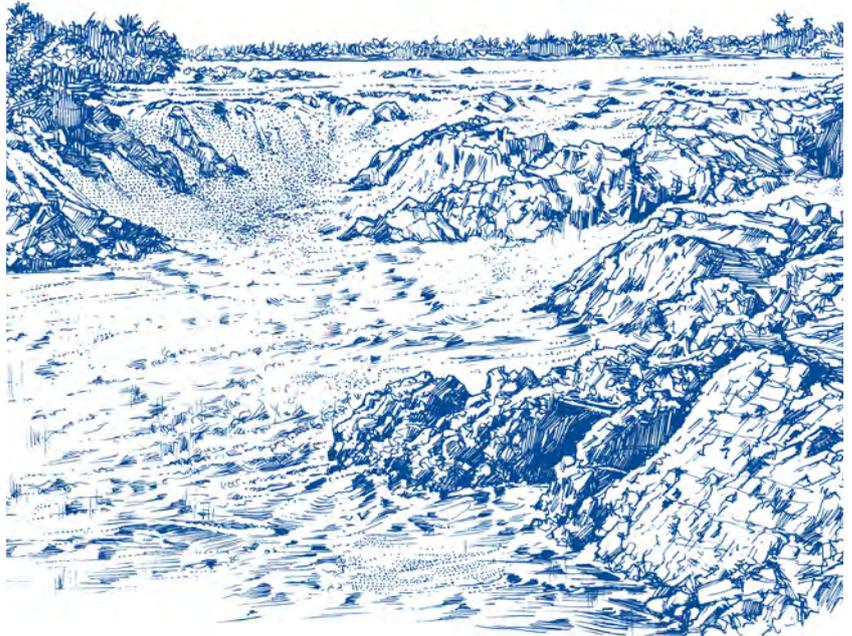




Headlines: USAID Mekong ARCC Climate Study for the Lower Mekong

By 2050 the Lower Mekong Basin (LMB) will experience increasing climate extremes, including higher temperatures, wetter wet seasons, drier dry seasons, and more frequent and intense flood events. The extent and distribution of rainfall and daily maximum temperatures will also differ significantly from the LMB's historical trends.



- **Climate extremes** – wetter, drier, hotter – will push some traditional agricultural and natural systems across the LMB outside of tolerable temperature and precipitation ranges for productivity or growth. Many species, crops, and natural systems that were once suited to a location will no longer be able to thrive.
- **Temperatures** across the LMB will increase. The eastern plains of Cambodia and parts of the central highlands of Vietnam could see the most significant shifts of average annual temperature, with increases of as much as 3°C to 5°C possible.
- **Annual precipitation** is projected to increase across the LMB by anywhere from 3% to 18% (+35 to +365 mm). Significant rainfall increases in Khammouan, Lao PDR (+355mm a year) and Sakon Nakhon, Thailand (+305mm a year) will impact soil moisture while increasing the occurrence of flashfloods and erosion.
- **Flooding** of at least 0.5 meters that currently occurs over 300,000 hectares of the Mekong Delta is projected to cover an additional 50% of the delta, or a total of 1.9 million hectares.
- **Drier dry seasons** coupled with increasing daily maximum temperatures – from 35°C to 38°C in Gia Lai, Vietnam for example – will lead to heat and water stress on people and cropping systems, while gradually shifting seasonal cycles.

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CROP SUITABILITY

Maximum daily temperatures exceeding 35°C will inhibit flowering and grain production of rainfed and irrigated rice in many areas of the LMB, including the Mekong Delta.



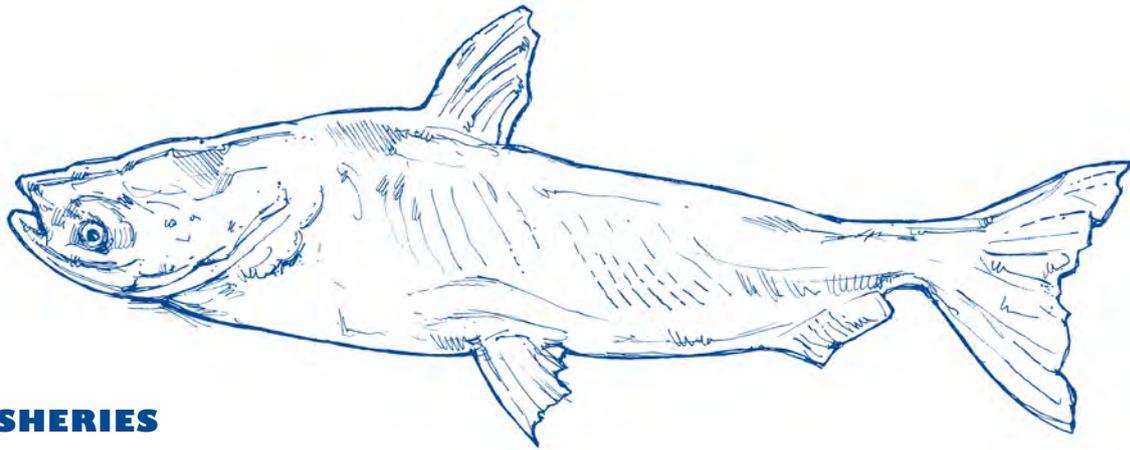
- **Industrial crops** like rubber, robusta coffee, and cassava will be less viable in the heat of the central part of the basin, including the eastern plains of Cambodia, with optimal growth suitability shifting to higher altitudes, including in northern Thailand, and northern Lao PDR.
- **Rainfed rice** will be impacted by large increases in precipitation during the wet season, which will decrease yields in typically wet provinces like Gia Lai, Chiang Rai, and Champasak, while increasing yields in traditionally 'dry' provinces like Sakon Nakhon.
- Projected sea level rise of 0.3 meters in the **Mekong Delta** will impact rice production, shrimp farming, and freshwater supplies from saline intrusion into both surface and ground water, particularly during the dry season.
- **Maize** yield will generally decrease across the basin, with Gia Lai (-12%), Mondulkiri (-6%), and Kampong Thom (-6%) provinces severely affected.
- **Soya** yield reductions will be experienced in Cambodia and Northeast Thailand due to increasing precipitation causing water-logged soils.
- **Cassava** will be less suitable for growing in central Lao PDR and the central highlands of Vietnam due to dramatic increases in precipitation.



LIVESTOCK

Communities relying on smallholder livestock for dairy, protein, and income-generating activities will become more vulnerable to food insecurity and sudden asset/savings loss as rising temperatures stress livestock breeds and amplify costs of feed.

- **Smallholder pigs** will face lower reproduction rates and increased stress from disease as the entire LMB will experience more days above 35°C, extending beyond the upper limit of the pig's temperature tolerance range.
- **Smallholder cattle and buffalo** will experience lower reproduction rates due to heat stress and variable availability of fodder, with increased flood events driving higher disease rates and herd loss.



FISHERIES

Aquaculture and associated infrastructure will be vulnerable to increasing frequency and intensity of flood events throughout the LMB, and aquaculture stocks will experience increasing disease induced by the more extreme temperatures and corresponding lower dissolved oxygen levels.

- Coastal shrimp ponds in Vietnam will be impacted in the wet season by flash floods causing sudden drops in salinity; in the dry season, shrimp ponds will see increased salinity due to saltwater intrusion.
- Drier and hotter dry seasons will stress migratory white fish, which require cooler waters, higher dissolved oxygen levels, and the ability to move to upland reaches in catchments to spawn.
- Black fish, which have limited migrations and are more tolerant to varying water quality conditions, will be more climate-resilient than migratory fish.
- Upland fish populations will be less vulnerable than lowland fisheries, which will see lower reproductive rates and higher disease rates due to heat stress in the dry season.

ECOSYSTEMS AND NON-TIMBER FOREST PRODUCTS (NTFPs)

Heat stress across the LMB will cause geographic changes in the ranges where certain plants and animals can be found, as they shift upland and eastward to escape heat extremes.

- Shifting temperature and rainfall profiles will drive biodiversity loss and invite new invasive species. Those species adapted to higher temperatures may dominate natural community composition.
- Productivity and fertility of NTFPs will be affected by increased temperatures and shifting seasonality, with dry season spikes impacting life cycle events such as flowering, fruiting, and seed dispersal. This will directly impact income generation for communities depending upon the wild harvest of rattan, wild rice, cardamom, tree resins, etc.





Design & illustration by Donald Bason

COMMUNITY ADAPTATION STRENGTHENING INITIATIVES

The completion of the USAID Mekong ARCC Climate Adaptation and Impact Study for the LMB is not an end point but instead serves as a tool in linking research and on-the-ground adaptation action that increases the adaptive capacity of local communities. Through partners, USAID Mekong ARCC is assisting communities at 5 sites in Thailand, Lao PDR and Vietnam to better understand and prioritize climate risks, and take actions that strengthen their resilience to food and livelihood insecurity resulting from climate change. Successful adaptation will require flexibility and a diversity of approaches to adapt to shifting conditions.

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.

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