



INDONESIA

CLIMATE VULNERABILITY PROFILE

| US Foreign Assistance: ¹ (thousands USD) | Requested FY 2012 | Requested FY 2013 |
|--|--------------------------|-------------------|
| Estimated total: | 180,000 | 180,276 |
| Adaptation: | 3,000 | 3,000 |
| Agriculture: | 7,395 | 3,000 |
| Water: | 6,333 | 6,333 |
| Priority Adaptation Country in 2011: | YES | |
| Key Climate Stressors: | Flooding, Sea level rise | |

INTRODUCTION

Indonesia is the world's largest archipelago, with more than 17,500 islands and 230 million people, and is located in the Indian and Pacific Oceans. The manufacturing industry supports about a quarter of Indonesia's economy. Agricultural production and natural resource mining together contribute another quarter of the country's Gross Domestic Product (GDP). Forests, as well as marine and coastal ecosystems, provide vital services that sustain millions of livelihoods. While the country has experienced sustained development over the last decade, it faces several challenges, including a lack of reliable infrastructure (e.g., energy production) for leveraging by the private sector and weak governance systems (e.g., land use, environmental protection, human rights). These challenges, coupled with environmental and natural resource stressors, could hinder further sustained growth.

PROJECTED WEATHER AND CLIMATE CHANGES

Indonesia experiences two main seasons: a dry season from June to September and a wet season from December to March. Tropical areas of the country tend to experience rain throughout almost the entire year. Average temperatures range from 23°C in mountainous, high altitude areas to 30°C in inland areas. Average relative humidity varies between 70 and 90 percent.

TEMPERATURE: Average annual temperature has increased by 0.3°C since 1990. Temperature is expected to continue to increase at a rate of 0.2-0.3°C per decade through 2100.

PRECIPITATION: Overall, annual rainfall has decreased 2-3 percent since 1990. Seasonal precipitation patterns have also changed. In southern regions, there has been a decline in average annual rainfall, but an increase in wet season rainfall. Meanwhile, in northern regions, there has been an increase in average rainfall, but a decrease in dry season rainfall.

Indonesia is projected to experience increasing annual precipitation, except in the southern regions, where precipitation is projected to decline by up to 15 percent by 2100 from the 1980-1999 period. In addition, models project a 30-day delay in the annual monsoon season. This delay would result in a 10 percent increase in rainfall later in the crop year (April-June) and up to a 75 percent decrease in rainfall later in the dry season (July-September).

SEA LEVEL RISE: Indonesia has 42 million citizens who live on low-lying land less than 10 meters above sea level. A one-meter rise in sea level could inundate about 405,000 hectares of land and low-lying islands. A recent study by the Government of Indonesia projects that sea levels will rise 27.5-40 cm by 2050 and 60-80 cm by 2100 from the 2000 baseline.

EXTREME EVENTS: Indonesia is vulnerable to extreme hydro-meteorological events such as floods and droughts. Urban centers such as Jakarta, Medan, and Bandung frequently experience floods and flood-induced landslides and mudslides. Projections are inconclusive as to how the intensity and frequency of these events may change. Prolonged droughts have and will continue to exacerbate the risk of forest fires.

KEY CLIMATE IMPACTS AND VULNERABILITIES

Agriculture, freshwater resources, and coastal and forest ecosystems are expected to be particularly vulnerable to climate impacts.

Climate change will affect both subsistence and cash crops, with food security and economic growth implications. Changing precipitation patterns, evaporation, run-off, and soil moisture could all impact agricultural production levels. As sea levels rise, districts located in rural coastal areas may face reductions in local rice and maize production. Aquaculture production may also be affected. Since Indonesians rely heavily on seafood for their protein intake, reductions in aquaculture production will threaten food security.

Saltwater intrusion may alter the availability and quality of freshwater supplies during the dry season. Freshwater in Indonesia is required for irrigation, drinking water, and industrial uses. Compromised (i.e. contaminated by saltwater) and reduced availability of freshwater will thus have implications for health, agriculture, and economic production processes.

Finally, changes in land-use, temperature, and precipitation have caused widespread wildfires in Indonesia that have altered forest composition and structure. Climate changes could exacerbate this problem. Further, mangrove systems have and will continue to feel the effects of climate variability and change. Reduced freshwater flows and sea level rise will increase pressure on these ecosystems.

KEY USAID PROGRAM VULNERABILITIES

EDUCATION: USAID supports several education programs that are developing opportunities for children with visual and hearing impairments and physical and mental disabilities, promoting university partnerships, and building capacity for higher education. Climate changes such as sea level rise and storm surge could affect USAID-built structures for schools and related facilities. The program will need to ensure that facilities are properly sited to minimize impacts and constructed with materials that increase climate resilience.

¹ US foreign assistance includes both USAID and Department of State program funding, but in most cases the bulk of this funding is implemented through USAID. In order to have comparable figures in these categories, all country profiles use figures from the Congressional Budget Justification (CBJ) (see <http://transition.usaid.gov/performance/cbj/185016.pdf> and <http://transition.usaid.gov/performance/cbj/158269.pdf>). Between the time of the budget request and the 653(a) report to Congress, these figures can change significantly.

DEMOCRATIC GOVERNANCE: By working with local communities, governments, and civil-society organizations, USAID is supporting the further development of democratic governance structures. Climate stressors may affect the ability of government agencies and local institutions to deliver services.

ECONOMIC GROWTH: USAID supports programs that promote the production and marketing of high-value crops such as coffee, cocoa, and horticultural products. These crops are likely to be vulnerable to climate impacts in the future, including temperature and precipitation change and saltwater intrusion. USAID's programs can help promote agricultural practices that increase resilience to climate change impacts.

ENVIRONMENT: USAID supports several environment-related programs, including ones that are improving the management of forest, marine, and mangrove ecosystems; increasing access to clean energy systems; and reducing disaster risk. Climate changes could stress managed ecosystems. Over time, areas may become uninhabitable for certain species. For example, sea level rise could affect and displace mangrove forests. USAID programs can protect their gains by adjusting ecosystem management practices in ways that consider future climate conditions. Climate changes may also exacerbate extreme weather events, resulting in an increased need for disaster risk reduction programs.

HEALTH: USAID programs in Indonesia are focused on improving child and maternal health and stemming infectious diseases. Climate change could have significant impacts on agriculture production, which will affect nutrition programs aimed at improving child and maternal health. In addition, increasing temperature and variable precipitation could affect the future distribution and abundance of disease vectors.

ACTIONS UNDERWAY

Indonesia is an adaptation priority country for USAID, which has several ongoing climate change-related efforts in the country. These include the Coral Triangle Support Partnership, a National Oceanic and Atmospheric Administration (NOAA) Training program, the Indonesia Marine and Climate Support Project, Adapting to Climate Change in Eastern Indonesia, and the Indonesian Forest and Climate Support Project. These programs address the integral role that forest and marine ecosystems play in ensuring climate resilience. Further, the NOAA program provides capacity building in fisheries and marine protected areas management. Additionally, all of USAID's environment-related programs listed in the Environment section above take into account climate risks.

CHALLENGES TO ADAPTATION

Significant challenges to adaptation remain, including data, information, and research gaps. Needs include: additional climate information in forms that can be easily integrated and used in decision-making; detailed vulnerability assessments in more regions of the country to help clarify the nuances of future impacts; training on how to integrate climate information into programming; and early warning systems for disaster risk reduction efforts.

RESOURCES

Australian Agency for International Development (AusAID), 2010. Climate Change Vulnerability and Adaptation Assessment. Accessed 4/27/2012. <http://www.ausaid.gov.au/countries/eastasia/indonesia/Documents/adaption-poster-pds.pdf>

Republic of Indonesia, 2009. Indonesia Climate Change Sectoral Roadmap (ICCSR): Synthesis Report. Accessed 5/27/2012. bappenas.go.id/get-file-server/node/11431/

USAID, 2012. Indonesia Country Page. Accessed 4/27/2012. <http://indonesia.usaid.gov/en/home>

World Bank, 2011. Climate Risk and Adaptation Country Profile for Indonesia. Accessed 4/27/2012. http://sdwebx.worldbank.org/climateportalb/doc/GFDRRCountryProfiles/wb_gfdr气候_change_country_profile_for_IDN.pdf

World Bank, 2012. Indonesia Dashboard. Accessed 4/27/2012. http://sdwebx.worldbank.org/climateportalb/home.cfm?page=country_profile&CCCode=IDN