



**KINGDOM OF CAMBODIA
NATION RELIGION KING**

**NATIONAL WATER RESOURCES POLICY
FOR
THE KINGDOM OF CAMBODIA**



With the approval of the Council Ministers
at the plenary meeting on 16 January 2004

Prepared by Ministry of Water Resources and Meteorology

CONTENTS

1	INTRODUCTION.....	1
2	VISION FOR WATER IN CAMBODIA.....	2
3	FUNDAMENTAL PRINCIPLES.....	2
4	THE NATIONAL WATER RESOURCES POLICY.....	3
4.1	CAMBODIA'S SURFACE WATER AND GROUND WATER.....	3
4.1.1	Water resources evaluation.....	3
4.1.2	River Basin Management and Development.....	4
4.2	APPROPRIATE DEVELOPMENT AND MANAGEMENT OF FRESHWATER RESOURCES.....	5
4.2.1	Water for agriculture.....	6
4.2.2	Water for energy.....	7
4.2.3	Water for industry small manufacturing enterprises and services.....	7
4.2.4	Water for domestic use.....	8
4.2.5	Water for navigation and tourism.....	9
4.2.6	Effectiveness of water utilization and partnerships.....	10
4.3	EQUITABLE WATER SHARING AND ALLOCATION.....	10
4.3.1	Water Sharing and allocation.....	10
4.3.2	Public information and knowledge.....	12
4.4	MITIGATION OF WATER-RELATED HAZARDS.....	12
4.4.1	Measures for hazard mitigation.....	12
4.4.2	Data collection, forecasting and warning.....	13
4.5	MAINTENANCE, PROTECTION AND SUSTAINABILITY OF AQUATIC SYSTEMS.....	14
4.5.1	The legislative framework.....	15
4.5.2	Institutional strengthening.....	15
4.5.3	Financial aspects.....	16
4.6	INTERNATIONAL ASPECTS OF WATER.....	17
4.7	WATER RESOURCES MANAGEMENT ALONG THE BORDER WITH NEIGHBORING COUNTRIES.....	18
4.8	MANAGEMENT OF COASTAL AND MARINE WATERS.....	18
4.8.1	Institutional and regulatory framework.....	19
4.8.2	The knowledge base.....	19
4.8.3	Land-based human activity and coastal waters.....	20
4.8.4	Offshore marine waters.....	21
5	IMPLEMENTATION OF THE NATIONAL WATER RESOURCES POLICY.....	22
6	Conclusion.....	22

GLOSSARY

ADB	Asian Development Bank
ASEAN	Association of South East Asian States
CARD	Committee for Agricultural and Rural Development of the Council of Ministers
Coastal waters	Sea waters that are within the zone of influence of coastal and shoreline processes, usually relatively shallow. Often referred to as "in-shore waters". (see "marine waters").
Drainage basin	See river basin
EEZ	Exclusive Economic Zone; the marine area offshore from a country's coastline over which it claims jurisdiction.
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FAO	Food and Agricultural Organisation of the United Nations
FWUC	Farmer Water User Community
GMS	Greater Mekong Sub-region
Hydrological cycle	The cycle of water from the oceans, into the atmosphere by evaporation, to the land surface by precipitation, and back to the oceans by river flow.
IFAD	International Fund for Agricultural Development
Instream uses	Uses of a stream or river that take place in the channel itself, as opposed to requiring abstraction of water from the channel.
IO	International Organisation
Marine waters	Sea waters that are outside the zone of influence of coastal and shoreline processes, but are influenced by conditions – weather, currents, etc. – experienced in deeper waters away from the coastline. Often referred to as "off-shore waters".
MCM	Million cubic metres
MOWRAM	Ministry of Water Resources and Meteorology
MW	Megawatt (unit of electric power)
NGO	Non-Governmental Organisation
Non-structural flood mitigation measures	Measures to mitigate the effects of flooding that do not involve the construction of capital works such as flood embankments, flood gates, detention reservoirs, and drainage channels. They might include real-time water level monitoring and flood forecasting systems, flood-warning systems, floodplain zoning and prohibition on occupancy, building regulations to specify floor levels above peak water levels, flood insurance, procedures and facilities for evacuation, etc.
RGC	Royal Government of Cambodia
River basin	The area of land and the system of channels that contribute water to a river system (often referred to as a catchment [English usage] or a watershed [American usage]). River basins are arranged in a "nested" hierarchy, e.g. Mekong River basin contains the Tonle Sap basin, which contains the Battambang River basin, and so on).
SEATAC-GWP	The Southeast Asia Technical Advisory Committee of the Global Water Partnership
Stakeholder	A person or institution which has a particular interest in the results or outcome of an activity or programme.
UNESCO	United Nations Educational, Scientific and Cultural Organisation
Water body	An expanse of water, normally permanent, such as a pond, lake, or reservoir. May also include the water contained in an underground aquifer.
Watercourse	A channel along which water flows, either perennially or intermittently.
WMO	World Meteorological Organisation

1 Introduction

The Kingdom of Cambodia is a country that is considered to have abundant water. Its rivers and streams, lakes, aquifers and marine waters are an important resource for national economic development in many areas, such as agriculture, manufacturing and small-scale industries, hydropower, navigation, tourism, environmental protection, and daily life.

The Mekong and Tonle Sap River system plays an important role in maintaining aquatic ecosystems, and provides a basic resource for national development.

Most Cambodian people face a shortage of freshwater during the dry season, and also during the "small dry season" in the wet season, but in the rainy season face too much water. Irrigation infrastructure is insufficient, old and run-down, which has a severe impact on water storage, distribution and supply, sanitation, and food production.

The waters of the Gulf of Thailand are enclosed by land, and there is a growing risk that contaminants and sediment from coastal towns, agricultural areas, and forest logging may pollute the sea. Furthermore, shipping and off-shore exploration for oil and gas reserves present additional risks to the water resources.

The Kingdom's marine waters require careful management, particularly along the coastline and in estuaries, to ensure that they continue to support healthy ecosystems and fisheries, and provide the basis for sustainable economic activities, particularly fishing and tourism.

Cambodia has a relatively small population and undeveloped economy, but in future years we expect that population growth and economic development will place rapidly increasing demands on water resources and national environment. Thus, the RGC maps out its vision for the role of water in society to ensure water use with wisely and equitably.

The National Water Resource Policy is:

- To protect, manage and use water resources with effective, equitable and sustainable manner,
- To foresee and take measures to assist related institutions to settle the facing problems which might be occurred in water sector,
- To develop and implement the national strategy and formulate the national policy and sector policies on water resources management,

- To direct the water resources development, management and utilization in the Kingdom of Cambodia to all activities of institutions, private sector and public sector,
- To improve and uplift the people living to achieve the national policy on poverty reduction and sustainable national economy development.

2 Vision for Water in Cambodia

The Royal Government of Cambodia maps out Vision for Water to ensure the effective, sustainable, wise and equitable use of water resources as follows:

- *Access for all to safe, adequate, and affordable drinking water, hygiene, and appropriate price,*
- *Provide sufficient water for agriculture, industry and economic activities,*
- *Tackle and minimize for all from the threat of loss of life and livelihood as a result of water related hazards,*
- *Manage the water resource environment with unpolluted.*

3 Fundamental principles

Most countries agreed on a number of fundamental principles related to water. Some of these are long established; for instance, almost all countries regard water as being vested in the state and not owned by any one person.

To ensure the effective and sustainable water resources management, the Royal Government of Cambodia agrees on the following fundamental principles:

- Water and water resources management are the competence of the Royal Government of Cambodia.
- Water resources projects shall be prepared based on the data and information resulting from the water resources inventory, in accordance with the national water resources plan, the economic development plan and the national and regional environmental plans, and by maintaining the balance between water availability and present and foreseeable demands.
- Everyone has the right to use water resources for drinking, washing, bathing and other domestic purposes, the watering of domestic animals and buffaloes, fishing and the irrigation of gardens and orchards, in an amount not exceeding that necessary to satisfy the individual and family needs of the user.

- The water resources utilization and development must ensure the effectiveness, sustainability and does not harm to environment.

4 The National Water Resources Policy

4.1 Cambodia's surface water and groundwater

4.1.1 Water resources evaluation

The part of Cambodia within the Mekong River basin generates 75,000 MCM/year of surface water runoff, and its aquifers contain an estimated 17,600 MCM of groundwater. This is more than 100 times the amount that is used at present. Annual rainfall varies between 1,400 mm and 3,500 mm.

Each year, the Mekong River carries 475,000 MCM from Cambodia to the South China Sea.

Water is used for many purposes, such as for household use, agriculture, industry, hydropower, navigation, and tourism. The estimated total quantity used each year is 750 MCM/year, of which 95% (710 MCM/year) is for irrigated agriculture. There is very little reliable information on the quantities used for other purposes.

Groundwater are essential resources for providing water, maintaining water balance, and is also a fresh water source for daily water use of people, irrigated agriculture, industry and may be available to provide a year-round source of water. There are insufficient data and information about the distribution, quantity, and quality of groundwater.

During the wet season, when river flows are high, water quality is determined by natural processes, particularly by the dilution effect of runoff from heavy rainfall. At this time, bacteriological and chemical water quality is generally high, although physical water quality may be reduced because of heavy sediment loads. On the other hand, during the dry season, when river flows decline, water quality may deteriorate markedly, because contaminants are diluted to a much smaller extent. The growing population and socio-economic development can be expected to threaten water quality, especially during the dry season.

All these issues related to the quantity and quality of the Nation's water resources require an accurate evaluation of their condition and trend, as a basis for defining the policy on effective water resources management.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To promote and facilitate study and research on water sector as a basis for evaluation, management and sustainable development of

water resources with participation from line ministries, educational institutions, national and international organizations.

2. To continuously monitor the condition of surface water and groundwater resources, as a basis for managing and responding to undesirable trends and changes, reporting to the community on the Nation's water resources, and future planning.
3. To require all RGC institutions and other organisations that are implementing water-related projects to provide copies of data, information and reports that are outputs from the projects to the MOWRAM for establishing as a national data and information base. Water-related data and information held by the MOWRAM will be made available without restriction to other RGC institutions, through a clearly defined procedure for data and information transfer.
4. All water-related data and information, property of the state, will be available for public use, except for those which are confidential, commercially sensitive, or of nationally strategic significance.

4.1.2 River Basin Management and Development

River basins and aquifers are the fundamental units for equitable and sustainable planning, development and management of water resources. They also are the fundamental bio-physical units of the hydrological (water) cycle. In Cambodia, lakes and wetlands play a crucial role in the hydrological cycle, and in aquatic resources and fisheries on which many Cambodians depend for livelihoods and food.

The management and development of river basins have been limited in the past, because lack of human resources, capital, law, technology, etc. that lead to the illegal land occupation, construction, deforestation, and exploitation of natural resources. These factors have had a large impact on river basin condition, through soil erosion, sedimentation, degradation of water quality, changes in river morphology, altered hydrological regime, floods and droughts, and thereby on national economic development.

During the dry season in many river basins, there is insufficient surface water to meet human and ecosystem needs, while in the wet season there may be far more water than can be used. Construction of artificial storages and channels to modify and regulate the natural water balance of a river basin can help to address these imbalances between supply and demand. However, they require much labour, technology, and/or capital, and the social and ecological effects need careful analysis.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To promote the study and the preparation of short-, medium-, and long-term development plans for river basins by taking comprehensive account of modifications to the hydrological system, particularly river flows and aquifer levels, to ensure that utilisation of water resources at present and in the future is sustainable.
2. To promote the expansion of surface water storage (reservoirs, ponds), channel capacities and drainage systems to ensure water supply and environmental sustainability.
3. To follow an integrated approach to water resources development and management, that at the same time considers all sources of water, linkages between the water resource and other aspects of the natural environment, the varying human and ecological demands on the water resource, and the need for many different disciplines to carry out effective management.
4. To focus management effort on priority river basins and aquifers, including those that are under serious threat from human activity, and on competition for water before it becomes a major threat to the socio-economic development and environmental sustainability.
5. To conserve and strengthen the ability of natural lakes to provide flood retention and support aquatic ecosystems.
6. To conserve the ability of groundwater aquifers, particularly those that are considered to be at greatest risk of degradation, to provide a sustainable, high quality source of water, and to achieve a balance between aquifer recharge and outflows or abstraction.
7. To promote and facilitate knowledge about, and participation by line agencies, stakeholders and beneficiaries in, the preparation and implementation of river basin development and management plans.

4.2 Appropriate development and management of freshwater resources

Water plays a key role in achieving the Royal Government's over-arching goals in poverty alleviation, economic development, food security, and environmental conservation. Water is a basic resource in many sectors, including agriculture, energy, industry, domestic use, navigation, tourism, fisheries, and ecosystem maintenance. Water distribution need to balance the requirements of all these sectors, so that water is used to the greatest total national benefit.

To address the above issue, the Royal Government of Cambodia has the development policy and effective water resources management in such a way as to support the achievement of national goals for sustainable socio-economic development and poverty reduction, by balancing the requirements of the sectors of the economy that depend on water.

4.2.1 Water for agriculture

Cambodia's population is predominantly rural and agricultural. Every year, farmers face shortages of water, drought, and floods, and these have a major impact on agricultural production.

At present, irrigation infrastructure is in poor condition and is not able to provide enough water for agricultural production. Participation of the beneficiaries in the planning, construction, management and operation of irrigation, drainage and flood control infrastructure is limited.

To address the above issues and ensure the provision of sufficient water for agricultural production, the Royal Government of Cambodia has the following policies:

1. To provide farmers with the quantity of water they need, when and where they need it, and within the limits of available water resources and technology.
2. To promote the rehabilitation and construction of irrigation, drainage, and flood management infrastructure, in order to provide sufficient water for agricultural production and to alleviate the adverse consequences of excess water.
3. To promote the development and extension of appropriate water management technologies that are particularly suited to rain-fed agricultural areas, such as water harvesting, improvements to the moisture-holding capacities of soils and use of farm ponds.
4. To strengthen and expand Farmer Water User Communities, to enable them to participate in water management and allocation and to maintain irrigation infrastructure with effectiveness and sustainability.
5. To minimize the impact on the water resources caused by the uses of chemical substances in the agricultural production by encouraging people to implement diversified agriculture.

4.2.2 Water for energy

Cambodia has a potential for development of about 10,000 MW of hydro-electric power, of which 50% in the main river, 40% in the tributaries and 10% in the coastal area, but only 13 MW has been developed so far, at Ochum II (1 MW) and Kirirom I (12 MW). Another station (Kamchay) has been studied, and soon may be constructed. Hydropower development has the advantage of contributing to poverty reduction and promoting the Cambodian economy; it not only provides electrical energy to urban and rural areas, but also can enable agriculture, flood protection, and agro-industry in rural areas, which is a very important market for farmers.

Only about 15% of households in Cambodia have access to electricity, which is produced by diesel-powered stations.

To address the above issues, and gain full advantage from the water resource, the Royal Government of Cambodia has the following policies:

1. To promote and encourage the research study for small, medium and large scales hydropower development on the potential of water use for hydropower including cost and benefit.
2. To promote investment and exploitation at all scales of hydropower development, including those that meet the needs of poor, remote and/or small communities for affordable electricity.

4.2.3 Water for industry, small manufacturing enterprises and services

Industry, small manufacturing enterprises and services are, in general, users of small volumes of high quality water. Water is an important factor of production, but water fees are not usually a large part of total costs. Some establishments are able to purchase the water that they require; others operate their own water treatment plants, although not under technical supervision by the RGC. However, they may place a heavy demand on the water resource as a whole, when they dispose of wastewater to the environment, by presenting a potentially serious threat to the quality of receiving waters, both surface water and groundwater. Point source discharges are, in principle, easy to manage, and Cambodia has introduced legal instruments to do so. Technology for wastewater management – including re-use, recycling, and in-plant waste treatment – is developing rapidly. Implementation may be more difficult in practice, because institutional capacity for enforcement needs further development and many establishments have primitive waste management facilities and/or are not connected to municipal sewer systems.

To address these issues, and manage and conserve the water resource to eliminate pollution, the Royal Government of Cambodia has the following policies:

1. To determine the location and quantity of water sources available for industrial, small manufacturing enterprises and services.
2. To manage water resources to ensure that industrial, small manufacturing enterprises, services have access to the quantities of water of appropriate quality that they need.
3. To require the construction of wastewater treatment systems in industrial development areas, to reduce the discharge of contaminants to natural water bodies.
4. To promote, encourage and facilitate development of new technology for water supply and wastewater management, including rainwater harvesting, in-plant wastewater treatment, re-use, and re-cycling.
5. To minimize the impacts on water quality caused by industrial development, by measures such as defining water quality standards, regulations for wastewater and stormwater management, and water and wastewater licencing.

4.2.4 Water for domestic use

To increase public access to safe water and sanitation is a key goal of the RGC's poverty alleviation strategy.

Delivery of safe water requires the availability of water sources of sufficient quantity, acceptable quality, and/or appropriate treatment.

Water supply and sanitation services do not yet meet the population's needs, because systems are old and deteriorated, and need to improve urgently the effective water delivery. Water supply systems serve only towns and densely populated areas, and water supply in rural areas is mostly from wells, ponds, and small lakes, for which there are no measures to control water quality, and this has an impact on public health.

To address the above issues and to guarantee delivery of sufficient water, the Royal Government of Cambodia has the following policies:

1. To continue to take full account of water management and delivery, and give first priority to the need to provide safe, adequate drinking water, hygiene and sanitation to all people.

2. To strengthen and extend water supply systems in urban and densely populated areas.
3. To encourage and facilitate private investment in the rehabilitation and construction of water supply systems in rural, urban and densely populated areas.
4. To promote public education on the benefits of hygienic water use, especially for people in rural areas.
5. To promote and facilitate the construction or rehabilitation of wastewater treatment systems in urban areas and densely populated areas, with piped sewerage to wastewater treatment plants, to reduce the contamination of water.
6. To encourage and facilitate research into and development of low-cost water technology that is appropriate for Cambodian circumstances, particularly for application by people in rural areas to meet their own needs for safe water supply.

4.2.5 Water for navigation and tourism

Cambodia has an extensive network of rivers and lakes, particularly in the Central Plain, that are navigable for at least part of the year. Water transport is an extremely low-cost means of moving bulk products over long distances.

Today there are many changes in the natural environment. Changes in the hydrological regime, morphology and sedimentation of rivers, streams and lakes may restrict navigation, tourism and water transport. Environmental changes in marine areas may have similar effects. However, development and management of river works, hydro-meteorological information systems, and budget for relevant study and research are still limited.

To address the above issue and assure navigation, tourism and water transport, the Royal Government of Cambodia has the following policies:

1. To promote the use of the Nation's watercourses, both natural and artificial, for bulk water transportation, tourism, and cruises.
2. To take account of the effects of managing water flows and levels in river channels, estuaries, lakes, canals, reservoirs and sea, on their actual or potential use for navigation and tourism. The design and implementation of short, medium and long term water resources development projects as far as possible will provide for navigation and tourism.

3. To promote dredging in critical locations, while taking every effort to protect and conserve natural water bodies and waterways for navigation and tourism.

4.2.6 Effectiveness of water utilization and partnerships

Effective water utilization in Cambodia has faced difficulties in the past. There are many RGC institutions that have different responsibilities with regard to water, and the cooperation or coordination among them is limited. In addition, there has not been an adequate body of law relating to water resources management, adequate law enforcement and monitoring, nor an effective mechanism for enabling the participation of private investors, stakeholders, beneficiaries, NGOs and External Support Agencies in water resources development and management.

A Law on Water Resources Management will be considered and adopted by the Legislative Institution. After it has been officially promulgated, water management, water allocation, and water resources development will have an effective and sustainable basis, with MOWRAM having the responsibility for enforcement.

To assure effective, successful water management, the Royal Government of Cambodia has the following policies:

1. To promote better collaboration among RGC institutions, private investors, stakeholders and beneficiaries at all levels, in activities and programmes related to the management on investment, exploitation, protection and development of water resources.
2. To promote and facilitate the participation of private investors, stakeholders, beneficiaries at all levels, NGOs and IOs - especially women - in investment in and the management, exploitation, protection, and development of water resources.
3. To ensure and promote the implementation and enforcement of Law on Water Resources Management and other water-related legal instruments meet national needs at all times.

4.3 Equitable water sharing and allocation

4.3.1 Water sharing and allocation

Water is indispensable for the well-being of every person, and for almost every human activity. However, because the availability of water varies from place to place and from time to time, people do not have equal access to water. In particular, people do not have the same ability to access water, because of varying financial resources. A basic principle is that everyone should have

unhindered access to the water they need for life and health; another that is widely accepted internationally is that water is an economic good and should be allocated to the economically most beneficial purposes. While people have a basic right to access to water, they also have an obligation, to ensure that their own use of water does not harm other people's rights to access.

Water is a basic need for agricultural development, water supply, industry and small manufacturing enterprises, navigation, hydropower, capture fisheries and aquaculture, and tourism. Several RGC institutions are responsible for effective and equitable management and use of water in these sectors.

The sharing and allocation of water among the above sectors has not yet been implemented in a formal way that meets the needs of all water users. For historical and cultural reasons, and because of a desire to achieve national food security, irrigated agriculture traditionally has received a high priority for allocation of water. However, other uses may have greater economic or social value, and considerable wisdom will be required in the future to share and allocate water to achieve the greatest National benefit.

Moreover, adequate information and data on the water requirements of the above sectors is not available, and mechanisms, principles and regulations for determining water use fees are limited.

To address the above issues, and assure effective and equitable water allocation that achieves the greatest National benefit, the Royal Government of Cambodia has the following policies:

1. To promote the equitable sharing and allocation of water, and introduce the necessary laws, regulations, and procedures to achieve them. To recognise the particular interests in water supply, food, and hygiene that women have, as the principal givers of care in most households.
2. To apply fees and/or licences for water use where they are necessary to conserve the water resource, and administer them in a consistent and timely manner.
3. To share water during periods of water shortage, normally in the following order: domestic and municipal uses, irrigation, hydropower, industry and small manufacturing enterprises, navigation, aquaculture and minimum flows for ecosystem maintenance.
4. To take international agreements fully into account in the use and allocation of water during periods of water shortage in rivers, streams along the border of neighboring country.

4.3.2 Public information and knowledge

Public understanding and basic knowledge about the benefits of water and the problems caused by water has been and still is limited. Programmes related to water also are limited in educational institutions. Moreover, there is limited participation by users and stakeholders in protecting, conserving, managing, conserving and using water, and contribution concept and payment of water service fees is low.

To address the above issue, and to increase public awareness on water, the Royal Government of Cambodia has the following policies:

1. To educate and inform the public about the contribution of water to human welfare and economic development, and to disseminate information about approaches for safe and hygienic use, maintenance, management and conservation of water.
2. To increase the participation of water users and stakeholders in the sustainable use, management and conservation of water resources, in order to enhance community and individual benefits.
3. To include information about water resources and their role in sustainable socio-economic development in the programmes of educational institutions.
4. To disseminate to the public on payment of safe water service supply fees.
5. To disseminate and enable the members of FWUCs to contribute fund for the sustainable operation and maintenance of irrigation systems.

4.4 Mitigation of water-related hazards

4.4.1 Measures for hazard mitigation

Owing to its geographical position in the lower Mekong River basin, and its monsoonal climate, Cambodia is very exposed to several water-related natural hazards, particularly floods, storms and droughts. On the other hand, several regional and international organisations, including Mekong River Commission and the WMO-ESCAP Typhoon Committee, coordinate programmes or projects to mitigate their effects.

Every year, in some part of the country, private households, commercial establishments, and public property suffer damage from flooding, and there is loss of life. During the dry season, most of Cambodia has insufficient water, or water quality is not adequate for drinking. Accidental pollution events at the

upstream of Mekong River has not yet affected the Mekong River system, but increasing economic activity and increasing use of the upper Mekong River implies a greater risk of such events.

Cambodia already is served by the National Disaster Management Committee, which is responsible for managing pre, during and post-disaster. However, the threats posed by water-related hazards inevitably will become more serious in Cambodia, as the population and national assets grow, the economy develops, and national wealth increases.

To address the above issues, and assure protection from the effects of water-related natural hazards on human life, private households, commercial establishments, and public property, the Royal Government of Cambodia has the following policies:

1. To promote, study and construct the system of flood protection embankment and drainage in the purpose of minimizing the natural disaster related to water.
2. To apply non-structural methods of flood mitigation in all locations where they provide the most economical approach, and to ensure their effectiveness through effective channels of communication, public information, and community education.
3. To respond immediately in places that are suffering the effects of severe drought, flood, or other water-related hazards.
4. To encourage and promote to the people and institutions at all levels to participate actively in flood mitigation measures through such means by providing safe high land, materials and earth-moving machinery, education and demonstration of new technology, to adopt mitigation measures that are appropriate to their circumstances.
5. To participate fully in regional and international programmes to mitigate the impacts of water-related hazards.

4.4.2 Data collection, forecasting and warning

All measures for mitigation of water-related hazards depend on accurate data and information for planning and design. Warnings also require trustworthy forecasts of future conditions.

Forecasting and analysis of floods and droughts along the Mekong, Bassac and Tonle Sap rivers, and in their tributaries, does not meet national requirements for hazard mitigation. Cambodia needs a more comprehensive national data and information base for hazard mitigation.

To address the above issues, and assure effective forecasting, the Royal Government of Cambodia has the following policies:

1. To strengthen and extend the hydrological and meteorological systems that provide the technical basis for responding to hazards such as climate change and floods, delimiting flood-prone areas, defining the frequencies of hazardous weather conditions, etc.
2. To provide short, medium and long-term forecasts and warnings of droughts, floods and storms to the public and related institutions. Forecasts and Warnings about meteorological conditions, including drought, will be provided to the whole country. Flood warnings will be provided to places at risk from flooding.

4.5 Maintenance, protection and sustainability of aquatic system

Cambodia is in the fortunate position, in Southeast Asia, of having a relatively small population that so far has put limited pressure on its natural resource base. Nevertheless, there is much evidence of growing pressure on water resources, such causes as deforestation, illegal fish capture, wastewater discharges from densely populated areas, solid and liquid waste disposal and leakage of fuel from boats into rivers, streams and the sea. Strong measures are required to prevent the water resources of Cambodia from being irreparably degraded, in the way that they have been in a number of other countries in the region.

To address the above issues and assure a healthy aquatic environment, the Royal Government of Cambodia has the following policies:

1. To strengthen and promote the implementation and enforcement of law on water resources management, law on environment protection, sub-degree and others related regulations to control and prohibit all construction projects that are impact to the water resources as well as eco-systems.
2. To develop and apply procedures for social and environmental impact assessment and mitigation that are consistent with those applied by the principal international organisations active in Cambodia.
3. To preserve the river flows and minimum water level of rivers, streams, lake for ensuring the ecosystems, social and cultural values, and navigation.
4. To comprehensively consider, in all water resources developments, the need to provide for unimpeded fish migration.

5. To prohibit and take necessary measures to the infilling or excavation of or encroachment on watercourses, seasonally inundated depressions, permanent water bodies, and the sea, where there would not be permitted and would be an impact on water resources, aquatic ecosystems or the environment.
6. To manage the banks and riparian areas of perennial watercourses and water bodies in such a way as to protect the watercourse or water body from the input of sediment, animal wastes, deforestation and mine exploitation that might be impacted on those rivers and streams.

4.5.1 The legislative framework

In Cambodia, a large number of legal instruments make at least some reference to water resources management and development. Implementation and monitoring of enforcement are limited.

To address the above issues, and to achieve effective implementation and monitoring of water-related law, the Royal Government of Cambodia has the following policies:

1. To strengthen and increase capacity to enforce the Law on Water Resources Management and water-related legal instruments.
2. To formulate and administer sub-decrees, regulations and other instruments required for effective and sustainable management, allocation, investment, exploitation, maintenance, conservation and development of water resources, and maintenance of aquatic ecosystems.

4.5.2 Institutional strengthening

The strengthening and capacity building of RGC institutions has been and is being seriously considered, in particular the MOWRAM, to carry out their functions with full effective and sustainable water resources management. At the same time, the RGC's commitment to devolving responsibility requires that the ability of the local authorities and the community to manage their local affairs must be developed further.

To address the above issues and to increase the capacity of government staff at all levels, the Royal Government of Cambodia has the following policies:

1. To strengthen the ability of government staff at national and sub-national levels, communities, and all Cambodian people to understand the benefits of water in daily life and economic development, and to enable active participation in effective and

sustainable planning, management, maintenance, conservation and use of water and aquatic ecosystems, through formulating guidelines and implementing means such as training courses, workshops, the training programmes of educational establishments, information bulletins, magazines, radio, TV, etc.

2. To establish guidelines for community participation in water sector.
3. To promote and encourage the role of women in water resources management and water services delivery.
4. To introduce training in administration and management into institutions with water-related responsibilities, which meet national and internationally accepted standards.
5. To invest in building the capacity of government staff in water sector institutions, at central and sub-national levels.

4.5.3 Financial aspects

Financial sustainability is a critical issue in many areas of the economy, including those in the water sector. Water resources management and development requires a large investment. At present, the annual investment in water resources management and development is limited. The funds available for rehabilitation, operation and maintenance of hydraulic infrastructure, meteorological forecasting systems, and hydrological monitoring systems also are limited.

At present, developments in hydropower and urban water supply in cities, provincial towns and densely populated areas are being considered, and there has been investment by local and foreign investors, donors, and funding agencies.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To encourage and facilitate investors, private enterprise, and the community to participate in water resources management and development.
2. To progressively transfer small and medium scale irrigation systems to FWUCs, to manage, operate and maintain themselves.
3. To monitor and as necessary modify water fees for operation and maintenance of irrigation systems by FWUCs.
4. To transfer water supply systems in RGC ownership to management by private enterprise, through such arrangements as

leases or management contracts that are made under open and competitive procedures for selection.

5. To monitor and as necessary to modify service fees for water supply systems that are owned and/or managed by public/private or private enterprise.
6. To monitor and as necessary to modify service fees for hydropower facilities that are owned and/or managed by public/private or private enterprise.
7. To take responsibility for the costs of flood and drought management and mitigation.
8. To seek for foreign aid and increase the national budget for water resources management and development.

4.6 International aspects of water

Eighty-six percent of Cambodia lies in the Mekong River basin. China, Myanmar, Lao PDR, Thailand and part of Vietnam are located upstream, and part of Vietnam is located downstream of Cambodia.

The flood mitigation, the maintenance of minimum water flow, water quality and ecosystem in Cambodia have closely related to the aforementioned countries.

To be ready to address the above issues in the future, the Royal Government of Cambodia has the following policies:

1. To take necessary measures and to use all means to closely cooperate with other countries that use water from rivers, streams, and assure effective and sustainable water use with respect of mutual benefits.
2. To collaborate fully with neighboring countries, to achieve the aims of the 1995 *Agreement on the cooperation for the sustainable development of the Mekong River basin*.
3. To integrate Cambodia into the international arena in the water sector, and to use all available opportunities, particularly through international organisations and development banks such as UNESCO, WMO, ASEAN MBDC, ADB, World Bank, IFAD, GMS, and ESCAP to promote cooperation and international understanding in water sector.

4.7 Water Resources Management along the Border with Neighboring Countries

The geographical situation of the Kingdom of Cambodia, which has a land boundary occupied by many rivers, streams and canal that form about 26% of the land boundary, constitutes a natural barrier for the defenses security of the boundary and a positive factor for the population living along those streams to access to the source of water for daily life, navigation and other activities.

By taking into consideration the importance of the water resources along the boundary between Cambodia and Thailand, Cambodia and Vietnam and Cambodia and Lao and the result obtained by the Government (National Committee on the Boundary) in it negotiations to delimit the land boundary with its three neighbor countries, the Royal Government adopts in this regard the following policy:

1. To assure the official management and the application internationally recognized on the boundary that followed the streams, for the delimitation, the limit of the management by Cambodia along the land boundary as followed:
 - For the sectors of the streams-boundary non-navigable, the water management limit of the Kingdom of Cambodia follows the median line of the principle course of the stream.
 - For the sector of the streams-boundary navigable, the water management limit of the Kingdom of Cambodia follows the median line of the main channel navigable of the stream.
2. To continues its full cooperation with the three neighbor countries that has streams as boundary as well as with the Cambodia National Mekong Committee (CNMC), the Mekong River Commission (MRC) and the National Committee for the Boundary with the view to reach the target fixed by the present policy.

4.8 Management of coastal and marine waters

The coastal provinces are lightly populated, but in the future, the economic development will be increased, particularly offshore production of oil and gas, could have major impacts on coastal and marine waters. Natural phenomena, such as increasing water temperature or modification of ocean currents in response to global environmental change, also may affect Cambodia's coastal and marine water resources. At present, a number of laws, policies and regulations relate to Cambodia's marine area, but those are not sufficient. The RGC will continue to establish additional regulations and other related legal instruments to clarify the management of coastal and marine waters.

4.8.1 Institutional and regulatory framework

Cambodia's coastal and marine waters offer significant opportunity for social and economic development, through aquaculture and tourism. However, a concerted effort will be required to ensure that such development can be sustained by the natural environment, without degradation.

The management of aforementioned issues are inadequate to carry out their functions, but there are RGC institutions, as well as provincial authorities, have various responsibilities for coastal and marine waters and associated resources. No legal instruments appear explicitly to provide for the management of coastal and marine waters, as distinct from specific coastal and marine resources such as seabed minerals.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To promote sustainable development of coastal and marine waters and associated resources, and to avoid, remedy or mitigate any development or management practices that are not sustainable.
2. To make appropriate legal provision for sustainable management of coastal and marine waters.
3. To require and facilitate, through an appropriate policy, planning, institutional and regulatory framework, the efficient cooperation of government agencies, NGOs, IOs, and the community in the management of coastal and marine waters and other resources.
4. To promote the participation of the community in decisions that affects their living environment and livelihoods.
5. To ensure that the relevant governmental and non-governmental (including private sector) organisations have the resources (trained staff, knowledge base, equipment, operational funds) required for management of coastal and marine waters and resources.

4.8.2 The knowledge base

There is a serious lack of scientific knowledge about Cambodia's coastal and marine waters and ecosystems, the sustainable yields of valued products (fish, coral, sand, etc.), the levels and trends of human use, and the impacts of human activity on the coastal and marine environment.

The traditional knowledge of coastal communities provides a valuable information resource that could be more fully exploited. Research and investigations are

carried out by a variety of RGC agencies, NGOs, and international organisations, commonly with little coordination and limited strategic planning.

Mechanisms for ensuring that coastal and marine resource management is based on an adequate information base are limited.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To promote, and strategically plan, research and investigations that will provide the knowledge base required for sustainable management of Cambodia's coastal and marine waters, ecosystems, and resources.
2. To ensure that the traditional knowledge of coastal communities is used appropriately, in managing Cambodia's coastal and marine waters, ecosystems, and resources.
3. To promote and facilitate the exchange of information and knowledge about Cambodia's coastal and marine waters, ecosystems, and resources, among governmental management agencies, NGOs, International Organizations and researchers.
4. To educate the community about the value and management of coastal and marine waters.

4.8.3 Land-based human activity and coastal waters

Human activity in the coastal zone and in river basins that supply water, solutes and sediment to the coast may have a substantial impact on the status of coastal waters, and on the ecosystems and biological resources that depend on them.

Mangrove clearance for charcoal production, aquaculture, land use change (forest exploitation, clearance for agriculture), contaminated runoff from roads and urban areas, effluent from industry and hotels, discharges from ships in port, beach pollution by tourists, food vendors and people living along the coastal areas – these are just some of the ways in which human activity onshore can affect coastal waters. The connection between land, coastline and sea is recognised in the principle of Integrated Coastal Zone Management. The sustainable management of coastal waters will require management of human activity not only in the marine environment, but also along the coast and inland.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. To take full account of and to minimise the potential impacts on coastal waters, in managing natural resources and human activity in river basins that flow directly to the Gulf of Thailand.
2. To manage natural resources and human activity in the coastal zone (the shoreline, estuaries and coastal waters, and the land area behind the shoreline that interacts hydrologically with the shoreline) in a fully integrated way, in order to avoid unintended impacts on coastal waters.
3. To actively and comprehensively manage all land-based and shoreline sources of solid, liquid and airborne contaminants that might enter coastal waters.

4.8.4. Offshore marine waters

Global environmental change, such as global warming, has a potential impact on an even greater scale to the EEZ. Management of such effects is possible only on the basis of international agreements and action. Within the EEZ, shipping, fishing activity, oil and gas exploration, exploitation of marine minerals (coral, sand, etc.), and other human activity also have potential impacts on the marine environment, and are more readily managed by law of the Kingdom of Cambodia.

Creation of protected areas has been found by the international community to be an effective mechanism for conserving and improving the condition of marine resources.

To address the above issues, the Royal Government of Cambodia has the following policies:

1. Consistent with Cambodia's sovereign interests, to cooperate fully with the other Nation's surrounding the Gulf of Thailand in managing the Gulf's waters and marine resources.
2. To actively and comprehensively manage all actual or potential marine sources of solid, liquid, airborne, and biological contaminants that might enter marine waters.
3. To require that management and regulatory regimes developed for specific marine resources (e.g. oil and gas deposits) will avoid or minimise impacts on marine waters and associated resources and ecosystems.
4. To conserve the coastal protected areas that will conserve, the marine waters, associated resources and ecosystems that are being threatened by nature and human activity.

5. Implementation of the National Water Resources Policy

The National Water Resources Policy will be implemented as water users, RGC institutions, and other stakeholders carry out their normal activities in a way that fully achieves the aims of the Policy. RGC institutions will be responsible for ensuring that their own sub-sectoral policies and activities are fully consistent with the National Policy. The MOWRAM and other RGC institutions will be expected to include in their Strategic and Annual Plans the strategies and actions needed to ensure that they discharge their responsibilities with regard to the Policy. The MOWRAM will have particular responsibility for monitoring all activities related to the Nation's water resources, and taking remedial action if activities do not achieve – or even work against – the aims of the Policy.

The Ministries and other RGC institutions will ensure that their Headquarters and Provincial staff are fully informed of the Policy, where it has an impact on their activities. A very important responsibility will be to ensure that Provincial officials are equipped to inform officials and the public at district, commune and village levels about the Policy, and how it affects water users. The MOWRAM also will inform international and non-governmental organisations of the Policy, and of its implications for water resources development and management.

The MOWRAM will review the implementation of this Policy at the time that the RGC's Socio-Economic Development Plan is being prepared, and will request to RGC of any needs for amendment.

6. Conclusion

This National Water Resources Policy expects to be actively participated, supported and implemented by related institutions, private sector and the public in the allocation, development and management of Cambodia's water resources, in order to ensure equity, effectiveness, and sustainability, both for the present and the future. The Policy will help to improve standards of living and reduce poverty among the Cambodian people. It will help RGC institutions and people throughout society to understand the benefits of water for daily life and socio-economic development, and to participate in effective, sustainable maintenance, management, conservation, and use of water resources.