



CASE STUDY

Sustainable Livelihoods and Water Management in Shared River Basins

MAY 2008
LOWER SONGKRAM BASIN,
THAILAND



This study is of particular relevance to those engaged in:

- *Projects responding to the impact of human activities on resource availability (e.g. dam construction)*
- *Projects developing sustainable livelihood solutions to the demands of a changing environment*

BACKGROUND

The Songkram River is an undammed, major tributary of the Mekong River in Northeast Thailand. Approximately 960 square kilometers of the Lower Songkram River Basin (LSRB) floods seasonally, generating a large wetland area that supports key livelihoods such as rice cultivation and fishing. Some parts of the LSRB receive more than two meters of precipitation annually, though this is distributed over a six month period and flash flooding is rare. Mild flooding occurs almost every year, and the last severe floods were in 1966 and 1995. Each of these floods lasted for two months, reached the second floor of dwellings, damaged agricultural fields, killed livestock, and was associated with outbreaks of diarrhea and foot and mouth disease. Although drought has historically not been a problem, the LSRB did experience mild droughts in 1986, 2003, and 2004. These led to reduced agricultural yields for most crops, shifts to dry land agriculture, and increased demand from the farming community for dams to buffer against such problems in the future. In addition to being important to local livelihoods, the LSRB is a demonstration site for the Mekong Wetlands Biodiversity Program.

DEVELOPMENT CHALLENGE

To balance the competing needs of protecting livelihoods and biodiversity.

CORE PROJECT

This pilot study was not connected with a pre-existing USAID project, and instead started by identifying a site where climate change was likely to impact livelihoods.

ADAPTATION OBJECTIVE

To identify and adopt strategies that will allow villagers relying on climate sensitive sources of income to maintain stable livelihoods.

FOLLOWING THE STEPS IN THE USAID ADAPTATION GUIDANCE MANUAL

STEP 1: SCREEN FOR VULNERABILITY

The most serious threats to water availability throughout much of Southeast Asia are from human activities. In Thailand, the LSRB faces significant risks from ongoing land conversion activities and upstream dam construction by both China and Thailand. However, climate change, by altering patterns of precipitation and storm intensity, may further negatively impact livelihoods and generate conflicts between fishing, agriculture, and biodiversity protection. This adaptation pilot study was based in three villages, which experience different levels of flooding (locations: on the river bank, in the middle of flooded lands, and on somewhat higher ground). It should be noted that the substantial and ongoing water management and land development activities make it very hard to predict what will happen to runoff, even in the absence of climate change.

STEP 2: CONVENE STAKEHOLDERS AND DEVELOP A PLAN FORWARD

Stakeholders such as farmers, fishers, local government officials, and teachers were brought together to discuss how they viewed climatic variation and how they had historically adapted their livelihoods to it. Persistent flooding negatively impacted rice cultivation and positively impacted fishing, leading most villagers to rely on multiple activities as sources of income. Persistent flooding also negatively impacted forage crops, reducing food availability for livestock during the dry season. Flooding was viewed by villagers as part of the natural cycle, and villagers did not perceive changes in flood regimes although the frequency of strong storms was thought to have increased. Villagers felt their livelihoods were threatened by land use changes that converted flooded forests to dry season agriculture (rice) and eucalyptus plantations that have reduced fish stocks and increased soil erosion. Land use changes were also leading to water shortages that were resulting in pressure on local government to construct dams and weirs.

STEP 3: ANALYSES

Impact of increased atmospheric CO₂ on temperature and precipitation was analyzed by SEA-START.

Climate change simulations were conducted for three levels of atmospheric carbon dioxide (CO₂) concentration [360ppm (baseline), 540ppm, 720ppm] using the Conformational Cubic Atmospheric Model (CCAM) which was developed specifically for the Australasian Region.

Increased CO₂ levels led to an increase in the number of hot (above 33°C) days, potentially leading to as much as a six week extension in the duration of summer. The model predicted little to no increase in temperature during the cooler wet season. Average annual precipitation increased with CO₂ concentration (by up to 8% for 720ppm CO₂), and the model also indicated that there might be a shift in the timing of the rainy season.

Impact of climate change on flooding was analyzed by the Finnish Environmental Institute's Water Utilisation Programme.

The Songkram River flows into the larger Mekong River (though there can also be backflows of the Mekong into the Songkram), and the dynamics of the Songkram are consequently affected by the Mekong. A suite of hydrological models was used to analyze the impact of climate change on discharge and flooding of the Mekong River, and impacts of the Mekong on flow patterns of the Songkram River.

Below 540 ppm CO₂, there was a slight increase in maximum flow rates of the Mekong, and daily discharge of the Songkram was projected to increase 8.4%. Below 720 ppm CO₂, the daily discharge of the Mekong increased substantially throughout the entire rainy season, and the daily discharge of the Songkram was projected to increase 23%. High flow events are associated with flooding, thus the predicted increased discharge rates of the Songkram are likely to result in more frequent and larger floods, and will have implications for agriculture, fisheries, and infrastructure.

STEP 4: SELECT COURSE OF ACTION

Following the analyses, stakeholders were assembled to discuss how they would cope with expected climate change, in particular changes in the duration and magnitude of flooding. Stakeholders identified possible adaptations and discussed their economic, institutional, social, and governmental feasibility. Adaptations were identified which could be employed at the household, community and state levels. Local people and state representatives met separately to identify adaptations. Some of the adaptations suggested were planting alternative crops and switching to aquaculture (household level), developing a resource management plan and insurance policies (community level), and increased capacity building and funding for development projects (state level). All adaptations were presented and discussed at the second National Workshop.

STEP 5: IMPLEMENT ADAPTATIONS

Not yet applicable.

STEP 6: EVALUATE ADAPTATIONS

Not yet applicable.

OUTCOMES

1. Impact on government planning: Results were presented to the Thai government for consideration in the development of their National Strategic Plan on Climate Action, which will include adaptation strategies in five vulnerable sectors and an adaptation capacity building strategy.

2. Identification of ways in which USAID can contribute to promoting sustainable livelihoods:

- a) Convey to government the impacts of upstream river management on Songkram livelihoods;
- b) Promote alternative crops;
- c) Help identify new markets;
- d) Work with local and national government to improve natural resource management;
- e) Build local capacity; and
- f) Advise on the development of a national insurance framework to partially compensate losses due to flooding and on laws to regulate unsustainable fishing practices.

LESSONS LEARNED

1. Human impacts, such as dams, deforestation, and water use practices, currently pose the most serious threat to water availability for downstream populations.
2. Water level of the Songkram was found to be driven by water level of the Mekong, indicating that future analyses and water management strategies should focus on the Mekong.
3. A small additional amount of money (\$5,000-\$10,000) would allow for direct follow-up engagement with local parties and potential partners who might be interested in implanting adaptations identified by this pilot.
4. Different stakeholders (state representatives vs. community leaders) had different ideas about the most feasible or desirable solutions to problems. For this pilot study, workshops with these two groups were held separately. Having a single workshop would be helpful in achieving a consensus plan, though it is important to make sure the diversity of views is still initially expressed. Alternatively, in some cases, a pre-existing project may be constrained to work at a particular level (e.g., household adaptations vs. regional government policy) and this will determine who are the key stakeholders to engage.

QUESTIONS TO CONSIDER AS YOU THINK ABOUT ADAPTING SIMILAR PROJECTS**Current Obstacles to Development**

1. What are the primary stresses affecting the local population? To what extent are demand for food and water currently being met, and how is demand likely to change in the coming decades?
2. Are human activities currently affecting availability of key resources such as water? How big are these impacts?
3. Who makes decisions about human activities with potentially large environmental impacts, and what criteria do they use? Are likely impacts on resource availability and food security taken into consideration?

Observation of Change in Climate

4. Has the frequency, magnitude, or timing of precipitation changed in the last several decades?
Has temperature changed?

Impacts of Climate Change

5. Has the frequency or magnitude of flooding, drought, or other climate related problems changed in recent decades?
6. To what extent is this likely to be due to climate change versus to human activities, such as building dams and developing on floodplains?

Sources of Advice, Support, and Training

7. Where do farmers, fishermen, etc., currently go for advice and support? How could information access and training opportunities be improved?

Current Coping Strategies

8. What are the primary livelihoods that people in your community depend on? Is it relatively easy or relatively hard for families to find alternative means of support when one resource is not available? On what basis do individuals make decisions about what livelihood(s) to pursue?
9. Are there insurance policies that partially compensate for losses due to flooding or other natural disasters? If not, how could development of such policies be encouraged?

For more information on Thailand, visit: <http://www.usaid.gov/locations/asia/countries/rdma/>

For a copy of the USAID Adaptation Manual, visit:

http://www.usaid.gov/our_work/environment/climate/docs/reports/cc_vamannual.pdf