Implementation of IWRM Principles and Processes for Management and Development of Indonesian Water Resources

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The First General Meeting NARBO and IWRM Workshop
Batu, Malang, Jawa Timur, Indonesia, 24-26 February 2004

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TABLE 1.1
SURFACE WATER DEMAND BY ISLAND
IN INDONESIA

(Unit : m^3/s)

YEAR / NAME	1990			2000			2015			2020		
	IRRIGATION	DMI	TOTAL	IRRIGATION	DMI	TOTAL	IRRIGATION	DMI	TOTAL	IRRIGATION	DMI	TOTAL
JAVA/BALI	950	124	1,074	1,609	168	1,777	1,639	239	1,878	1,648	260	1,908
SUMATERA	70	3	73	450	47	497	621	72	693	689	80	769
KALIMANTAN	271	26	297	81	12	93	173	20	193	209	21	230
EASTERN ISLANDS	19	7	26	342	23	365	495	34	529	555	37	592
SULAWESI	120	6	126									
MALUKU	5	1	6									
IRIAN JAYA	2	1	3									
TOTAL	**1,437**	**168**	**1,605**	**2,482**	**250**	**2,732**	**2,928**	**365**	**3,293**	**3,101**	**398**	**3,499**

Source : DPP **DMI : Domestic, Municipal and Industrial**

TABLE 1.2
SURFACE WATER RESOURCES STATUS BY ISLAND IN INDONESIA (1990)

NAME	AREA (1000 Km^2)	SURFACE WATER POTENSIAL m^3/s	GROUND WATER POTENSIAL m^3/s	LOW FLOW AVAILABLE m^3/s	DEMAND 1990 m^3/s			STORAGE AVAILABLE m^3/s	SURPLUS or DEFICIT
					IRRG.	DMI	TOTAL		
JAVA/BALI	139	6199	95	786	950	124	1074	245	-
NUSA TENGGARA	81	1777	21	90	70	3	73	-	+
SUMATERA	470	23660	NA	4704	271	26	297	150	+
KALIMANTAN	535	32279	NA	6956	19	7	26	150	+
SULAWESI	187	2488	44	561	120	6	126	-	+
MALUKU	78	3373	9	391	5	1	6	-	+
IRIAN JAYA	414	28061	NA	4140	2	1	1	-	+
TOTAL	**1904**	**97837**		**17628**	**1437**	**168**	**1603**	**545**	

Source : DPP

NA : NOT AVAILABLE

DMI : DOMESTIC, MUNICIPAL AND INDUSTRIAL

Abstract

Indonesia water resources and irrigation sector faces increasingly complex long term investment challenges and management problems which, unless effectively addressed, will increasingly constrain the country's economic development and lead to a deterioration of food security, public health and irreversible damage to the environment exacerbated by inappropriate and ineffective legal structures, regulations, policies and institutions. The problems arise from the adverse impact of population growth, urbanization and industrialization. It is, therefore, essential to reform sector policies, use more effective institutional framework, improve planning and management systems as well as increased beneficiary participation to adjust to current and future challenges. The objective of sector reform consist of the following components: 1) Improve the National institutional Framework for Water Resources Development and Management, 2) Improve the Organizational and Financial Framework for River Basin Management, 3) Improve Regional Water Quality Management Regulatory Institutions and Implementation, 4) Improve Irrigation Management Policy, Institutions and Regulations.

Water resources related activities must be synchronized at the national policy and strategic level so that resources and efforts can be effectively directed towards achievements of common public goals. To support water resources development and management, the Government of Indonesia is reviewing current policies and procedures in water resources and adopted an Integrated Water Resources Management Policy framework that is able to support and guide the management, development and conservation efforts of all government and private entities. The policy is covering water quantity and quality for both surface and groundwater in the context of river basins, including upper watersheds and estuarine areas.

Key words: ***water resources, irrigation, reform, integrated, management, development***

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1. Background

1.1 Introduction

The Indonesian Archipelago consists of about 17,508 islands, about 6,000 of the islands are inhabited. The tropical archipelago spreads over along the one eight of the equator at about 8 million square km of the earth's surface with the total land area of about two million sq. km (1.92 millions km2 in more precise figure), and three million sq. km of sea territory, with a total length of coastline of about 84,000 km. Despite of the abundance of water resources potential, the Indonesia's surface water resources have already experienced a shortage during the dry season, and geographical as well as climatic conditions. The total water demands of the country is currently utilized for supporting irrigation, domestic, municipal and industrial 1,074 m3/sec, while the low flow available at the normal climatic year are only about 790 m3/sec. This explains that the current water uses is highly constrained by unbalanced condition of demands and the potential availability of water, particularly at point of time during the season of scarcity of the year.

Indonesia's population of 207,6 million (2000) is spread over a number of islands. The increasing number of population in Indonesia is not followed by the equal distribution of population regionally either by province or by island. According to 2000 Population Census, Java Island resided by around 59% of population, which has area of 7% to total area of Indonesia. Meanwhile, Maluku and Papua, which have area of 25% to total area of Indonesia, yet inhabited by 2% total Indonesian population. With current growth rate of 1.66% the population is expected to grow to 280 million by the year 2020. In the past decade urban immigrant as resulted in an urban growth of about 5% annually. It is estimated, therefore that by the year 2020 about 52% of the nation's population will live in urban surroundings, compared to 38% in 1995. The key statistics related to population, irrigated agriculture and rice production are presented on **Figure 1**.

Issues of environmental quality and sustainability represent a relatively more recent addition to Indonesia's development concerns. This is not surprising given the challenges that existed at the start of the First Long-Term Plan about 32 years ago, and what was known at that time about the relationship between economic activities and the underlying ecosystems upon which they depend. The growing attention to these issues in Indonesia's development strategy is a result of the worsening environmental conditions in Indonesia today, due to the pace and pattern of growth in the past, and the increasing awareness of the costs and risks of continued environmental degradation in the future.

The development of water resources over the past 32 years -- irrigation systems in particular, but also water supply systems in urban areas and hydro-electric facilities to meet the growing energy demands of the industrial sector—has played a critical role in stimulating rapid growth and reducing widespread poverty. Issues of water resources management (both quantity and quality) is increasingly important on Java and other islands off Java such Sumatera, Kalimantan, Sulawesi, etc. with different characteristics of the problems and hence approaches to be taken. Problems on Java characterized by overpopulation and natural as well water resources degradation and depletion, while islands off Java mainly characterized by natural and water resources degradation due to widespread of deforestations and improper open mining practices as well as vast expanding of newly opened plantations on the upper watersheds.

As presently experienced in many other countries, the condition of water resources in Indonesia has come to the stage where an integrated action is needed to **reverse** the present trends of over-consumption, pollution, and the increasing threat of drought and floods.

Given the challenges facing the water resources and irrigation sector in the 21st century and the public sector reformation aspirations, the Government of Indonesia has initiated the water resources sector reform program that covers policy, institutional, legislative and regulatory aspects including water conservation policies have got a substantial portion in the reform agenda.

1.2 Current Status of Country Water Resources

1.2.1 Water Resources Potential

Although water resources are abundant, yet seasonal and spatial variation in the rainfall pattern and lack of adequate storage creates competition and conflicts among users. The annual renewal water resources are estimated to about 3.085 km3 while the estimated freshwater demand in 1990 was of the order of 1.600 m3/s. In spite of the abundance in water resources (13,000 m3/capita/year), the water resources potential per capita varies from island to island. In parts of Java island this is less than 2.000 m3/capita/year while for Irian Jaya (Papua) it is greater than 282,000 m3/capita/year [1]. This large variation in water resources potential poses a challenge for nations development and requires a sound planning and management system in water resources.

The estimated surface water demand (by the year of 1990-2000-2015-2020) by major islands in Indonesia is presented in **Table 1.1**. it is seen that Java and Bali which has 62% of the country's population has the biggest water demand for DMI. Groundwater potential in Indonesia is limited and can support only part of the urban and rural needs for water supply while providing irrigation water for very limited areas [1].

In some river basins the available water resources are inadequate to meet the current needs. The status of surface water resources in 1990 is presented in **Table 1. 2**. it is seen that Java has already a shortage during the low flow season. The on-going industrialization and urbanization have put a further strain on the water resources due to water quality degradation. Hence, Indonesia is putting a greater emphasis on holistic planning and orienting its effort towards a mission driven program approach to meet the challenges of the 21st century [1].

Indonesia has over 5590 rivers. Excepts for rivers in Kalimantan and a few river in Java, most rivers are short with limited flood carrying capacity. In general the rivers originate from volcanic mountains and have a distinct upper reach were the bed slopes are steep, a short middle reach with moderate bed slopes and a meandering lower reach where bed are flat. Because of high rainfall intensities and upper watershed erosion, most river carry large quantities of sediment which result in river regime problems as well as mouth problem. Because of the flat

slopes and inadequate carrying capacity in lower reaches, many rivers experience flooding in the lower reaches.

To facilitate planning, development, management and administration, the river basins are grouped into river territories called Satuan Wilayah Sungai (SWS). Thus, the country has been divided into 90 SWS or river territories. Of these, 73 SWS which are fully located in a province are termed as provincial SWS. The remaining 17 SWS which are located in two or more provinces or are of strategic importance are termed as central SWS (to be under the management authority of Central Government).

Owing to the rainfall distribution and variability of stream flow between low and high flow conditions, only part of the renewable water resources can be taken by users, unless large storage reservoirs are constructed. Since much of this annual flows discharges to the sea during periods of high flows, the actual volume of useable flow is only about 30% to 50% of the total renewable resources [1].

It is estimated that water tends to become a limiting factor in national socio-economic development when water withdrawal exceeds 20% of the total renewable water resources. While it is difficult to generalize, a higher level of water use relative to water supplies implies that role of water in socio-economic development is becoming more important. Water availability may therefore become a limiting factor in national development.

Although Indonesia has an abundance of rainfall, with a national average of over 2500 mm/year of which 80% falls during the rainy season; however large regional variations in the rainfall exist over the country. It ranging from the very arid areas of Nusa Tenggara, Maluku and parts of Sulawesi Islands (less than 1,000 mm), to very wet areas in parts of Irian Jaya, Java and Sumatra (more than 5,000 mm)

The average annual renewable water resources, or surface water potential per island, can be expressed in terms of per capita population (1990), by dividing the islands into their relative catchments and estimating run-off using a rainfall/run-off relationship (UNDP/FAO, 1992). These vary between a maximum of 543.230 m3 in Irian Jaya, to minimum of 1,767 m3 in Java and Madura, and 2,003 m3 in Bali [1].

Using this approach, the average annual surface water potential for the whole of Indonesia is 18,178 m3/capita (1990). With estimated total annual per

capita demands of approximately 40 m3, the water resources availability would not yet appear to be significant constraint on further socio-economic development in Indonesia.

Nevertheless, considering the annual surface water potential per capita in Java (including Madura) at 1,767 m3, with an estimated population of 120,4 million, the annual per capita water demand amount to 482 m3, or 27% of the available water resources, the high water demand would potentially become a limiting factor on socio-economic development [1].

1.2.2 Water Resources Demands

The demand on water resources has rapidly increased as the nation implements its development program to meet the sharply increasing needs for irrigation, safe drinking water, industrial water, energy, etc. the irrigation, domestic and industrial surface water demand which formed the bulk of the demand in 1990 and projected demand for year 2000, 2015 and 2020 by islands is presented in **Table 1.1**, indicates that over the period (1990 – 2020) the demand will increase by about 220% [1].

Despite Indonesia's remarkable achievement in reducing the population growth rate, population still continues to grow. An average rate of 1,2% will push the population level to about 250 million in 2020. This growing population will create an increasing demand for food and ever greater pressures on land and water. Also, the labor force will grow at an appropriate rate of 2,2% requiring a rapid growth in employment opportunities [1].

Taking into consideration of the estimated population growth rates and the corresponding requirements for domestic, municipal and industri (DMI) uses, the total projected DMI demand for water in the year 2020 has been based upon. Similarly, predictions can be made for irrigation demands, based on population projections and food (rice) requirements to maintain self-sufficiency. Water demand for river maintenance is estimated by multiplying projected urban population by per capita flushing water requirement. Total annual water demand on each island in year 2020 is shown in Table 1.3 below.

Table 1.3 Annual Water Demand and Estimated Natural Basic Discharge in 2020

Unit: MCM

Region	DMI	River Maintenance	Irrigation	Fishpond	Livestock	Total Demand	Estimated Natural Basin Discharge
Sumatera	2.630	2.733	15.992	1.275	155	22.766	482.173
Jawa & Bali	9.850	9.799	54.918	809	258	74.569	122.699
Kalimantan	768	820	3.643	753	29	6.014	556.700
Sulawesi	686	769	14.243	354	110	16.612	143.343
Maluku & Nusa Tenggara	406	444	5.526	40	69	6.485	45.909
Irian Jaya	107	124	48	0	2	281	496.422
Indonesia	14.401	14.670	94.370	3.213	623	127.277	1.847.246

Out of 1,947 billion m3 of available water (natural basin discharge per year), about 127 billion m3 will be used for DMI, Irrigation, River Maintenance, etc. Balanced of about 1,720 billion m3 is available for another new development of DMI, Mining, and for Agricultural uses [1].

In order to be able to regulate the water allocation and distribution to meet water demands for various purposes, the “real-time management” of all water resources in each river basin, must be made operational, both under the normal and emergency conditions. This can only be achieved by adopting the integrated approach to river basin planning, with the necessary regulations and procedures in place, to provide the means of “managing” the water resources efficiently on integrated basis. For these purposes, a number of policy instruments are currently being set up under the policy reform program for putting integrated approach to river basin management.

1.2.3 Current Water Resources Development

Having a vast land, large number of population with abundant natural heritages, water resources have played a major role in Indonesian development. Currently, over 5.5 million hectares of agricultural lands have been served with technical irrigation schemes. Parallel with these, another 1.6 million hectares are irrigated

under the village irrigation schemes. These involved diversity of either construction or rehabilitation works of about 12,500 diversion structures and 40 reservoirs. Apart from these, Indonesia has also been able to extend water resources utilization progressively to support its 2,200 megawatts of hydropower generation -- which is now encompassed about 20 percent of the nation's electricity generating capacity. Rural and Urban water supply schemes deliver close to 100,000 liters per second of piped drinking water [1].

On top of the above achievement, over 3.3 million out of the 3.4 million hectares of swamplands have been developed and major flood control and drainage projects have been implemented. In addition, nearly 18,000 hectares of fishponds have been developed mostly in Aceh, North Sumatra and Sulawesi. Further to this, about 1.96 million hectares of lowlands and urban areas are provided with flood protection infrastructures, compounded with 15 kilometers of coastal structural protections [1].

1.3 Water Resources Problems

Because of its multiple roles—economic, ecological, and socio-cultural—most issues of sustainable development in Indonesia are related in one way or another to the management of land. As a result of growing population pressure and intensity of economic activities throughout Indonesia, land-related issues of efficiency, sustainability and equity have become increasingly important. On Java, the conversion of upland forests and coastal wetlands to agricultural use has led to soil erosion, watershed degradation and the loss of valuable marine resources. The rapid—but often uncoordinated—expansion of urban areas results in less-than-optimal land use densities and efficiency in the provision of infrastructures.

Java Island – with 60% of the country's population – currently having 70% of the country's irrigated agriculture, and 75% of water demand for industry. This has been associated with the escalation of conflicts amongst the competing users (agriculture, industry, and domestic), including competition between surface and groundwater utilization in urban areas [1].

The problem is one of seasonal and annual variations, compounded by the fact that river basins on Java are currently suffered from severe degradation, During the wet season river flows bring high rates of sedimentation due to

excessive erosion on the upstream watershed. These cause very fast sedimentation rates on reservoirs and lakes, making the lifetimes of reservoirs shorter than planned. While a number of dams have been built in major river basins such as Citarum, Brantas, Serayu-Bogowonto, and Bengawan Solo – accommodating about 5% of total river flows, the reservoir capacities of these river basins were only planned to meet the water demand for various uses up to the planning horizon of 2010. Several additional sites have been identified for possible future dams, but implementation is likely to be constrained by high population densities and the intangible social and economic costs of human resettlement [1].

The bulk water use in agriculture currently accounts for 80% of total water demand, while industrial and municipal requirements together account for only about 20%. The domestic water consumption as well as for industry would be rapidly growing in the next two decades to the magnitude of about 25% - 30% of total water demand by the year 2020.

To support continued rapid growth and improvement in human health and welfare, however, these needs will have to be met. This will require a shift of water in the dry season from agriculture to municipal and industrial use. Being the case, greater attention is needed to the process of water allocation so as to minimize the social and economic costs for farmers, at the same time, to protect the potential disruption to agricultural production.

Under this dilemmatic condition, the Government of Indonesia is fully aware of the need to manage its water resources on an integrated river basin basis. More important would be to ensure the appropriate balance of conjunctive use of surface and groundwater – particularly in the densely populated urban areas. Many of the aquifers in Java's rapidly growing urban centers have already suffered from over-extraction, resulting in salt-water intrusion and ground subsidence in many coastal urban areas [1].

The challenges of meeting the demand for water in the dry season are complicated by the growing volume of pollution from urban and industrial sources. Most of the major rivers on Java are badly polluted with a combination of untreated domestic wastes and largely from uncontrolled industrial effluents.

Meanwhile, the groundwater aquifers in many urban centers are also polluted, primarily by human wastes, but with increasing evidence of industrial

waste as well. The underlying contamination of water supplies, in part also due to the clogging of drains and canals by solid wastes. Over the longer, toxic and hazardous waste poses an even more serious threat to human health and welfare. Sample of groundwater in Jakarta, and marine life in Jakarta Bay, for example, already show evidence of contamination by toxic metals (e.g., mercury).

In the outer islands, the key issues arise from the conversion of both forest areas and coastal wetlands into agricultural lands, and also due to uncontrolled logging. During the last three decades, water resources policy issues in the outer islands have been mainly concerned with the sustainability of the newly constructed irrigation schemes. Soil erosion and high fluctuation of river flows between the rainy and dry seasons has been hampering the effectiveness and sustainability of the schemes. This in turn, resulting significant escalation of Operation and Maintenance (O&M) costs of the water resources infrastructures. For some parts of the low lying areas, sedimentation on the lower reach of river such as the case of several main rivers in Kalimantan, has been threatening the routine accessibility of natural harbors on the river mouth as well as for the inland water transportation -- especially during the dry season [1].

2. Integrated Water Resources Management Conception

2.1 The Need of Integrated Water Resources Management

Public pressure caused by e.g. lack of safe and affordable drinking water and basic sanitation, pressure from national economic sectors like energy and agriculture due to lack of water for development, degradation of watershed, polluted water, unreliable river flows and deteriorated water infrastructures all provide incentives and opens for opportunities for governments to initiate processes leading to improved management of water resources. Such improvements can be achieved through Integrated Water Resources Management.

Water scarcity and deteriorating water quality and increase of number of water related natural disasters in Indonesia have been critical factors limiting national economic development, expansion of food production and/or provision of basic health and hygiene services to the population. The recognition of the need to

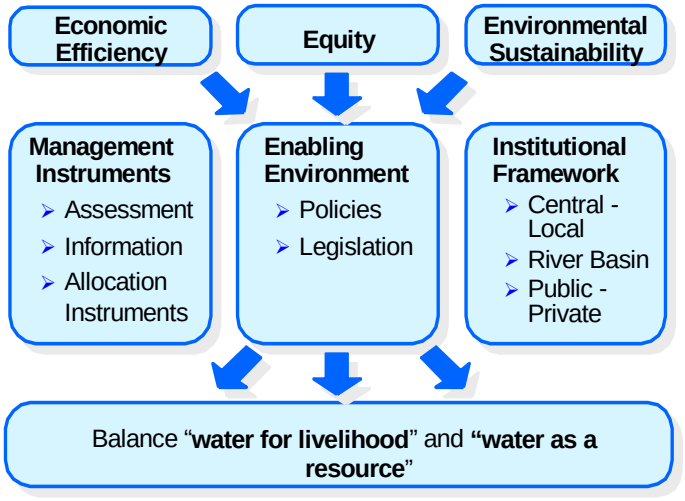
redress these weaknesses in their water governance structures has convinced many countries that a new water management framework is needed. Other common critical issues include:

- Awareness – and priority - at political level of water issues is limited
- Institutions are rooted in a centralised culture with supply driven management and fragmented and sub-sectoral approaches to water management. Few water managers view water holistically, but the integrated approach is required, among others, because of the biophysical reality where the water´s movement through the catchment links the livelihood and resource perspectives.
- Local governments lack capacity to manage pressures on water resources
- Inappropriate pricing structures and hence limited cost recovery result in inefficient operation and maintenance of water systems, as well as in misallocation and loss of water
- Investments in the water sector are low, and do not get sufficient attention in the national budgeting procedures
- Information and data to support sound management of water is generally lacking

2.2 Integrated Water Resources Management (IWRM) Principles

IWRM may be defined as: ”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 eco-systems” (GWP-TEC) [2].

IWRM is a political process and involves conflicts of interest that must be mediated. Effective water governance is crucial for the implementation of IWRM Plans. Implementing an IWRM process is in fact a question of getting the "three pillars" (economic efficiency, equity, and environmental sustainability) right: moving toward an enabling environment of appropriate policies, strategies and legislation for sustainable water resources development and management; putting in place the institutional framework through which to implement the policies, strategies and



legislation; and setting up the management instruments required by these institutions to do their job. The three pillars are illustrated in Figure 2 (source GWP-TEC) below [2].

Governments play a key role in the implementation of an IWRM framework as the one illustrated in Figure 2. They must also be the main regulators and controllers in the water sector with its associated infrastructure. Further, governments promote improvements in the public sector, regulate the private sector involvement, and decide on market mechanisms. But *"water is everybody's business"* – a resource to be managed at the lowest appropriate level. It is governments working with civil society that must raise awareness of the importance of improved water resources management among policy makers and the general public. Dialogues

will take place between the many stakeholders involved, both government, civil society and private sector. Governments can only exercise their responsibilities of good water governance if they involve all relevant national (and if appropriate also regional/ transboundary) stakeholders in the dialogue when the framework is developed and implemented. Without stakeholder support, government efforts to implement the framework will be frustrated.

2.3 Overview of the Status of IWRM in Indonesia

This section presents an overview of the status of integrated water resources management (IWRM) in the country progress towards achieving IWRM and water sector reforms. The reform process in the water sector that has started in 1998 that clearly mentioned the need to adopt IWRM principles in the new water resources law have progressed very well. It is currently being finalized by both the government and its parliament. It is expected that the new law will be enacted by February or March 2004. The aim is to ensure that the IWRM process is not treated as an add-on programme but to the overall IWRM focus. In addition to that Indonesia has made provisions for the establishment of river basin organizations in the form of public corporation to manage the most developed river basins, i.e., Brantas (Perum JasaTirta I/PJT I) and Citarum (PJT II). Since their establishment in 1975 for PJT II and in 1991 for PJT I these public corporation are able to gradually recover their basic operation and maintenance cost of their infrastructures. While for the less developed river basins in Java and selected rivers off Java a river basin management unit has been established to serve a certain task such as water allocation for various purposes. The operational budget for these river basin management unit still funded by provincial and central government.

2.4 Priority IWRM Issues and Challenges

Indonesia is a large country with many islands and its water resources and irrigation sector therefore faces increasingly complex long-term investment challenges and management problems. These problems, if not effectively addressed, will increasingly constrain the country's economic development and

lead to a deterioration of food security, public health and irreversible damage to the environment which is already exacerbated by inappropriate and ineffective legal structures, regulations, policies and institutions. The problems arise from the adverse impact of population growth, urbanization and industrialization. It is, therefore, essential to reform the sectoral policies, use more effective institutional framework, improve planning and management systems to increase beneficiary participation to adjust to current and future challenges. The objective of the sectoral reforms consist of: 1) Improvement in the National institutional Framework for Water Resources Development and Management, 2) Improvements in the Organizational and Financial Framework for River Basin Management, 3) Improvements in Regional Water Quality Management Regulatory Institutions and Implementation, and 4) Improvements Irrigation Management Policy, Institutions and Regulations.

2.5 The Generalized Process Toward IWRM

The generalized process leading toward Integrated Water Resources Management is envisaged to comprise the seven steps and Indonesia position on each step is described below [2]:

1) Establish goals and agendas

Priority issues in terms of significant and urgent water resources problems to be dealt with is part of the "need" based approach to building a management framework. The issues can conveniently be divided into livelihood/demand issues (e.g. meeting the increasing and often conflicting demands of different economic sectors) and resource-impact issues (e.g. impact of climate variability and changes, impact from human activities and land management).

In Indonesia the challenges to be dealt with comprise issues such as securing access to safe drinking water and basic sanitation for the presently unserved; the challenge of rapidly growing urban water demands and wastewater discharges; securing water for increased food production; reducing vulnerability to floods and droughts (including considerations of possible impact of climate change); reducing risk to human health and production from diseases and hazards; meeting

increased demands from irrigated agriculture, industry and other economic activities; protecting the resource base and vital ecosystems; and the prioritization among these often conflicting demands.

The above livelihood or demand issues need to be balanced based on an understanding of the resource base and the threats to this resource base: the impact of human activities and land management causing for instance deforestation, erosion and siltation, pollution and ecosystem deterioration, reduction of wetland areas, declining groundwater tables and salt water intrusion, the impact of natural phenomena such as climate variability and change, desertification, floods and droughts.

Several important elements of a framework will already be in existence. It is however important to establish the starting point and identify gaps and areas needing review and strengthening, in relation to agreed goals and objectives. The elements to consider will in particular include:

- *The enabling environment* National water resources and water services policies, laws and regulations, as well as financing and incentive structures
- *The institutional framework* in terms of trans-boundary organizations, national agencies, basin organizations, regulatory bodies, local authorities, private sector and civil society groups
- *Management instruments* in terms of water resources and demand assessments, economic instruments and water resources information and monitoring
- *National plans*, such as relevant Sector Reform Plans, Infrastructure Plans, National Environmental Action Plans, Water Action Plans etc.
- Endorsed *international agreements* and processes
- *Fora for cross-sectoral and multi-stakeholder dialogues*, such as partnerships at national and/or local level, active NGO's or other civil society organizations through which dialogues take place
- *Capacity building and empowerment* activities to enable stakeholders at all levels, and in relevant structures (public, private, civil society) to play their role

Elements such as those above need to be amalgamated to form a basis for further progress towards the IWRM and water services framework.

For Indonesia context, overall goals have been set up in the objective of Indonesian water resources sector reform that will thoroughly discussed in the next chapter. Other elements such as national plans, for a for cross-sectoral and multi-stakeholder dialogues and capacity building and empowerment activities are under consideration to be implemented once the new water resources law is enacted.

2) Build commitment to reform process

Build political will and raise awareness about water management issues and solutions.

Conscious actions to build consensus, also at the highest political level must be built into the process from the beginning, and be checked and enhanced at every stage. As the IWRM concept challenges existing ways of doing things, building awareness and understanding of the needs for change among the highest political decision- makers, managers, practitioners and other stakeholders is needed at this stage. Identification of national "champions" that will take responsibility for driving the planning process, and securing adequate human and financial resources is important at this stage.

Indonesia since 1998 is in the middle reform process for all aspect of sociopolitical and economical dimensions. For water resources sector, reform process is accumulated in the formulation of a new Water Resources Law.

Consolidation/development of partnerships are necessary to develop strong multi-stakeholder groups and fora that can play a role of interactive participation in the IWRM planning process, including frameworks for water service delivery and associated water infrastructure. The cross-cutting nature of IWRM has to be reflected in the composition of the fora. The role and interests of the actors should be established through a stakeholder analysis. As awareness raising and multi-stakeholder involvement is critical to the success of IWRM planning processes, it will be necessary to put in place a communication strategy on the IWRM reform process and its results. The availability of timely and relevant information to all concerned is an essential precondition.

Currently a multi-sector team for water resources management consisting 11 of government institutions chaired by Coordinating Minister of Economic Affair is

existed based on Presidential Decree No. 123/2001. The Water Resources Bill stipulates that the membership of this team will be extended to accommodate all components of water resources stakeholders.

3) Analyse gaps

A number of functions are required to deal with the prioritized water resources management and development issues. These functions would typically include:

- *Resource management functions, such* as formulation of policies for international co-operation on transboundary waters, water allocation and wastewater discharge permits, water resources assessments, monitoring, enforcement, mediation, training and information
- *Water services and infrastructure management functions* including such items as frameworks for water services with the associated policies, laws, regulations and enforcement. Outlines of infra-structural requirements with associated social and environmental impacts, as well as water use efficiency standards are also included
- *Financing functions and mechanisms* including such items as national and local capital markets and mechanisms such as grants and internal sources, user payments, subsidies, loans and equity capital

Identification of potentials and constraints should take place at all levels: central (including transboundary issues), local and community levels based on the functions required to handle the main water resources management and development issues. For Indonesia some functions are already in existence, however many things still need to be done especially for financing functions for achieving Millennium Development Goals and food security programs for the whole country.

4) Prepare strategy and action plan

The milestone in the process where actions to improve the IWRM framework have been identified will be documented in an IWRM 2005 Plan. Actions will address the gaps in the framework and aim at reform of *policies, legislation and financing* frameworks, *institutional roles* and capacities, and enhanced *management*

instruments required to deal with the priority water resources issues. The links to other *national plans and international processes* are additional important components.

These plans include, among others, guidelines for balancing public/private sector involvement, amending regulatory frameworks accordingly and identifying financing and tariff options.

The planning process has to be accompanied by parallel implementation in order to become useful. Implementation of needed projects/actions can be commenced at an early stage for the most obvious high priority projects/actions and "hot spots". Also some of the required changes in institutional structures, capacity building, improved knowledge and a capability to use the appropriate management instruments may well start implementation in parallel with the planning process, as well as changes following from water services reforms and envisaged infra-structural requirements. Proposals and project documents ready for consideration by funding agencies and donors can be prepared and a portfolio of projects/actions built up as part of the process.

5) Build commitment to actions

An IWRM plan will typically suggest actions that go well beyond the resort area of a particular ministry or department, and it may propose changes of central government institutions. It is therefore essential that it is adopted at the level where inter-ministerial co-ordination takes place, and ultimately - as in the case of national water legislation - with the Parliament.

The enactment of the new Water Resources Law by February or March 2004 will ensure the adoption of IWRM at the highest political level.

Acceptance and buy-in from stakeholders for the IWRM planning process is crucial. Social acceptance is mostly generated through the acceptance of local differences and the fact that actions can be seen to lead to real improvements for people. Important for the acceptance of actions is that political feasibility, ideology and cultural aspects have been incorporated into the management strategies and plans. A strategy on how messages on necessary changes are communicated is therefore very important for the process.

There are important linkages between implementation of the water resources management strategy and plan and the government's annual budget cycle. Thus it is important that water resources management become institutionalized in domestic budget preparation and policy and program formulation practices.

6) Implement frameworks

The implementation of an IWRM framework can start at different points depending on the national preferences and priorities. Implementation activities can take place in parallel or sequentially and the duration of the activities is often dependent on the dynamics of "champions" driving the processes:

Reform often means considerable changes in established structures and roles and is likely to meet friction. In a situation where a centralized water resources management has taken place, decentralization of responsibilities to river basin agencies, or other structures at the basin level, will mean a shift in power and there will also be implications for employment and positions. Implementation of strategies for reallocation of water in order to maximize benefits to the society will inevitably meet with resistance from individuals who will see a change in what they perceive as their rights.

The IWRM framework is developed in order to manage resources in such a way that economic and social welfare is improved. The framework also becomes a framework for water infrastructure development being a factor in welfare. The IWRM framework may for instance prioritize water for domestic water supply, set "game plans" for water user groups and include regulations that prevents pollution of sources. Water supply infrastructure will thus be developed in ways that are consistent with the IWRM framework and there will be a close link and a sliding transition between the IWRM framework and the more specific, technical water supply acts.

High priority areas for capacity development within existing institutions are identified at an early stage and initial capacity building can be undertaken. Once the IWRM planning process is well underway, then further capacity and human resource development can be undertaken

7) Monitor and evaluate progress.

Indicators are necessary tools for elucidating developments, identifying challenges and monitoring implementation and results. Indicators contain information in a less detailed and often more aggregated form than data and statistics. IWRM indicators should be able to illustrate improvements in the water and sanitation situation for people (impact indicators), progress in the process towards IWRM (process indicators) and the function of the IWRM management system (performance indicators). An IWRM indicator system should be developed and adopted as part of the IWRM process, and each system should reflect the actual situation in a given country.

There is a need for overall globally coordinated indicators to be used for worldwide joint assessments. In addition, IWRM indicator systems will comprise more detailed indicators tailor-made to the country context. Examples of indicators for implementation are given in the following list [2]:

- *Impact indicators on water resources availability and trends.* Demand and development trends for major uses; demand- livelihood challenges; threats to water resources from pollution, challenges for water resources management; user conflicts and competition for water.
- *Process indicators of where a country is in the IWRM process.* Awareness about IWRM and political will to support the process; framework for stakeholder participation, water resources management issues prioritized; roles and functions within water resources management identified and defined; management potentials and constraints identified; stage of development of IWRM framework.
- *Performance indicators on how the IWRM framework works.* National policies- water goals, use, protection and conservation; integration of water concerns into national policies and sector policies; legislative framework for policies and goals; financing and incentive structures; organizations set-up forms and functions; management capacity.

3. Indonesian Water Resources Policy Reform

3.1 The Need for Sector Reform

There are three major considerations that necessitate this policy reform: a) the nature of water resources problems in Indonesia, b) continuous need for achieving food security and sustainable irrigation, and c) overcoming institutional constraints.

a) Water Resources Problems

Indonesia's water resources management still faces increasingly complex long-term problems and investment challenges. Unless effectively addressed, it will increasingly constrain the country's economic development and food security. The problems arise from the adverse impacts of population growth, urbanization and industrialization.

The key sector problems are [1]:

(i) water allocation is under local scarcity due to growth of non-irrigation water demand;

(ii) inadequate urban access to piped water supply while affordable investment in urban water supply facilities is unable to cope with the growth in demand;

(iii) water pollution and adverse impacts of untreated municipal wastewater discharge, including industrial and mining effluent disposal;

(iv) adverse impacts of watershed degradation such as increasing flood peaks causing economic damages, decreasing dry season flow and sedimentation damages to water infrastructure; and

(v) adverse environmental impacts of poorly planned swampland development designed to meet the country's food security needs, as well as income generation for transmigration settlers.

Capital investment required to mitigate these problems run into billions of dollars. It is therefore essential that Indonesia tries to use improved institutional frameworks, planning and management, as well as greater beneficiary participation to meet these challenges.

b) Achieving Food Security and Sustainable Irrigation

While about 80% of domestic rice production comes from irrigated areas, food security is uncertain because of problems that have constrained public irrigation performance and sustainability. Sustaining rice and food production also requires an effective irrigation O&M program instead of deferral of routine maintenance and dependence on periodic externally aided investment for irrigation scheme rehabilitation. Also, government's investment strategy of maintaining rice security through expansion of irrigation and swamp reclamation on the Outer Island needs review, particularly with respect to the choice of most cost-effective and environmentally sustainable interventions [1].

Despite preservation of central O&M funding in real terms at about $70-80 million/year since 1987, allocated funds are used primarily for staff activities, while whatever remains (about 15-40 percent) is generally used for urgent repairs needed to ensure water delivery elsewhere. Since 1997, O&M funding is provided to provinces as part of the general provincial block grant transfer mechanism; this has resulted in provincial governments allocating about 25% less resources to O&M while Rupiah devaluation has further reduced the O&M budget value. Our past attempts to transfer management of small irrigation schemes to farmer controlled Water User Association (WUAs) has not met with much success while our attempt to establish effective WUAs on large irrigation schemes has also not succeeded.

c) Institutional Constraints

Mitigating the sector's multifaceted challenges has been difficult because of [1]:

(i) growing inadequacy of both legal and regulatory framework;

(ii) non-implementation of legal provisions which would require payment for bulk irrigation water supply and municipal or industrial effluent discharges fees;

(iii) weak sector institutions for integrated water resources policy formulation investment planning, governance, management, strategic allocation of scarce resources and water pollution control;

(iv) inadequate coordination of government agencies in addressing problems and diseconomies that require concerted inter-government cooperation and action;

(v) a “construction project administration culture” with scant attention to effective service delivery and program based on economic incentives and regulatory sanctions;

(vi) acceptances of a deferred maintenance cycle leading to premature externally-aided capital-intensive rehabilitation;

(vii) complexities of human resources deployment, performance incentives, budgeting and organizational structure have prevented devolution of central government roles and powers to regional and local government; and

(viii) absence of appropriate mechanisms for stakeholder consultation and representation in sectoral decision-making institutions.

3.2 Water Resources Management Policy Reform

a) Reform Principles

In April 1999 the Government of Indonesia (GoI) formulated the Letter of Sector policy and Policy reform matrix, which formed the basis of the Indonesian Water Resources Sector Adjustment Loan (WATSAL) of the World Bank. This was the start of major institutional reforms, including policy, legal, organizational and financing aspects, aimed at improving overall water resources and irrigation sector performance.

The sector reform is based on the following principles[1]:

- Empowerment: water users and other stakeholders democratically define what kinds of water services they need, who will provide them and how they are provided.

- Accountability: delivery of water services should be demand driven and ensured through service agreements, management audits and effective regulatory institutions for water resources

- Sustainability: physical and financial sustainability of water infrastructure depends on proper application of the above two principles, efficiency in service and delivery and smart subsidies designed to stimulate local investment and elicit appropriate behavior.

- Unbundling of support services for irrigation and irrigated agriculture are diversified to promote choice, competition and greater accountability with irrigation being a responsibility for the Kabupaten (districts).

Implementation of these principles in practice is a major change in governance and management culture. This will take time and requires a process approach based on reasonably achievable benchmarks. As a first step the principles have been or will be legalized in a new basic Water Resources Law, Government Regulations, Presidential Decrees, Ministerial Decrees, Administrative and Technical Implementation Guidelines and Administrative Instructions.

b) Objectives.

The on-going reforms are addressing water resources' problems and structural deficiencies through policy, legislative and institutional adjustments more conducive to attainment of food security, sustainable water and land use and an improved aquatic environment. Our specific sector reform objectives are [1]:

(i) establishment of a national intergovernmental water resources and irrigation management coordination framework;

(ii) adoption and implementation of a bidding National Water Policy to guide sector planning, programming, budgeting, real time management;

(iii) establishment of institutions and procedure for the involvement of stakeholders and water resources service beneficiaries in river basin management policy formation and decision-making;

(iv) improving national water resources management information and decision-support data systems and networks;

(v) fostering integrated management and regulation of river basin water resources;

(vi) establishing effective management organization in strategic river basins;

(vii) introducing a water rights system for secure, equitable and efficient water allocation;

(viii) establishing institutional frameworks for enforceable water pollution control;

(ix) transparent empowerment of farmer irrigation organization with governance and financial powers to manage irrigation networks of their jurisdiction;

(x) ensuring fiscal sustainability and efficiency and efficiency of O&M and rehabilitation of irrigation schemes; and

(xi) reorganization of irrigation services administration.

c) Integrated Water Resources Management Policy

Water resources related activities must be synchronized at the national policy and strategic level so that resources and efforts can be effectively directed towards achievements of common public goals. To support water resources development and management, the Government of Indonesia is reviewing current policies and procedures in water resources and adopted an Integrated Water Resources Management Policy framework that is able to support and guide the development and conservation efforts of all government and private entities. The policy is covering water quantity and quality for both surface and groundwater in the context of river basins, including upper watersheds and estuarine areas. A specific component of the policy is dealing with environmentally and socially sensitive swampland development issues.

The Integrated Water Resources Management Policy would include [1]:

(i) introduction of a water rights framework for water allocation and utilization conducive to economic and social development and environmental sustainability;

(ii) improving the efficiency in utilization of water, particularly for irrigation;

(iii) attaining regional surface and ground water quality levels that are compatible with both socio-economic development and environmental sustainability;

(iv) developing participatory institutions for prioritized, integrated spatial and river basin planning processes, based on participatory involvement of stakeholder representatives in water resources and irrigation decision-making and activities;

(v) establishing an enabling mechanisms for community management and financing of irrigation networks;

(vi) establishing a sustainable planning, programming and budgeting system for water resources development and management under a framework for regional autonomy and government decentralization;

(vii) creating a national and regional water resources management structure to support and implement integrated river basin management;

(viii) improving coordination between forestry, agriculture, conservation and water resources sector activities in watershed management;

(ix) establishing a specific integrated policy for environmentally sustainable wetland and swampland development, and

(x) promoting corporation of government water service by: (i) ensuring that new River Basin Corporation have adequate revenue to cover the cost of more efficient service provision, and (ii) supporting organization for corporate management of provincial water services.

d) Expected Output of the Water Resources Policy Reform

The implementation of the reform agenda on water resources sector would lead to the following changes that need the follow up action plan [1]:

- establishment of a national water council or coordinating body at Ministerial level;
- a national integrated water resources management policy-and the necessary legal, regulatory and administrative instruments needed for implementation of that policies;

- plan to reform of the *Jatiluhur (Jasa Tirta II)* Public Company, and establishment of four new self-financing river basin management agencies (Bengawan Solo, Serayu-Bogowonto, Jeneberang and JRATUNSELUNA);
- establish of Basin Water Coordination Committees, Provincial Water Coordination Committees and Hydrological Units in the key river basins of at least eight provinces;
- stakeholders representation on Provincial and Basin Water Coordination Committees;
- development of an improved regulatory framework, and use of fiscal incentives to reduce river and reservoirs pollution by mining, industry and urban areas;
- establishment of a system of water use rights for water allocations (for the time being at two pilot river basins, i.e., Brantas and Citarum river basins), and an improved water waste discharge permits to facilitate water quality management;
- establishment of institutional and fiscal framework that enable self-governing Water User Association (WUAs) and federations of WUAs to operate and maintain irrigation canals on their jurisdiction;
- reform of national and local irrigation administrations to serve WUAs and establishment of demand based system to finance WUA maintenance and rehabilitation expenditures; and
- development of a national water resources management information system and data base.

3.3 Policy Implementations:

*a) Integrated Management in Less-Developed River Basins***.**

In an effort to strengthen water resources management based on a river basin approach in less-developed basins, the Government is setting up basin level organizations called River Basin Management Unit or *Balai Pengelolaan Sumber Daya Air (BPSDA)*. During the period 1999-2002 the Government has set up the 23 BPSDAs in Java covering 5 provinces, while for provinces outside Java 18 BPSDAs has been established in more recent period (2002-2003). Many more

BPSDAs still need to be established for river basins off Java. The roles of these *Balai PSDAs* are gradually strengthened in licensing of water abstraction and discharge, water allocation, conjunctive use of groundwater and co-ordination with watershed management programs. In particular, as a result of the movement towards decentralization and regional autonomy, some *Balai PSDAs* are also being given an operational role in the management of irrigation networks that transcend District boundaries. The operational budget of these BPSDAs become responsibility of the related provincial government, while central government responsible in strengthening BPSDAs through a well planned capacity building programs supported by the World Bank and the Government of Netherlands.

*b) Strategic Developed River Basins***.**

In developed and strategic basins of national importance, the Government is strengthening various aspects of basin water resources management, water allocation and water quality, by establishing self-financing river basin management corporations that are centrally managed. Currently two basins are already managed by public corporations, i.e., Jasa Tirta I (Brantas river basin) and Jasa Tirta II (Citarum river basin) and five more basins, i.e., JRATUNSELUNA, Jeneberang, Serayu-Bogowonto, Way Seputih-Way Sekampung and Bengawan Solo (already included on the extension of Jasa Tirta I operation area) are targeted to have such organizations, to establish financially sustainable and autonomous organizations in keeping with the principles of the national reform.

c) Secure, Equitable and Efficient Water Allocation.

As demands increase and inter-sectoral competition increases for limited supplies, public regulation based on recognized water rights will be required to achieve societal goals. At present, the existing water licensing system for abstraction and wastewater discharge is weak and is poorly applied. The implementation suffers from a lack of political will, appropriate institutional mechanism, and absence of administrative and technical guidelines.

In order to support effective and efficient water allocation, to promote user investment, and improve water administration, the Government will establish an enforceable formal national water use right. Implementation of water use right will

be carried out in stages through two piloting river basin, i.e., Brantas and Citarum basins.

*d) Water Pollution Control Framework and Institutions***.**

To support regional/river basin water quality management and pollution control, the government is formulating a more effective, enforceable and sustainable, regulatory and financial framework to abate river, lake and reservoir pollution by industrial and domestic urban effluents. Legal and regulatory instruments will be developed on the basis of affordable publicly accepted stream standards, river basin management needs and environmental conservation. This will enable the strengthening of water quality management in priority river basins through investment and regulatory control of water pollution.

e) People's empowerment for responsible water use and conservation

Ecosystem-based catchment management can be implemented successfully when it takes a path that is based on people's well –informed decision-making, and adoption to changing conditions. This is a process that enables humans to improve their standards of living and lead their lives in dignity and fulfillment, while learning to conserve their resources base and contribute in a meaningful way to solidarity within their society.

Devolution of power to local levels, and people's participation in water management decision –making, requires individuals to take up new responsibilities and become actively involved. Water-related problems have taken a long time to reach this critical stage; persistence, tempered with patience, is needed to find solutions. Energy and capacities exist at local levels that can be complemented, where appropriate, with technical expertise by NGOs, CBOs, research institutes or governments.

f) Establishing Gender Equity

Gender equity in relation to water resources use and management is crucial for resolving potential water conflicts, enhancing social security, and improving strategies for water conservation, pollution control and demand management. The identification of obstacles to the broad and fair participation of women in water

resources management is therefore fundamental for the implementation of sustainable and equitable resource use practices. While it is axiomatic that both women and men should have an equal right to access, around the world, women and men play different roles with regard to maintenance and use of water resources. Women often have unequal access to, control over and benefits from water resources. To establish a gender balance in water management will require substantial but subtle changes to be made to the ways that both men and women collectively manage freshwater and related ecosystems.

g). Raising Public Awareness

Public awareness, private sector responsibility and a general commitment among local groups to protect water resources are fundamental to establishing change. Often underestimated but potentially influential is the role of religious groups. These can provide leadership, and raise the awareness of communities and individuals of the need to protect our environment and take personal responsibility for caring for it. Community-based groups, such as service and user groups, labour unions, and women's and youth organization, also have a key role to play in stimulating changes in human behaviour to spread around the world.

4. Characteristics of the New Water Resources Law

Since the commencement of the Water Resources Sector Reform Program in May 1999, high priority was given to the preparation of the draft Law on Water Resources. Mid 2001 a draft legislative proposal had been completed. After various amendments, the final bill was formally submitted to the parliament by the President in October 2002. Since its submission, a number of discussions with parliament have been made, 100 articles have finally been addressed in the final version (the original version only 97 articles). The bill has finally been approved by the Commission IV of the National Parliament on the February 11, 2004 and will be enacted by the February 19, 2004 on a General Assembly of the National Parliament. The following paragraph address salient characteristics of the new act on water resources and the main issues being discussed with parliament.

4.1 The Strength of the New Water Resources Law

The following are some salient characteristics of the new act:

- The act has now become a true management law. It is no longer primarily focused on the construction (development) of water infrastructures and irrigation networks, but on the provision of conditions for sensible, sustainable water resources management and the irrigation networks.

- The act's scope is aimed at integrating water management in all its aspects, i.e., surface water and groundwater, with regard to quantity and quality. Consequently, a coherent integral approach is adopted. The integral approach manifests itself in emphasizing the importance of the basin approach. Water resources management is based on a river basin approach.

- Openness and encourage participation of stakeholders. All social organizations involved in water management and citizens (community) are given possibility of participating in all steps of water resources development and management, i.e., in the preparation of strategic policy plans for water resources, in the design, construction, operation and maintenance, and monitoring of in-stream water quality. In this respect, principles of *good governance* such as effective, efficient, transparency, etc. are adopted.

- It is integrating social and economic functions and values. Along with water's social function, its economic function is now also emphasized. This reflects the fact that water, i.e., surface water and groundwater, is a scarce commodity, which need investments that in principle should be paid for. Although government remains responsible for the intersectoral allocation of water for its various purposes including social purpose, the option to further incorporate the market sector has emphatically been opened.

- It is framework act. Although the act has grown considerably in size in comparison to the old act, i.e., from 17 to 97 articles (97 article in October 2003 and subsequently become 100 articles in December 2003), the subjects included in the act are only provided in outlines. Substantive elaboration of

almost all subjects is took place in regulations. This makes the act a typical framework act and therefore it is in accordance with the modern principles of legislation approach in complex policy areas. Since parliament is formally not involved in the adoption of these regulations, therefore the content of the implementation regulations should be roughly known by the parliament as the legislator at the time of discussion of the bill. This necessitates that the preparation of the regulations is carried out in parallel to drawing up the bill. To accommodate this need, the key regulations of the existing act have been completely revised and adapted to the philosophy and content of the act. The following draft regulations are listed here in particular:

- Regulation about Water Resources Management. This replaces the Regulation on Water Management from 1982
- Regulation for River Basin Water Resources Corporation. This a new regulation.
- Regulation for River. This replaces the Regulation on Rivers from 1991.
- Regulation for Water Quality and Control of Water Pollution. This regulation based on the Law on Management of Environment No. 68/1997 and replaces the Regulation on Water Quality Management from 1990.
- Regulation on Irrigation. This regulation is complete and came into force in 2001, although it is still based on the existing Law on Water Resources No. 11/1974.

However, it should be noted that the two regulations, i.e., on Water Quality and Irrigation, that were enacted at the end of 2001 are still subject to be reviewed based the new law on Water Resources once it is enacted.

The important features of the bill on water resources on institutional, planning, utilization, conservation, system information, etc., aspects are described as follows:

1) Institutional Aspects

Institutional aspects concern the distribution of authority and responsibility, the way in which policy coordination between the various authorities involved in water tasks has been arranged (coordination), and the way in which the participation of

society in the policy-making process in the area of water management has been regulated (public consultation, etc).

2) Authority and Responsibility

The regulation concerning Authority and Responsibility stipulates the tasks and responsibilities of national government, the provinces, and the districts/municipalities. The act distinguishes the river basin categories and their associated responsible authority:

- River basin in one district/town; responsibility of districts/towns;
- river basin crossing district/town; responsibility of provinces;
- river basin crossing province, state and national strategic river basin; responsibility of national government.

It also provides for an arrangement that gives the provinces the option of transferring part their task to national government in particular circumstances. It also provides for an arrangement in case tasks are neglected.

3) Coordination

The responsibility for water resources is distributed over a large number of authorities at different administrative levels. It provides for establishment of coordination councils. The current legislation already provided for the establishment of coordination committees at different levels, however, its membership still limited to government institutions. In the new set-up, these committees are transformed into more administrative consultative bodies. In addition, the composition of these consultative bodies will be considerably broadened. Social interest organizations, that reflect all components of stakeholders, will also be represented in the council for national level and committees at provincial and river basin levels. The openness principle laid down in the new law is given substance, aimed at the involvement of society in policy-making processes in the area of water management through a public consultation. This is an important step forward and it also fulfills the government's general aim of strengthening the democratic standard in policy-making processes. The establishment of council and committees are good. This creates conditions for obtaining administrative and social support for policy themes in which there are major, and to a growing extent, conflicting social interests.

4) Public Consultation

Involving society in water management policy-making is not limited to the planning phase, but in principle to all decision-making phases of water resources management. Authorities involved, citizens and social interest groups should consequently have the option of participating in operational decisions, such as licensing, for the implementation of policy formulated in a water resources management plan.

5) Planning

In the new act, a distinction is made between two forms of planning: water resources policy and planning of water resources management. The first is more general and aimed at policy, the second is specifically aimed at a river basin and has a more technical objective. The adoption of water resources policy has been provided for at all administration levels. At national level, the formulation of water resources policy is obligatory. For the other authorities it is only a right and it is therefore not obligatory. It has been determined that provincial water resources management policy should be based on national water resources policy. The national water policy document is consequently a starting point for the other authorities. Applicable to all authorities is that they must determine a water resources management plan for the river basins under their responsibility. This plan must be based on water resources policy at provincial and subsequently at national level.

6) Water Resources Information Systems

Water resources information systems have an appropriate place in this new act. One chapter is dedicated to regulate water resources information system by giving obligation to Government (central) and Local Governments (provincial, district/city) levels to foster them as a part of their responsibility in managing water resources at their jurisdiction. Water resources information systems will consist of data and information management system on hydrology, hydrometeorology, hydrogeology, water resources policy, water resources infrastructures, water resources technology, environment on and surrounding water sources and socio-economic and cultural activities of community that relate to water resources. This is an important step in ensuring an accurate and reliable management of water

resources, otherwise water resources information systems are given lower priority in budget allocation.

7) Irrigation Management Policy

Related to irrigation management policy, the draft of new water resources law states the following principles:

- Responsibility in development/construction and operation & management of irrigation schemes are belong to the central government and local governments according to their jurisdiction and it will be implemented with participation of Water User Associations

- Irrigation management jurisdiction:
  - Irrigation scheme located in one district/city, its management authority belong to district/city government
  - Irrigation scheme located in more than one district/city (district/city transboundary scheme), its management authority belong to provincial government
  - Irrigation scheme located in more than one province/country (province/ country transboundary scheme), its management authority belong to central government
  - Funding for construction and operation & maintenance of tertiary systems belong to farmer community responsibility, and if required the government will provide an assistance

8) Utilization

The regulation regarding Water Resources Utilization is the most extensive section of the new act. This is due to the fact that utilization comprises a broad range of activities, i.e.: utilization, supply, usage, development, and exploitation of water resources. The new act also reconfirms the importance of water's social function. This is considered to be of such importance that this has now been enshrined in law in the form of a "water user right" guaranteed by the State. The use of water by individual citizens for their daily necessities of life is free. Therefore no license is required. All other forms of water use are subject to license. Along with its social function, the economic function of water now also takes an important place in law.

In principle, the use of water should be paid for on the basis of the cost recovery principle, especially to delivery service of water to municipalities, urban areas, industry and other commercial uses. In the regulation concerning water exploitation the act has explicitly opened up the option to involve the market sector.

9) Conservation

The new act explicitly stipulates that the implementation of provisions in the area of conservation should become one of the elements in space arrangement planning. It should be noted, that proper self-execution of the water policy in town and country plans is necessary for the actual implementation of the conservation aspect.

10) Operation and Maintenance

The regulation describing what Operation & Maintenance (O&M) comprises, i.e., the management of water resources as well as water resources infrastructures, and indicating that the implementation of O&M is part of task of the water administration involved.

11) Flood Control

The act now provides for a regulation about flood control. Focus is on creating conditions to prevent floods. It also describes the roles of the Central Government and Local Government in mitigating flood disasters.

12) Financing

A start is made on elaborating on the principle introduced in the act that water has an economic function alongside its social function. Water user will have to be paid taking into account its social function.

4.2 The Weakness of the Policy Framework Within Purview of the IWRM

Matters that could be considered as weakness of policy frameworks within purview of the Integrated Water Resources Management (IWRM) principles depicted below is made based on the following factors: a) adherence of the water resources

sector reform objectives and agendas to IWRM general principles, and b) understanding and appreciation of law makers and NGOs on the general principles of IWRM.

a) Adherence to the IWRM general principles

- Adherence or gap between the policy frameworks and the IWRM general principles can be identified by comparing them to the structure of the IWRM GWP ToolBox .
- For Indonesian case, the most important elements of the enabling environment and institutional roles have been covered in the sector reform agendas, while on the management instruments, they need to be broadened to cover more important elements such as water resources assessment, economic instruments, demand management and plans for IWRM implementation.
- Economic instruments that are not well covered in the new bill among others are: i) a provision that a water use right is not permitted to be rented or sold partly or wholly will potentially hinder efficient use of water and transfer of water among sectors (agriculture to urban, etc), ii) role of private sectors is somewhat limited to only on a service provider for drinking water for housing areas, and iii) free charge policy for irrigation water use provides disincentive for efforts to improve irrigation water use efficiency.
- Coordination mechanism still need to be strengthened by providing a substantive coordination instruments, especially on obligation of each institution.
- Once gaps are identified, correction measures can be determined. It still can be considered in making implementing regulations.

b) Understanding and appreciation on the general principles of IWRM

- A big gap between the IWRM general principles and the actual legislative frameworks shows that understanding and appreciation of law makers and all components of stakeholders (including NGOs and government staffs) to IWRM principles and processes is still weak.

- A capacity building on IWRM is required for law makers and all component of stakeholders including related NGOs and government staffs to ensure that all parties have a common platform.
- An IWRM implementation plan is required at national, provincial and river basin levels to make implementation of the new water resources policy effective and sustainable.

5. Proposed NARBO Action Plans

The proposed action plans is focused on the real implementation of the IWRM principles and processes on a river basin context. The collection of best practices on how the IWRM principles and processes is implemented in river basins around Asian region and other places around the world that have a similar natural, environment, economic, and social conditions will be very useful for its member. A river basin organization that has proven itself success in implementing a certain area of the IWRM principles and processes should be appointed as a leading partner in a capacity building program such that its *good practices* experience could be disseminated to other RBOs in the region.

The following frameworks of action plans in the frame of the GWP IWRM Toolbox, i.e., the enabling environment, institutional roles and management instruments is proposed:

A THE ENABLING ENVIRONMENT

A1 Policies – setting goals for water use, protection and conservation.

This part of the framework deals with water policies and their development. Policy development gives an opportunity for setting national objectives for managing water resources and water service delivery within a framework of overall development goals.

A2 Legislative framework – the rules to follow to achieve policies and goals.

The required water laws covers ownership of water, permits to use (or pollute) it, the transferability of those permits, and customary entitlements. It underpins regulatory norms for e.g. conservation, protection, and priorities.

A3 Financing and incentive structures – allocating financial resources to meet water needs.

The financing needs of the water sector are huge, water projects tend to be indivisible and capital-intensive, and many countries have major backlogs in developing water infrastructure. Financing approaches and incentives are required to achieve the development goals.

B INSTITUTIONAL ROLES

B1 Creating an organisational framework – forms and functions.

Starting from the concept of reform of institutions for better water governance, the practitioner needs to create the required organisations and institutions – from trans-boundary to basin level, and from regulatory bodies, to local authorities, civil society organisations and partnerships.

B2 Institutional capacity building – developing human resources.

Upgrading the skills and understanding of decision- makers, water managers and professionals will take place in all sectors, and capacity building for regulatory bodies and for empowerment of civil society groups will need to be undertaken.

C MANAGEMENT INSTRUMENTS

C1 Water resources assessment – understanding resources and needs.

A set of tools are assembled to assist water resources assessment, starting with the collection of hydrological (water quantity and water quality), watershed

degradation and its impacts, physiographic, demographic and socio-economic data, through to setting up systems for routine data assembly and reporting.

C2 Plans for IWRM – combining development options, resource use and human interaction.

River, aquifer and lake basin planning entail a comprehensive assembly and modelling of data from all relevant domains. The planning process must recognize social, economic and environmental needs using a range of assessment tools.

C3 Demand management – using water more efficiently.

Demand management involves the balancing of supply and demand focusing on the better use of existing water withdrawals or reducing excessive use rather than developing new supplies. Technical agenda such as efficient operation of multipurpose reservoirs (single reservoir and cascade reservoirs) and others includes in this section.

C4 Social change instruments – encouraging a water-oriented civil society.

Information is a powerful tool for changing behaviour in the water world, through school curricula, university water courses and professional and mid-career training. Transparency, product-labelling and access to information are other key instruments.

C5 Conflict resolution – managing disputes, ensuring sharing of water.

Conflict management has a separate focus as conflict is endemic in the management of water in many places and resolution models must be at hand.

C6 Regulatory instruments – allocation and water use limits.

Regulation in this context covers water quality, service provision, land use and water resource protection. Regulations are key for implementing plans and policies and can fruitfully be combined with economic instruments.

C7 Economic instruments – using value and prices for efficiency and equity.

Economic tools involve the use of prices and other market-based measures to provide incentives to all water users to use water carefully, efficiently and avoid pollution.

C8 Information management and exchange– improving knowledge for better water management.

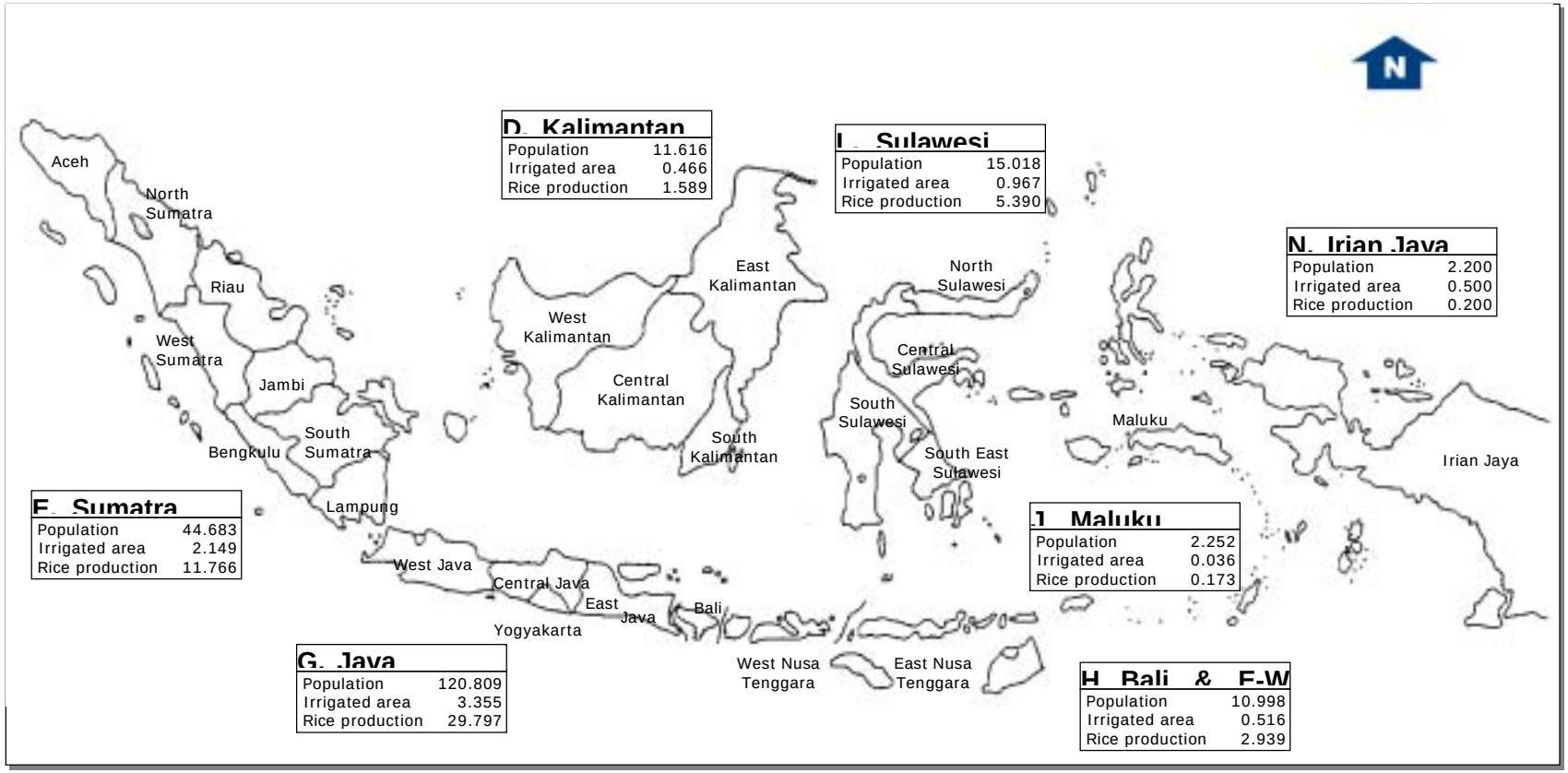
Data sharing methods and technologies increase stakeholder access to information stored in public domain data banks and effectively complement more traditional methods of public information. Effective watershed management that minimize soil erosion at upper watershed and discharge of pollution to water body include in this category.

References:

[1] *Water Resources Management Toward Enhancement of Effective Water Governance in Indonesia,* Sutardi, Country Report, for the Third World Water Forum, Kyoto, Japan. March 2003.

[2] *"Integrated Water Resources Management (IWRM) and Water Efficiency Plans by 2005",* Why, what and how ?, Torkil-Jonch-Clausen, Jan Hassing, Palle Lindgaard Jorgensen, GWP-Technical Committee (TEC), October 2003.

FIGURE 1
KEY STATISTICS BY ISLAND GROUP



Legend:
Population (million)
Irrigated area (million ha)
Rice production (wetland production, million per year)