Assessing Threats to Lower Mekong Livelihoods, Communities & Ecosystems

The U.S. Agency for International Development’s (USAID) Mekong Adaptation and Resilience to Climate Change project (Mekong ARCC) is conducting a Climate Change Adaptation and Impact Study that will assist in addressing key knowledge gaps of how climate change will affect livelihoods, communities, and ecosystems in the Lower Mekong Basin (LMB).

CLIMATE TREND AND THREAT MODELLING – THE STUDY METHODOLOGY

The Mekong ARCC Study team has developed a modelling approach to define and quantify the changes in hydro-meteorological variables over time, and to apply changes in the global climate system down to zones at a subnational scale across in the LMB. These factored changes include incidence, magnitude and duration of events such as floods, storms, rainfall-runoff relationships, evapotranspiration, and temperatures. Four geographical scales sharing common biophysical characteristics such as meteorology, hydrology, ecosystems, land use, and agriculture systems are being considered:

1. Global

The Mekong ARCC Study will apply six Global Circulation Models (GCMs) under the Intergovernmental Panel on Climate Change (IPCC) Emissions Scenarios. GCMs approximate general circulation of the planetary atmosphere and are widely applied for weather forecasting, understanding climate, and projecting climate change at a large scale. The six selected were chosen based on their ability to most accurately replicate daily historical temperature and rainfall data. GCM output is compared to observed information from a reference period of 1980-2005 to calculate period factors.

2. Lower Mekong Basin

Since GCMs operate at coarse resolution, they are not appropriate for spatial assessments at basin, national or subnational levels. A statistical technique, which assumes local climate is conditioned by global climate but does not try to understand physical causality, used by the Mekong ARCC project downscales global information to a Mekong Basin scale.

This document is made possible by the support of the American People through the United States Agency for International Development (USAID). Its contents are the sole responsibility of DAI and do not necessarily reflect the views of USAID or the United States Government.

Source: http://www.mekongarcc.net/resource

continued...
An Integrated Water Resource Management Hydrological model will then utilize data from 151 precipitation stations and 61 temperature stations on the Lower Mekong to understand how climate change will alter hydrologic processes and forecast future changes in the movement, distribution, and quality of lower Mekong River water resources. The hydrological models will project changes in: rainfall, runoff, flows, infiltration, evapotranspiration, crop productivity and patterns.

3. Mekong Ecozones
Mekong ARCC’s approach to zoning identifies areas in the LMB with common bio-physical and socio-economic characteristics, and projects temperature, rainfall and other “shifts” in these areas expected to result from global climate change. Corresponding impacts on biodiversity and ecosystem services; agriculture, aquaculture, fisheries and livestock production; and food security and livelihoods will be determined and described for each zone. The relative level of vulnerability of a zone and areas and species within it will be assessed considering the following factors:

**Exposure**
- significant climate change relative to base conditions
- exposure to new climate/hydrological conditions

**Sensitivity**
- limited temperature and moisture tolerance range
- degraded and/or under acute pressure
- severely restricted geographic range
- rare or threatened

**Adaptive capacity**
- socioeconomic metrics
- population dynamics

4. Provincial Level
The result of the assessment process will be the demarcation of areas highly vulnerable to climate change. Using this information, Mekong ARCC will develop a set of options for community-based *integrated adaptation interventions* that link agriculture, animal husbandry, and fisheries sectors with ecosystems at a provincial level. These focal provinces will be targeted for the support of Mekong ARCC community and ecosystem-based adaptation initiatives upon completion of the Study.