Position Paper

Impact on Tonle Sap Lake's Tributary Functions

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Background

This study aims to identify and document the main factors affecting the tributaries of the Tonle Sap Lake, which in turn affects people's livelihood and the biodiversity along the tributaries. The study will generate recommendations for key stakeholders to ensure sustainable growth and development.

The study was conducted in five provinces with tributaries including the rivers Steung Sen, Steung Sraeng, Steung Moung (Dauntri), Steung Pursat, and Steung Boribou, based on their contribution to the Tonle Sap Lake, using the livelihood and biodiversity conceptual framework. The study engaged 17 provincial departments; 10 districts; 14 communes; and 14 villages in the 5 provinces. There was a total of **379** respondents of which **235** were women. Methodological approaches were employed including literature reviews, key informant interviews, focus group discussions, case studies, and validation workshops.

Tonle Sap Lake in Cambodia is the largest freshwater lake in Southeast Asia that directly supports the livelihood of more than 1 million people and provides the largest source of protein for Cambodia's young and increasing population. However, the ecosystem of the Tonle Sap basin has recently been under pressure due to severe threats including overfishing, overexploitation of wildlife resources, dry-season encroachment, and land clearance of the flooded forest.

Surface air temperature in the Southeast Asian region increased between 0.1 and 0.3 °C per decade between 1951 and 2000 (ADB, 2009). Sea levels have been rising at the rate of 1 to 3mm per year over the last 50 years. Events of heavy rainfall have increased significantly between 1900-2005, while tropical cyclones occurred more frequently between 1990-2003 (ADB, 2009). The increasing change in rainfall patterns since the 1920s have been unpredictable, and intense rainfall greatly impacts the livelihood of farmers. The country is projected to experience an increase in surface temperature of up to 3.1°C by the 2090s, against the baseline conditions over 1986–2005 under the highest emissions pathway.

Another factor is climate change which is threatening the natural flow patterns of 11 river sub-basins contributing to the Tonle Sap Lake. The tributaries in Kampong Thom, Siem Reap, Battambang, Pursat, and Kampong Chhnang have already experienced the impact caused by the change in water flow patterns, inadequate and unpredictable rainfall, irregular flood pulse, and the lack of reverse discharge from the Tonle Sap lake during the dry season. Flash floods and protracted droughts have continued to drain food sources and income of many people that depend on the rainfed river regimes

for agricultural production. This indirectly drives up the price of agricultural inputs while the selling price for agricultural produce remains relatively lower.

There have been extensive incidents of illegal poaching, land clearance and burning of flooded plants, disposal of toxic residues, landslides, and landfills, which are rampant in Tonle Sap Lake area and along the five studied tributaries. There has been a significant loss of trees, and the loss of aquatic and terrestrial wildlife species has been rising and the livelihood of fishing and agricultural communities has been greatly affected.

The above factors are forcing more people to find alternative occupations to sustain their household food and income. Some have already sent their family members to work in garment factories, construction, and other temporary paid work outside their communities. Others have migrated to either bigger cities in Cambodia or traveled to Thailand in search of jobs. Older people are therefore shouldered with the care of grand children whose parents have migrated to work far from home. At the same time, migrated families have often been unable to keep their children in school. Many children had dropped out of primary level of education to engage in income generating activities to help support their families.

Rural women are becoming increasingly active in economic activities due to the demand for formal and informal employment opportunities locally or externally. Gender roles have also been changing as both men and women work to improve their livelihood and cover their household's needs or pay off any debts if there are any. The change of men's role in supporting their partners has therefore been crucial.

Some existing initiatives that have been effective include raising the awareness of concerned communities on water pollution, waste management, environment protection, and preventing illegal fishing and deforestation. Facilitation was provided to relocate floating households to inland areas and land possession was processed for agricultural production in wetlands to abate the current pressure on natural resources. NGOs have been actively involved in raising awareness of the local residents by providing agricultural skills trainings, institutional capacity building of community-based organizations, agricultural inputs, and other facilitation support including increased market access for farm produce.

However, the local governments lack concerted efforts and have been struggling to enforce applicable laws, and to replicate good practices in line with the national policies for the sustainability of natural resources.

Key Messages

1. The enforcement of relevant laws is crucial to sustain the governance of natural resources. Local governments have been trying to enforce the applicable laws however the efforts have been sporadic. Some of the reasons are insufficient budget allocation, lack of technical expertise amongst the concerned government officials, lack of robust coordination and cooperation amongst the technical provincial departments, local authorities, and civil society organizations.

The support from the national sectoral ministries on the development of local aquaculture has been more on a project basis and often lacked coherence for scaling up.

Observation 1

In this respect, *the sufficient allocation of budget and capacity building to concerned stakeholders involving in the law enforcement should be on top of priorities to effectively contextualize the sustainability of natural resources management*.

2. The local residents have basic awareness of applicable laws, legal frameworks, and good practices concerning environmental protection including fish conservation and protection. The local governments and civil society organizations have jointly been encouraging local participation in the protection and management of natural resources and the environment.
   The strategic implementation modalities will reinforce awareness creation amongst the local residents that can help to track behavioral changes at individual levels if applied. It requires a long-term endeavor with systemic approaches that can affect positive mindsets towards the love and care for nature as thousands of lives and various animal and plant species depend on a healthy ecosystem.

Observation 2

Consideration is therefore should be placed on, *an introduction of systemic approaches, as opposed to project based, to raise awareness of local residents on the applicable laws, legal frameworks, and good practices concerning the protection and conservation of natural resources including biodiversity and ecosystem available in their locality*.

3. The flooded forest covers were gradually being depleted in the study areas because of rampant forest clearance and encroachment for expanding agricultural production, commercial purposes, and land privatization. As an example, the flooded forest covers in eleven communes in Boribou district and the Tonle Sap area are cleared and burned by local residents almost every year. The severe loss is apparent in Moung Reussey and Rokakiri districts, and along Steung Sraeng of which 1,079 ha in 2012 and additional 40 ha were lost out of total 31,00 ha available in the present time. The tree, fish, and wildlife species have been on a significant loss.

Observation 3

Where it is possible and given the priority of necessary existence of the local biodiversity and ecosystem, *"rehabilitation of the flooded forest covers is pre-requisite to attention of all relevant stakeholders for present and future design of interventions"*.

4. The Provincial Department of Water Resources and Meteorology (PDWRAM) takes the lead in the construction of dams or dikes across the tributaries. The Water Farmer User Community (FWUC) is established after that to sustainably maintain the irrigation scheme. The dams have created irregular water inflows and outflows and local farmers living in the middle and downstream areas face water shortage for crop irrigation and household needs. The water level

in the Tonle Sap basin is becoming too low during the dry season making it hard for the reverse discharge into the tributaries. Low water levels cannot sufficiently supply farming and animal raising activities and the drought period is getting longer. There are also parts of the river such as the one in Kravanh district that dry up during the dry season.

On the bright side, the irrigation schemes can store water for the dry season to partly rejuvenate the local biodiversity and improve the availability of fish in the upper stream of Steung Moung. Four other irrigation schemes have been under construction in Ta An commune, Oddar Meanchey, Phnom Srok district, and Banteay Meanchey province where the rivers are filled with water throughout the year.

Observation 4

Sustainable consideration of the local biodiversity and ecosystem should be integral parts of the socio-economic cost analysis to determine the feasibility of hydroelectric dam construction. As such, *the engagement of wider stakeholders including the civil society organizations, local communities, private sector, and etc., in the assessment process prior a construction of the dam is therefore centrally important as an entry point to assure the benefit from the irrigation scheme is fairly distributed*.

5. The decline of fish catch has highly impacted the survival of people in the middle and downstream areas that have a high reliance on fisheries. For example, over 90% of the people living in Phatsandai commune in zone 3 of the floodplain area make their living from fishing activities and only a few have engaged in agricultural or other activities. On the other hand, people living upstream have been moderately affected by the decline of fish as most of them don't involve in fishing activities as their main livelihood[1]. The lack of adequate water in the rivers is critical to sustaining the surrounding biodiversity, ecosystem, and agricultural production which is the prominent source of food and livelihood. Income security is threatened by cyclical flash floods and protracted droughts. At the same time, the cost of agricultural production is increasing while the price for agricultural produce remains low leaving the local residents with little option. These have factored into income diversification activities where many local residents are already engaged in construction work, garment factories, running micro business, and other off-farm occupations. Young people, especially women are highly visible in the garment factories established in Pursat and Kampong Chhnang provinces. Many people also migrate to Thailand in search of jobs to support their families and pay off their debts to banks or micro financial institutions.

Observation 5

The intervention on livelihood development for those being affected along the rivers should be strategically sound, and socio-economically feasible and scalable to ensure decent work and livelihood for local communities on their land.

[1] in Kampong, Siem Reap, Battambang, Pursat