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# **Water resources for livelihoods and economic development in Cambodia**

**by**

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## Summary

A substantial part of Cambodia's economy and the majority of livelihoods are water-dependent and will remain so in the foreseeable future. Agriculture represents 29 percent of GDP and occupies 75 percent of the labour force.

The links between water, livelihoods and economic development are quite visible in the country. Water resources management and water-related development can, at the same time, support national macroeconomic growth and rural livelihoods. These two objectives can add value to each other and are, when approached in parallel, an effective poverty alleviation measure.

Integrated water resources management (IWRM) is a well suited framework, with its broad collaboration, its orientation towards interaction between sectors, and its aim to balance present and future needs.

## Acknowledgement

The present paper draws on work conducted in 2007-2009 by CNMC in the 4-Ps basin (Kratie and Mondulhiri Provinces) with support from ADB (PDA TA 6325) and Global Water Partnership.

## Location map



## 1 Introduction

Even if each country has its own agenda for water-related development, observations in one country can serve a purpose in other countries.

This paper presents some views on the relations between water resources management, economic development and livelihoods generation, in a Cambodian perspective.

The paper has been compiled as a greeting to the new Indonesian '*Center for River Basin Organizations and Management*'.

## 2 The context

A substantial part of Cambodia's economy and the majority of livelihoods are water-dependent and will remain so in the foreseeable future. <sup>1</sup> Agriculture represents 29 percent of GDP and occupies 75 percent of the 8.6 mio. labour force <sup>2</sup>.

Poverty alleviation is an overruling development goal. 35 percent of the population is rated as poor, and 20 percent of the population live below the food poverty line. <sup>3 4</sup> By another estimate <sup>5</sup> 10 percent of the population live on less than 1 USD per day and 52 percent live on less than 2 USD per day.

The rural poverty (in 2004) was 39 percent. By a different measure, 90% of the poor population live in rural areas, which are affected by low productivity in agriculture and low access to various services. <sup>6</sup> The rural poverty is caused by a combination of factors that include traditional paddy cultivation technology (with low yields <sup>7</sup> and one crop per year only); poor soils; small land holdings; lack of credit; unsupportive land ownership; pressure from floods, drought and pests; inadequate road and irrigation infrastructure; poor post-harvest processing and storage; poor access to markets; and vulnerability to social risks (like illness in the family, causing loss of land by mortgaging). The poverty is steadily declining, but slowly in rural areas.

Safe water is available to 76 percent of the urban population and 42 percent of the rural population. <sup>8</sup>

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<sup>1</sup> Chapter extracted from CamboWP and CNMC (Sep 07)

<sup>2</sup> CIA World Factbook, Internet edition, 2008 data

<sup>3</sup> The definition of '*poor*' has not been ascertained. The National Poverty Reduction Strategy 2003-2005 (Dec 2002) applies a poverty line of 0.46-0.63 USD per person per day, presumably making a distinction between urban and rural areas. The Cambodia Millennium Goals Report (Nov 03) applies a food poverty line as the ability to acquire a food intake of 2100 calories per person per day

<sup>4</sup> 2004 figures according to National Strategic Development Plan 2006-2010

<sup>5</sup> 2007 estimates according to The World Bank East Asia Regional Update, Apr 07

<sup>6</sup> 2004 figures according to National Strategic Development Plan 2006-2010

<sup>7</sup> National average in 2005 was 2.0 t/ha according to the same source

<sup>8</sup> 2005 figures according to the same source

Cambodia is critically short of electricity. The hydropower potential is estimated at some 10,000 MW<sup>9</sup>. Construction has begun of the 193 MW Kamchay Hydropower Project in Kampot province, and projects are being considered in several places.

Another important sector is inland fisheries, with an estimated production of 200-430,000 tonnes fish per year with a value up to US\$ 500 million. Cambodia's freshwater capture fisheries production is the fourth largest in the world after China, India, and Bangladesh. Fish is the main source of protein and calories for Cambodian people; over 75% of animal protein consumed comes from fish and fish consumption ranges from 40- 70 kg per person per year.<sup>10</sup>

The country has unique wetlands and aquatic habitats, notably in the Mekong itself, its active floodplains, and the Tonle Sap sub-basin with its Great Lake. The wetlands and habitats can be affected by over-exploitation and by physical intervention (roads, embankments, irrigation infrastructure), and are sensitive to the flood pulse - the time, duration and height of the seasonal Mekong floods.

Floods and drought are widespread. Sometimes, floods and drought occur at the same time in different places within a province. In its Strategic Plan on Water Resources Management and Development, MOWRAM notes that *'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 in some areas and other areas are still facing with shortage of water due to lack of irrigation infrastructure. Irrigation infrastructure is insufficient, old and run-down, which has a severe impact on water storage, distribution and supply, sanitation, and food production'*.

### 3 IWRM-related opportunities

Below are listed examples of water-related development needs and opportunities:<sup>11</sup>

- Improved water efficiency: A variety of measures to improve the water efficiency (output per m<sup>3</sup>), reduce losses, and improve the added value of water utilization or *'economic efficiency'* (\$ per m<sup>3</sup>)
- Water and agriculture, as indicated by the new national Joint Strategy for Agriculture and Water 2006-2010, which provides guidance on measures that can improve agricultural productivity and added value
- Infrastructure and trade: Response to the opportunities (and challenges) offered by better road and railway links, lowered trade barriers, and increased regional and international competition
- Tourism: Response to the opportunities (and challenges) offered by escalating tourism
- Flood and drought management (possibly coordinated with pest management with its partly similar remedies);
- Climate change: Response to greater climatic variability, expectedly including increased rainfall irregularities (which will affect the flood and drought risk)

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<sup>9</sup> MIME and CNMC (Jun 03): Hydropower. National sector review prepared by Ministry of Industry, Mines and Energy in association with CNMC

<sup>10</sup> MAFF and CNMC (Jun 03): Fisheries management. National sector review prepared by Ministry of Agriculture, Forestry and Fisheries in association with CNMC

<sup>11</sup> Chapter quoted from CamboWP and CNMC (Sep 07)

- Price fluctuations for water-related commodities (such as rice and biofuel), possibly with an increasing trend
- Enhanced knowledge base for decision-support. This includes (i) improved monitoring (in many ways); (ii) improved groundwater mapping, and compilation of existing (but scattered) knowledge about groundwater availability and quality; and (iii) improved availability and accessibility of data for their intended purposes
- A range of national and international research, knowledge-sharing and awareness-building activities
- Support to the upcoming RBOs
- Support to consolidation and expansion of management capacity at the province level, the commune level, and the irrigation scheme level<sup>12</sup>

These opportunities are basically independent but closely related. They can amplify each other if pursued in a coordinated way. For example, rural livelihoods and income generation can highly benefit from simultaneous improvements of water availability, agricultural technology, agro-processing capacity, transport infrastructure, and trade. It makes sense to expect that the combined benefits of these related developments will highly exceed the sum of individual benefits that can be achieved by one measure at a time. Challenges from climate change fluctuations will interact with challenges from escalating commodity prices.

The aim of improved water efficiency can be pursued within the framework for service delivery, as it is the case today. The aim of improved economic efficiency requires a broader, integrated framework for resource allocation. While the main axis goes between the water resource allocation and technology and development support within primary production (agriculture, fisheries and hydropower), other water-related perspectives must be included in order to reduce the opportunity costs and achieve a high value of the resource allocation and an appropriate related livelihood generation: Domestic supplies, water-consuming industries, flood management, navigation, and water-related tourism. In many river basins, there is a competition between the off-stream demand of water for production and the in-stream demand of water for flow maintenance and ecological preservation.

Appropriate operation of irrigation schemes (and added benefits from the investment) can be supported by information, including real-time data and forecasts, that exist, but which are today not readily available to those who need it. This includes (i) conceptual information about scheme capacities (for storage and flow) and related capacity margins; (ii) historical information about normal and '*reliable*' rainfall and runoff. For example, the '*small dry season*' is critical to the traditional cultivation cycle and hereby to the livelihoods and household economy of the farmers. Any knowledge about its characteristics can support an appropriate scheme operation (as well as decisions on when and how to cultivate); (iii) real-time information about rainfall and water level; and (iv) short-term forecasts of rainfall and water level (all year) as well as flood forecasts (in the wet season). Today, it happens that the persons who are responsible for scheme operation have no information even of the normal rainfall.

The tourism sector is an increasingly important contributor to the national economy. It is characterized by accelerating growth and a huge potential for development both in terms of volume and (more interesting) in terms of value. One water-related implication of increased tourism is that it adds to the so-called indirect value of water. The value of

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<sup>12</sup>

In Cambodia, irrigation schemes can be operated, maintained and owned in partnership between the government and Farmer's Water User Communities (FWUCs)

a waterfall can bypass the value of the agricultural production that could have been sustained by the same flow, both in terms of economic revenue and livelihoods. (Of course, the choice can be a matter of *both-and*, rather than *either-or*, particularly if the waterfall is located upstream).

IWRM-based development is supported by

- opportunities offered by the new water law; and
- opportunities identified in the national Joint Strategy for Agriculture and Water 2006-2010.

The National Rectangular Strategy emphasizes (1) enhancement of the agricultural sector; (2) further rehabilitation and construction of physical infrastructure; (3) private sector development and employment generation; and (4) capacity building and human resources development. The national strategy is reflected by MOWRAM's related strategy for water resources development, which has human resources development and irrigation development among its 5 goals. The National Poverty Reduction Strategy (Nov 02) uses the word '*irrigation*' in no less than 79 places.

## 4 Water, livelihoods and economic development

Cambodia is a WTO member. Its economy is open and responds to regional and global trends regarding trade barriers, commodity prices and investment climate. The economic growth averaged 9.2 percent per year from 2001 to 2008, when the global crisis hit<sup>13</sup>.

The links between water, livelihoods and economic development are quite visible in the country. Agriculture remains a key sector both in terms of livelihoods and economic growth. Rice is by far the predominant crop in terms of volume, while a variety of other crops (and livestock) contribute significantly (and increasingly) to the income generation. The typical production system is rainfed paddy, but 21 percent of the cultivated area (590,000 ha) have infrastructure for supplementary wet season irrigation, recession irrigation, or full dry season irrigation. *'To predict GDP, you have to be a bit of a weatherman in Cambodia. Irrigation is vital for sustained growth in agriculture and to reduce volatility. To increase crops significantly year after year, Cambodia needs to invest more heavily in canals and dams to free agriculture from boom-and-bust cycles that depend on the monsoon'*, according to World Bank senior country economist Robert Taliercio.<sup>14</sup> MOWRAM aims to expand the irrigated area by 20,000 ha per year.

The economic growth is strongest in the area around the capital, Phnom Penh, in the coastal zone and in some border areas, while remote rural areas have a low growth rate. The differences generate imbalances, for example regarding employment opportunities, which in turn pull a migration from the countryside to the growth centers. This effect is enhanced by the traditional rainfed paddy cultivation being highly seasonal, with a shortage of labour for a few weeks per year and a surplus in the remaining time.<sup>15</sup>

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<sup>13</sup> IMF (Apr 2009)

<sup>14</sup> Quoted in Phnom Penh Post Dec 1 2006

<sup>15</sup> The storage capacity is limited with a large part of the country being within the Mekong floodplain



Urbanisation has many benefits, but if it proceeds too fast there will be adverse side effects. The same is the case for the inevitable adjustments of the structural imbalance between agricultural production and employment. Provision and consolidation of rural livelihoods can restrain these processes and provide time for the related developments of public services and infrastructure.

## **5 Bottom line**

In Cambodia, water resources management and water-related development can, at the same time, support national macroeconomic growth and rural livelihoods. These two objectives can add value to each other and are, when approached in parallel, an effective measure against poverty.

Both objectives will be supported by increased water efficiencies and economic efficiencies of water uses. Other measures are improved irrigation infrastructure, provision of storage capacity, and open-minded attention to the potentials of groundwater utilisation.

This can provide higher yields and crop diversification, both of which are highly attractive in their own right, but can also provide employment more evenly over the year. So can support to other water-related rural livelihoods, for example by expanding the value chains that build on (water-dependent) primary production, as well as continued development of tourism and recreation.

Integrated water resources management (IWRM) is a well suited framework, with its broad collaboration, its orientation towards interaction between sectors, and its aim to balance present and future demands.

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