOURCES - Pamba Basin</b>							
<i>Match between water quantity needs and available quantity of groundwater resources - Pamba Basin</i>							
Demand for urban water supply	Insufficient groundwater resources	0					
<i>Match between quality needs and available water quality of groundwater resources - Pamba Basin</i>							
Demand for rural water supply	Insufficient groundwater quality	5	■				

**Table 9 Ranked risk issues imposed by the resource**

Nature of issue	Cause	ES					
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>C - RISKS - Pamba Basin</b>							
<i>Risks imposed through water resources - Pamba Basin</i>							
Soil erosion	Floods, intensive pluviometry	63	■	■	■	■	■
Loss of crops	Floods	28	■	■	■	■	■
Accidents (dam breaks, etc)	Reservoirs	21	■	■	■	■	■



## 6 Strengths, weaknesses, opportunities and threats

To identify strengths, weaknesses, opportunities and threats (SWOT) towards adopting IWRM principles in the Pamba River Basin, part of the stakeholder sessions in July and September 2010 included an assessment of management constraints and possible solutions to the issues described in the chapter above. Based on these findings, first-hand experience and observations in the field, a SWOT analysis was conducted to capture the current Strengths, Weaknesses, Opportunities and Threats in process towards addressing high priority water resources issues and introducing water resources management based on IWRM principles in the Pamba River Basin. The results from the SWOT analysis are given in Table 10.

**Table 10 SWOT analysis for implementation of IWRM principles in the Pamba River Basin**

STRENGTH	WEAKNESS
<ul style="list-style-type: none"> <li>▪ The Water Policy adopted in 2008 supports IWRM principles.</li> <li>▪ Legal framework is presently found sufficient to regulate some of the important issues that need to be addressed in the Pamba basin.</li> <li>▪ Political will to adopt IWRM as future water management guidance principles and clarity of vision at the top political and administrative level.</li> <li>▪ The Pamba Basin Authority Act, 2009 in place and the Authority has appointed a Director and opened a Bank Account, which signalize long-term commitment of the state government</li> <li>▪ High technical capacity at centralized level</li> <li>▪ Water being a state subject, GoK has full autonomy in implementing IWRM (Pamba has no trans-boundary implications)</li> <li>▪ Ongoing capacity development/ training programmes on IWRM instituted by research institute on water in the State (CWRDM)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Present legal framework does not fully support the new water policy.</li> <li>▪ Water policy does not address ecological needs</li> <li>▪ Existing legal framework is not enforced fully in order to address the water resources issues faced in the Pamba Basin e.g. issues caused by uncontrolled sand mining.</li> <li>▪ Fragmented and centralized management of the water resources and poor inter departmental coordination.</li> <li>▪ Lack of a communication strategy to assure participatory approach towards IWRM – lack of a stakeholder platform.</li> <li>▪ Technocentric approach towards management of water resources issues.</li> <li>▪ Lack of data sharing among the numerous governmental institutions collecting and assessing data concerning the water resource.</li> <li>▪ Existing Pamba Action Plan focuses only on pollution abatement and as so only deals with technical solutions, not addressing reform processes needed to manage the resource.</li> <li>▪ Translation of existing Acts into rules and practices has been weak.</li> <li>▪ The Pamba Basin Authority exists through the</li> </ul>



	<p>Pamba Basin Authority Act, but an operational body is not yet in place.</p> <ul style="list-style-type: none"> <li>▪ Relatively low human capacity in IWRM principles at centralized and de-centralized level</li> <li>▪ Ecosystem needs not represented in the current water policy</li> </ul>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<ul style="list-style-type: none"> <li>▪ The Water Policy and the Pamba Basin Authority Act provides the enabling environment to establish a operational River Basin Authority</li> <li>▪ Skilled technical capacity present and capacity in IWRM are available at CWRMD.</li> <li>▪ Data on water quality and quantity exist, though scattered in different government organizations. Thus a full assessment on the actual water resources situation can be conducted.</li> <li>▪ The Government of Kerala's have indicated willingness to provide funds for supporting the continuous implementation of IWRM in the Pamba Basin.</li> <li>▪ GoI support to Pamba IWRM approach (e.g. SPCB action Plan).</li> <li>▪ Experiences gained from piloting IWRM in the Pamba Basin can provide valuable guidance for other basins of India</li> <li>▪ Interest from multilateral donors to support future actions in the process towards adaption of IWRM principles in the Pamba River Basin</li> </ul>	<ul style="list-style-type: none"> <li>▪ The continuous change at Political and Administrative level can result in lack of institutional memory and focus may shift.</li> <li>▪ Undue bureaucratic delays causing implications for keeping momentum in the initiated IWRM process and addressing high priority water resources issues in the Pamba Basin</li> <li>▪ Funding limitations to prepare and implement elements identified in the IWRM roadmap for the Pamba Basin</li> <li>▪ Lack of awareness</li> </ul>

## 7 The roadmap: next steps, milestones and indicators

In the process to move from the IWRM vision to the IWRM plan, it is useful at the outset to establish a roadmap with specific goals and milestones. The IWRM Roadmap describes how a country may proceed from making an IWRM Vision over the situation assessment and the policy and strategy to make the IWRM plan in accordance with the IWRM 2005 target. So the roadmap “maps” the road, but does not travel to the actual “milestones”. Based on the outcomes from the different sessions conducted, given in the chapters above, an IWRM roadmap was developed and a final dialogue was conducted in October 2010.

The final IWRM roadmap for the Pamba River Basin is shown in the below table. A set of 12 priority actions, considered necessary to make the transition from current management practices to develop and implement an IWRM action plan is shown in the table. A more detailed roadmap including objectives, responsible institutions and expected source of support/financing can be found in Annex 1.

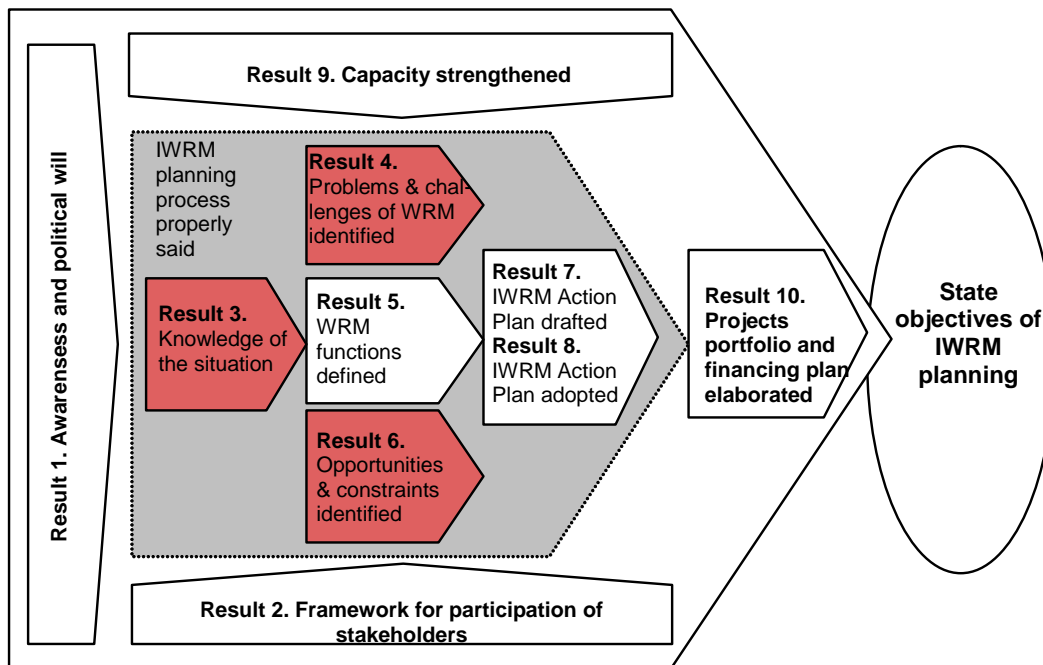
**Table 11 IWRM Roadmap for the Pamba River Basin**

Next steps	Milestones	Indicators
<b>Form an operational body for water resources management in the Pamba River Basin</b>	June 2011	Pamba River Authority operational - offices, staff, work plans and budgets identified.
<b>Capacity building in IWRM</b>	December 2011	Capacity need assessment conducted, IWRM training conducted at central and de-centralised level
<b>Development of a communication strategy</b>	September 2011	Communication strategy formulated and being implemented ensuring stakeholder involvement
<b>Enforcement of existing legal framework</b>	Immediately	Identified priority issues addressed e.g. illegal sand mining
<b>Adjustment of existing legal water framework for the Kerala state</b>	January 2012	Enactment of primary water legislation
<b>Full assessment of the water resources situation (quantity &amp; quality) in the Pamba Basin</b>	March 2011	The quantity and quality of the resource assessed based on data from the numerous intuitions involved in monitoring.
<b>Setting-up a sustainable monitoring and evaluation system for water resources management &amp;</b>	August 2011	MIS operational - databases, GIS and modelling tools  Collaboration with the World

<b>Establishment of an information system on water resources</b>		Bank supported Hydrology II project for developing Hydrology Information System (HIS)
<b>Initiation of elaboration and adoption of an IWRM Action Plan for the Pamba Basin</b>	August 2011	IWRM action elaborated and endorsed by the Government
<b>Elaboration of DPRs (Detailed Project Reports) for implementation of different actions identified</b>	December 2012	Detailed project reports prepared for the actions identified in the IWRM plan
<b>Elaboration of financing plan and investment strategies</b>	December 2011	Financing strategies and development plans adopted
<b>Implementation of the IWRM Action Plan for the Pamba River Basin</b>	January 2012 – December 2015	Identified actions implemented.
<b>Development of IWRM indicators to monitor the effects from implementing the IWRM plan</b>	June 2012	Set of indicators developed to monitor that the desired effect from the reform process is being achieved. Regular evaluation reports.

## 8 Status of the IWRM progress in Kerala’s Pamba Basin

The transition process crystallised by an IWRM Roadmap for the Pamba River indicates how to get from an IWRM Vision to an IWRM Action Plan in an orderly, well-structured process. The Pilot Project applied a method developed by DHI in collaboration with United Nations Environmental Programme (UNEP), the 10 Steps/Results of the IWRM planning process. This approach clearly distinguishes the different stages the process is tight to and highlights responsibilities and external factors needed for support to the process.



**Figure 9 The 10 Steps IWRM Planning Process**

The status of the IWRM progress in Kerala and the Pamba Basin is reflected in Table 12 with 10 rows corresponding to the 10 steps/results referred to above. The table represents a synthesis of where Kerala can be found in the IWRM planning process for the Pamba River Basin. Moreover, under comments it is indicated where the present Pilot Project has contributed in piloting IWRM in the Pamba Basin.

Table 12 Status on the IWRM planning process for the Pamba River Basin

Step/ Result	Description	Present Situation	Comments and suggestions for the Pamba River Basin Authority
1.	Awareness and political will	<p>Awareness of IWRM concept and principles relatively limited.</p> <p>Moderate to strong political will to bring water management into line with international best practices.</p>	<p><b>Conduct targeted awareness raising of policy-makers, water sector managers, local councils, NGOs and CBOs.</b></p> <p>Present project has through involvement of stakeholders throughout the project created increased awareness. Involving the media at several occasions created awareness to a larger group of stakeholders.</p>
2.	Framework for participation of stakeholders	Presently non-existent	<p><b>Take necessary steps to establish legal and regulatory framework for stakeholder participation.</b></p> <p><b>Development of communication strategy to help solve problems in a participatory manner and to explore opportunities for improvements in the water sector.</b></p> <p>Stakeholder involvement has been an essential part the Pamba Pilot Project implementation.</p>
3.	Knowledge of the situation	<p>Data scattered between different institutions monitoring quantity and quantity.</p> <p>Knowledge gaps e.g. environmental-flows</p>	<p><b>Establish common databases and information systems so that a situation analysis can be conducted based on existing data.</b></p> <p><i>The on-going WB funded Hydrology Project II has already assembled an integrated Hydrology Information System (HIS). This information system will eventually be upgraded to provide a comprehensive Water Information System (WIS) at the state level and national level. Pamba River Basin Authority can benefit from this.</i></p> <p>Priority water related issues assessed (WRIAM) during the Pamba Pilot Project, provided essential input to a future comprehensive situation analysis. <b>The identification of issues was carried out with full participation of stakeholders, those prioritized issues should be addressed first.</b></p>

4.	Problems and challenges of IWRM identified	Problems and challenges identified	In general well known. One of the outcomes of present pilot addressed this step by assessing water related issues and management constraints.  <b><i>Future planning towards a full IWRM Action Plan can benefit from the data and findings of the current pilot project, especially the identified water resources issues and management issues as defined by the stakeholders.</i></b>
5.	WRM functions defined	Present WRM functions defined, including the Pamba Basin Authority	<b><i>Continued support required for reform process within IWRM paradigm. Short term focus should be given to setting up and operationalize the Pamba River Basin Authority</i></b>
6.	Opportunities and constraints identified	Done under present Pamba Pilot Project	A future situation analysis should benefit from this project output.
7.	IWRM Action Plan drafted	Pollution abatement plan exists. No IWRM plan drafted	<b><i>IWRM plan to be developed as part of implementing the Roadmap</i></b>
8.	IWRM Action Plan adopted	No IWRM plan adopted	<b><i>Future action plan to be adopted</i></b>
9.	Capacity strengthened	Ongoing capacity building but accumulation rates quite low.	<b><i>Capacity needs assessment and capacity building at all levels required</i></b>  Capacity building in IWRM has been conducted as part of all sessions in present project
10.	Projects portfolio and financing plan elaborated	To be developed	Part of implementing the Roadmap

The current Roadmap has been developed to serve as a guiding document for the newly set up Pamba River Basin Authority to direct its planning according to actions identified by the stakeholders and proposed means of implementation connected to specific timelines agreed during the workshops held during this pilot project.

The pilot project has attempted to draw attention to IWRM to a vast group of stakeholders at different levels. It has provided a framework for participation of a core group of actors directly and indirectly involved with water matters. River basin stakeholders greater involvement and co-management of water issues promotes good governance and sustainability by improving accountability, encouraging support for decisions taken, improving the quality of those decisions, assisting with monitoring and bringing early warning of potential challenges.

Participatory approaches enhance project quality, ownership and sustainability, with stakeholders becoming active contributors to basin development and management. In order to guarantee stakeholders

participation institutional mechanisms need to be designed. Basin Forums can be a good means to ensure they have a say in decision-making, planning and sustainable co-management of the river Pamba. Another very important aspect is the communication channels chosen to reach the public. A communication strategy needs to be made that is open and effective horizontally and vertically between and among the structures off the government and basin stakeholders via the development of accessible, timely and good quality information and dissemination mechanisms to build trust.

The Authority as it is has no capacity to implement such a communication strategy. Other organizations outside the government may be better placed to provide the services. The PRBA remains the overall facilitator. A focused strategy is needed here, which over time need to include a minimum required level of stakeholder involvement and guidelines to achieve it.

Meaningful participation of stakeholders in the management of the basin requires effective communication and information exchange between all relevant role players at state and at basin level. A website with information on activities in the basin can serve as a water information portal as well as a platform for information exchange between stakeholders.

Effective stakeholder participation also requires that all stakeholders have the necessary capacity to meaningfully interact and contribute to decision-making on matters relating to the management of the basin. This requires the strengthening of PRBA's future members' capacity to interact with stakeholders and include them in decision-making. Capacity can be developed through the suggested regular basin forums.

## 8.1 Strengths and constraints in the management framework

The universally accepted three pillars of IWRM are i) Enabling Environment ii) Institutional Framework and iii) Management Instruments. Enabling environment stimulate desirable work practices of IWRM and forms an essential pre-condition. Examples of enabling environment include nurturing of integrated policy perspective, holistic legal provisions and a culture of collaborative working across sectors. This enabling environment pre-condition will have to be supported by the other two pillars i.e. establishment appropriate institutional framework and development and operationalization of required management instruments. The current management constraints in institutionalizing IWRM in the Pamba river basin is described below along with appropriate responses. These constraints and suggested responses were essentially a compilation of articulation by the participants of the stakeholder consultation workshops held in the past 10 months over 2010.

The essence of each of the constraints indicated and their implications across three IWRM pillars in the new RBO regime are explained below.

**Table 13 Management constraints and suggested responses**

Management Constraint	Suggested Response			Responsibility
	Enabling Environment	Institutional Framework	Management Instruments	
Weak staff capacity both in number and expertise in IWRM	-	Identify a nodal department to coordinate all staff capacity development	Identify ways and means of promoting community involvement	RBO, LSG

	activities			
Weak linkages of WR department with important catchment organizations, resulting in fragmented responsibilities at the field level (e.g. forestry and revenue departments)	The culture of integrated working of various departments at the cutting edge level needs to be promoted	PRBA to take a lead role in catchment area treatment and ensure integrated working, thus avoiding overlaps and gaps in working	Develop, promote and institutionalize technical competence in IWRM working (e.g. silt management, bio-fencing, community participation in basin management etc)	PRBA, LSG, Department of Forestry
Lack of scientific method and systems to assess demand for eco-system management	-	PRBA to play a nodal agency role and institutionalize required scientific systems in participating departments	Standardize assessment methods to understand demand-supply situation. Develop models for ensuring minimum flow in the river. Institutionalize capacity development	PRBA and related departments
Weak policy framework	Defining clear policies  Making multiple technology choices available for on-site and off-site sanitation	Enacting laws and enforcing regulations	STP systems, decentralized sewage management	PRBA, LSG, KWA, SPCB
Inadequate sewage and waste management systems and methods	Defining waste management policy and tuning it to meet area specific needs	Institutionalizing decentralized waste management solutions (defining norms and practices)	Supportive systems at local level  Public education	PRBA, LSG, District Administration
Absence of policy framework to prevent reclamation of productive wetland for non-farming activities, resulting in man-made disasters	Enacting laws, rules and regulations	-	Capacity development systems	Capacity development systems



### 8.1.1 The enabling environment

#### **Weak policy framework**

Generally, policies and programs are promulgated and regulations are laid down at the state level, where as the implementation vests with field level organizations. This system is generally observed to be weak, with poor feed forward and feedback loop. For example, sanitation during peak pilgrimage is a major concern in the basin. However, this issue hardly is reflected in the policy or regulation mechanism. This needs urgent and immediate resolution. In addition, lead-time from program announcement to actual implementation is inordinately long, as seen in the instance of the recent Action Plan of the State Pollution Control Board. Despite good intentions, there have been long drawn delays in installing STPs at the identified locations. With the greater autonomy of decision-making vesting with the PRBA, such issues can be resolved in a more efficient manner with built in concurrence of all sectors of government. For example, project implementation can be fast tracked and the PRBA will have complete monitoring role, making it easy for taking corrective actions. In addition, the PRBA being closer to stakeholders, their concerns can be addressed and expectations can be managed more effectively.

#### **Absence of policy framework to prevent reclamation of productive wetland for non-farming activities, resulting in man- made disasters**

With rapid urbanization in and around many towns in the basin, reclamation of productive wetland for non-farming and commercial activities has become a widespread practice. Illegal sand mining to meet the civil construction industry demands and intense building activity along the river banks are some examples of this. This has resulted in reduced flow in the river as well as floods during monsoons. The existing laws are inadequate to tackle this problem and the systems to ensure transparency and more rigid methods to enforce compliance are required.

### 8.1.2 The institutional framework

#### **Weak linkages of WRD with important catchment organizations, resulting in fragmented responsibilities at the field level**

Most departments work independently, although there is an immediate need for them to work in tandem. For example, treatment of catchment areas along the river Pamba is mainly entrusted to the department of forests, which receives limited inputs from the irrigation department. Similarly, groundwater management in the basin is regulated by the groundwater department, largely independent of the irrigation department. For effective management of water resources in the basin (e.g. use bore wells for irrigation), there is an obvious need for the two departments to work synergistically. To an extent, this collaboration is seen at the state level, but this is inadequate at the field level. In the absence of collaborative working, water resource management gets fragmented, especially at the field level. Some of these key issues can be addressed by the proposed PRBA, by rearranging institutional responsibilities and developing appropriate management instruments. As explained in the roles and responsibilities in the following chapter, the Project Director will be responsible for all project level implementation activities and coordination with all other departments. This will ensure improved field level coordination resulting in fast-paced project implementation.

### 8.1.3 The management instruments

#### **Lack of scientific method and systems to assess demand for eco-system management**

Actual demand-supply for water in the basin is poorly understood in its totality by the stakeholders. Most water resource development projects are taken up depending on urgency (i.e. drinking water needs in summer, river flushing during pilgrimage, irrigation etc). To manage water resources more scientifically, a framework to assess the demand for eco-system needs to be institutionalized and it needs to be done on an on-going basis. Transiting from immediate, one-time solution to view the issue more strategically from IWRM perspective can be institutionalized by the proposed Pamba River Basin Authority, by developing appropriate systems and by undertaking capacity development efforts. This task of the PRBA will ensure more balanced approach to manage the eco-system. For example, the demand for water during peak pilgrim season and during agriculture season can be studied by undertaking purpose driven studies (demand side) and it can be matched with resource availability estimates (supply side- using data from HIS) and corrective action as needed can be taken up by the PRBA.

#### **Inadequate sewage and solid waste management systems and methods**

Treatment of solid and liquid waste generated in the basin has received very poor attention. Domestic as well as commercial waste in raw form is discharged directly into the river. Because of this, river pollution reaches its peak during high pilgrim season. Plastic and other waste discarded indiscriminately by the pilgrims as well as residents along the basin amplifies this problem. While on one hand, sewage and waste management systems needs strengthening, on the other public education has become increasingly critical. This can be effectively carried out only with active people's participation at the local level. The PRBA has an important role to play in this.

### 8.1.4 The human capacity

#### **Weak staff capacity both in number and expertise in IWRM**

Most water resource development organizations in India are new to IWRM and Kerala is no exception to this. They are typically irrigation development organizations with their main focus on constructing and operating large scale, medium scale or small-scale irrigation schemes. Consequently, the staff skill development has been centred on construction and operation & maintenance of irrigation schemes. While adequate staffing of irrigation departments with conventional irrigation specialists has never been a problem, what needs strengthening is 'hands on' skill development in IWRM. To achieve this, it is essential that a nodal department is mandated to coordinate this responsibility. As described earlier, the existing practice of allocating responsibilities across several departments (see weak linkages of WRD above) runs the risk of diluted IWRM implementation. By nominating a central coordinating agency to impart IWRM skills, this problem can be overcome. This will also ensure long-term institutionalization of IWRM practices. This responsibility can be ideally housed in the PRBA.

### 8.1.5 The economic and financial instruments

While the macro assessment of economics at the state level is strong and understood well, the understanding of the situation at the basin level is poor, mainly because relevant economic data is unavailable. For example, data on livelihood issues, opportunity costs of wetland agriculture and non-farm based activities, subsistence agriculture vis-à-vis large scale commercial farming etc are either not available or not dependable. Similarly, project management related financial aspects such as cost benefit analysis of large-scale STPs vis-à-vis decentralized waste management systems need to be properly assessed and understood, in the context of Pamba basin. The RBO will have to develop such technology related financial instruments and integrate them in the basin-wide planning process.



## 9 Options for a structure and functions of the proposed Pamba RBO

As River Basin Organisations (RBOs) are designed to help bring about IWRM and improve water governance, their responsibilities are becoming increasingly complex. For a RBO to become a well functioning agency, it should extend itself beyond mere discharge of technical functions. In many river basins in India, use of water through investments in water infrastructure for urban, industrial, and agricultural growth is far more than the extent of it's of renewability. Such overexploitation of water resources is caused by a disregard for environmental considerations, incomplete hydrological knowledge, undefined or poorly understood water rights etc. The challenge for water management is to view it from an integrated perspective to provide much stricter scrutiny by decision makers so to avoid over commitment of water resources. In addition, river basins are experiencing multiple constraints such as contamination of freshwater, reduced flow due to sand mining, overdraft of aquifers etc. On the demand side, requirement increases as population grows, irrigation often expands, and more water needs to be allocated. A typical response is too often to seek supply-side approaches for capturing more water.

The organizational structure of a RBO is of great importance to its performance in managing the river basin. Three different domains can be identified for its performance: the institutional set up, its sources of financing and its formal links to other organizations.

The decision-making process and procedures of the members of the Authority that develops its general policies and strategies as well as intermediate bodies translating those policies into strategies, programs and projects are of great importance for managing the river basin on the ground. Those processes and procedures need to be established early on.

The roles and responsibilities of the PRBA need to be defined, especially its project implementation tasks. A first priority should be to form and operationalize the executive committee by assigning them on a full time basis. The efficiency and effectiveness of a RBO also depends on interactions with different bodies. Elaborating on work descriptions of the executive committee representatives of the PBRA should be highly on the agenda. The long - term sustainability of the PRBA depends on the operation of the executive committees' skills and capabilities. Ensuring they have the human, financial and technical capacity to fulfil tasks is imperative. Capacity building at this level should be considered a priority.

As regard to decentralization of river basin management tasks within a RBO, in the same way, clear roles and responsibilities need to be assigned to LSGs according functions considered important to be implemented at local level. Again, their capacity to implement tasks needs to be assessed and proper training given to do so. In order to increase ownership at local level working groups can be established for different sectors such as fisheries, dams, water quality, pilgrims, data management, etc.

When decentralized river basin management is to function well, the capacity of the different bodies to fulfil newly gained responsibilities needs to be ensured. The Authority therefore needs to make sure that all bodies possess sufficient human, technical and financial capacities to successfully perform the functions potentially assigned to them.

It is important to note that the executive committee is the basin level planning and management organization and its existence is an extension of the PRBA members at state level. The Pamba River Basin Authority Act endorsed in 2009. According to the Act, *“subject to the general supervision and control of the Authority, the management of the affairs of the Authority shall vest in the Executive Committee, which shall assist the Authority, as the Authority may require”*. AND, *“the Executive Committee shall coordinate the working of the implementing agencies such as Water Resources Department, Kerala Water Authority, Travancore Devaswom Board, Local-self Government and other Local Institutions and other Agencies and initiate the construction works to be undertaken and facilitate timely release of fund.”*

The key functions, responsibilities and powers of the Members of the Authority at state level, as described in the Act, are:

1. to formulate policies and projects for enabling the sustainable development of water resources, reservoirs and water resources of the Pamba River and the scientific management for protecting the ecosystem containing various species and the environment with its genetic diversity;
2. to co-ordinate the activities of different departments and agencies of the projects under the plan for implementation
3. to take decisions relating to the matters in the Pamba Action Plan and implement the projects coming under the plan
4. to impose control or restriction over exploitation of natural resources or encroachments which may have impact on water resources and reservoirs of the Pamba River
5. to receive grants, contributions and funds for the Authority
6. to undertake the project works by the Authority itself in case of failure by the Departments and other agencies
7. to appoint Committee from among its members for the disposal of any business of the Authority or for tendering advice in any matter pertaining to the functions of the Authority
8. to control the disposal of wastes or discharge of any industrial effluent or domestic effluent to the Pamba River in accordance with the provisions of the Water (/Prevention and Control of Pollution) Act, 1974 (Central Act 6 of 1974) without proper treatment
9. to bring the contravention of laws to the notice of the Authority concerned and t monitor the follow up action
10. to control and take steps including the prohibition in accordance with the existing laws on any activity which may cause pollution to the Pamba River and the river basins: and
11. to do such other things which may be directly or indirectly connected with or incidental or conducive to the efficient administration for the protection of water sources and river basins of the Pamba River; and
12. to implement appropriate campaigns and awareness programmes for conserving and making the Holy River Pamba pollution free

The Pamba River Basin Authority is a state level policy making and regulatory institution that envisages project implementation through a coordination mechanism (refer 2 above) amongst a multiple set of organizations. The multi-layered institutional set up (secretariat level and field level) in water resource management is described in section 4.2. The Pamba River Basin Authority retains the role of policy-making, acts as a receptacle of funds and grants, sets out rules and regulations and discharges overall monitoring function at the highest level. It proposes to take up direct implementation work only in exigencies such as failures by the responsible departments and agencies. In the given scenario of multiple departments and agencies (over eighteen of them) involved in water resource management in the state, the risks of delays, cost overruns, conflict of interests and failures are endemic.

It is in this context the need emerges for establishing the Authority at the basin level that will be mandated with project implementation tasks. Thus the PRBA at local level needs to be viewed as a project implementing organization with strong autonomous institutional characteristics. The organization design of the Authority is based on the philosophy that it needs to have a new generation work approach which responds to the needs of all stakeholders in a more efficient and equitable manner. The below suggested model is futuristic in its positioning and the envisaged relationships between and across departments is more organic.

Arising out of this institutional arrangement, the Pamba River Basin Authority at state and local level will be vested with some key functions ranging from policy and strategy development, funding and finance, water use regulation, physical implementation of programs (thus making judicious supply of water on an equitable basis), basin level institutional support, information management, to carrying out water audit. The key areas suggested below are derived from successful IWRM implementation experience in other countries, including Europe as well as other developing countries. The key functional areas to be shared between PRBA at state and local level are presented in Table 14.

Keeping the above distinctions of functions in focus, it is envisaged that the Pamba River Basin Authority will also be set up at local level. In this regard, two options exist. One option is to set it up as an extension of the water resources department and the second is to set it up as a separate, independent entity. By setting it up as an extension of the water resources department it is likely that most of the management constraints described will be transferred to the new entity and collaborative working with other departments may be jeopardised. Therefore, it is recommended that the local Authority be set up with the status of a Special Purpose Vehicle (SPV).

The Pamba River Basin Authority Act is very clear in providing the Authority with a Project Director as well as the employment of a number of officers and employees as it deems necessary for the efficient discharge of its duties under the Act. In order to manage a team of experts representing the different sectors as well as to operate at state as well as at local level it is imperative the Project Director is entrusted with the full decision-making power in order to implement activities. As the Executive Committee is to coordinate the working of the implementing agencies the functions of the Members of the Authority and the functions of the Executive Committee (chaired by the Secretary of Water Resources) and managed by the Project Director are proposed to be as follows:

**Table 14 Key functions of PRBA**

Pamba River Basin Authority (PRBA) State level Members	Pamba River Basin Authority Executive Committee managed by the Project Director
<p><b>Policy and Program Facilitation</b></p> <ul style="list-style-type: none"> <li>▪ Develop legislation, internal policy in line with state water policy</li> <li>▪ Develop catchment management strategies</li> <li>▪ Develop or support other statutes, strategies, plans and IWRM-related bodies</li> </ul>	<p><b>Physical Implementation and decision making</b></p> <ul style="list-style-type: none"> <li>▪ Develop water resource infrastructure</li> <li>▪ Operate &amp; maintain water resource management system</li> <li>▪ Implement water conservation and manage demand</li> <li>▪ Manage flood and drought</li> <li>▪ Emergency response</li> </ul>
<p><b>Funding and Finance</b></p> <ul style="list-style-type: none"> <li>▪ Provide funding support</li> <li>▪ Decide on water tariffs</li> <li>▪ Decide on budgetary allocations</li> <li>▪ To Authority</li> <li>▪ Explore public private participation (PPP)</li> </ul>	<p><b>Water Use</b></p> <ul style="list-style-type: none"> <li>▪ Establish user connectivity</li> <li>▪ Register water users</li> <li>▪ Authorize water use</li> <li>▪ Collect water use charges</li> <li>▪ Enforce compliance</li> <li>▪ Regulate dam safety</li> <li>▪ Ensure supply equity and uniform accessibility</li> </ul>
<p><b>Regulation and Control</b></p> <ul style="list-style-type: none"> <li>▪ Develop and maintain pricing policy and water tariff</li> <li>▪ Develop and announce norms and standards (e.g. WQ)</li> </ul>	<p><b>Basin Planning</b></p> <ul style="list-style-type: none"> <li>▪ Assess demand-supply situation</li> <li>▪ Involve stakeholders in basin planning</li> <li>▪ Assess peak (pilgrimage) and seasonal requirements and adjust supply situation</li> </ul>

<p><b>Inter-departmental Coordination</b></p>	<ul style="list-style-type: none"> <li>▪ Coordination with various state level departments</li> <li>▪ Identify policy gaps and recommend solutions</li> <li>▪ Facilitate state level inter-departmental coordination</li> </ul>	<p><b>Information Management</b></p>	<ul style="list-style-type: none"> <li>▪ Data acquisition</li> <li>▪ Data and information storage and management</li> <li>▪ Information generation and dissemination</li> <li>▪ Support for complex knowledge products</li> <li>▪ Information Management Research</li> </ul>
<p><b>Institutional Support</b></p>	<ul style="list-style-type: none"> <li>▪ Establish statutory water management institutions</li> <li>▪ Facilitate establishment of non-statutory participatory bodies (stake holder involvement)</li> <li>▪ Build IWRM-related capacity</li> <li>▪ Coordinate activities of various water management agencies and institutions</li> </ul>	<p><b>Water Resource Audit</b></p>	<ul style="list-style-type: none"> <li>▪ Water Resource Audit strategies and their outcomes</li> <li>▪ Audit water use regulation and its efficacy</li> <li>▪ Conduct periodical water audits and develop feedback loop with water use regulations</li> </ul>
<p><b>Monitoring &amp; Evaluation</b></p>	<ul style="list-style-type: none"> <li>▪ Define Monitoring &amp; Evaluation (M&amp;E) Systems</li> <li>▪ Build capacities in M&amp;E</li> <li>▪ Carry out impact evaluation</li> </ul>	<p><b>Monitoring &amp; Evaluation</b></p>	<ul style="list-style-type: none"> <li>▪ Set up baseline data</li> <li>▪ Carry out basin level M&amp;E surveys</li> <li>▪ Report on physical and financial progress</li> <li>▪ Assess benefits derived out of IWRM</li> </ul>

If it is decided to implement an organization with a SPV status needs to be set up as a distinct entity under an appropriate Act (e.g. the Companies Act 1956, or Society Act, 1962) with complete operational freedom to ensure timely completion of all project activities within the overall budgetary limits.





# 10 Conclusion and recommendations

The Water Resources Department of the Government of Kerala has shown commitment towards a more integrated approach to water management planning. It has initiated the adoption of IWRM principles in its water policy as well as approving the establishment of a River Basin Authority represented by various governmental sectors, responsible for the management of the Pamba River, both signs of strong political will to bring water management in line with international best practice. By agreement between the Indian Government and EU it was decided that the present project should provide assistance to the Government of Kerala by piloting IWRM in the Pamba Basin.

The Pamba Pilot Project has been implemented through targeted training/working sessions, consultations, a broad stakeholder forum as well as a final dialogue on the IWRM Roadmap for the Pamba Basin. Moreover the press were invited at several occasions assuring that the process towards IWRM in the Pamba reached an even broader group of stakeholders. Focus of the sessions included:

- sharing EU experience and practices;
- IWRM training and use of IWRM planning tools;
- stakeholder consultations on water resources issues;
- management constraints faced within the present water management framework;
- possible actions to improve management constraints.

The outcomes from these sessions have been given in Chapters 5 to 8 of this report and session reports are annexed. It may be noted that by request from the Government of Kerala special focus was given on operationalizing the Pamba Basin Authority. Summarising the achievements from the conducted sessions and consultations, the following can be highlighted:

- sharing of experiences from the EU and elsewhere and capacity built in IWRM;
- representative group of stakeholders identified and involved in the IWRM Roadmap process;
- water resources issues identified and ranked in accordance to their importance;
- water management constraints and possible solutions identified;
- an IWRM Roadmap prepared;
- decisions and actions taken in order to execute the roadmap process;
- lessons learnt that will be of value to others involved in similar situation;
- assessment of Strengths, Weakness, Opportunities and Constraints in implementing IWRM principles in the Pamba River Basin;
- final IWRM Roadmap identifying actions, timeline, responsible organisation and indicators to establish the IWRM plan.

The responsibility for various aspects of water resources management is shared among several government institutions. Overall, the main tasks associated with water resources management are carried out by one institution or another, but the newly established Pamba River Basin Authority has not yet been granted the official responsibility for catchment management of the River. The operationalization of the Authority, especially the appointment full time members at local level for the implementation of water management tasks and coordination with the different sectors and stakeholders that have a stake in water, should be considered a first priority.

This Roadmap provides guidance to the process for continuing on the IWRM path. Fair amount of work is needed to align Pamba's River Basin Authority and its working structure to support the development and implementation of IWRM plans in the future as well as its constraints to water resources development. Actions that need to be addressed immediately are the full operationalization of the Pamba River Basin Authority and its definition of institutional roles and responsibilities. Another bottleneck needing attention is the lack of sharing of data and coordination between departments to constitute baseline data required for future planning and decision-making.

The technical skills required for basin management are widely available at state level. However, there is still a need for targeted capacity building at all levels, and not to forget at basin level where the Pamba River Basin Authority is to be established. The decentralization process envisaged for the operationalization of the Authority will have to be accompanied by extensive capacity building at Local Self Governance (LSG) level to adequately manage and administer the interests of the different water users at basin level. A proposal has already been approved to establish the Pamba River Basin Authority in Chengannur in the catchment area of the Pamba. Once this decision has been taken officially it will be appropriate to assess the capacity of the LSGs to undertake the management of the river and to identify areas where it may be necessary to strengthen technical, administrative and financial capacity.

This study has brought together the experiences obtained from various projects conducted abroad. The approach to develop a Roadmap has been positively received in a number of countries but the momentum and continued commitment will depend entirely on the commitment and willingness of the sectors involved to engage in further reforms. The actions for implementation of this process have been laid out in the IWRM Roadmap by the current project and it is hoped, will assist the decision makers with an agenda for future prioritization of activities. Stakeholder engagement was assured throughout the project. The identified water related issues were ranked by representatives of a selection of different sectoral government representatives as well as NGO's.

The participatory prioritization of issues gave a baseline for analyzing management issues constraining the current management of water resources of the Pamba. Important outcomes of the management issues encountered are mainly the enforcement of existing legislation. It was perceived there is no lack of proper legislations addressing water but the enactment and enforcement of the same is poor. The inter-sectoral silos prove to be difficult to demolish but with the implementation and operationalization of the Authority, a platform for inter-sectoral coordination of different interest can be brought on the table. To ascertain the Authority's proper mandate is however imperative. Follow up and proper attention to the IWRM Roadmap process and a willingness to embark reforms within the enabling environment, institutional framework and management instruments will be decisive for its long-term success.

Several legal and institutional challenges exist to the creation of an inter-sectoral mechanism dealing with pollution control and reduced availability of water. Those mechanisms are needed as part of the basin wide control measures that need to be taken. Measures are mainly referring to the (i) lack of adequate enforcement of environmental legislation, (ii) fragmentation of responsibilities among the water, environmental and agricultural authorities, and (iii) limited integration of environmental requirements into economic development policies. In addition, the elaboration of a full assessment of the water quantity and quality based on integration of available data from the numerous departments involved in monitoring of the resource is urgently needed, of which sharing of data is imperative.

## Recommendations

Obviously the identified actions in the roadmap must be initiated, which for a start should be supported by a detailed budget estimate to conduct these actions and financing sources and specifics on who will implement the roadmap elements. Of high importance is to commence the implementation of actions identified in the current roadmap immediately to assure that the momentum created at present will be kept up. It is unfortunately often seen that momentum created as part of a given IWRM project slowly ends after the project has been finalized. As indicated in the Roadmap some of the identified actions will need external funding and may require technical assistance. A way to assure funds are allocated for the continuous IWRM process will be that the Government of Kerala in the near future calls for a roundtable meeting involving state and national actors to discuss possibilities with potential external partners.

A key factor for the further progress is the continuous involvement of relevant stakeholders. A starting point may be to invite the stakeholder forum already established as part of present project and perform regular consultations, whenever major achievements or decisions concerning the IWRM implementation process in the Pamba River Basin are in place. In order to reach a broader stakeholder forum the involvement of the press should also be considered in the future, which could be combined with IWRM capacity building of the media to assure a better understanding and thereby coverage of the IWRM process in Kerala as such and in the Pamba Basin.

Of special importance are the efforts needed towards operationalising the Pamba Basin Authority, especially at basin level. A suggested organizational set-up, staffing and areas of responsibilities have been provided as part of the present project. However, as stated in the Act, the Authority shall prepare implementation plans, budgets, financing plans etc. which presently is absent. Setting up the PRBA should be line in line with preparation of the IWRM action plan, a proposal for the structure of this plan has been provided as part of this project (Annex 9). The IWRM plan should include a full situational analysis, a strategy on how to obtain the vision stated in the water policy and a portfolio of actions with detailed responsibilities, costs and implementation plans for each action identified. Outcomes from present project can be used especially in the situation analysis, were prioritized issues, management constraints etc. will provide valuable input. Moreover, actions identified in the Roadmap can be part of the foreseen portfolio of actions in the IWRM plan.

The IWRM approach strives to ensure coordination of all sector uses, so that the impacts of one particular user are accounted for by all other affected users. This implies that water sector plans for water supply and sanitation (Water for People), for irrigation and fisheries (Water for Food) and for nature conservation (Water for Nature), etc. are weighed against each other in their particular water allocations and impacts. It is important to realize that IWRM is not a product to be achieved over night. Rather, it should be seen as a conceptual framework and a vision for a long-term process of introduction of a number of national – and sometimes regional and international - water management reforms.

This reform process contains six steps in a continuous circular flow to gradually improve the actual IWRM status to reach a future ideal vision for IWRM in the country:

- what is the status of IWRM achievement versus the IWRM vision for full implementation;
- where are we now: a situation assessment of the present water issues and how the present water management system is able to cope with its challenges;
- what are the basic water policy rules and which strategy do we apply to achieve a full IWRM implementation;
- what is the next step to be taken (and in some cases the first ) in the IWRM implementation process, to de determined in the IWRM implementation plan;

- how to execute the specific implementation programs, projects and actions; and
- monitoring of progress towards improving the achievement of the national IWRM vision.

In its nature the implementation of the IWRM approach will differ from country to country and its basins, depending on where a given country is in the IWRM planning process, what are issues and constraints faced, are there regional or international reforms and issues that should be addressed etc. Hence no specific blueprint exists on how to implement the IWRM approach. However, previously the approach used in piloting IWRM in the Pamba Basin and creating a IWRM roadmap, has been successfully applied in more than 20 countries in Africa, Central Asia, South East Asia and Latin America providing valuable support in accelerating the process towards developing action plans and adapting IWRM principles (more information can be found at: [www.gwp.org](http://www.gwp.org) and [www.unepdhi.org](http://www.unepdhi.org)).

Thus the approach and experience gained from piloting IWRM in the Pamba Basin is considered adequate and could in the future be applied in other states and basins of India in order to progress towards achieving the vision stated in India's National Water Policy.



Pamba Pilot Project, Final Dialogue on IWRM, 29<sup>th</sup> October 2010

## Annex 1 Complete Roadmap

No	Scope of Work	Objectives	Milestones	Responsible Executors	Expected Source of Financing
1.	Form an operational body for water resources management in the Pamba River Basin	To establish a de-centralised operational body for management of the Water Resources in the Pamba Basin to assure fulfillment of the objectives stated in the Pamba Basin Authority Act.	Started – June 2011	Government/ Pamba Basin Authority	Government, Development partners
2.	Capacity building in IWRM	To strengthen the human capacity at all levels (central and de-central) to assure adequate implementation of integrated water resources management in the Pamba River Basin.	Jan 2011 – Dec 2011	Pamba Basin Authority, CWRDM, regional/ international experts	GOI MOEF/NRCD, Development partners
3.	Development of a communication strategy	To establish and maintain clear and regular channels of communication between stakeholders to support the objectives of IWRM, thus providing a platform for stakeholder participation.	Jan 2011 – Sep 2011	Pamba Basin Authority	Government
4.	Enforcement of existing legal framework	Enforcement of existing legal framework to mitigate to present water resources issues in the Pamba Basin	Immediately	Government	Government

5.	Adjustment of existing legal water framework for Kerala state	Updating existing legal framework to assure compliance with IWRM principles and the Water Policy from 2008.	June 2011 – Jan 2012	Government, Ministry of Law/Ministry of Revenue/Ministry of Water Resources	Government
6.	Setting-up a sustainable monitoring and evaluation system for water resources management  & Establishment of a information system on water resources	Improvement of quality of measurements and reliability of forecasts of water resources availability and quality  & Develop a information and database system supported by GIS	January 2011 – Jan 2013	Pamba Basin Authority/  Relevant government institutions  (Water Resources Dept/KWA/Groundwater Dept/SPCB/Kerala State Remote Sensing Agency), consultant	Government, Development partners
7.	Full assessment of the water resources situation (quantity & quality) in the Pamba Basin	Elaborate a full assessment of the water quantity and quality based on integration of available data from the numerous departments involved in monitoring of the resource.	March 2011	Pamba Basin Authority / consultant	Government, development partners
8.	Initiation of elaboration and adoption of an IWRM Action Plan for the	Development and adoption of an IWRM Action Plan based on stakeholders participation	Jan 2011 – Aug 2011	Government and consultant	Government, Development Partners

Pamba Basin					
9.	Elaboration of DPRs (Detailed Project Reports) for implementation of different actions identified	Development of detailed DPRs by corresponding governmental sectors and coordinated by the Pamba Authority to ensure collaboration and communication between departments	December 2012	Corresponding Government bodies and Pamba Basin Authority	Government / GOI
10.	Elaboration of financing plan and investment strategies	Develop a financing plan for prioritized actions.	December 2011	Government, Pamba Basin Authority	Government
11.	Implementation of the IWRM Action Plan for the Pamba River Basin	To implement prioritized actions in the IWRM plan	January 2012 – December 2015	Pamba Basin Authority	Government, Development partners
12.	Development of IWRM indicators to monitor the effects from implementing the IWRM plan	To monitor that the effects from implementing the action plan comply with the vision stated in the Water Policy	June 2012	Pamba Basin Authority	Government, Development partners





# Annex 2 Ranked water resources issues for the Pamba basin using the WRIAM method

Nature of issue		Cause		ES	Light problem	Problem	Important problem	Very important problem	Major problem
<b>A - SURFACE WATER RESOURCES - Pamba Basin</b>									
<i>Quantitative reduction of surface water resources - Pamba Basin</i>									
Reduced availability	Impact from sandmining	81							
Reduced availability	Encroachment	72							
Water loss	Sedimentation of reservoirs	72							
Reduced availability	Abstraction for urban water supply	42							
Reduced availability	Long term climatic changes	30							
Reduced availability	Abstraction for rural water supply	28							
Perturbation of runoff	Infrastructures	27							
Reduced availability	Impact from upstream dams	18							
Reduced availability	Abstraction for irrigation	14							
Perturbation of runoff	Urbanisation	14							
Reduced availability	Short term variability of precipitation	14							
Water loss	Excessive evaporation	14							
Perturbation of runoff	Modification of soils	5							
Reduced availability	Abstraction for livestock	3							
Reduced availability	Abstraction for industries	0							
Reduced availability	Abstraction from mining	0							
Perturbation of runoff	Deforestation	0							
Perturbation of runoff	Irrigation schemes	0							
<i>Match between demand and availability of surface water resources - Pamba Basin</i>									
Demand for ecosystems	Insufficient water availability	72							
Pilgrims & Tourism	Insufficient water availability	36							
Tot. demand/exploitable res.	Insufficient water availability	36							
Demand for urban water supply	Insufficient water availability	24							
Demand for rural water supply	Insufficient water availability	24							
Demand for hydropower	Insufficient water availability	18							
Fisheries	Insufficient water availability	18							
Demand for terrestrial wildlife	Insufficient water availability	12							
Demand for irrigation	Insufficient water availability	0							
Demand from industries	Insufficient water availability	0							
Demand for mining	Insufficient water availability	0							
Demand from neighbour countries	Insufficient water availability	0							

Nature of issue	Cause	ES					
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>A - SURFACE WATER RESOURCES - Pamba Basin</b>							
<i>Quantitative reduction of surface water resources - Pamba Basin</i>							
Reduced availability	Impact from sandmining	81	■	■	■	■	■
Reduced availability	Encroachment	72	■	■	■	■	■
Water loss	Sedimentation of reservoirs	72	■	■	■	■	■
Reduced availability	Abstraction for urban water supply	42	■	■	■	■	■
Reduced availability	Long term climatic changes	30	■	■	■	■	■
Reduced availability	Abstraction for rural water supply	28	■	■	■	■	■
Perturbation of runoff	Infrastructures	27	■	■	■	■	■
Reduced availability	Impact from upstream dams	18	■	■	■	■	■
Reduced availability	Abstraction for irrigation	14	■	■	■	■	■
Perturbation of runoff	Urbanisation	14	■	■	■	■	■
Reduced availability	Short term variability of precipitation	14	■	■	■	■	■
Water loss	Excessive evaporation	14	■	■	■	■	■
Perturbation of runoff	Modification of soils	5	■	■	■	■	■
Reduced availability	Abstraction for livestock	3	■	■	■	■	■
Reduced availability	Abstraction for industries	0					
Reduced availability	Abstraction from mining	0					
Perturbation of runoff	Deforestation	0					
Perturbation of runoff	Irrigation schemes	0					
<i>Match between demand and availability of surface water resources - Pamba Basin</i>							
Demand for ecosystems	Insufficient water availability	72	■	■	■	■	■
Pilgrims & Tourism	Insufficient water availability	36	■	■	■	■	■
Tot. demand/exploitable res.	Insufficient water availability	36	■	■	■	■	■
Demand for urban water supply	Insufficient water availability	24	■	■	■	■	■
Demand for rural water supply	Insufficient water availability	24	■	■	■	■	■
Demand for hydropower	Insufficient water availability	18	■	■	■	■	■
Fisheries	Insufficient water availability	18	■	■	■	■	■
Demand for terrestrial wildlife	Insufficient water availability	12	■	■	■	■	■
Demand for irrigation	Insufficient water availability	0					
Demand from industries	Insufficient water availability	0					
Demand for mining	Insufficient water availability	0					
Demand from neighbour countries	Insufficient water availability	0					

Nature of issue	Cause	ES	Light problem	Problem	Important problem	Very important problem	Major problem
<b>Qualitative degradation of water quality resources - Pamba Basin</b>							
Turbidity	Sandmining	72					
Pathogenic contamination	Excreta	63					
Organic pollution	Excreta	63					
Organic pollution	Urban waste	63					
Other pollution	Waste - plastic	54					
Pesticide pollution	Agricultural cropping	42					
Other chemical pollution	Urban waste	24					
Eutrophication	Agricultural cropping	12					
Turbidity	Erosion	12					
Organic pollution	Livestock	6					
Eutrophication	Excreta	6					
Other chemical pollution	Energy/transport	6					
Organic pollution	Outlets from food industries	0					
Eutrophication	Livestock	0					
Eutrophication	Outlets from food industries	0					
Eutrophication	Aquaculture	0					
Pesticide pollution	Livestock	0					
Pesticide pollution	Combat of disease vectors	0					
Other chemical pollution	Mines	0					
Other chemical pollution	Outlets from industries	0					
<b>Match between water quality needs and the available water quality of surface water resources - Pamba Basin</b>							
Demand for urban water supply	Insufficient water quality	48					
Demand for rural water supply	Insufficient water quality	48					
Demand for environment	Insufficient water quality	24					
Demand from fisheries	Insufficient water quality	24					
Demand for hydropower	Insufficient water quality	6					
Demand for livestock	Insufficient water quality	0					
Demand for irrigation	Insufficient water quality	0					
Demand from industries	Insufficient water quality	0					
Demand for mining	Insufficient water quality	0					

Nature of issue	Cause	ES	Light problem	Problem	Important problem	Very important problem	Major problem
<b>B - GROUNDWATER RESOURCES - Pamba Basin</b>							
<i>Quantitative reduction of groundwater resources - Pamba Basin</i>							
Reduced availability	Long term climatic changes	48					
Perturbation of infiltration	Urbanisation	18					
Reduced availability	Short term variability of precipitation	8					
Reduced availability	Abstraction for rural water supply	4					
Reduced availability	Abstraction for urban water supply	0					
Reduced availability	Abstraction for irrigation	0					
Reduced availability	Abstraction for livestock	0					
Reduced availability	Abstraction for industries	0					
Perturbation of infiltration	Deforestation	0					
Perturbation of infiltration	Modification of soils	0					
Perturbation of infiltration	Irrigation schemes	0					
<i>Match between water quantity needs and available quantity of groundwater resources - Pamba Basin</i>							
Demand for urban water supply	Insufficient groundwater resources	0					
Demand for rural water supply	Insufficient groundwater resources	0					
Demand for livestock	Insufficient groundwater resources	0					
Demand for irrigation	Insufficient groundwater resources	0					
Demand from industries	Insufficient groundwater resources	0					
Demand for mining	Insufficient groundwater resources	0					
Demand for tourism	Insufficient groundwater resources	0					
Demand from ecosystems	Insufficient groundwater resources	0					
Total demand/renewable res.	Insufficient groundwater resources	0					

Nature of issue	Cause	ES					
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>Qualitative degradation of groundwater resources - Pamba Basin</b>							
Pathogenic contamination	Excreta	81					
Organic pollution	Excreta	81					
Pesticide pollution	Agricultural cropping	7					
Organic pollution	Urban waste	0					
Organic pollution	Livestock	0					
Organic pollution	Outlets from food industries	0					
Organic pollution	Aquaculture	0					
Pesticide pollution	Livestock	0					
Pesticide pollution	Combat of disease vectors	0					
Other chemical pollution	Mines	0					
Other chemical pollution	Industrial outlets	0					
Other chemical pollution	Energy/transport	0					
Other chemical pollution	Wastes	0					
<b>Match between quality needs and available water quality of groundwater resources - Pamba Basin</b>							
Demand for rural water supply	Insufficient groundwater quality	5					
Demand for urban water supply	Insufficient groundwater quality	0					
Demand for livestock	Insufficient groundwater quality	0					
Demand for irrigation	Insufficient groundwater quality	0					
Demand from industries	Insufficient groundwater quality	0					
Demand for mining	Insufficient groundwater quality	0					
Demand from ecosystems	Insufficient groundwater quality	0					

Nature of issue	Cause	ES					
			Light problem	Problem	Important problem	Very important problem	Major problem
<b>C - RISKS - Pamba Basin</b>							
<b>Risks imposed through water resources - Pamba Basin</b>							
Soil erosion	Floods, intensive pluviometry	63					
Loss of crops	Floods	28					
Accidents (dam breaks, etc)	Reservoirs	21					
Damage of infrastructure	Floods, intensive pluviometry	18					
Increase of waterborne diseases	Physical structures	0					

## Annex 3 Stakeholder mapping table

<b>Stakeholders</b>				
<b>Public Sector National Level</b>	<b>Public Sector State Level</b>	<b>Public Sector Municipal Level</b>	<b>Private Sector</b>	<b>Civil Society</b>
Ministry of Water Resources	Irrigation Department	Municipalities (Pathamthitta Chengannur, Thiruvalla)	Hospitals	NGOs
MoEF / NRCD	Kerala Water Authority	Panchayats	Hotels	Kuttanadu Vikasana Samity
Ministry of Urban Development	Groundwater Department	Panchayati Raj Institutions	Industries	
	Department of Geology and Mining			Socio Economic Unit Foundation
	Agriculture Department			Media
	Forest Department			Major Religious Institutions
	Agricultural University			Farmer Associations
	Ministry of Agriculture			Pilgrims
	Fisheries Department			Ayyappa Seva Sangham
	State Pollution Control Board			
	Department of Industry and Commerce			
	Devasam Board			
	Urban Development Department			
	Planning Commission			
	Tourism Department			
	Revenue Department			
	Department of Local Self Government			
	State Electricity Board			
	Health Department			





# Annex 4 Report inaugural workshop February 2010



## Pamba Pilot Project

# Inaugural Workshop Water Sector Policy Support to Integrated River Basin Management, Pamba River Basin Pilot Project

Trivandrum, 10<sup>th</sup> of February 2010



## EU-India Action Plan Support Facility

This project is funded by:



The European Union

Implemented by:



## Report

### Introduction

Policy Support to Integrated River Basin Management” aims to contribute to the continuing EU-India policy dialogue in the water sector by providing policy support inter alia in project definition, stakeholder relations, capacity building and river basin planning to new river basin management authorities in various parts of India. It will seek to ensure that these authorities have access to current international best practice on integrated river basin management, and will strive to be complementary to activities already in progress with the support of other international agencies. The pilot project depends on a process driven and owned by the concerned authorities. The output from the activity will contribute to a model for river basin management throughout India.

The proposed Pamba Pilot Project resulted from Focus Group discussions organized by the APSF team with support of the MoEF. Main findings of the Focus Group were to create a common platform for different agencies which is to be exemplary for best coordination and to scale up the Pilot Project to be used as a replicable model for new RBO's (River Basin Organisations) in India. A small river basin having water quality problems and falling under a single state was considered a useful contribution to integrated water resources management in India.

### The Session

The presentation of the Pamba Pilot Project was organized by the APSF Project with the support of the Water Resources Department, Government of Kerala. Organising partners were Euroconsult Mott MacDonald and DHI Water and Environment.

The list of stakeholders invited for the workshop was prepared in collaboration with the Water Resources Irrigation and Administration Department.

Mr M N Gunavardhanan, Secretary to the Government of Kerala opened the event by highlighting the need for an integrated vision on water resources management and welcomed the stakeholders and consultants to deliberate on water management issues and opportunities. General IWRM principles were introduced during the workshop as well as a general framework for proposed activities during the pilot.

The workshop was attended by representatives of the Water Resources Department, State Pollution Control Board, Forestry Department, Electricity Board, Groundwater Department, Kerala Water Authority, Centre for Water Resources Development and Management and the NGO Socio Economic Unit Foundation as well as by the Additional Chief Secretary to the Government, Mr K Jayakumar.

The purpose of the inaugural session was to present the Action Plan Support Facility Project, the proposed Pamba Pilot Project and to identify main stakeholders related to water management in Kerala.

The aim of the workshop was to present a proposed framework for implementation of activities and to move towards shared views on how to proceed, agree and implement a Pamba Pilot Project. The stakeholders were invited for the discussion to address institutional capacity building requirements to operate the Pamba River Basin Authority and to indicate what specific trainings and workshops were considered adequate for supporting the River Basin Organisation.

Presentations were held about the operations of the APSF project in India, public participation in planning processes, proposed steps to be taken and activities to be carried out during the Pilot Project as well as a

timeline for implementation were presented by the APSF team. In addition general principles for IWRM (Integrated Water Resources Management) were given by Dr George Chackacherry, Scientist and Officer in Charge of the Centre for Water Resources Development and Management.

A Stakeholder mapping and categorization exercise was held in the afternoon to identify and select stakeholders with direct and indirect importance to the operation of the Pamba River Basin Authority. General water management issues and stakeholders at basin and sub-basin levels were identified which play an important role in managing the Pamba River (water users, governmental institutions, civil society). Those stakeholders will play different roles in the implementation of a Pilot Project and shall take part in the participatory planning session aiming at identifying local stakeholder's interests and perceptions of water related problems and opportunities and how they rank them.

The workshop was attended by the government departments that will play a major role in the coordination and management of the Pamba River Basin Authority. The workshop helped bring back the Pamba River Basin Authority into the picture and discussions on capacity building requirements for reviving the Authority were conducted.

**Major findings by the participants and recommendations for action:**

- There is an immediate need for Training of Trainers in IWRM as well as a training session on IWRM principles for a larger group of stakeholders
- Need to integrate IWRM principles in a new Pamba River Action Plan
- Rules and responsibilities need to be specified on how the Act is to be implemented. Rules need to be established, an act only is not sufficient
- Training needs analysis – the different sectors and stakeholders need to be made aware of their roles in managing the basin.
- Initiatives need to be streamlined with the National Water Policy
- A strategy for water quality management needs to be incorporated as well as a strategy for improving water quality monitoring
- River bank erosion is very important issue. Actions need to be undertaken to prevent further erosion.

Further to the deliberations above Mr K Jayakumar, Additional Chief Secretary to the Government of Kerala briefed the participants about the history of the design of the Authority and the need to cut across institutional barriers. The Authority was born out of the need to combine sectors with different skills in order to implement future integrated action plans for the Pamba River. Mr K Jayakumar indicated that previous attempts to address pollution in the river have not been successful due to single sectoral approaches and lack of coordination, as was the case with the Sabarimala – Pamba Action Plan Phase I.

The Authority needs to be brought back into life and the proposed Pilot Project could well serve this purpose as it is perceived as a stimulus to have the Authority meet again. The act has all the powers and the legislation does not lack the enforcement tools necessary but the institutional capacity to run the Authority is weak. He further pointed out that the Pilot Project could help with giving direction to the Authority.

Finally a request was made for a revised official letter of support from the Ministry of Environment and Forests to be submitted to Mr M N Gunavardhanan in order to make official the launching of the Project. A third meeting of the Pamba River Basin Authority is envisaged to further discuss the proceeds as well as indicating counterparts for implementation of activities under the proposed Pilot.

## Next Steps/proposed action plan for the Pamba Pilot Project

### Step 1) Training session on IWRM for a wide group of stakeholders

Identification of stakeholders and a participant list shall be composed with the assistance of the Water Resources Department

**Expected timeline: April 2010**

**Step 2) Focus group discussions** – The representatives of the different governmental organisations will operate as part of the Steering Committee for the coordination and implementation of the Pamba River Basin Action Plan as well as to encourage stakeholder participation in future basin decision-making.

**Expected timeline: April 2010**

### Step 3) Participatory planning session - Exercise on visualization of the future

Steering Committee representatives together with a selection of key stakeholders at local level will identify **interests at basin and sub-basin level** and perception of water related problems and opportunities and rank them. Participatory Planning methodologies will be applied.

**Expected timeline: May 2010**

### Step 4) 'Short term' Action Planning

Identification of a short list of priority implementable options based on exercise of visualization of the future. The Steering Committee will come together to discuss the results of assessments of the 'participatory planning session' held at local level and agree on general goals and principles of river basin management.

**Identify and prioritize actions** that can and should be taken to preserve resources and support sustainable development in the Pamba basin. This will be compiled in a draft **Action Plan and Logical Framework** Emphasis will be on practical problems that can be solved using existing resources.

**Expected timeline: May 2010**

### Step 5) Training Needs Assessment & Capacity Building

Identify internal capacity building needs to implement above mentioned options. The capacity building will be conducted in the form of workshops, trainings, training of trainers or work shadowing, etc.

**Expected timeline: May/June 2010**

### Step 6) Mobilize resources

Early actions should be those that can be implemented with local resources. However, during the planning phase resources mobilization might be needed for dealing with larger-scale issues. Advice and assistance will be given to draft project proposals, terms of references and tender documents. Possible activities:

- Training on how to prepare project proposals
- Training on how to prepare TOR's
- Training on how to prepare tender documents

**Expected timeline: July 2010**

### Step 7) Develop a medium to long term plan

After enough learning about IWRM among stakeholders, participants will be more able to prepare a medium to long-term plan for between 5 and 20 years duration.

The principles of IWRM and elements of the European Water Framework can be promoted as general approach.

During this phase the following activities will take place:

- Identification and prioritization of actions
- Assignment of responsibilities
- Describing the implementation schedule
- Timeline for implementation
- Communication strategy
- Necessary resources mobilization strategy

**Expected timeline: Sep 2010**

#### **Step 8) Dissemination of results**

Keeping in mind the objective of this pilot as being a tool for a replicable model on IWRM in India, participants and stakeholders will be involved together with the team of consultants in rolling out the experience obtained during the pilot project. Appropriate locations for road shows in India will be selected which maximize the impact of the sharing of experience.

**Expected timeline: Nov 2010**

## Appendix 1. Stakeholder mapping table

Stakeholders	Public Sector National Level	Public Sector State Level	Public Sector Municipal Level	Private Sector	Civil Society
	Ministry of Water Resources	Irrigation Department	Municipalities (Pathamthitta Chengannur, Thiruvalla)	Hospitals	NGOs
	MoEF / NRCD	Kerala Water Authority	Panchayats	Hotels	Kuttanadu Vikasana Samity
	Ministry of Urban Development	Groundwater Department	Panchayati Raj Institutions	Industries	
		Department of Geology and Mining			Socio Economic Unit Foundation
		Agriculture Department			Media
		Forest Department			Major Religious Institutions
		Agricultural University			Farmer Associations
		Ministry of Agriculture			Pilgrims
		Fisheries Department			Ayyappa Seva Sangham
		State Pollution Control Board			
		Department of Industry and Commerce			
		Devasam Board			
		Urban Development Department			
		Planning Commission			
		Tourism Department			
		Revenue Department			
		Department of Local Self Government			
		State Electricity Board			
		Health Department			
Issues	High Importance	Medium Importance	Low importance		
	Pollution	Water Abstraction	Encroachment		
	Riparian Rights				
	Soil Erosion				
	Sand Mining				
	Deforestation				
	Base Flow				



## Appendix 2. Agenda



### EU-India Joint Action Plan Support Facility Environment Component



## Introductory session for the Pamba Pilot Project in the context of Integrated Water Resources Management

**Hotel Mascot, Trivandrum, Kerala, 10 February 2010**

<b>Programme</b>		
09:15 – 09:30	<i>Welcome address</i>	<i>Mr M. N. Gunavardhanan, IAS Secretary to Government (Irrigation)</i>
09:30 – 10:00	<i>Introduction of the APSF Environment project:</i> <ul style="list-style-type: none"> <li>• <i>The objectives and activities of the APSF Environment project in India</i></li> <li>• <i>Introduction of the proposed Pamba Pilot Study</i></li> </ul>	Dr Johan Bentinck, EU-India ASPF Environment TA and Ms Annemieke Alberts, EU-India ASPF Environment TA
10:00 – 10:15	<i>Presentation EU Programs</i>	Ms Maitane Concellon, Project Manager European Union (EU)
10:15 – 10:30	<i>Video presentation on IWRM in the European Union</i>	
10:30 – 10:45	<i>Presentation IWRM, the Kerala situation</i>	Dr George Chackacherry, Centre for Water Resources Development & Management. <i>Member of the Coordination Committee of Pamba River Basin Authority</i>
10:45 – 11:15	<i>Round for open questions or discussion / suggestions</i>	
11:15 – 11:30	<i>Tea and Coffee</i>	
11:30 – 12:30	<i>Best practices in Integrated River Basin Planning and a possible framework of a Pamba River Basin Plan</i>	Interactive session
12:30 – 13:15	<i>Pamba stakeholder mapping and categorization exercise</i>	Interactive session facilitated by Mr Narayan Bhat, EU-India ASPF Environment TA
13:15 – 13:30	<i>Discussion on follow up</i>	
13:30 – 14:30	<i>Lunch</i>	



# Annex 5 Report workshop May 2010



# Pamba Pilot Project

## Situation analysis and stakeholder consultation workshops for the water sector policy support to Integrated River Basin Management

Trivandrum, 25 & 27<sup>th</sup> of May 2010



### EU-India Action Plan Support Facility

This project is funded by:



The European Union

Implemented by:



Report

## Introduction

Policy Support to Integrated River Basin Management” aims to contribute to the continuing EU-India policy dialogue in the water sector by providing policy support inter alia in project definition, stakeholder relations, capacity building and river basin planning to new river basin management authorities in various parts of India. It will seek to ensure that these authorities have access to current international best practice on integrated river basin management, and will strive to be complementary to activities already in progress with the support of other international agencies. The pilot project depends on a process driven and owned by the concerned authorities. The output from the activity will contribute to a model for river basin management throughout India.

The proposed Pamba Pilot Project resulted from Focus Group discussions organized by the APSF team with support of the MoEF. Main findings of the Focus Group were to create a common platform for different agencies which is to be exemplary for best coordination and to scale up the Pilot Project to be used as a replicable model for new RBO's (River Basin Organisations) in India. A small river basin having water quality problems and falling under a single state was considered a useful contribution to integrated water resources management in India.

## The Sessions

Two workshops were organized in Trivandrum by the APSF Project with the support of the Water Resources Department, Government of Kerala. The list of stakeholders invited for the workshop was prepared in collaboration with the Water Resources Irrigation and Administration Department. Both sessions were prepared according to the proposed framework for implementation of the Pamba Pilot Project. The organization of both May workshops was carried out in close collaboration with the Institute for Water Resources Development and Management (CWRDM) which kindly offered assistance to the Pamba Pilot Project TA team. It is expected CWRDM will remain closely involved throughout the Pilot Project.

**Workshop Day 1: “Road Map for Integrated Water Resources Management for the River Pamba basin”**

***The workshop of Day 1 was inaugurated by the Minister of Water Resources, Shri N. K Premachandran. Specialists from various sectors of the government as well as NGO's have attended the workshop.***

The workshop's aim was to develop a situation analysis of the issues the Pamba River is facing. A specific tool was used to explore the issues the Pamba Basin is facing and ranked those issues according to their importance. The classification of current situation and the prioritization of the issues in order of importance will enable the specialists to identify relevant actions for implementing IWRM in the Pamba Basin.

**Workshop Day 2: “Integrated Water Resources Management for the River Pamba & Stakeholder Consultation”**

The Pamba Pilot Project inaugural workshop held on 10<sup>th</sup> of February 2010 indicated the need for a large scale IWRM training for a group of non specialists for both government and non-governmental organisations. The aim of the workshop was therefore to promote the principles and concepts of IWRM to a large audience of non-specialists and stakeholders at Pamba Basin level, followed up by a presentation of the issues identified in the workshop of day 1. Findings of the workshop of the 25<sup>th</sup> of May were presented and discussed with the stakeholders to assure agreement on the issues to be addressed in a coming Draft Action Plan for the Pamba Basin in the form of a consultation session. The findings were used to encourage discussions and to agree on priority issues to be included in the Pamba River Basin

Draft Action Plan. Representatives of 10 different local Grama Panchayats attended the meeting, as well as state government officials and NGO's. ***The stakeholder session was conducted in the local language Malayalam. For a complete report on the major findings of this workshop and consultation session, please refer to the Appendix in this document.***

***The day was closed with a Press Conference attended by the Principal Secretary Mr L. Radhakrishnan as well Dr K Jayakumar, Director, Centre for Water Resources Development & Management and technical specialists of the APSF project, Dr Paul Holmes & Ms Annemieke Alberts to present the objectives of the Project to the media.***

#### **Proposed IWRM roadmap for the Pamba Pilot River Basin Draft Action Plan**

Outcomes of both workshops held in May 2010 will form the basis for the development of strategies and priorities of the Draft Action Plan for the integrated management of the Pamba river basin. The Draft Action Plan will set out clear and coherent objectives in line with best international practice as well as a timetable for implementation of priority actions. The plans will clearly indicate implementation responsibility and activities prioritised on clear short-, medium- and long-term. As well as the governmental authorities and institutions, the Draft Action Plans is ensuring means for public participation and engagement in civil society in the prioritization of actions. Options for funding priority actions will be identified and presented to the local authorities in charge.

Support and capacity building will continue to be provided to local and state government representatives taking part in the workshops. The TA team will attempt to ensure continuous participation of a selection of participants to build up knowledge in the process leading to a road map for the integrated management of the Pamba. To achieve the above, there is need to develop a transition plan, the so called Roadmap towards IWRM. The roadmap is a strategy for the formulation and implementation of the IWRM plan.

These activities entail a stakeholder consultation session to be held in a selected Panchayat at basin level as well as 3 additional trainings or workshops.

#### **Proposed next steps for the Pamba Pilot Project**

The process of developing the roadmap has now been initiated with the workshops held in May with representation of Government sectoral institutions involving forestry, agriculture, water, health, as well as NGO's, etc. It culminated with a larger stakeholder forum with representation of local Panchayat representatives from the Pamba basin, state level government officials and NGOs on 27th May 2010.

A Roadmap for the Integrated Water Resources Management of the Pamba Basin will endeavour to accelerate the IWRM process by building local commitment, analyzing gaps and preparing a strategy to develop a roadmap towards a Draft Action Plan. This roadmap should contribute to the improvement of water resources management and also access of its people to water supply and sanitation services. The IWRM approach facilitates mainstreaming water issues in the political economy of a country, as it focuses on better allocation of water to different water user groups and in so doing stresses the importance of involving all stakeholders in the decision-making process.

The draft IWRM Roadmap for the Pamba River Basin is being developed with input from various stakeholders and it is hoped that it will produce the synergy needed for sector collaboration and improvement.

#### **Step 1) Training session on IWRM for a wide group of stakeholders**

Identification of stakeholders and a participant list shall be composed with the assistance of the Water Resources Department

**Expected timeline: May 2010 - concluded**

#### **Step 2) Participatory planning session - Exercise on visualization of the future**

Steering Committee representatives together with a selection of key stakeholders at local level will identify interests at basin and sub-basin level and perception of water related problems and opportunities and rank them. Participatory Planning methodologies will be applied.

**Expected timeline: May 2010 - concluded**

#### **Step 3) 'Short term' Action Planning**

Identification of a short list of priority implementable options based on exercise of visualization of the future. The Work Group will come together to discuss the results of assessments of the 'participatory planning session' held at local level and agree on general goals and principles of river basin management. Identify and prioritize actions that can and should be taken to preserve resources and support sustainable development in the Pamba basin. This will be compiled in a draft Action Plan and Logical Framework. Emphasis will be on practical problems that can be solved using existing resources.

**Expected timeline: July 2010**

#### **Step 4) Develop a medium to long term plan**

After enough learning about IWRM among stakeholders, participants will be more able to prepare a medium to long-term plan for between 5 and 20 years duration. The principles of IWRM and elements of the European Water Framework can be promoted as general approach.

During this phase the following activities will take place:

- Identification and prioritization of actions
- Assignment of responsibilities
- Describing the implementation schedule
- Timeline for implementation
- Communication strategy
- Necessary resources mobilization strategy

**Expected timeline: Oct 2010**

#### **Step 5) Presentation of Draft Action Plan to Authorities in charge & Options for financing**

The final Draft Action Plan will be presented to the Authorities of the GoK and options for funding priority issues will be presented.

**Expected timeline: Nov 2010**

#### **Step 6) Dissemination of results**

Keeping in mind the objective of this pilot as being a tool for a replicable model on IWRM in India, participants and stakeholders will be involved together with the team of consultants in rolling out the experience obtained during the pilot project. Appropriate locations for road shows in India will be selected which maximize the impact of the sharing of experience.

Learning from all aspects of the policy support activity will be captured and disseminated in the form of flash notes and a summary report to participants and stakeholders. Key learning points, outline action plans and other suitable material will be made available to all practitioners through the Internet. Further dissemination in the form of international conference presentations, press releases or other publicity will be



considered in coordination with the EC Delegation and the Ministry of Environment and Forests, depending on the nature of the findings.

**Expected timeline: Nov 2010 / 2011**

## Appendix 1. Agenda Day 1



**EU-India Joint Action Plan Support Facility  
Environment Component**



**Road Map for Integrated Water Resources  
Management for River Pamba basin**

**Hotel Mascot, Trivandrum, Kerala, 25 May 2010**

<b>Programme</b>		
<b>Specialist Group</b>		
09:30 – 10:00	Opening of the workshop and welcome address	<i>Dr Paul Holmes, APSF Team Leader</i>
10:00 – 10:30	Inauguration of the Workshop	Honourable Minister for Water Resources, <i>Shri N. K Premachandran &amp; Mr L. Radhakrishnan</i> , IAS Principal Secretary to Government, Water Resources Department
10:30 – 11:00	Recap February Workshop, Presentation of programme, objectives and expected results	<i>Ms Annemieke Alberts, APSF Technical Expert</i>
11:00 – 11 :30	Challenges for adopting IWRM in the Pamba River basin	<i>Mr Vijay Kumar, APSF Component Leader</i>
11:30 – 11:45	Tea Break	
11:45 – 12:00	IWRM Institutional setup	<i>Mr Narayan Bhat, APSF Technical Expert</i>
12:00 – 12:15	Introduction to WRIAM (Water Resources Issues Assessment Method - Tool)	<i>Mr Nick Ahrensberg APSF Technical Expert</i>
12:15 - 12:30	Discussion and Q&A	<i>Team &amp; Participants</i>
12:30 – 13:30	Lunch	
13:30 – 15:30	Group work application of the WRIAM tool	<i>Team &amp; Participants</i>
15:30 – 16:00	Presentation of group outcomes and agreement on Way Forward	<i>Team &amp; Participants</i>
16:00 – 16:15	Introduction to IWRM road mapping	<i>Mr Nick Ahrensberg, APSF Technical Expert</i>

## Appendix 2. Agenda Day 2



**EU-India Joint Action Plan Support Facility  
Environment Component**



### **Integrated Water Resources Management for the River Pamba**

**Hotel The Residency Tower, Trivandrum, Kerala, 27  
May 2010**

<b>Programme</b>		
	<i>Registration</i>	
09:45 – 10:00	- Opening of the workshop and welcome address	<i>Dr Paul Holmes, APSF Team Leader</i>
10:00 – 10:30	- Inauguration of the Workshop	<i>Mr L. Radhakrishnan, IAS Principal Secretary to Government, Water Resources Department</i>
10:30 – 11:00	- Introduction to Integrated Water Resources Management Concept and its application in Europe: Presentation of Case Studies	<i>Mr Nick Ahrensberg, APSF Technical Expert</i>
11:00 – 11:15	- IWRM issues for the Pamba Basin	<i>Mr Vijay Kumar, APSF Component Leader</i>
11:15 – 11:30	Tea & Coffee Break	
11:30 – 11:45	- Video presentation on IWRM in the European Union	
11:45 – 12:00	- The importance of public participation and Stakeholder engagement	<i>Ms Annemieke Alberts, APSF Technical Expert</i>
12:00 – 12:30	- Presentation outcome of issues identified in Pamba Basin	<i>Dr George Chackacherry, Scientist, Centre for Water Resources Development &amp; Management. Member of the Coordination Committee of Pamba River Basin Authority</i>
12:30 – 13:30		
13:30 – 16:00	- Discussion & Public consultation	<i>Chair - Dr Jayakumar, Director, Centre for Water Resources Development &amp; Management.</i>
16:00 – 16:30	- Press Conference	

## Appendix 3.

### **Minutes of the Workshop, Road Map for Integrated Water Resources Management for River Pamba basin, Trivandrum, 25<sup>th</sup> of May 2010**

1. Two Sewage Treatment Plants proposed (one in Pampa and another in Sabarimala) under NRCP, but not yet taken up.
2. GoK has approached JICA for funding; but JICA has raised concerns on the slow progress of Pampa River Valley Action Plan, under NRCP.
3. Pampa River Basin Statutory Authority not fully activated. No active meetings have taken place. It is only a “virtual organization”. The challenge is to transform the “virtual organization” to a “real organization”.
4. This authority lacks ownership.
5. APSF must show other examples of IWRM institutional arrangements (e.g. China, Europe, South Asia)
6. APSF Technical support is a welcome step. Financing options for implementation can be varied (GoI, JICA, EU, Others). GoK is open to look at an array of funding options.
7. Dewasom is a key stakeholder (not represented in the meeting).
8. SPCB is an umbrella organization and is a key stake holder. They are not represented.
9. There are multifarious problems; all of them cannot be taken up simultaneously. Therefore, there is a need to prioritize issues.
10. Pollution problems exist both upstream and downstream.
11. KWA is the agency to manage source pollution; capacity is limited.
12. Divergent use of water needs to be considered.
13. Stakeholder meeting at the local level must be considered. Organizations representing various stakeholder groups must be consulted to reflect field realities.
14. Action Plan must reflect distinguishing features of upper and lower catchment areas.
15. Pampa drains into Kuttannad which has unique ecological features. This needs to be considered. Agriculture source pollution is high.
16. Informal field level institutions must be consulted.
17. The extent of bacterial contamination needs to be studied (part of the Action Plan?)
18. There is tremendous amount of local knowledge and wisdom. It must be factored in.
19. The proposal to interlink Pampa with a river in Tamil Nadu needs to be examined. This proposal will have disastrous effect on Pampa.
20. Changing cropping pattern needs to be encouraged.
21. Fall in GW tables are observed in the basin. River bed has definitely fallen.
22. Forest conservation is not alarming; it is much better in Kerala. Project Tiger is an example of this success. Cardamom plantations are not replacing forests
23. Current laws are good enough. Implementation is weak, though.
24. Poverty is an issue that needs consideration while developing the Action Plan.

## Appendix 4.

### Minutes of the Stakeholder Consultation Workshop, Integrated Water Resource Management for the Pampa River Basin, Trivandrum, 27<sup>th</sup> May 2010

Workshop Title	Stakeholder Consultation Workshop on Integrated Water Resource Management for the Pampa River Basin
Venue	The Nova, Residency Towers, Thiruvananthapuram
Date	May 27, 2010
Time	10:00 hrs to 16:00 hrs

#### 1. Background

- 1.1. As a part of the Technical Assistance program titled "Action Plan Support Facility (APSF)", a one day stakeholder consultation workshop was organized by the APSF TA team in collaboration with the Government of Kerala. This workshop succeeded another one day workshop held on May 25, 2010 with key government departments towards preparing a 'Road Map for an Integrated Action Plan for the Pampa River Basin'. The APSF Technical Assistance Program is funded by the European Union and supported by the Ministry of Environment & Forests, Government of India.
- 1.2. Dr. Paul Holmes, APSF Team Leader opened the workshop with his welcome address. Mr. L Radhakrishnan, Principal Secretary, Water Resources Department, Government of Kerala, inaugurated the workshop. While the forenoon sessions of technical presentations were facilitated by Dr. Paul Holmes, Dr. Jaya Kumar, Director, Centre for Water Resources Development and Management (CWRDM), chaired the post-lunch session.
- 1.3. A total of 22 participants, representing the state government, local government and the civil society organizations participated in the workshop and actively contributed to the proceedings. Of the 22 participants, eight belonged to the local governments (Gram Panchayats) situated in the Pampa river basin; three were representatives from the civil society and the balance 11 were drawn from various government departments.

#### 2. Agenda of the workshop

- 2.1. The Agenda of the workshop covered four presentations by the Technical Experts of the APSF TA Team, a video presentation on IWRM in the European Union and an open discussion, in the form of public consultation. The four technical presentations were:
  - i) Introduction to IWRM-concepts and applications in Europe by Mr. Nick Ahrensberg, APSF Technical Expert
  - ii) IWRM issues for the Pampa Basin by Mr. Vijay Kumar, APSF Component Leader
  - iii) The importance of public participation and stakeholder engagement by Ms Annemieke Alberts, APSF Technical Expert
  - iv) Outcome of issues identified in the Pampa Basin during the workshop on May 25, 2010 by Dr. George Chackacherry, Scientist, CWRDM and Member of the Coordination Committee of Pampa River Basin Authority
- 2.2. The Open Discussion and Public Consultation session was chaired by Dr. Jayakumar, Director, CWRDM.
- 2.3. At the end of the day, a Press Conference was organized to share the vision on the pilot project of the Pampa River Action Plan for the benefit of the general public. Several media houses from the electronic and print media participated in the Press Conference.

#### 3. Proceedings of the Workshop

##### 3.1. Opening and Inaugural Sessions

- 3.1.1. The workshop had a slightly delayed start at 10:20 hrs, because of the long distance travel of participants from the Pampa river basin and some misunderstanding of the venue. In his welcome address by Dr. Paul Holmes, recalled the workshop held on May 25, 2010 and briefly covered the

discussion highlights. He welcomed all the participants and thanked them for having it made it to the workshop. He then introduced the technical team members of the APSF team and stressed that they will be working with the participants in the preparation of the Pampa River Basin Action Plan.

- 3.1.2. Mr. L Radhakrishnan Nair, IAS, Principal Secretary, Water Resources Department, Government of Kerala, specified the objectives of the workshop and the purpose of developing the Pampa River Basin Action Plan. He clearly placed before the participants the four top priorities of water use as spelt out in the state water policy i.e. i) drinking water ii) irrigation iii) power and iv) fisheries. The Pampa River Basin Action Plan will factor in multiple uses of water and strive to arrive at judicious use of water. His address covered the following key issues:
- i) A balance needs to be arrived between competing needs between drinking water, irrigation, tourism and pilgrimage use
  - ii) Water pollution is a major problem due to municipal waste. The impact of this needs to be minimized (cannot be eliminated altogether)
  - iii) Downstream problems such as salinity and pesticide pollution needs to be managed effectively
  - iv) Sand mining along the river is rampant, which is affecting the flow of water
  - v) Depleting groundwater table and heavy metal pollution of groundwater table cannot be ignored
- 3.1.3. He further stressed that sustainable development of water resources is the key issue. This is more relevant to Pampa Basin, because Pampa River Basin Authority is only a 'virtual organization, and there is a lack of ownership. The need to transform Pampa River Basin Authority from "virtual organization" to "real organization" is a big institutional challenge. The institutional arrangements can be on a "mission mode" or on an "embedded mode" within the department. All options need to be examined and the most appropriate and workable strategy needs to be adopted. This is where the successful international models come into focus.
- 3.1.4. Pampa River Basin Authority needs funding support. He recalled the workshop held on May 25, 2010 at Hotel Mascot and mentioned that there is an array of funding options for Pampa. Multilateral agencies, GoI, and many other national and international organizations are willing to extend funding support. Through a meaningful Pampa River Basin Action Plan, we need to place our strategy and take the issue forward.

## 3.2. Technical Presentation Sessions

- 3.2.1. The Opening and Inaugural sessions were followed by four technical presentations. The summary of the presentations are briefly described below.
- 3.2.2. Introduction to IWRM Concepts and Applications in Europe: Case Studies. Mr. Nick Ahrensberg presented the concepts and applications of IWRM and the lessons from implementation in Europe and Brazil. His presentation covered the following key aspects:
- i) History of changes in water resource legislation and management in Europe
  - ii) Transition from sectoral to integrated approach
  - iii) Two different waves (1975-1980 first wave and 1980 to 1990 second wave) of changes in IWRM
  - iv) Development of Water Framework Directives
  - v) Emphasis on the protection of Surface Water and groundwater sources
  - vi) Review of WQ norms every six years
- 3.2.3. IWRM issues for the Pampa Basin. The presentation on this aspect was covered by Mr. Vijay Kumar. He stress on the importance of viewing water uses from an integrated perspective, rather than from the conventional sectoral perspective. This brought forward the need to look at water from the stakeholder point of view. He then moved on to highlight the need of IWRM and to position a trans-boundary organization to manage water uses in an effective manner. He placed the concept of IWRM in the 3 E framework (Efficiency, Equity and Environmental Sustainability).
- 3.2.4. He classified water uses into four broad clusters viz. Water for People, Water for Food, Water for Nature and Water for Other Uses. He also presented another angle of viewing water from the perspective of sources of water (ground water and surface water) and various uses of water (urban water supply, rural water supply, agriculture, irrigation, drinking water etc) This is how the contextual setting of IWRM is set in the State Water Policy. The current need is to institutionalize IWRM in a formal manner. The Pampa River Basin Authority must be supported by funds and functionaries to make it a 'real' organization.
- 3.2.5. The IWRM issues for the Pampa Basin as identified by the group in the workshop on May 25, 2010, using WRIAM tool was then presented by him.
- 3.2.6. He categorized the IWRM challenges as i) the technical and ii) governance. Some of the technical challenges are:
- i) Pollution
  - ii) Forest degradation
  - iii) Depletion of ground water table

- iv) Salinity
- v) Deterioration of lakes and other water bodies
- vi) Environmental degradation
- vii) Inadequate base flow
- viii) River bank encroachment
- ix) Poor data collection and management
- x) Silting of reservoirs

He further summarized key governance challenges as follows:

- i) Moving from sectoral approach to holistic approach
  - ii) Transitioning from supply based approach to demand driven approach
  - iii) Separating regulation from management
  - iv) Building competence for IWRM
  - v) Recovery of costs
  - vi) O&M systems
  - vii) Managing O&M cost, capital cost, environmental cost and total cost
- 3.2.7. The session on the importance on Public Participation and Stakeholder Engagement was managed by Ms. Annemieke Alberts. She covered various issues involved in public participation and emphasized the need for engaging public in managing IWRM issues because ownership of such initiatives is closely linked to public participation. Political commitment is a necessary ingredient to ensure public participation and the subsequent project ownership. Based on experiences elsewhere, she argued that the success or failure of IWRM resides more in political issues and less in technical parameters.
- 3.2.8. Supplementing the points presented by Ms. Annemieke Alberts, Dr. Jaya Kumar mentioned that evidence indicates that successful project implementation requires strong political commitment. He cited the example of Ganga Action Plan. The water that is flowing in the Ganges today is of much better quality than that was of the 1980s. This could be achieved because of strong political commitment and powerful administrative resolve. This he said, holds lessons for Pampa.
- 3.2.9. The session was followed by a presentation of the Outcomes of Issues identified by participants in the workshop organized on May 25, 2010. The session was lead by Dr. George Chackacherry. He briefly recalled the workshop processes followed on May 25, 2010 and mentioned that valuable discussions took place in that workshop. He then presented the outcome of the issues discussed.
- 3.2.10. He opened his presentation with a premise that water management cannot be treated in isolation because all uses are inter-dependent in nature. Consideration of all uses is important to ensure sustainable management of water. He contextualized sustainable water management against the four Dublin Principles viz. i) fresh water is a finite and vulnerable resource ii) water development must follow a participatory approach iii) women play a central part in water use and development and iv) water has an economic value and therefore, should be treated as an economic good.
- 3.2.11. The issues identified on May 25, 2010 in the Pampa river basin consisted over 100 in number, ranging from shortage of surface water availability, ground water depletion and water quality issues. The situation analysis shows that the water related risks need to be managed well. He briefly explained the process of ranking of issues using participative method (WRIAM tool) and presented the issues in the order of their relative ranking. Many participants amplified the fact that sand mining, pollution and sedimentation are important issues in the Pampa river basin.

### 3.3. Discussion and Public Consultation Session

- 3.3.1. The post-lunch session was dedicated to open discussions on a range of issues, in which all participants actively participated. The session was chaired by Dr. Jaya Kumar, Director, CWRDM. In his opening remarks, Dr. Jaya Kumar mentioned that IWRM is a key for effective management of water. There are many examples of this in India and abroad. We can scientifically determine the quantity of water availability in a river basin and how much we can extract to ensure proper river basin management.
- 3.3.2. In the discussion that followed, the following representatives from the NGOs, GPs and the departments actively participated and presented their view points.
- i) Mr. N K Sukumaran Nair
  - ii) Ms Sreeja Vimal
  - iii) Ms Mini Shyama Mohan
  - iv) Ms Mariamma Joseph
  - v) Ms Raman Kutty Amma
  - vi) Ms Gracyamma Mathew
  - vii) Mr A Nazaruddin
  - viii) Ms Savithry Balan
  - ix) Mr V G Mohanan
  - x) Mr. G Gopala Krishnan Pillai

The highlights of the discussion are summarized below.

- 3.3.3. The issue of faecal contamination of ground water due to unscientific spacing of septic tanks raised keen interest amongst participants. Mr. Babu Joseph of the Groundwater department mentioned that there cannot be a universal norm of 15 meters of spacing because spacing depends on the nature of soil and other geo-physical conditions. Dr. Jaya Kumar clarified that the norm is not universal; it represents only a general picture. Many GP and NGO representatives wanted to know if there was a norm for the Pampa basin. Decentralized septic tank management possibilities were also briefly touched upon.
- 3.3.4. After some prolonged discussion, a consensus was arrived at that bacterial contamination of ground water and surface water has reached alarming magnitude in the Pampa river basin and there is an urgent need to manage it effectively. The Pampa River Basin Action Plan must incorporate this aspect.
- 3.3.5. The participants also felt that amongst the issues ranked on May 25, 2010 ground water depletion and pollution did not figure as prominently as it should. The field realities contradict the ranking. Therefore, this needs to be reviewed. Mr. Sukumaran Nair emphasized that surface water runoff is high because of the gradient and ground water depletion is noticeable. This needs explanation. Dr. George clarified the ranking is only a first level scan; it will be further validated by field level verifications.
- 3.3.6. Most participants felt that Pampa requires long term solution. Indiscriminate sand mining has been going on for several years. It has now reached an alarming proportion. Some participants argued for enhancing water holding capacity through various methods such as artificial recharge and by creating small reservoirs at various locations. Using NREGS can be explored to do this.
- 3.3.7. Savithry Balan mentioned that illegal sand mining along the basin at night and plastic waste are two major problems. She also said that bio-diversity is increasingly coming under threat. All these issues must become integral issues to IWRM in the Pampa basin.
- 3.3.8. Dr. Jaya Kumar stressed on the need for the Gram Panchayats (GPs) to become more vigilant and active in basin management. They have a significant role in educating public and enforcing laws. Dumping of commercial waste, including plastics directly in to the river can be regulated by the GPs. Tamil Nadu has demonstrated that such regulations are possible.
- 3.3.9. Grace Mathew expressed her opinion on the need for effective river bed management. The river narrows down during summer months and flood becomes a major crisis point during monsoon. GPs on their own cannot able to manage such issues; they need technical help during such times.
- 3.3.10. Many participants, including representatives of the government departments felt that post-pilgrim season is the most crucial for the management of Pampa river basin. The waste residuals of traditional rituals are a major problem. Some even argued that visitors from within Kerala display better awareness and sensitivity and it is pilgrims from other states leave waste indiscriminately. Therefore, awareness creation amongst pilgrims must be carried out at their origin states.
- 3.3.11. The representative of Kerala Water Authority (KWA) mentioned that reduced flow in the river is affecting supply. This issue has been discussed with the District Collector and long-term solution needs to be worked out.
- 3.3.12. Ms Sreeja Vimal amplified the need to have IWRM for Pampa in place as quickly as possible. Drinking water is becoming an increasing problem in many villages. Media is raising these issues frequently, enforcement of laws is weak. Coverage of toilets is high. However, that has created associated problems such as over use of flush water and ground water pollution. We must have technology for efficient water use at all levels. We also need river bank protection methods because of soil erosion. The metaphor that "Holy River Pampa is dying is not a distant nightmare. It is increasingly becoming real", she forcefully argued for quick solutions.
- 3.3.13. Ms Mariamma Joseph and Mr. Nazaruddin stressed on the point that drinking water problem is acute during the peak pilgrim season and pollution is also becoming unmanageable. Encroachment of river bed is common and GPs are aware of this problem. There is proper drainage in the basin. Poor coordination amongst various departments is endemic to the system and consequently no corrective actions are initiated. Dr. Jagadeesh supported their opinion and mentioned that water resource management is isolated. All departments including Health, Agriculture, Environment and GPs should work together. The EU example can be a lesson in this regard.
- 3.3.14. Mr. Sukumaran Nair argued for area-specific actions in the Pampa River Basin Action Plan. Upstream and downstream issues need to be treated separately. Similarly, Kutannad regional issues (to which river Pampa drains into) need to be taken up separately. There are many unique species of native trees, flora and fauna which must be taken into consideration in IWRM planning so as to arrive at proper ecological balance. Micro-level water shed development within Pampa River Basin Action Plan could be an answer to this, he pointed out.



- 3.3.15. The representative of the Forest Department and the representative of the State Pollution Control Board supported the idea of water shed management. They also argued for wide spread public education and the need for awareness raising amongst pilgrims.
- 3.3.16. Dewasom Board representative mentioned that sewage treatment facilities are lacking and the two STPs sanctioned are yet to be commissioned.
- 3.3.17. Dr. Jaya Kumar shared the results of the limited water quality study carried out by WRDM and mentioned that this is only a beginning. This will be taken forward and the entire basin will be covered. He also mentioned the initiative of forming Water Clubs in twenty schools and the training of 250 teachers. This, he said, could be integrated into the IWRM Action Plan. He further added that many good models of kitchen waste management and grey water management available across India which can be adapted to the Pampa river basin.
- 3.3.18. All participants felt that the problem of GW water quality cannot be undermined and it needs further in-depth discussion.

#### 3.4. **Concluding Session**

- 3.4.1. Dr. George Chakkacherry led the concluding session and thanked all the participants for their valuable contribution. He summarized the discussions of the day and mentioned that this workshop will be followed up with field level consultations. He covered the following list of technical, managerial and social components that need consideration in the IWRM Draft Action Plan.
  - i) Increasing levels of water pollution
  - ii) Increasing levels of human waste
  - iii) Slaughter house waste management
  - iv) Plastic waste management
  - v) Drinking water supply management
  - vi) Ground water study
  - vii) River stabilization and river bank protection
  - viii) Toilet soak pit management
  - ix) Special actions for areas below MSL
  - x) Use of traditional knowledge and values
  - xi) Protection of native flora and fauna
  - xii) Effective use of River Management Fund
  - xiii) Encroachment
  - xiv) Convergence with Total Sanitation Campaign program and NREGS
  - xv) Effective coordination with multiple departments
  - xvi) Upstream and downstream management
- 3.4.2. The workshop concluded with a vote of thanks by Dr. Paul Holmes. He mentioned that the workshop proceedings will be documented and ideas and opinions expressed by the participants are highly valuable and they will be used while developing the IWRM Draft Action Plan for the Pampa River Basin.



# Annex 6 Report workshop July 2010



# Pamba Pilot Project

## Workshop on management constraints and possible actions in the context of Integrated Water Resources Management

Trivandrum, 22<sup>nd</sup> of July 2010



### EU-India Action Plan Support Facility

This project is funded by:



The European Union

Implemented by:



## Report

### Introduction

Policy Support to Integrated River Basin Management” aims to contribute to the continuing EU-India policy dialogue in the water sector by providing policy support inter alia in project definition, stakeholder relations, capacity building and river basin planning to new river basin management authorities in various parts of India. It will seek to ensure that these authorities have access to current international best practice on integrated river basin management. The pilot project depends on a process driven and owned by the concerned authorities. The output from the activity will contribute to a model for river basin management throughout India.

The proposed Pamba Pilot Project resulted from Focus Group discussions organized by the APSF team with support of the MoEF. Main findings of the Focus Group were to create a common platform for different agencies which is to be exemplary for best coordination and to scale up the Pilot Project to be used as a replicable model for new RBO's (River Basin Organisations) in India. The Pamba Pilot project implementation was launched and inaugurated in February 10, 2010. The purpose of the inaugural session was to present the Action Plan Support Facility Project, the proposed Pamba Pilot Project and to identify main stakeholders related to water management in Kerala. This workshop indicated the need for a large scale IWRM training for a group of non specialists for both government and non-governmental organisations.

The second and third workshops were organized on 25<sup>th</sup> and 27<sup>th</sup> May 2010. The aims were to develop a situation analysis of the water resources issues the Pamba River is facing and secondly to roll out the main principles of IWRM to a larger non specialist group of stakeholders. A specific tool was used to explore the issues and ranked those according to their importance. Consequently the outcomes were presented in another workshop attended by local Panchayat representatives as well as local NGO's and a consensus was reached on the prioritized issues.

### The Session

Following the inaugural workshop in February and two successive stakeholder consultation workshops in May 2010, the Action Plan Support Facility (APSF) TA team organized a one day working session on identification of water management constraints and possible actions in collaboration with the Government of Kerala, on July 22, 2010.

**The day was inaugurated by *the Principal Secretary of Water Resource, GOK, Mr L. Radhakrishnan*. A total of 21 participants, representing various government departments and the civil society organizations participated in the workshop.**

CWRDM (Centre for Water Resources Development & Management) has again actively participated in the delivery of the workshop, presenting water governance strategy options and actions in a desired Pamba River IWRM Action Plan, covering various other supportive aspects and constraints of IWRM in the Kerala context.

The APSF team presented key features of the existing Pamba Action Plan and opportunities for updating it in accordance to the IWRM framework. Group work was facilitated by APSF to identify and agree on priority issues and consensus building on management problems and possible actions by using the three pillars of IWRM principles to represent identified solutions.

The work group sessions were structured under two broad heads: Issues related to Quantity and Quality. The group then discussed the issues and place all needed actions under the three pillars of IWRM i.e. i) Enabling Environment ii) Institutional Framework and iii) Management Instruments.

The workshop was organized in by the APSF Project with the support of the Water Resources Department, Government of Kerala. The list of stakeholders invited for the workshop was prepared in collaboration with the Water Resources Irrigation and Administration Department.

#### **Proposed IWRM roadmap for the Pamba Pilot River Basin and the Draft Action Plan**

Outcomes of the workshops conducted throughout the year will form the basis for the development of strategies and priorities of the Draft Action Plan. The GoK has appointed CWRDM to develop the Draft Action Plan with support of the APSF team. It will set out clear and coherent objectives in line with best international practice as well as a timetable for implementation of priority actions. The plans will clearly indicate implementation responsibility and activities prioritised on clear short-, medium- and long-term. As well as the governmental authorities and institutions, the Draft Action Plans is ensuring means for public participation and engagement in civil society in the prioritization of actions. Options for funding priority actions will be identified and presented to the local authorities in charge.

Support and capacity building will continue to be provided to local and state government representatives taking part in the workshops. The TA team will attempt to ensure continuous participation of a selection of participants to build up knowledge in the process leading to a road map for the integrated management of the Pamba. To achieve the above, there is need to develop a transition plan, the so called Roadmap towards IWRM. The roadmap is a strategy for the formulation and implementation of the IWRM plan and will be developed by the APSF team and delivered to the GOK end of October.

The next workshop to be organized in September will be in the form of a consultation session at the Pamba basin, in selected local Panchayat with representation of the civil society and local government.

#### **Proposed next steps for the Pamba Pilot Project**

A Roadmap for the Integrated Water Resources Management of the Pamba Basin will endeavour to accelerate the IWRM process by building local commitment, analyzing gaps and preparing a strategy to develop a roadmap towards a Draft Action Plan. This roadmap should contribute to the improvement of water resources management and also access of its people to water supply and sanitation services. The IWRM approach facilitates mainstreaming water issues in the political economy of a country, as it focuses on better allocation of water to different water user groups and in so doing stresses the importance of involving all stakeholders in the decision-making process.

The draft IWRM Roadmap for the Pamba River Basin is being developed with input from various stakeholders and it is hoped that it will produce the synergy needed for sector collaboration and improvement.

#### **Step 1) Training session on IWRM for a wide group of stakeholders**

Identification of stakeholders and a participant list shall be composed with the assistance of the Water Resources Department

**Expected timeline: May 2010 - concluded**

#### **Step 2) Participatory planning session - Exercise on visualization of the future**

Steering Committee representatives together with a selection of key stakeholders at local level will identify interests at basin and sub-basin level and perception of water related problems and opportunities and rank them. Participatory Planning methodologies will be applied.

**Expected timeline: May 2010 - concluded**

### **Step 3) 'Short term' Action Planning**

Identification of a short list of priority implementable options based on exercise of visualization of the future. The Work Group will come together to discuss the results of assessments of the 'participatory planning session' held at local level and agree on general goals and principles of river basin management. Identify and prioritize actions that can and should be taken to preserve resources and support sustainable development in the Pamba basin. This will be compiled in a draft Action Plan and Logical Framework. Emphasis will be on practical problems that can be solved using existing resources.

**Expected timeline: July 2010**

### **Step 4) Develop a medium to long term plan**

After enough learning about IWRM among stakeholders, participants will be more able to prepare a medium to long-term plan for between 5 and 20 years duration. The principles of IWRM and elements of the European Water Framework can be promoted as general approach.

During this phase the following activities will take place:

- Identification and prioritization of actions
- Assignment of responsibilities
- Describing the implementation schedule
- Timeline for implementation
- Communication strategy
- Necessary resources mobilization strategy

**Expected timeline: Oct 2010**

### **Step 5) Presentation of Draft Action Plan to Authorities in charge & Options for financing**

The final Draft Action Plan will be presented to the Authorities of the GoK and options for funding priority issues will be presented.

**Expected timeline: Nov 2010**

### **Step 6) Dissemination of results**

Keeping in mind the objective of this pilot as being a tool for a replicable model on IWRM in India, participants and stakeholders will be involved together with the team of consultants in rolling out the experience obtained during the pilot project. Appropriate locations for road shows in India will be selected which maximize the impact of the sharing of experience.

Learning from all aspects of the policy support activity will be captured and disseminated in the form of flash notes and a summary report to participants and stakeholders. Key learning points, outline action plans and other suitable material will be made available to all practitioners through the Internet. Further dissemination in the form of international conference presentations, press releases or other publicity will be considered in coordination with the EC Delegation and the Ministry of Environment and Forests, depending on the nature of the findings.

**Expected timeline: Nov 2010 / 2011**



## Appendix 1. Agenda



**EU-India Joint Action Plan Support Facility  
Environment Component**



# Integrated Water Resources Management in the Pamba River Basin

Working session on Management Constraints and Possible Actions  
Hotel Mascot, Trivandrum, Kerala, 22 July 2010

<b>Programme</b>		
10:00 – 10:15	- <i>Opening of the workshop, objectives and agenda</i>	<i>Annemieke Alberts, APSF Activity Leader</i>
10:15 – 10:30	- <i>Inauguration of the Workshop</i>	<i>Mr L. Radhakrishnan, IAS Principal Secretary to Government, Water Resources Department</i>
10:30 – 11:00	- <i>Surface water Quantity &amp; Quality in the Pamba basin</i>	<i>Mr Thomas Mathew, Deputy Director, State Hydrology Data Centre</i>
11:00 – 11:15	<b>Tea &amp; Coffee Break</b>	
11:15 – 11:45	- <i>Ground water Quantity &amp; Quality in the Pamba basin</i>	<i>Mr. M. R. Ramesh, Superintending Hydrogeologist, Ground Water Department</i>
11:45 – 12:15	- <i>Existing Pamba Action Plan and opportunities for updating in accordance to the IWRM framework</i>	<i>Mr Nick Ahrensberg, APSF Technical Expert</i>
12:15 – 12:45	- <i>Where are we in the IWRM planning cycle, Water Resources Issues identified and ranked in the Pamba Basin</i>	<i>Mr Vijay Kumar, APSF Technical Expert</i>
12:45 – 13:30	<b>Lunch</b>	
13:30 – 16:00	<b>Groupwork &amp; Discussion</b>	
13:30 – 14:00	- <i>Possible IWRM strategy and actions in a desired Pamba River IWRM Action Plan</i>	<i>Chair, Mr Jeyaprasad, Chairman Kerala State Pollution Control Board Dr George Chackacherry, Scientist CWRDM</i>
14:00 – 16:00	- <i>Group Work &amp; Consensus building on Management Problems and possible actions</i>	
16:00 – 16:15	<b>Tea &amp; Coffee Break</b>	
16:15 – 16:45	- <i>Presentations of group work</i>	<i>Group</i>
16:45 – 17:00	- <i>Sum up of the day</i>	<i>Mr Rajesekharan Nair, Chief Engineer &amp; Project Director Pamba Authority</i>
17:00 – 17:15	- <i>Closure and Way Forward</i>	<i>Ms Annemieke Alberts, APSF Activity Leader</i>

## Appendix 2.

### Minutes of the Workshop, Trivandrum, 22<sup>nd</sup> of July 2010 Integrated Water Resource Management Working session on Management Problems and Possible Actions

Workshop Title	Working session on Management Problems and Possible Actions for Pamba River Basin
Venue	Sonata, Mascot Hotel, Thiruvananthapuram
Date	July 22, 2010
Time	10:00 hrs to 16:00 hrs

#### 1. Background

- 1.1. Following the inaugural workshop in February and two successive stakeholder consultation workshops in May 2010, the Action Plan Support Facility (APSF) TA team organized a one day working session on management constraints and possible actions in collaboration with the Government of Kerala, on July 22, 2010. The APSF Technical Assistance Program is funded by the European Union and supported by the Ministry of Environment & Forests, Government of India.
- 1.2. Ms. Annemieke Alberts, APSF Activity Leader welcomed the participants and recalled what has been achieved in the earlier workshops. She highlighted the expected objectives and presented the proposed agenda for the day. She further mentioned that this workshop is arranged in two parts. The first part to be held in the pre-lunch session will focus on presentations by the APSF consultants and the GoK representatives and the second part to be held in the post-lunch session will be dedicated to discussion on the IWRM related management problems and possible actions. She invited all participants to actively participate in the workshop and add value to the proceedings. She briefly recalled the discussions held in the two workshops in May and summarized the WRIAM tool results.
- 1.3. Ms. Annemieke followed up this by recalling the ten results of IWRM initiative. She highlighted on the fact that this workshop will cover Results 3, 4 and 6, while IWRM functions are already well defined and universally understood. (Refer Figure 1 for IWRM Results and their logical sequencing). She then invited Mr. L Radhakrishnan, Principal Secretary, Water Resources Department, Government of Kerala to address the participants.
- 1.4. Mr. L Radhakrishnan articulated that IWRM in Kerala has no precedence and therefore, we are all collectively learning new practices. He shared the information that the GoK has established the Pamba River basin Authority. With this, the first step in IWRM has been achieved by establishing the Pamba River Authority. There is good deal of awareness amongst the decision makers regarding the need for taking up IWRM initiative in the Pamba basin. In the last meeting of the authority held in June, Mr. Rajasekharan Nair, CE Irrigation Department has been named as the Chief Executive.
- 1.5. He further elaborated that although this is only a part-time arrangement, this is good beginning and a forward step. Many follow-up activities will have to be taken up, including exploring options for funding. He stressed that the GoK does not consider funding as a constraint and it can be obtained from multiple sources, including own funding by GoK, GOI and donor support.

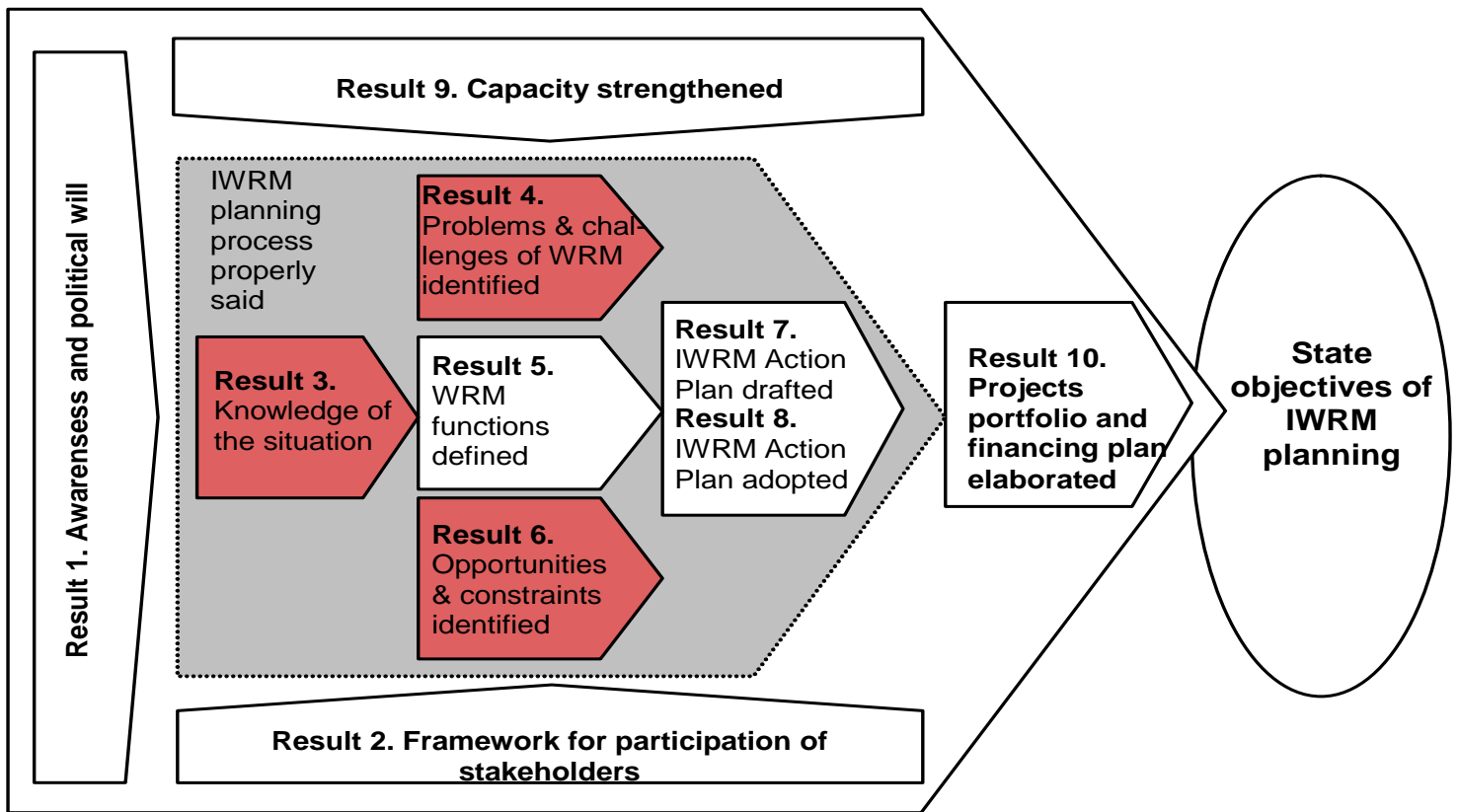


Figure1: IWRM results

- 1.6. Pamba has a rich heritage and has significant ecological value to the people of Kerala. Everyone living in and around Pamba is concerned about the diminishing surface flow and deteriorating quality of water. The competing demands by a variety of stakeholders in the Pamba basin has given rise to over exploitation of resources. Therefore, it has become increasingly important to use IWRM principles in the Pamba basin.
- 1.7. He expressed his disappointment with the non-representation of Dewassom Board in the workshop, despite confirmation of their participation. They are one of the most important players and their participation is critical for the success of IWRM in Pamba.
- 1.8. The TA team of APSF has helped the GoK in clarifying the concepts. Since it is green field project for the GoK, it is necessary to understand the best practices elsewhere and therefore, it would be appropriate for the consultants to share some successful examples and provide insights on the key aspects that need to be taken care of.
- 1.9. He acknowledged that onus of preparing the Action Plan for the Pamba Basin is with the GoK; consultants mandate being limited to provide only broad direction and providing sector expertise. In this regard, GoK is in dialogue with CWRDM to draw upon their institutional knowledge. He stressed that the Action Plan will be prepared by October 2010, although the time line is very tight.
- 1.10. The Authority will be staffed by full time professionals by the GoK. The next meeting of the Authority is on August 30, 2010. He urged all participants to make use of the opportunity and discuss all issues in detail. In the interest of smooth transition from sectoral management to IWRM, it is important that all departments work in tandem. Therefore, he emphasized that all those who are interested in gaining a new perspective on IWRM may opt to work with the consultants voluntarily.
- 1.11. A total of 21 participants, representing various government departments and the civil society organizations participated in the workshop.

## 2. Agenda of the workshop

- 2.1. The pre-lunch sessions of the workshop were well laid out with two presentations by officers of the State Hydrology Data Centre, one from the Surface Water and the other by the Groundwater. The temporal and spatial data collected by these two wings on hydrology forms an important input for the development of IWRM in Pamba. Therefore, APSF TA team thought it would be pertinent to invite them to the workshop and seek their involvement in the project development stage itself.

Following the opening and inaugural sessions, the workshop was sequenced as follows:

- APSF background, Objectives of this workshop and IWRM strategy-Presentation by Annemieke, Activity Leader of APSF
- Presentations on the availability of data sets (Surface Water, Groundwater) with specific reference to Pamba Basin by Data Centre Managers of Surface Water and Ground water
- Key features of the existing Pamba Action Plan and opportunities for updating in accordance to the IWRM framework by Nick Arhensberg, APSF Technical Expert
- Possible IWRM strategy and actions in the desired Pamba River IWRM Action Plan-Presentation by Dr. George Chackacherry, CWRDM
- The current status of GoK in the IWRM planning cycle, Water Resources Issues identified and ranked in the Pamba Basin. Presentation by Vijay Kumar, APSF Technical Expert.
- Group Discussion on Priority Issues and Consensus building on management problems and possible actions. Facilitated by APSF Team
- Closure and Way Forward. Discussion lead by Annemieke, Activity Leader, APSF Team

## 3. Presentation by the State Hydrology Data Centre Managers

- 3.1. The Surface Water wing and the Groundwater wing of the State Hydrology Data Centre presented the procedures adapted by them to collecting, analyzing and interpreting hydrology data, temporally and spatially. Thomas Mathew, Deputy Director of the Surface Water Data Centre stressed that the data is used mainly for the purpose of state level water resources planning and management. While recent data is available in digitize form, some old data sets are in manual form.
- 3.2. At first, he presented the overall picture of the state. The data centre collects hydrological, meteorological and SW WQ data from 44 rivers basins in Kerala. In these 44 river basins data is collected from 85 river gauge stations, 152 rain gauge stations, 9 full climatic stations and 10 level 1 WQ labs.
- 3.3. He then narrowed down to the Pamba river basin. In Pamba, hydrological data is available with data centre for six centres, of which in two locations data is available only up to 2003 and in four locations data is available up to 2008. Metrological data is collected from six stations and the processed data is available up to 2008. The rain fall plot indicates that the highest rain fall in 2008 was on 21<sup>st</sup> July (220mm). The plot also indicates that most of the rainfall occurred in four months i.e. between 15<sup>th</sup> April to 15<sup>th</sup> July. He also presented the plots of discharge vis-a-vis time for three stations in the Pamba basin. These data sets once updated to the current year will become very useful data inputs for IWRM planning.
- 3.4. This was followed by a presentation on Ground Water data by Ramesh, Senior Superintendent-Hydro-geology. The Ground Water department collects hydro-geological data from 871 observation wells at a frequency of once a month. The presentation also covered key characteristics of the river basin, including topography, geology, hydro-geology, structural deformation. The structural deformation is conducive to groundwater storage in large quantities. Ground Water data in Pamba basin is collected from custom built wells (tube wells, bore wells, open dug wells) some fitted with digital water level recorders.
- 3.5. Water level data is available from 2000 onwards and it is updated every year. For some wells historical data is available from 1982 onwards. Based on the ground water assessment conducted by the department, Pamba basin has been categorized as safe. This is very useful input for IWRM in Pamba. He also took the participants through composite hydrographs for bore wells and DWLRs, showing significant water level variation. The ground water pollution data that is available with the data centre will constitute an important input for IWRM. Ground water contamination in Pamba appears to be from four main sources viz. Mineralogical, Pathogenic, Saline ingress and Human activity related pollution (urban, hospital, municipal waste).
- 3.6. Participants sought clarifications from the state data centre on the following:
- Adequacy of net work to realistically represent the basin
  - Type and frequency of analysis of WQ data
  - Studies to assess the impact of risks
  - Data availability on soil erosion

- Studies on sand mining i.e. the extent to which this type of economic activity conflicting with ecological activity
- 3.7. While the state data centre collects and analyses hydrological data, most of what is available is not current. In addition, data accessibility is not easy. While at one level, the available data provides a broad picture, it is not fully equipped to meet the specific data needs for IWRM planning.

**4. Existing Pamba Action Plan and Opportunities**

- 4.1. The post-tea session was taken up by Nick Ahrensberg, in which he summarized the key aspects of the existing Pamba Action Plan prepared by the State Pollution Control Board and highlighted the opportunities for updating it to meet the IWRM norms. The plan is a good beginning, but it is limited in its scope to pollution abatement. IWRM principles are broader. The missing aspects in the existing plan must be taken care of. Therefore, the need has emerged to prepare a comprehensive IWRM plan. Implementation of IWRM is much more time intense and generally it needs a time frame of 20 years. For example, preparation of a sound IWRM plan itself in Denmark took about three years and implementation took another 20 years.
- 4.2. He followed it up by taking the participants through the three pillars of IWRM and how changes can be introduced, as visualized in Figure 2 below.

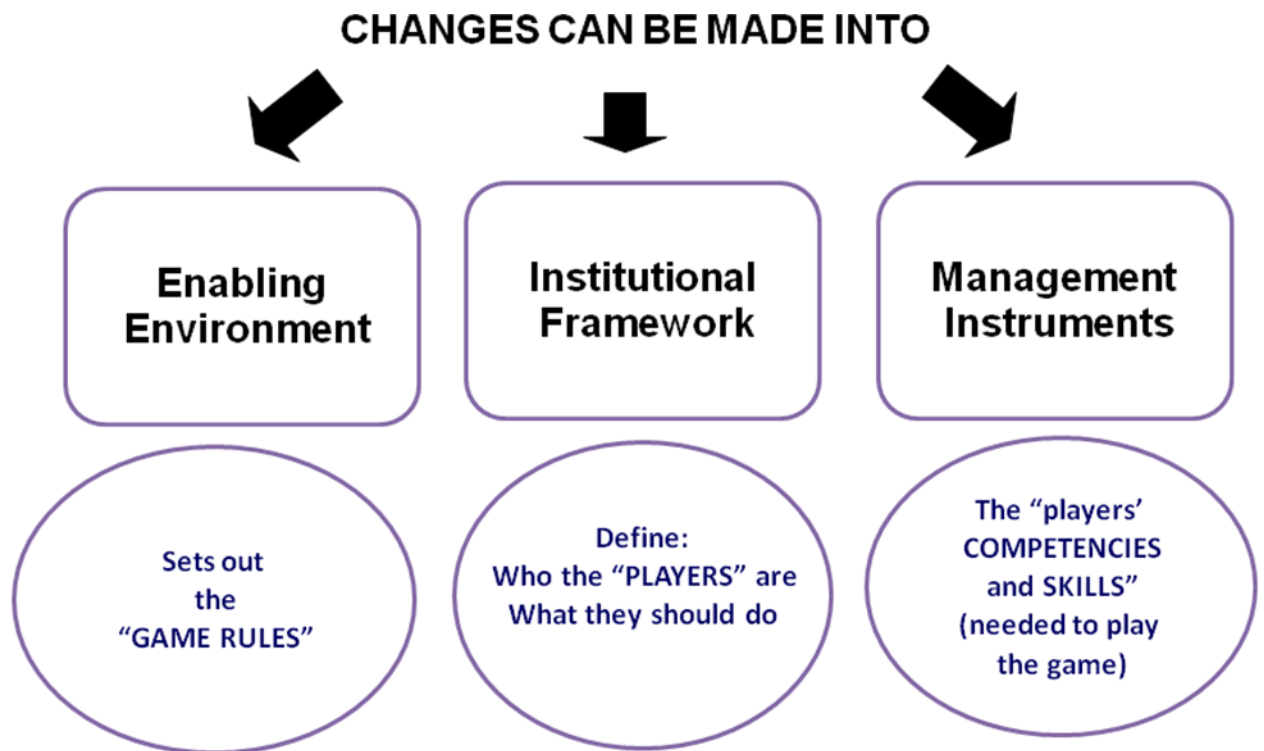


Figure 2: Three Pillars of IWRM

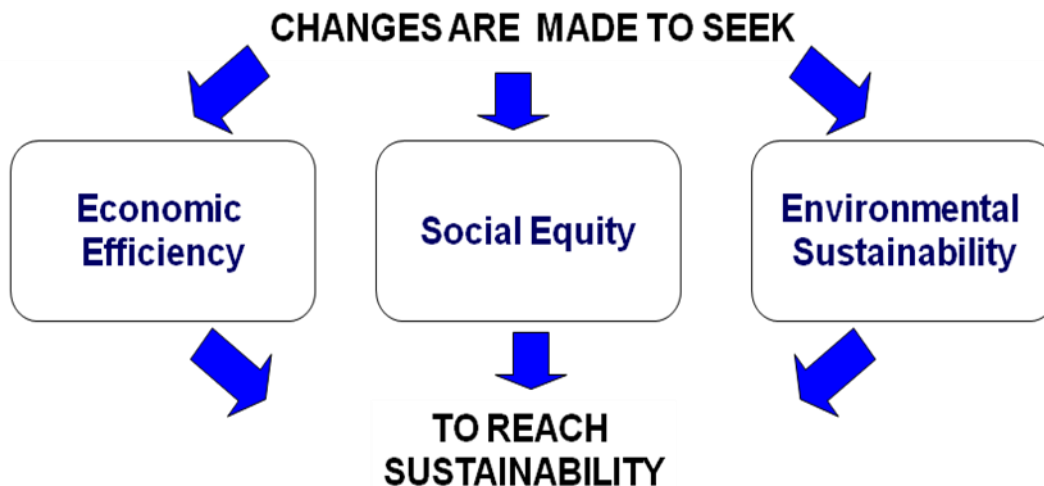
- 4.3. The ten result areas of IWRM and the key activities under each of the ten steps were then presented and discussed. A sound IWRM plan must ensure covering all the result areas. A wide range of clarifications sought by the participants is an indicator of the significant interest created amongst participants on IWRM. The questions included the following:
- How IWRM will work in an inter-sectoral/territorial environment?
  - Are there any guidelines on stakeholder consultations for IWRM?
  - The existing plan was prepared without deep stakeholder consultation. How do we upgrade this? Is there a model for stakeholder consultation in this part of the world?
  - How will the funding mechanism be organized?
  - Will the existing plan be ignored or will the new plan be built on the experience of the existing one?

- Are there any institutional models that will fit into Pamba basin?
- What are the post-Action Plan activities?

The APSF TA team responded to all the questions and clarified the doubts of participants.

## 5. Possible IWRM strategy and actions in the desired Pamba IWRM Action Plan

- 5.1. The post-lunch session on group work was chaired by Dr. Jey Prasad, Chairperson of the State Pollution Control Board (SPCB). Following recapitulation by Annemieke on the proceedings of the morning session, Dr. Jey Prasad in his address mentioned that river Pamba is not suffering because of lack of Action Plans. He further highlighted the key aspects of the current Action Plan and mentioned the delay in implementation because of various reasons, including lack of coordination. Funds are adequate. State government could not utilize funds. Lack of stakeholder interest and poor awareness are the other reasons for the delay. He also stressed that the new Action Plan to be prepared with the support of APSF team should not be a replacement of the current one; it should be more comprehensive. It should not remain at the 'hope' level. The proposed Pamba Authority should lead the formation of the IWRM plan and its implementation.
- 5.2. The session on possible IWRM strategies was lead by Dr. George Chackacherry of CWRDM. Following a recapitulation of IWRM vision and strategies, he presented the options before the Authority. He also visualized the three dimensional changes that are necessary in IWRM to attain sustainability in the framework, as presented in Figure 3 below.



**Figure 3: Framework to reach sustainability**

- 5.3. He then presented the four change levels that are the necessary ingredients of IWRM i.e. i) water supply and sanitation ii) water and agriculture iii) water and environment and iv) water and other uses
- 5.4. George covered various other supportive aspects and constraints of IWRM in the Kerala context. Kerala Water policy has set the enabling environment for initiating IWRM, because it specifically mentions IWRM as the key for water resource planning in the state. However, hydrological data management is the weak link that needs to be strengthened. CWRDM has project specific data which can be leveraged. He also dwelt on other institutional and policy related issues such as cost recovery, financial sustainability and enforcing 'polluters pay' principle against the context of changes that are required to realize IWRM from concept to practice.

## 6. Water Resources Issues identified and ranked in the Pamba Basin and introduction to group work

- 6.1. This session was anchored by Vijay Kumar, Technical Expert of the APSF team. In his presentation. The clarifications sought by the participants were responded to by Nick and other team members of APSF, which are summarized below:

- Inter-sectoral working is the reality everywhere. The limitations of inter-sectoral working drive the need for IWRM. Establishing River Basin Organization is the first step towards achieving IWRM. Preparation of IWRM plan takes three to seven years and implementation takes about 20 years.
  - Stakeholder consultations need to be specific to the context. Because Pamba is a small river with no inter-state implications, consultations can be effectively done in the Pamba basin.
  - Funding mechanism can be a combination of internal and external funding i.e. GoK, Gol and bilateral or multilateral donors.
  - Post-Action Plan activities are very important. They will include institutionalizing the Pamba RBO, staffing and training etc.
  - There are no tailor made formulas for IWRM. It has to be evolved to suit the context, specific to Pamba basin.
- 6.2. He covered the contextual setting of Pamba river basin and moved on to summarize the issues identified in ten earlier workshop using WRIAM tool. He suggested structuring the group discussion under two broad heads i.e. Issues related to Quantity and Quality. The group then could discuss the issues and place all actions under the three pillars of IWRM i.e. i) Enabling Environment ii) Institutional Framework and iii) Management Instruments. He then presented the following priority issues that have been relatively ranked in the higher order by all stakeholders:
- 6.3. Surface Water Quantity: Four priority issue under this category are:
- i) Sand Mining
  - ii) Encroachment
  - iii) Sedimentation of Reservoirs
  - iv) Abstraction for urban water supply
- 6.4. Demand v/s Surface Water Availability: Two priority issues under this category are:
- i) Demand on Eco system (Quantity and Quality)
  - ii) Pilgrims and Tourism
- 6.5. Surface Water Quality: Five issues were ranked during the WRIAM exercise (Demand for urban water supply, Demand for rural water supply, Demand from environment, Demand for fisheries, and Demand for Hydropower). Since water quality problem for the urban and rural water supply mainly arise from the pathogenic and organic pollution that is occurring due to discharge of untreated sewage into the river, one factor considered for discussion under this category is:
- i) Pathogenic Pollution
- 6.6. Ground Water Quality: Reduced availability, perturbation of infiltration, reduced availability (because of short-term variability of precipitation and/or because of abstraction for water supply) were the factors ranked relatively higher in the WRIAM tool. However, some of these were out of sync with the general perception as articulated by many; the group was asked if there is a need to revisit the ranking. The group was also presented the fact that faecal contamination of ground water due to unscientific spacing of septic tanks is important. The spacing depends on the nature of soil and other geo-physical conditions but these factors are often not taken into account. Therefore, in IWRM this issue needs to be factored in.
- 6.7. Risks imposed by Water Resources: Soil erosion, loss of crops, accidents (dam bursts), damage of infrastructure are the four higher ranked issues that need to be considered.
- 6.8. After providing the above background, Vijay Kumar introduced the group work process and the expected end result of the process. Although it was initially proposed to conduct group discussions in two sub-groups, one considering issues related to quantity and the issues related to quality. Participants however, preferred to hold the discussion in the plenary due to unfamiliarity of many members with the IWRM issues and a complex inter-play of quantity and quality issues. Therefore, it was agreed to lead the discussion in one group.
- 6.9. Thus the following aspects were taken up for discussion by the group:
- Reduced water availability due to:
- i) Sand Mining
  - ii) Encroachments
  - iii) Sedimentation of reservoirs
  - iv) Abstractions for urban water supply
  - v) Reduced water availability due to demand for
  - vi) Ecosystem
  - vii) Pilgrimage and tourism
  - viii) Insufficient surface water quality due to pathogenic and organic pollution
  - ix) Insufficient surface water quality in urban and rural water supply
  - x) Insufficient ground water quality due to pathogenic and organic pollution
  - xi) Soil Erosion due to Floods
- 6.10. To provide a form and a uniform structure to the discussion, it was agreed that the group will follow the format presented below, using the three pillars of IWRM principles to represent identified solutions.

Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
		Enabling Environment		
		Institutional Framework		
		Management Instruments		

6.11. Participants had some initial difficulties in comprehending the suggested framework, especially the distinctive actions between the three pillars of IWRM. However, they were resolved by the APSF team by providing an example of possible actions and the necessary help during the discussions. The results of the group discussion are presented below:

Issue	Management Constraints	Identified Solution	Responsibility	Expected Timeline
Surface Water Quantity	<ul style="list-style-type: none"> <li>• Weak inter-sector/inter-department coordination</li> <li>• Lack of human resources</li> </ul>	<p><b>Enabling Environment</b></p> <ul style="list-style-type: none"> <li>• Legal framework exists (minor modification required)</li> </ul> <p><b>Institutional Framework</b></p> <ul style="list-style-type: none"> <li>• Closer coordination between WR, LSG, Police, Forests, Power etc.</li> </ul> <p><b>Management Instruments</b></p> <ul style="list-style-type: none"> <li>• CWRDM and CESS to assess and to set norms</li> <li>• Promote community involvement for enforcement</li> </ul>	<p>WR</p> <p>WR</p> <p>Irrigation, KWA, LSG</p>	



Issue	Management Constraints	Identified Solution	Responsibility	Expected Timeline
Surface Water Quantity	<ul style="list-style-type: none"> <li>Weak capacity both in terms of number of and expertise</li> </ul>	<p><b>Enabling Environment</b></p> <p>-</p>		
Encroachment		<p><b>Institutional Framework</b></p> <ul style="list-style-type: none"> <li>Nominate a single department and assign the role of river boundary demarcation</li> </ul>	RBO	Not Identified
		<p><b>Management Instruments</b></p> <ul style="list-style-type: none"> <li>Promote community involvement for enforcement</li> </ul>	RBO, LSG	

Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Surface Water Quantity	<ul style="list-style-type: none"> <li>Missing linkages of WR with catchment organization (e.g. forestry, revenue)</li> </ul>	<p><b>Enabling Environment</b></p> <p>Promote integrated working in departments</p>		Not identified
Sedimentation		<p><b>Institutional Framework</b></p> <p>RBO to take lead role in promoting catchment area treatment</p>	<ul style="list-style-type: none"> <li>RBO</li> <li>LSG</li> </ul>	
		<p><b>Management Instruments</b></p> <ul style="list-style-type: none"> <li>Assess rate of silting scientifically</li> </ul>		

- Use bio fencing Techniques
- Promote community involvement

Issue	Management Constraint	Identified Solution	Responsibility
<p>Surface Water Quantity</p> <p>Sedimentation</p>	<p>Missing linkages of WR with catchment organization (e.g. forestry, revenue)</p>	<p><b>Enabling Environment</b></p> <p>Promote integrated working of departments</p> <p><b>Institutional Framework</b></p> <p>RBO to take a lead role in promoting catchment area treatment</p> <p><b>Management Instruments</b></p> <ul style="list-style-type: none"> <li>▪ Assess rate of silting scientifically</li> <li>▪ Use bio-fencing techniques</li> <li>▪ Promote community involvement</li> </ul>	<p>Forest Revenue Agriculture LSG</p> <p>RBO, LSG</p>

Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Demand for Eco-system	Missing scientific assessment system	<p><b>Enabling Environment</b></p> <p>-</p> <p><b>Institutional Framework</b></p> <ul style="list-style-type: none"> <li>• RBO to take a lead role in promoting catchment area treatment</li> </ul> <p><b>Management Instruments</b></p> <ul style="list-style-type: none"> <li>Create additional storage</li> <li>Develop models for ensuring minimum flow</li> <li>Ensure minimum flow</li> <li>Research and Development</li> <li>Human resource development</li> </ul>	RBO, LSG, Fisheries	Not Identified

Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Pollution	<p>Weak policy framework</p> <p>No proper sewage management system</p>	<p><b>Enabling Environment</b></p> <ul style="list-style-type: none"> <li>Policy regulation</li> <li>Scientific toilet designs and multiple options</li> <li>On-site sanitation systems</li> </ul> <p><b>Institutional Framework</b></p> <ul style="list-style-type: none"> <li>Enforcement of rules</li> </ul>	RBO, LSG, KWA, SPCB, Planning Board	Not Identified

		<p><b>Management Instruments</b></p> <p>STPs, decentralized sewage management</p>		
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Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Solid Waste Management	<p>Inadequate solid waste management facilities (e.g. land filling sites)</p> <p>Over emphasis on centralized systems</p> <p>Inadequate human resources</p>	<p><b>Enabling Environment</b></p> <p>Waste management policy</p> <p><b>Institutional Framework</b></p> <p>Promote decentralized waste management solutions</p> <p><b>Management Instruments</b></p> <p>Awareness creation on segregation of waste at source</p>	<p>LSG, District Administration, SPCB</p>	Not Identified

Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Floods	<p>Reclamation of wetland for non-farming activities</p> <p>Poor flood forecasting mechanism</p>	<p><b>Enabling Environment</b></p> <p>Disaster mitigation policy framework</p> <p><b>Institutional Framework</b></p> <p>-</p> <p><b>Management Instruments</b></p>	<p>RBO, Disaster</p>	Not identified

Human resources Capacity development	Management Authority
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Issue	Management Constraint	Identified Solution	Responsibility	Expected Timeline
Bio-diversity (loss of bio-diversity due to pollution, sand mining, rapid urbanization etc)	-	<p><b>Enabling Environment</b> Sensitivity towards preserving bio-diversity among political and top level administrative hierarchy</p> <p><b>Institutional Framework</b> Fully functional Bio-diversity Board</p> <p><b>Management Instruments</b> Restoration of eco-system Promote native species</p>	RBO, Bio-diversity Board	Not Identified

Note: This issue was taken up additionally, although it did not figure as a high ranked issue in the WRIAM exercise. Most participants felt that this is an important issue that cannot be undermined in the context of IWRM.

## 7. Concluding Session

- 7.1. The concluding session was chaired by Mr. L. Radhakrishnan, Principal Secretary, Water Resources. He thanked the APSF team for their excellent support and all the participants for their contribution and amplified the need for future support from the TA team of APSF. He stressed on the fact that GoK is committed to the cause and it would ensure that funds are not a constraint. There is also a need for NGOs to play a greater role for making IWRM a reality and all departments need to work in tandem.
- 7.2. Annemieke thanked the participants and mentioned that the APSF team is committed to provide further support in collaboration with CWRDM and the next stakeholder meeting is planned to be held in the Pamba basin in September. The road map for preparing IWRM Action Plan will be submitted to the GoK and the EU in October 2010.



# Annex 7 Report workshop September 2010





# Pamba Pilot Project

## Public consultation workshop on water related issues identified by local stakeholders

Chengannur, 27<sup>th</sup> of September 2010



## EU-India Action Plan Support Facility

This project is funded by:



The European Union

Implemented by:



## Report

### Introduction

Policy Support to Integrated River Basin Management” aims to contribute to the continuing EU-India policy dialogue in the water sector by providing policy support inter alia in project definition, stakeholder relations, capacity building and river basin planning to new river basin management authorities in various parts of India. It will seek to ensure that these authorities have access to current international best practice on integrated river basin management. The pilot project depends on a process driven and owned by the concerned authorities. The output from the activity will contribute to a model for river basin management throughout India.

The Pamba Pilot Project is being implemented through a series of workshops guiding the participants through a process of identifying the main issues related to water as well as the main issues related to the management of water resources. The sessions conducted ensure wide participation from different government sectors as well as the public sector represented by NGOs.

On 27<sup>th</sup> of September a final workshop was organized at the banks of the Pamba River in the city of Chengannur. The event was organized by the Irrigation & Water Resources Department, Thiruvananthapuram. The APSF technical assistance team prepared the agenda and the programme. The objective of the stakeholder consultation was to obtain the views of local stakeholders on most important issues the Pamba River is facing. This exercise was conducted by ranking the most important issues by groups of stakeholders representing the upper, middle and lower stretches of the Pamba basin.

### The Session

**The day was inaugurated by Mr Rajasekharan Nair, Director of the Pamba River Basin Authority. Ms Annemieke Alberts, Activity Leader of the Pamba Pilot Project introduced the objectives of the consultation session as well as the background of the project, followed up by a presentation of Dr George Chackacherry on general introduction to IWRM.** APSF Technical Advisor, Mr Nick Ahrensberg explained the group work. After the group work took place, Dr Chackacherry presented the prioritized issues identified throughout the pilot project for discussion and comparison the issues identified by local stakeholders. **A total of 77 participants, representing various government departments and the civil society organizations participated in the workshop.**

**The outcomes of the consultation session have been carefully assembled and analyzed for inclusion in the final IWRM Roadmap report for the Pamba River.**

### IWRM Roadmap for the Pamba Pilot River Basin and the Draft Action Plan

Outcomes of the workshops conducted throughout the year will form the basis for the development of strategies and priorities of a future Action Plan. The Roadmap will be finalized by the end of November 2010 and distributed to the GOK officials. It will set out clear and coherent objectives in line with best international practice as well as a timetable for implementation of priority actions. The plans will clearly indicate implementation responsibility and activities prioritised on clear short-, medium- and long-term, as well as the governmental authorities and institutions responsible for implementation.

## Appendix 1. Agenda



**EU-India Joint Action Plan Support Facility  
Environment Component**



# Integrated Water Resources Management in the Pamba River Basin

**Stakeholder consultation session on Water Resources Issues,  
causes and constraints**

**Hotel Bhagavat Gardens, Chengannur, Kerala, 27 September 2010**

Programme		
10:45 – 11:15	<i>Registration &amp; tea and coffee</i>	
11:15 – 11:30	- General introduction to the day	Mr Rajasehkar Nair, Irrigation Department, Chief Engineer
11:30 – 11:45	- Opening of the workshop, background, objectives and agenda	<i>Annemieke Alberts, APSF Activity Leader</i>
11:45 – 12:00	- Introduction to Integrated Water Resources Management	Dr George Chackacherry, Scientist, CWRDM
12:00 – 12:15	- Introduction to group work on issues, causes and constraints	<i>Mr. Nick Ahrensberg- technical advisor</i>
12:15 – 13:30	- Formulation of groups and Discussion & Consensus building on issues, causes and constraints	<i>Groups</i>
13:30 – 14:30	<b>Lunch</b>	
14:30 – 15:00	- Identified issues, causes and constraints	Dr George Chackacherry, Scientist, CWRDM
15:00 – 16:00	- Presentation of outcomes from groups & discussion	<i>Groups</i>
16:00 – 16:15	- Closure and Way Forward	<i>Ms Annemieke Alberts, APSF Activity Leader</i>
16:15	<i>Tea &amp; Coffee</i>	

## Minutes of the Meeting (By Department of Irrigation, GOK)

### Minutes of the stakeholder consultation session on Water Resources Issues causes and Constraints, Hotel Bhagavat Gardens, Chengannur, 27th September 2010

The meeting was arranged to collect public opinion regarding the issues connected with Pamba River and to discuss about the remedial measures that can be taken.

Sri. Rajasekharan Nair, Chief Engineer, Irrigation department inaugurated the meeting at 11.15am. He invited all the guests to the workshop and explained the purpose of the workshop. Central forest and environment ministry has appointed European Union consultants to prepare a draft regarding the protection of Pamba basin based on which the Pamba action plan is to be formed. European Union consultants were organizing workshop to collect public opinion regarding the problems in river Pamba and the remedies for the same. This was the 5th workshop organized by them.

The workshop was attended by Professors, Panchayath members, 'Sasthra Sahithya Parishath' members, Police officers etc. who residing by the river Pamba and who are well versed with the problems in Pamba for a long period. Officers from the Irrigation department, Kerala Water Authority, Pollution Control board etc. also attended the workshop. Ranni MLA, Sri. Raju Abraham who is a member of 'Pamba Samrakshana Samithi' was also present.

Ms. Annemicke Alberts, APSF activity leader explained why Pamba River is chosen as the pilot project for implementing integrated water resource management principles.

Sri. George Chackachery, scientist, CWRDM explained the principles of integrated water resources management. He also stated that the Pamba river basin authority was formed to properly coordinate various departments such as the Irrigation Department, Kerala Water Authority, Pollution Control board etc. which were all dealing with water resources and environmental issues and to make the activities more transparent to the public.

Mr. Nick Ahrensberg, Technical advisor, APSF gave an introduction to the purpose of the workshop and explained how to form groups to work on issues connected with river Pamba and its causes and constraints.

The participants were divided into three groups viz. those from the upper reaches of Pamba River, those from the middle reach and from the lower reach. The three groups actively discussed the issues. Morning session of the workshop ended at 1.15pm.

The afternoon session started at 2.15pm. In the afternoon session, the three groups presented the outcomes.

Sri. Paulus Eapen leader of the upper reach group pointed out the following:

#### **Problems & Constraints**

1. Pollution in the upper reaches of Pamba is mainly caused by Pilgrims visiting Sabarimala during 'Makaravilakku'.
2. Lack of awareness of people is leading to pollution.
3. Encroachment of land.

4. Lack of sewage treatment facilities.
5. Unavailability of land in Periyar tiger reserve to build sewage treatment facilities.
6. Unavailability of funds.
7. Lack of flow in river during 'Makaravilakku Season'

Prof. M.V. Sadasivan Nampoodiri leader of middle reach group pointed out the following issues:

**Problems & Constraints**

1. Sandmining causing deepening of riverbed and hence the lowering of water table.
2. Pollution both organic and chemical.
3. Problems caused by unregulated outflow from dams.
4. Encroachment of banks of Pamba.
5. Destruction of aquatic creatures due to pollution.

Dr. K.C. John leader of the lower reach group pointed out the following issues:

**Problems & Constraints**

1. Pollution by pesticides from Paddy cultivation.
2. Organic wastes from houseboats.
3. Dumping of plastic in the river.
4. Unavailability of pure drinking water.
5. Destruction of fishes and other aquatic culture.
6. Soil Erosion.

Some other participants also expressed their views regarding various issues faced by river Pamba and the remedial measures that can be taken.

Ms. Annemieke Alberts thanked the organizers of the meeting as well as the participants. The workshop adjourned at 3.45 pm.

**MINUTES ON THE MAJOR PROBLEMS FACED AS REPORTED BY THE GROUP OF STAKEHOLDERS REPRESENTING THE UPPER PART OF PAMBA RIVER**

10 most important water resources issues and ranking in terms of the importance of the issue in the Pamba Basin. For each issue, the cause and the constraints on mitigation of the problem if given.

ISSUE(EFFECT)	CAUSE	CONSTRAINTS
Pollution due to Sabarimala	Accumulation of large crowd in limited space in short time. Lack of treatment plants Lack of awareness Agriculture particulars	Limited space 2. Lack of fund 3. Un controlled increase of pilgrims.
Lack of flow in river	1. Dams 2. Forest degradation 3. Non implementation of Swami Saranam Project	1. Policy decision
Encroachment	1. Sand. mining 2. increase in depth river bed 3. River bank demarcation 4. Forest monitoring	1. Lack of involvement. and co-ordination of Government agencies and NGOs
Excess & indiscriminate sand mining	Frequent monitoring 1. Promotion of attention 2. Failure in implementation 3. Scarcity of sand	
Drinking water scarcity and ground water depletion	1. Lack of flow 2. Excess. domestic use 3. Lowering of river bed. 4. Degradation of Forest. 5. Over exploration of ground water	1. Convenience of officials concerned. 2. Lack of public awareness or water 3. Lack of rain water conservation 4. 3. Lack of monitoring of central agency
Bio diversity loss Attuvanchy Discharges and waste dump from towns	5. Lack of flow 6. constructing of permanent river banks Lack of bio remedies Lack of waste management 2. Lack of awareness.	Non availability of land for waste disposal Public operations. 3. Demographic structure 4. Urbanization of
Lack of sanitation enroute and from Bath ghat identification Public awareness	Non availability Lack of guidance Lack of waste management	







# Annex 8 Report workshop October 2010



## Pamba Pilot Project

### Final dialogue on IWRM for the Pamba River: Sharing solutions between India and the European Union

Thiruvananthapuram, 29<sup>th</sup> of October 2010



### EU-India Action Plan Support Facility

This project is funded by:



The European Union

Implemented by:



## Report

### Introduction

Policy Support to Integrated River Basin Management” aims to contribute to the continuing EU-India policy dialogue in the water sector by providing policy support inter alia in project definition, stakeholder relations, capacity building and river basin planning to new river basin management authorities in various parts of India. It will seek to ensure that these authorities have access to current international best practice on integrated river basin management. The pilot project depends on a process driven and owned by the concerned authorities. The output from the activity will contribute to a model for river basin management throughout India.

The Pamba Pilot Project has been implemented through 6 workshops guiding the participants through a process of identifying the main issues related to water as well as the main issues related to the management of water resources. Analysis was conducted taking the Pamba river basin as one single entity. The sessions conducted ensured wide participation from different government sectors as well as the public sector represented by NGOs and culminated in a consultation session held in Chengannur at the banks of the Pamba River in September 2010.

The objective of the different sessions held over a period of 10 months were to identify and engage main stakeholders and to provide the participants with an increased insight in IWRM and to share the use of relevant IWRM tools for action planning. The situation of water uses and water resources management were discussed. Moreover, participants provided input to the IWRM situation analysis in Pamba and identified main elements for consideration to be included in the Pamba IWRM Roadmap.

The Pamba Pilot project implementation was launched and inaugurated in February 10, 2010 to present the Action Plan Support Facility Project, the proposed Pamba Pilot Project and to identify main stakeholders related to water management in Kerala and more specifically, the Pamba River. This workshop indicated the need for a large scale IWRM training for a group of non specialists for both government and non-governmental organisations. The second and third workshops were organized on 25th and 27th May 2010 with the aim to develop a situation analysis of the water resources issues the Pamba River is facing and secondly to roll out the main principles of IWRM to a larger non specialist group of stakeholders. The outcomes were presented in next day's workshop attended by local Panchayat representatives as well as local NGO's and a consensus was reached on the prioritized issues.

Following the inaugural workshop in May 2010, the Action Plan Support Facility (APSF) TA team organized a one day working session on identification of water management and institutional constraints and possible actions for remediation. The APSF team, supported by the Centre for Water Resources Development and Management presented the key features of the existing Pamba Action Plan developed in 2002 and opportunities for updating it in accordance to the IWRM framework. A final workshop was held on the 27th of September in Chengannur on the banks of the Pamba River with overwhelming participation of local stakeholders where project findings of previous sessions were presented and discussed.

A final dialogue held last month, 29<sup>th</sup> of October marked the closure of a series of workshops organized by the APSF TA team towards preparing a Road Map for IWRM in the Pamba River Basin in Kerala.

### The Session

**The day was inaugurated by the honourable Minister of Water Resources, Shri N. K. Premachandran. The Minister expressed his gratitude to the APSF team and the support of the**

**European Union Delegation. He recognized that the process of adopting IWRM principles in government planning is only successful with full government support and emphasized that the GOK needs support to develop a full IWRM Action Plan for the Pamba River.**

The European Union Delegation in Delhi was represented by Mr Fernando Nino Page, Head of Economic Cooperation. Mr Fernando highlighted programmes of collaboration between the European Union and India in various sectors but particularly in the area of Environment.

The list of actions identified as the Draft Roadmap were presented by the Director of the Pamba River Basin Authority, Mr. Rajasekharan Nair, The Draft Road Map comprised 13 sequential steps, each step covering scope of work, objectives, date of realization, responsible agency and expected source of financing. Mr Nick Ahrensberg, APSF Technical Advisor followed with a synopsis of the methodology applied during the pilot project by and Dr George Chackacherry, Scientist of CWRDM, presented the proposed IWRM Action Plan development and actions that need special attention. **A total of 22 participants, representing various government departments and the civil society organizations participated in the workshop.**

#### **IWRM Roadmap for the Pamba Pilot River Basin and the Draft Action Plan**

Outcomes of the workshops conducted throughout the year will form the basis for the development of strategies and priorities of the Action Plan. The Roadmap will be finalized by the end of November 2010. It will set out clear and coherent objectives in line with best international practice as well as a timetable for implementation of priority actions. The plans will clearly indicate implementation responsibility and activities prioritised on clear short-, medium- and long-term. As well as the governmental authorities and institutions.

## Appendix 1. Agenda



**EU-India Joint Action Plan Support Facility  
Environment Component**



**Integrated Water Resources Management in the Pamba River  
Basin: Presentation of the Draft Roadmap for IWRM for the  
Pamba River Basin  
Vivanta Trivandrum by Taj, Trivandrum, Kerala, 29 October  
2010**

Programme		
09:45 – 10:15	Registration	
10:15 – 10:30	Welcome address	Dr Paul Holmes, Former Team Leader APSF Project
10:30 – 10:45	Opening of the workshop, objectives and lessons learned	<i>Annemieke Alberts</i> , APSF Pamba Pilot Activity Leader
10:45 – 11:00	Potential for IWRM in the State of Kerala	Mr Pradeep Kumar, Secretary Water Resources, IAS, GOK
11:00 – 11:15	European Union environmental cooperation initiatives with India	Mr Fernando Nino Page, Head of Economic Cooperation, European Union Delegation Delhi
11:15 – 11:30	Inauguration of the Workshop	Honourable Minister for Water Resources, <i>Shri N. K Premachandran &amp; Mr L. Radhakrishnan</i> , IAS Principal Secretary to Government, Water Resources Department
11:30 – 11:45	Tea & Coffee Break	
11:45 – 12:00	Presentation of the Draft IWRM Roadmap: management issues, opportunities and recommendations	Nick Ahrensberg, APSF Technical Advisor
12:00 – 12:15	Presentation on identified Roadmap Actions	Mr Rajasekharan Nair, Director Pamba River Basin Authority
12:15 – 12:30	Proposed IWRM Action Plan development and actions that need special attention	<i>Dr Jayakumar / Dr George Chackacherry</i> , CWRDM Centre for Water Resource Development and Management, Calicut, Kerala
12:30 – 13:30	Discussion	
13:30 – 13:45	Wrap up & Closure of the workshop	Mr Rajasekharan Nair, Director Pamba River Basin Authority &  <i>Annemieke Alberts</i> , APSF Pamba Pilot Activity Leader
13:45 – 14:30	Lunch	

## Appendix 2.

Minutes of the Workshop, Trivandrum, 29<sup>th</sup> of October 2010

### Final Dialogue for Integrated Water Resources Management for the Pamba River: Sharing Solutions between India and the European Union

## Final Dialogue on IWRM of the Pamba River Basin: Exchanging experiences between India and the EU

Workshop Title	Final Dialogue on IWRM of the Pamba River Basin: Exchanging experiences between India and the EU
Venue	Senate, Vivanta by Taj, Thiruvananthapuram

### 1. Background

- 1.1. This workshop was held on October 29, 2001 and it marked the closure of a series of workshops organized by the APSF TA team towards preparing a Road Map for Integrated Water Resource Management in the Pamba River Basin in Kerala. Preceding this closure workshop, six one day workshops were organized with a core group of participants over a period of nine months, beginning from February 2010. The conclusion of this workshop marked the withdrawal of the active support of the APSF TA team from the field. The title, specific objectives and other pertinent details of each of the workshops are presented below.

Title	Objective	Date	Location
Inaugural workshop	<ul style="list-style-type: none"> <li>To formalize the commencement of APSF TA support</li> <li>To discuss and map stakeholder profiles</li> </ul>	February 10, 2010	Trivandrum
Towards preparing a Road Map for an Integrated Action Plan for the Pamba River Basin	<ul style="list-style-type: none"> <li>To orient key state level stakeholders on IWRM</li> <li>To clarify expectations of stakeholders from TA support</li> </ul>	May 25, 2010	Trivandrum
	<ul style="list-style-type: none"> <li>To orient field level stakeholders on IWRM</li> <li>To capture stakeholder issues and concerns</li> </ul>	May 27, 2010	Trivandrum
Working Session on Management Problems and Possible Actions for Pamba River Basin	<ul style="list-style-type: none"> <li>To identify management constraints in IWRM</li> <li>To explore possible institutional actions</li> </ul>	July 22, 2010	Trivandrum
Field level Consultation	<ul style="list-style-type: none"> <li>To consult stakeholders at the field level and to understand their concerns about Pamba river basin</li> </ul>	September	Pamba River Basin
Final Dialogue on IWRM	<ul style="list-style-type: none"> <li>To share experiences between India and the EU</li> <li>To present and discuss the Road Map</li> <li>To mark the conclusion of active assistance of the APSF TA team</li> </ul>	October 29, 2010	Trivandrum

1.2. The participants of the workshop comprised a total of 22 members representing various departments of the Government of Kerala, the EU delegation, NGOs and APSF consultants.

## 2. Agenda of the workshop

2.1. The scope of the workshop was finalized after discussing with the Pamba River Basin Authority. It was decided to clearly focus the workshop discussions to presenting the IWRM Road Map Process, identified WR and Management issues and Road Map Actions. Thus the duration of the workshop was restricted to half-a-day.

2.2. The proceedings of the workshop are summarized in the following sections.



### 3. Welcome Address

- 3.1. Dr. Paul Holmes, Former Team Leader of the APSF project managed the responsibility as the Workshop Facilitator. In his welcome address, he elicited what is expected at the end of the day and described his role as Facilitator. He then introduced the following guests and resource persons to the group.
- a) Mr. N K Premachandran, Honorable Minister of Water Resources
  - b) Mr. Fernando Nino Page, Head of Economic Cooperation, EU Delegation, Delhi
  - c) Ms. Annemieke Alberts, Activity Leader of the APSF, Pamba Pilot
  - d) Mr. Nick Arhnesberg, IWRM Specialist, APSF
  - e) Mr. Rajasekharan Nair, Director of Pamba Basin Authority and
  - f) Dr. Jayakumar, Director of Centre for Water Resources Development and Management.
- 3.2. Dr. Holmes explained the larger role of APSF in the five sectors supported by the EU in India i.e. Waste, Chemicals, Water, Air and Climate Change and how the IWRM in Kerala fits into the overall objectives of the APSF. The objectives of the APSF are to improve sector policy analysis and to facilitate enhanced dialogue, and exchange of experiences between India and the EU.
- 3.3. He then recalled his association with the IWRM project in Kerala in the first workshop that was organized in February 2010. He reiterated that the process over the past ten months led to a beneficial collaboration between all stakeholders, including the GoK and the EU.
- 3.4. The APSF support to the Pamba River Basin Authority will culminate in the submission of the final Road Map document in November 2010.

### 4. Inaugural Address

- 4.1. Shri N K Premachandran, Honourable Minister for Water Resources formally inaugurated the workshop. In his inaugural address, he acknowledged the productive working relationship that evolved between the EU, APSF, GoI and the GoK over the past couple of months and stresses on the need to continue this over a longer time frame. The Pamba Action Plan is in tune with the other activities of the National River Conservation Directorate, such as Ganga Action Plan and Yamuna Action Plan; the difference is only in the size of the operation.
- 4.2. He narrated the implementation deficiencies of the 'old' Pamba Action Plan, despite the ample allocation of funds (i.e. Rs 18 crore in the first phase). The liquid waste management proposal through setting up of STPs is still under preliminary tender stage. He highlighted the main draw backs of the program as: i) inability to ensure participation of all stakeholders ii) inability to view the Pamba River Basin from the holistic point of view by all stakeholders iii) lack of enthusiasm at various levels iv) fragmented responsibilities across departments
- 4.3. The establishment of the Pamba River Basin Authority was an institutional response to correct this problem. The roles and responsibilities of the Authority are still evolving and it will take some more time to fully stabilize in its operational context. Over the next couple of months the roles of the Authority will expand and it will be given more regulatory powers.
- 4.4. He further elaborated that the GoK is content with the support extended by the APSF and the Road Map towards a full-fledged Action Plan is only a beginning. There is a lot of ground to cover, in which CWRDM will have to play a leading role. However, it would be extremely useful to have a continued support of APSF. He also mentioned that the GoK fully understands the constraints and limitations of a short-term TA support. Europe has achieved considerable amount of success in IWRM practices. Sharing the finer components of the IWRM successes will be extremely useful in the Pamba context.
- 4.5. The Kerala State Water Policy demonstrates the intention of the GoK to provide an enabling environment to IWRM. The head of accounts created by the government for the Pamba Authority in the budget indicates that the GoK views the implementation of IWRM very seriously.
- 4.6. Multiple options for financing are available i.e. GoI, GoK, Institutional finance, Donor support or a combination of all of the above. GoK, therefore is not constrained on the finance front. The institutional barriers to IWRM need to be addressed and the GoK is willing to take this up in its right earnest. He further stressed on the fact that the Pamba IWRM has the potential to become a good model for other states to follow.

### 5. Presentation by the Head of Economic Cooperation, EU Delegation, Delhi

- 5.1. In his presentation, Mr. Fernando Nino Page, Head of Economic Cooperation, EU Delegation, Delhi, covered the important aspects of the strategic partnership between the EU and the Government of India. The cooperation spans six key areas:

- 1) Political
- 2) Trade & investment
- 3) Transport & Energy
- 4) Protection of the Environment
- 5) Health & Education and
- 6) Human Resource Development

The support to IWRM initiative in Kerala through APSF is an extension of this strong collaborative relationship in the key area 4 i.e. Protection of the Environment mentioned above.

- 5.2. Mr. Fernando mentioned that the mutual collaboration between the EU and the GoI resulted in the expanding trade. The trade between the EU and the Indian sub-continent stood at Euro 65 billion in 2009 and it is likely to double by 2014.
- 5.3. Because infrastructure is the enabler of economic growth, he emphasized the need to invest in infrastructure. While giving a country-specific breakdown of infrastructure investments in five new growth countries, he mentioned that water & environment investments in India will be to the tune of \$ 52 million in the next three years. This is a simple indicator of priority investments.
- 5.4. Under the APSF Environment Component, the agreed activities include the following:  
Focus group discussion
  - 1) Network of expertise
  - 2) Groundwater: i) document ii) policy brief iii) international workshops
  - 3) River basin planning in Kerala (this is a flagship activity that is nearing completion)
  - 4) Water data management in 2010 and
  - 5) Study tour 2011
- 5.5. In conclusion of his presentation, he emphasized on the following:
  - 1) The EU and India have long standing cooperation, sharing of common values, democracy and rule of law
  - 2) India is a strategic partner for the EU, and trade and cooperation is rich, balanced and increasing
  - 3) EU has a lot to offer to India, to exchange best practices and technologies, to contribute to its inclusive and sustainable development, and to ensure a better world
- 5.6. The above aspects reassure that there is a 'window of opportunity' available to the GoK which can be harnessed well to benefit from the experience of the EU countries in integrated river basin planning.

**6. Objectives of the workshop**

- 6.1. In the session on Objectives of the Workshop Ms. Annemieke Alberts traced back the genesis of IWRM in Kerala and the APSF support to the preparation of a Roadmap. She recalled the series of workshops that predated this workshop on final dialogue on the IWRM road map and the idea of experience sharing between the EU and the GoK.
- 6.2. Having defined the Road Map of IWRM as a process leading from a vision about future development related to water resources use, conservation and protection to an actual IWRM plan, she further described the five project outcomes in a simple and easily comprehensible manner as laid down below:
  - 1) Stakeholder analysis in the water sector and arriving at an understanding of their needs
  - 2) IWRM training for government and non-government staff
  - 3) Water issues assessment and prioritization of problems using well tested WRIAM tool
  - 4) Arranging water management issues in accordance with the universally accepted IWRM pillars viz. Enabling Environment, Institutional Roles and Management Instruments and
  - 5) Identification of Actions needed towards a future IWR management plan i.e. The Road map
- 6.3. She elaborated the objectives of this workshop on Road Map as providing a plat form for dialoguing on the proposed actions towards inclusion of IWRM principles in governing the Pamba River and arriving at a common understanding of the steps in preparing the final Road Map by end November, 2010.
- 6.4. For common understanding all participants, she shared some elicitation of the components of the three pillars of IWRM as follows:

A. Enabling Environment	B. Institutional Roles	C. Management Instruments
A1. Policies	B1. Creating organizational framework	C1. Water resources assessment

A2. Legislation	B2. Institutional capacity Building	C2. Plans for IWRM
A3. Financing and Incentive Structures		C3. Demand Management
		C4. Social Change Promotion
		C5. Conflict Resolution
		C6. Regulation
		C7. Economics management
		C8. Information management

6.5. In her presentation she emphasized that to make IWRM initiatives truly meaningful it is necessary to introduce relevant activities under each of the three pillars.

**7. Open Questions**

7.1. The end of this session opened up space for some questions and clarifications by the Minister of Water Resources. The key questions raised by the participants and the responses provided by the APSF team are briefly captured below.

Clarification sought by the Minister of WR	Response provided by the EU and APSF
When will be the final Road Map Ready?	It will be ready by November end and this workshop will function as a sounding board to examine various actions leading to the final Road Map
The role of APSF ends with this workshop. Whether EU will extend further assistance in preparing the Detailed Project Reports (DPRs) that are necessary to implement action plans. Road Map will lead to Action Plan which will have to end up in finalizing DPRs. GoK would like to reach that stage in short span of time. The GoK needs support beyond intellectual and conceptual inputs to realize IWRM in its true form.	It is too premature to commit on the aspect of further assistance. The EU recognizes this need of further assistance and appreciates the interest of the GoK in taking the initiative forward. However, this needs elaborate discussion at various levels at the EU and at GoI level.
The GoK is serious in implementing Pamba IWRM. It will take a lead role in taking up the issue with the GoI. Presentation by the GoK before the Minister of Environment & Forests is a likely stimulant of further action. Therefore, the GoK will take a lead and assistance of APSF is required in this regard.	APSF is in agreement with the opinion expressed by the honourable Minister of Water Resources that co-opting of the GoI will accelerate action. APSF will provide support in the presentation, but the leadership has to reside with the GoK. November may be an opportune time to initiate this

## 8. IWRM Road Map Process

- 8.1. In the succeeding post-tea session, Mr. Nick Ahrenberg, APSF Technical Advisor took the group through IWRM process, identified water resources and management issues in the earlier workshops and stake holder consultations, especially using the WRIAM tool.
- 8.2. The main theme of his presentation revolved around the need for IWRM, the contextual relevance of IWRM (MDG goals and WSSD targets). He emphasized that WSSD has articulated reference to IWRM in the following manner:
1. Develop integrated water resources management and water efficiency plans by 2005, with support to developing countries
  2. Develop national/regional strategies, plans and programs with regard to integrated river basin, watershed and groundwater management.
- 8.3. With reference to the IWRM planning cycle and ten result areas, he clarified that the five workshops that predated this workshop achieved the following outputs.
1. Mapped stakeholder interests and ensured their participation
  2. Identified and prioritized water resources issues
  3. Indicated management constraints and issues
  4. Prepared Roadmap on actions towards IWRM
  5. Defined a way forward

## 9. Identified IWRM Road Map Actions

- 9.1. The Director of the Pamba River Basin Authority, Mr. Rajasekharan Nair, described the genesis of the Authority and mentioned that it is committed to provide leadership to the IWRM process in Kerala. The Pamba River Basin Authority Act has been enacted by the Gok, vide an ordinance. He then described the objectives of the Pamba River Basin Authority Act
- 9.2. He also placed before the group that NRCD is supporting the IWRM initiative in Kerala. Financial assistance of Rs 184.5 Million already received from NRCD for pollution abatement. The GoK has requested for further assistance sought, which is not difficult to come by. Therefore, financing IWRM in Pamba River is not a problematic issue for the Authority.
- 9.3. He then presented the Draft Road Map towards preparing an Action Plan. The Draft Road Map comprised 13 sequential steps, each step covering Scope of Work, Objectives, Date of Realization, Responsible Agency and Expected Source of Financing. Given the current governance structure, the responsibilities indicated across departments mirror the true spirit of collaborative working. (The open house discussion highlights on the Road Map are presented in Section 12 below)
- 9.4. Finally he shared the following time lines for implementation.

Activity	Time Plan
Finalize Action Plan	5 months
Institutional Strengthening	3 months
Legal Framework	6 months
Capacity Building	3 months
Communication Strategy	Continuous
Setting up MIS	6 months
GIS Based Information Systems	12 months
Full Assessment of WR	3 months
IWRM action plan elaboration	3 months
Development of DPR	12 months
Financing Plan	4 months
Implementation of IWRM action plan, including monitoring	36 months

## 10. Proposed IWRM Action Plan Development

- 10.1. This was followed by a brief presentation by Dr. George Chackacherry, CWRDM on the proposed Action Plan development and special attention needed. He also shared the willingness of CWRDM to take up the responsibilities of developing the Action Plan. He articulated that the following constraints are needed to be addressed to make IWRM a successful initiative.

1. Lack of information and systematic data for sharing amongst stakeholders
  2. Compartmentalized functioning and sector barriers
  3. Unwillingness to change at some levels
  4. Lack of tools for system integration
  5. Treating surface water and ground water as separate entities and separation of quantity from quality
  6. Lack of water entitlement and tariff systems
  7. Lack of capacity at all levels
  8. Apprehensions regarding centralisation, pricing and private sector involvement
  9. Lack of political and administrative will
11. The five key issues in the Pamba River Basin, that emerged through the use of WRIAM tool are: i) Pollution ii) Sand mining iii) Encroachment iv) Soil Erosion and v) Floods. The Action Plan will focus on addressing the above key issues and clear cut path will be laid to achieve cross-sector integration, basin management, land and water management, demand management by using participative approaches

## 12. Open House

- 12.1. The presentations were followed by an open house discussion. The session was moderated by Dr. Paul Holmes. The session captured opinions and suggestions by the participants and they are summarized below:
1. Immediate attention needs to be given to implementation aspects
  2. The Road Map needs tidying up (for example, point 2 and 3 can be combined, because the two are inter-linked).
  3. APSF has already done work on 3, and adding EU as donor (as this was the case).
  4. The table needs clear and uniform headings. Presented as it is, it appears to be separate tables and not integrated well.
  5. More than 18 departments are directly or indirectly involved in Pamba. This calls for tight integration of activities and close collaboration of actions. This aspect needs to be given the required attention
  6. Sea water intrusion in the downstream is an important aspect that cannot be undermined.
  7. Monitoring of implementation should be done by external agencies and not by the Pamba River Basin Authority, which is an implementing agency.
  8. Participation by NGOs has not been given prominent attention. This needs to be defined well. Similarly, mechanisms to ensure peoples participation (farmers, fisher folks etc) should be developed and explicitly mentioned.
  9. Political will is weak. How do we advocate for IWRM in the polity?
  10. Local Self Governments (ULBs and GPs) are the frontline players. Their role is not well defined. Their involvement is extremely important in planning and implementation. How do we ensure this?
  11. Awareness creation amongst pilgrims (mainly outsiders) is extremely important. Simple activities for this need to be developed. Adequate experience resides within various departments (e.g. Health, Forest). Some successful examples on peoples' participation exist in irrigation. Such positive experiences can be leveraged to the advantage of the Pamba River Basin Authority.
  12. Localized actions involving ULBs and GPs should be given priority
  13. The current track record of fund utilization amongst agencies in the Pamba river basin is not something that can be mentioned as achievement. Delays in installing already sanctioned STPs typify this weakness. If the same trend persists, external funding will pose a great risk. The Pamba River Basin Authority should focus on such issues and make it an in-built component of their Action Plan.
  14. Pamba River Basin Authority is not limiting itself to Pamba Action Plan, developed earlier by SPCB. It will be truly integrated in nature and this needs to be (and will be) reflected in the Action Plan.
  15. While the IWRM Action Plan will focus on long-term solutions, some short term actions are also needed (e.g. sanitation for pilgrims, pollution, construction of STPs), which may be independent of the IWRM plan.
  16. The IWRM Action Plan must be embedded in community ownership. What needs to be done to achieve this? And how this can be built into the final Action Plan?
  17. Internationally there are some good examples in the developing countries (e.g. Uganda). Action Plan can incorporate such experiences as good models for capacity building. EU has some excellent examples which have the potential for replication.
  18. Time plan in some places are vague (e.g. continuous). It does not reflect a beginning and a definite end. Time plans should not be kept open; they should be more specific.

19. Forest department is willing to collaborate with other departments and share experiences. Collaborative working is the key to success.
20. Two years for preparing an IWRM Action Plan is too long. There are many aspects which need immediate attention.
21. Under item 7, the role of the Hydrology project can be mentioned.

**13. Concluding Session**

- 13.1. In the concluding session Mr. Rajasekharan Nair responded to some of the key questions posed by the participants. He assured the participants that their suggestions will be taken into consideration and will be incorporated in the final Action Plan, wherever appropriate. He also requested for more suggestions, which can be mailed to the Pamba River Basin Authority.





# Annex 9 Proposed table of contents for IWRM Action Plan

## Pamba Basin - Integrated Water Resources Management Plan

### Preliminary outline of contents

#### (Vol. I) NATIONAL WATER RESOURCES MANAGEMENT ASSESSMENT REPORT

##### **1 INTRODUCTION**

- Why, how, what – objectives of IWRM in Kerala, national process etc. common to all three Volumes

##### **2 PHYSICAL AND SOCIO-ECONOMIC CONTEXT**

##### **3 STATUS ON WATER RESOURCES**

###### **3.1 Water resources – quantity**

- 3.1.1 Meteorology
- 3.1.2 Surface water
- 3.1.3 Groundwater

###### **3.2 Water resources – quality**

- 3.2.1 Surface water
- 3.2.2 Ground water
- 3.2.3 Pollution loads and sources

###### **3.3 Water uses, demands and requirements**

- 3.3.1 Access and demand – domestic water supply
  - Quantity and quality requirements
- 3.3.2 Use and demand – non domestic uses
  - Quantity and quality requirements for Agriculture, industry, mining, energy, navigation, environment, recreation
- 3.3.3 Efficiency in water use

###### **3.4 Overall status**

- Matching availability and quality with demands and requirements

###### **3.4 Risks related to water**

- 3.4.1 Floods
- 3.4.2 Droughts
- 3.4.3 Erosion and sedimentation
- 3.4.4 Water related diseases

###### **3.5 Water and environment**

- 3.5.1 Deforestation and water resources
- 3.5.2 Sandmining and water resources
- 3.5.3 Eutrophication
- 3.5.4 Wetlands

**3.5 Water and climate change**

**3.6 Prioritisation of issues**

3.6.1 Methodology

3.6.2 Impact issues

3.6.3 User requirement issues

3.6.4 Risks

**3.7 National synthesis on water resources issues**

**4. STRENGTHS AND CONSTRAINTS IN THE MANAGEMENT FRAMEWORK**

**4.1 The enabling environment**

**4.2 The institutional framework**

**4.3 The management instruments**

**4.4 The human capacity**

**4.5 The economic and financial instruments**

**4.6 The social aspects of water**

**4.7 International water resources management**

4.7.1 International cooperation and conventions

4.7.2 Sub-regional cooperation and agreements

**4.8 National synthesis on water resources management framework**

# Pamba Basin - Integrated Water Resources Management Plan

## Preliminary outline of contents

### (Vol. II) INTEGRATED WATER RESOURCES MANAGEMENT STRATEGY

#### **1 INTRODUCTION**

- Why, how, what – objectives of IWRM in Kerala, national process etc. common to all three Volumes

#### **2 THE IWRM VISION – THE OBJECTIVE OF THE STRATEGY**

##### **2.1 The Water Policy**

##### **2.2 The relation to other sectoral policies and legislation**

##### **2.3 The relation to development planning and poverty reduction strategies**

#### **3 FROM PRINCIPLES TO ACTION**

##### **3.1 Management of priority issues through an IWRM framework**

##### **3.2 Cross-sectoral integration**

##### **3.3 Management by basin**

##### **3.4 Land and water management**

##### **3.5 Participative approaches**

##### **3.6 Subsidiarity**

##### **3.7 Demand management**

##### **3.8 ....**

#### **4 REFORMS AND AJUSTMENTS TO THE WATER RESOURCES MANAGEMENT FRAMEWORK**

##### **4.1 The policy and legal framework**

##### **4.2 The institutional and organisational framework**

##### **4.3 Human capacity**

##### **4.4 Management tools and instruments**

- Not only technical

##### **4.5 Economic and financial instruments**

##### **4.6 Research**

##### **4.7 Information and communication**

# Pamba Basin - Integrated Water Resources Management Plan

## Preliminary outline of contents

### (Vol. III) INTEGRATED WATER RESOURCES MANAGEMENT ACTION PROGRAMME

#### **1 INTRODUCTION**

- Why, how, what – objectives of IWRM in Kerala, national process etc. common to all three Volumes

#### **2 THE ACTION PROGRAMME**

##### **2.1 The role and expected outcomes of the action programme**

##### **2.2 The action sheet format**

##### **2.3 The structure of the action programme**

2.3.1 The enabling environment

2.3.2 The institutional framework

2.3.3 Management instruments for monitoring and assessment of the water resources

2.3.4 Economic and financial instruments

2.3.5 Research

2.3.6 Information, education, and communication

2.3.7 Human resources capacity development

##### **2.4 Action programme summary table (simplified logical framework)**

#### **3 THE BUDGET AND FINANCIAL STRATEGY**

##### **3.1 Budgets for actions and action areas**

##### **3.2 Consolidated budget for the action programme**

##### **3.3 Strategy for funding**

#### **4 MODALITIES FOR IMPLEMENTATION**

##### **4.1 Implementation schedule**

4.1.1 Phasing of the implementation

4.1.2 Timeline for implementation of the first phase

##### **4.2 Management of the implementation**

4.2.1 Management mechanisms

4.2.2 The role of CWRDM & Pamba River Basin organisation

##### **4.3 Mechanisms for monitoring and evaluation**

##### **4.4 Performance indicators**

##### **4.5 Mechanisms for financial audit**