

## Case Study for 2006 HDR

# Tonle Sap Lake, Cambodia: Nature's affluence meets human poverty

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## Introduction

The Tonle Sap Lake of Cambodia is one of the most productive freshwater ecosystems of the world. Even though the area is affluent in natural resources, the lake's surroundings are among the poorest ones of Asia. Why? Isn't there interest to develop the region, as well as the entire Cambodia? Is the national and international interest missing? Are the people short of traditions and culture? Absolutely in contrary. Ancient traditions and strong culture are there. The development interest is there, and it has even been so high that it has, in a complex way, led to massive human disasters, hostilities and wars, and consequently to underdevelopment of the area and entire Cambodia.

## Nature's affluence

The Tonle Sap Lake is located in the drainage basin of the Mekong River in Southeast Asia. The Mekong is the ninth largest river in the world if measured by its runoff. With the 500 km<sup>3</sup> that it carries each year, it is ten times of the size of the Nile. Mekong is one of the world's most pristine large rivers.

Six countries share the Mekong Basin (Figure 1). They are China, Myanmar (formerly Burma), Thailand, Lao PDR, Cambodia and Vietnam. The population in the basin approaches 70 million. In Vietnam, Laos PDR and Cambodia, around 40% of population live below the poverty line, and over half of the countries' GNP originates from fishing and agriculture. Majority of the basin's population is deeply dependent on natural resources for their livelihood.

The Tonle Sap Lake is a unique lacustrine-wetland ecosystem. The lake is the major natural reservoir of the Mekong, the heart of river's aquatic production, an invaluable flood-leveller and an essential source of income and food for the region. The annual water level fluctuation of the lake is stunning eight meters. The surface area of the lake exceeds 12,000 km<sup>2</sup> during the monsoon floods, and shrinks to 2,500 km<sup>2</sup> by the end of the dry season. The lake is one of the world's most productive large wetland ecosystems. Its biodiversity is extreme. Fish and rice are the backbones of the traditional livelihood in the area (MRCS/WUP-FIN 2003, Kummu et al. 2006, Lamberts 2006).

Natural conditions are exceptionally favourable to humans and the history has seen many advanced cultures flourishing in the Tonle Sap area. The best-known evidence of such cultures is

the ancient city of Angkor with its famous Angkor Wat temple close to Siem Reap at the lake's northwestern corner.

### **Extreme human poverty**

Cambodia was economically the most advanced country of the Mekong Region in the 1950s and early 1960s. However, the Mekong riparian countries have followed very different paths ever since. In 2002, Cambodia's GNI per capita was US\$300, only 15% of Thailand's GNI. In the Tonle Sap Basin, the figure is only half of that. Cambodia is thus among the poorest countries of the world, and the Tonle Sap region is one of the country's poorest parts.

Most of country's population is heavily dependent on common natural resources for their livelihood, and more than 70% of the labour force works in the agricultural sector (NIS 2004). At the same time some parts of the country –particularly the main cities Phnom Penh and Siem Reap– are developing fast, and the well-connected elite enjoys levels of wealth never seen before in Cambodia (Tarr, 2003). Disparities grow as economic growth brings few direct benefits to the rural areas in Tonle Sap.

The livelihoods in villages around the Tonle Sap Lake are linked deeply and in various ways to water resources, environmental changes and migration. These connections are poorly known, despite of their profound importance to a big share of the Khmer population. Economy of the region is based on basic subsistence farming and fishery. Poverty touches everybody. Illegal activities, largely based on destructive exploitation of natural resources, mushroom. These activities result partly from poor and corrupt governance of both fish and agricultural resources.

The combination of extensive poverty and deep dependence on natural resources is particularly alarming since the services provided by natural resources are in a clear decline. The deterioration of natural resources, unjust management system and rapid population growth has resulted in worsening living conditions throughout the Tonle Sap Area (Keskinen, 2006). The communities would need diversification in their income sources in order to come along with the growing polarization that takes place in regions increasingly exposed to market-driven economy.

### **Too strong external pressure**

Why does this extreme affluence of nature coincide with one of the world's most striking traps of poverty and deprivation? The reasons can be found from both history and present day. Most unfortunately, the last three decades in the country have been extremely violent and politically volatile. The country, as the whole Indochina, has been subjected to substantial external pressures over more than a century. The 1970s saw the incredible collapse of the used-to-be prosperous Kingdom as a battlefield, and finally the Khmer Rouge emptied all towns, slaughtered practically all the educated people and many others in their attempt to create an ideal decentralized, rural society. The country has been violent ever since with the Tonle Sap Region among the most tumultuous areas. Only the past decade has seen emerging stability in the area.

Due to the history, geopolitics and the Mekong's transboundary character, the Tonle Sap's governance has a strong international dimension. Various different organizations such as the Mekong River Commission, UN agencies, Asian Development Bank, the Greater Mekong Subregion Programme, the ASEAN, as well as many donor countries have a considerable influence to policies, institutional development, capacity building and other governance related matters in the Tonle Sap area. Their roles are, however, very complex and overlapping, and rivalries are more common than cooperation (Makkonen et al., 2006; Sokhem and Suneda, 2006).

Further threats to Cambodia are due to the escalating commercial activities upstream the Mekong River. Particularly the expansion of modern agriculture in Thailand, the navigation interest of China, as well as the massive hydropower construction in China and in Laos are likely to have an impact on water quantity and quality of the Mekong, and consequently of the Tonle Sap. These impacts are poorly known, and the debate seems to be anchored in myth-like arguments for and against such developments, rather than sound scientific outcomes.

## **Strong and well-connected vs. the poor majority**

The acute shortage of educated people, distortion of social fabrics, lack of physical infrastructure and underdevelopment of economy have yielded a situation, in which the society and economy have polarized in a dramatic way. A number of axes of asymmetry and discontinuity in terms of power, economy and livelihoods follow. Related to these, we shall next look closer to the main livelihoods of the Tonle Sap Area, namely fisheries and agriculture.

### Fisheries

Fish is the primary protein source for all Cambodians, and family fishing is of prime importance particularly to the poor and landless villagers. Fishing activities in Cambodia can be classified into two categories: limited access fisheries consisting of large-scale fishing, and open access fishing consisting of middle-scale and small-scale fishing (Keskinen, 2003). Under these categories, four dominating types of fisheries can be recognized:

- *Fishing lots*: Concessions for the lots are auctioned by the Government for a two-year period for commercial operators.
- *Dai lots*: A dai (bagnet) is a stationary trawl constructed in a river to capture fish migrating downstream. Similarly to a fishing lot, the rights for positioning a bagnet in a river are auctioned.
- *Middle-scale fishing*: This activity is controlled by licenses by the government. A variety of gears are allowed including gillnets, traps, encircling seine nets, trawls, hooks, and lines.
- *Small-scale fishing*: No license is required for small-scale fishing, but the gear allowed is far more restricted than in medium-scale fisheries.

Large-scale fishing based on lot system is particularly large and abundant in the Tonle Sap Area. The most productive and largest fishing lots of the country are located in the lake, while the river connecting the lake to the Mekong River is the most important area for dai lots. These large-scale commercial fisheries exploit the resource intensively, and often in sharp contrast with both subsistence fisheries and farmers.

Not surprisingly, the debate over the fishing lot system has been a hot topic in the Tonle Sap Lake for many years. The system has been severely criticized for denying the customary public rights of the communities and landless people for the aquatic and land resources, and thus hampering notably the livelihood of the local population. The owner of each fishing lot has an exclusive right to harvest fish from the lot that are traditionally located in the most productive fishing areas. Some of the lots include even entire villages within their boundaries. The fishing lot system has also been seen to lead to overfishing, since the lot operators have little stake in taking care of sustainable fisheries practices while trying to make most profit out of the auctioned area.

Partly due to the increasing criticism over fishing lot system and its inefficiencies, around half of the fishing lots were handed over to communes in a sudden move in 2001. This, however, created new problems, as fishing communities were completely unprepared to handle the management of newly released fishing areas. Illegal fishing ran out of control, and anarchy replaced inequality. More lately, however, these fishing disputes have declined and the setting up of community fisheries is taking place throughout the Tonle Sap Area.

## Agriculture

Most villages in the Tonle Sap Area cultivate rice, and rice forms together with fish the staple food in the whole country. Rice farming has many forms depending on the location of the village in relation to the massive floods of the lake. Common to all of them is low productivity due to poor infrastructure and low level of resources to improve the yields. Development of agricultural sector is therefore seen as one of the best means for poverty reduction, and it is therefore among the main targets of the government. Due to problems particularly in governance and land tenure, this unfortunately seems also to mean that a similar contrast and confrontation as in the fisheries sector is developing in the agricultural sector.

The three basic, contemporary farming practices in the Tonle Sap Area include: 1) deep-water rice; 2) rainfed lowland rice, and; 3) dry season rice. Deepwater rice –also called floating rice– is mostly grown in low-lying fields close to the Tonle Sap Lake. Rice fields are therefore subjected to flood depths of 50 cm or more, and the maximum water level reaches often 3 meters. For this reason deep-water rice is very vulnerable to the changes in the flood, particularly to the excessive water levels and to a too rapid rise of the flood (Nikula, 2005). Although the proportion of floating rice from the total area of cultivated rice in the Tonle Sap Area is small, the variety has remarkable local importance as it can be cultivated in the fields where no other rice variety can grow. These low-lying fields are often owned by the poorest villagers, and deep-water rice is therefore particularly important for the poorest people in the area.

The rainfed lowland rice is cultivated in all provinces of Cambodia, and one of the country's largest concentrations is found around the Tonle Sap Lake (Javier, 1997). A great majority of the rice fields in the Tonle Sap Area are rainfed lowland rice fields that are located on the fringes of lake's floodplains close to the provincial towns and national roads. These are the areas with highest population in the area. The water supply for lowland rice fields is secured by a combination of local rainfall runoff, and immense floods of the Tonle Sap Lake.

Dry season rice cultivation can be broadly divided into two categories. The first category consists of the fully or partially irrigated second rice crop after the rainfed lowland rice. The second category is the flood recession rice that is partially irrigated. The recession rice is usually cultivated in areas of very deep flooding where the flood-rise is too rapid for deepwater rice (Javier, 1997). Dry season rice is clearly the most productive rice variety, and there are massive plans to increase its production in the entire area through development of irrigation infrastructure. At the moment, however, dry season rice area covers only a minor part of the Tonle Sap Area and benefits mainly the wealthiest farmers that have access and resources for irrigation. Besides rice, various other subsistence and cash crops such as vegetables and fruit are cultivated particularly in the dry season.

Cambodia has far less land under irrigation than the other countries in the Lower Mekong Basin. Only 3.6 per cent of rice cultivation area is irrigated, which means that Cambodia's irrigated area is only 2 per cent of that of Thailand's. After MRCS/UNDP (1998), the present wet season

irrigated area is 40,000 hectares in the Tonle Sap Area. The total area of existing irrigated land is 93,000 hectares, but around 57% of that area is not in use and would need rehabilitation. Irrigation potential would be 360,000 hectares. In summary, around 1/9 of irrigation potential is in use in the Tonle Sap Area. With unit yields similar to those in Northeast Thailand (which has comparable natural conditions to the Tonle Sap), these fields could produce some 0.5 to 1 million tons more rice than they do today. This would allow the maintenance of food self-sufficiency in the Tonle Sap Area for another two decades.

The main axis in these aspects in terms of future policy strategies is whether the subsistence and small-scale commercial activities should be prioritized, or whether the weight should be put on commercialization and market-driven development of the agricultural and aquacultural production systems. The latter would also mean a possibility to diversify the production to produce two or even three crops per year, by rotation of rice and e.g. legumes. At present, only one crop per year is a commonplace.

### How the poor could also become affluent?

In macroeconomics, the basic ground to allow poverty alleviation is economic growth. Without growth, there is not more to distribute to the poor than before. Whereas this is absolutely right, it tells only a part of the story. In too many low-income countries, the growth of the GNI means widening income gap and polarization of the society, as well as uprooting of uneducated people to urban shantytowns.

The poverty reduction dilemma is that the poorest countries tend to have the lowest economic growth, the most unequal income distribution, and the most limited possibilities for distributing anything to their poor. Countries such as Cambodia and Laos have extremely few possibilities for poverty reduction through economy. The growing cash flows do not tend to reach the poor strata of the society but instead polarize the societies to the benefit of the elite, primarily. In contrary, China, Thailand and Vietnam have more evidence and promise to poverty reduction due to positive economic development. Their societies have at least some mechanisms to distribute the created wealth, which tend to create virtuous economic circles.

The poverty issue is, however, far more many-sided than just economics. In the case of the Mekong basin, it is striking indeed to realize how strong the contrasts are between the traditional livelihoods the emerging modern economic sector. The table below summarizes some of the key features of these two sectors:

<b>Traditional sector (subsistence)</b>	<b>Modern sector</b>
Uses no or very little money	Is driven by money
People supply themselves with basic commodities such as food, water, fuelwood, etc.	Nature is used as a resource of tradable goods that are primarily valued after their trade value
Institutions are primarily customary, religious, etc.	Institutions are primarily set up by government, etc.
People are living within the nature	People are using nature as a resource base and are living out of the nature
Example activities: family farms/fishery/forestry for village-level supply	Example activities: cash-crop farming, commercial fishery, fish farming, industry, hydropower generation, urban water supply plants

The subsistence sector is often called traditional sector. In a way it also includes the urban informal sector that includes illegal dwellers, shantytown inhabitants and so forth, who in a way are living outside or at the borders of the formal economy on the subsistence level.

In many cases, increased aspirations of the modern sector have introduced massive changes to the traditional, much more stagnant co-existence of the nature and traditional livelihoods. These depend clearly whether the region in question is in the phase of being primarily appreciated for its traditional activities, for direct economic benefits, if the environmental consciousness is already there, or if the priority has shifted to rehabilitation efforts. Do we in fact always need to go this way?

Natural reserves are one way to conserve the lake ecosystems and the lake basin nature as a whole. In this context, an interesting question arises on the relation of traditional sector and natural reserves: Should we see the traditional sector as a part of the ecosystem to be conserved?

Poverty reduction is one of the key development goals. In economic terms, poverty is most often measured with an income indicator such as 1\$ a day. Such an indicator applies well to people within the modern sector but not at all to people who are living in the traditional sector. An income indicator may give an increased income value to an absolutely impoverished individual who was before a respected and prosperous herder (but who was not using much money), but is now living in a shanty town of a big city because his livelihood was destroyed by the modern sector that took over or destroyed that part of the lake basin that traditionally (customarily if not legally) belonged to his family or village.

How we should understand and develop the poverty concept to be more valid in coping with the differences between the traditional and the modern sector? Even the celebrated novel theories of poverty such as the one by Sen (1999) are not fully elaborating this issue. Consequently, how can the management of the river tackle poverty reduction?

## Way forward

Given the very tough starting point that the violent situation of the past three decades has offered to this Tonle Sap area and entire Cambodia, the development must find a controlled path. Strengthening the capacity and building trust and transparency on formal institutions, mobilization of the informal institutions for common benefit instead of illegal, destructive activities, supporting rural development, particularly egalitarian and participatory empowerment of the poor, and providing education and health care are the key points in developing the Tonle Sap Area into a prosperous region which still would enjoy a rich nature.

The opposite scenario—a deprived, overly polarized society with destructed nature—is also a very possible option. Things evolve and may change very much in a time frame of only a decade or two. The history has shown it many times in Southeast Asia and there is no doubt that it will show it again.

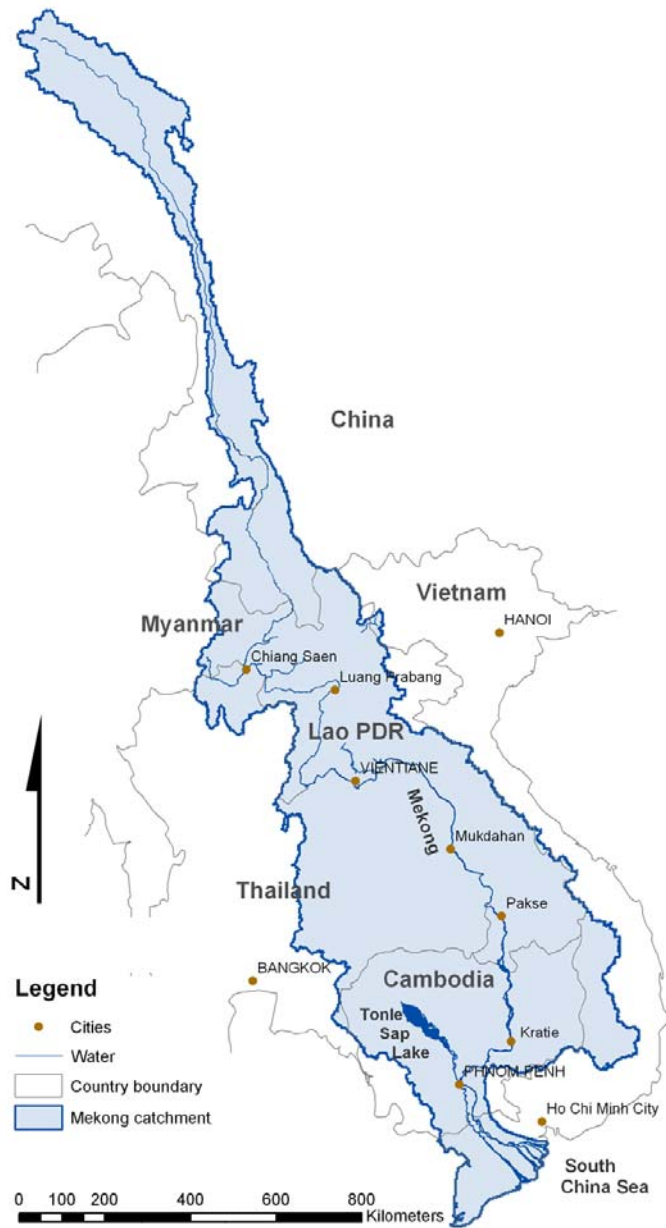
Water plays a fundamental role in this. Water is instrumental to fish production and catches, to rice yields, to health, to environmental well-being, to tourism industry, and many other aspects of life. In the unique case of Tonle Sap, integrated management of the water resources of the area is the only way to achieve equal economic development, and to find a balance between society and nature.

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*Figure 1. The Mekong River Basin and the Tonle Sap Lake.*