Columbia University and Institut Pertanian Bogor Partnership to Build Capacity for Adaptation to Climate Risks in Indonesia

Much of the population in Indonesia is highly dependent on monsoon rains for livelihoods. In a bad year, over 2 million households, many of which are women-headed, suffer from drought or flood-related disasters. Additionally, uncontrolled fires from degraded peat forests account for a large proportion of Indonesia's greenhouse gas (GHG) emissions, with serious local and regional health and economic impacts. The Government of Indonesia has placed a high priority on managing climate risks for sustainable development, and in leveraging universities for applied adaptation research. There is an urgent need to enhance science and technology capacity in Indonesian universities and agencies for adaptation to climate risks.

With funds from USAID Indonesia, Columbia University and Institut Pertanian Bogor (IPB) are implementing a project to build science and technology capacity for climate risk management in agriculture and peatland forest areas. In addition to engaging stakeholders at national, provincial and local levels in the research, the effort involves faculty exchanges, student internships and training workshops. Outcomes will include enhanced applied research capacity of IPB faculty in agricultural and fire risk adaptation, strengthened capacity for adaptation planning among local stakeholders, and enhanced awareness among national and provincial policy-makers, the private sector, and stakeholders on strategies and tools for climate-resilient development.

Agricultural adaptation

The collaborative research focuses on two innovations that hold great promise for helping manage climate risks and enhance adaptation: a ***dynamic crop calendar*** that integrates climate information throughout the growing season, and ***index-based agriculture insurance***. Indramayu, a critical rice-producing district located in West Java, serves as the context for developing both of these innovations, through close engagement with local government and other stakeholders.

Rice cropping management practices in Indonesia have not leveraged recent advances in forecasting seasonal rainfall characteristics. While onset, strength and duration of the wet season are strongly linked to climate patterns such as the El Nino Southern Oscillation (ENSO), the crop calendar used by Indonesia's farmers is not sufficiently flexible to account for such variability. Enhancing the responsiveness of crop management systems to future climate conditions would lead to improved food security. Towards this the project partners are developing a ***dynamic crop calendar*** system to assist users in adjusting cropping strategies based on time-ahead climate conditions. The effort also includes training and capacity building to help policy makers and farmers reduce risks while taking advantage of good climate opportunities.

Government programs in Indonesia are designed to help farmers when crops fail, and the government is also working to establish traditional indemnity-based agricultural insurance. However, moral hazard, adverse selection, and the costs of individual field verification on crop loss create formidable challenges for sustainable products and scaling. ***Index-based agriculture insurance*** effectively addresses these widespread risks by paying the contractual claim if the value of an index (e.g., rainfall) falls below a specified level, regardless of actual loss. Since the insurance is against events that cause loss, not against the loss itself, the index reduces the need for costly yield assessments. The project partners are working to develop an appropriate index based on historical climate data and seasonal climate forecasts. Through collaborative research and training, project partners are developing research capacity at IPB on the design of index insurance products, and helping build capacity of farmer groups and relevant government, insurance, and lending institutions in Indramayu District.

Anticipating and responding to peatland fires

The peatlands of Central Kalimantan province have undergone dramatic ecological and social change over past decades, as millions of hectares have been drained and converted from forest to agricultural land and palm plantations, leaving them extremely vulnerable to fire in dry years. Local communities use fire to clear land for agriculture and to establish ownership rights. When such fires get out of control, peat combustion can cause serious smoke and haze problems and contribute substantially to global carbon emissions. Government-led fire management efforts in the province have focused on short-term fire suppression using weather forecasts. Previous work by Columbia University and IPB has resulted in a seasonal early warning system for managing peatland fires in the province that showed high promise to reduce carbon emission. The current effort involves refining the early warning system at the district level, exploring alternate livelihood portfolios and economic incentives for local stakeholders, as well as developing a robust institutional architecture for peatland forest early response systems.

Improved capacity for climate modeling and analysis

Along with enhancing the responsiveness of agricultural practices and peatland fire management to climate forecasts, a key focus of this project is to improve climate analytics and forecast capacity. The tools, modeling approaches and online Data Library of the Earth Institute's International Research Institute for Climate and Society is utilized for building capacity on a range of critical functions, including construction of forecast models, verification techniques and geo-spatial representation of climate impacts. Through collaborative research and faculty exchange, Columbia University is working with IPB to strengthen expertise in climate analyses, modeling and forecasting and enhance the analysis and integration of climate, environmental and socio-economic data in order to better service policy engagement.

This publication produced by Columbia University and IPB under USAID grant No. AID-497-A-11-00011

Photo credit: S. Someshwar