Integrated Climate Change Adaptation, Land Use and Watershed Management Plan for the Grijalva-Usumacinta River Basin

The **Integrated Climate Change Adaptation, Land Use and Watershed Management Plan for the Grijalva-Usumacinta River Basin** provided comprehensive analyses on the forecasted effects of climate change and proposed adaptation measures to mitigate impacts on communities in the region. When implemented, the plan reduces the risk of losses associated with extreme weather events—including on natural resources and key ecosystems—and creates conditions for long-term, sustainable, economic growth resilient to climate change.

A Tabasco health center built at street level is highly prone to regional flooding. The Abt team assessed and proposed measures to increase the resilience of this infrastructure.

Project Background

Climate change adaptation and watershed management plan prepares Grijalva-Usumacinta River Basin for sustainable economic growth amidst climate change

Resource-rich with high biodiversity, the Grijalva-Usumacinta river basin in Mexico's Tabasco and Chiapas states holds significant local and national value. More than 40 percent of Mexico's hydropower is generated from the Grijalva River, and 17% of oil production and 22% of Mexico's natural gas is produced in the lower basin. However, the area's close proximity to the Gulf of Mexico and Atlantic Ocean makes it highly vulnerable to climate change effects: rising sea levels, destructive hurricanes, heightened rainfall and floods. Rising sea levels threaten to reduce Tabasco territory by 5-8% with a $115 million annual cost due to loss of natural resources and ecosystem services. These climate change impacts are devastating to the 6 million people in the region, 31% of who live in extreme poverty and have limited access to food.

Abt Associates identified and assessed climate adaptation intervention options across various sectors, and engaged multiple stakeholders within government, academia, and civil society, to design the Integrated Climate Change Adaptation and Integrated Watershed Management Plan for the Grijalva and Usumacinta River Basin.

QUICK FACTS

- **Inter-American Development (IDB)** funded project
- The Grijalva-Usumacinta Watershed has an extension of **13.2M hectares**
- The watershed is home to more than **6M** people, **27%** of whom are indigenous
- **116 municipalities** are located within the watershed
- **66%** of the municipalities are considered highly or very highly marginalized by the Mexican government
- Representatives from **21 federal and state agencies** participated in the assessment, along with NGOs, research centers, and development partners
- **45,000** of the region's families could face food insecurity due to climate change

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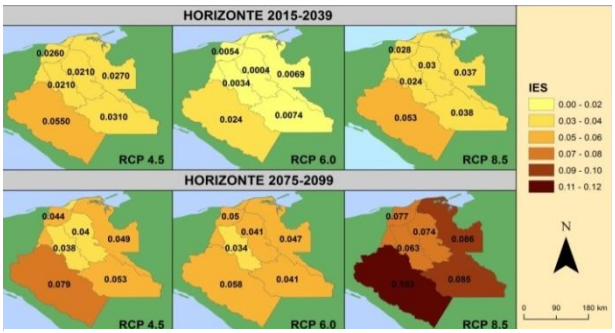
Key Activities

Assessed development priorities and non-climatic obstacles to achieve them

Through analysis and stakeholder engagement, the team identified the main development challenges for the region. Using existing technical, socio-economic, environmental and institutional information, as well as new hydrological and deforestation modeling, the team identified non-climate stressors and trends for the region. This information was integrated into maps that incorporated existing bathymetry, topography, hydrological, soil coverage, oceanographic, and population data.



Maps show the changes in superficial runoff under different scenarios over two time periods: 2015-2039 and 2075-2099.

Analyzed climate trends to develop future climate change scenarios

The Abt team downscaled global climate change models to regional and municipal levels to generate geo-referenced maps and metadata databases. Maps showed how different areas could experience changes in temperature, runoff, precipitation patterns, sea levels and frequency of extreme weather as a result of climate change, under different scenarios over two time periods: 2015-2039 and 2075-2099.

Conducted climate change impact analyses

Abt's preliminary analysis estimated climate change impacts on livelihoods, infrastructure, and ecosystems in the watershed. Specific maps and economic analysis were developed for vulnerable areas and livelihoods (maize, coffee growing, and cattle breeding), as well as several types of infrastructure (housing, schools, hospitals, roads, and bridges). This analysis showed how climate change would exacerbate existing development challenges in the region.

Evaluated intervention for climate change adaptation

Working with national, state and local stakeholders, Abt identified and prioritized intervention options to create resilience to climate change and variability in six sectors: agriculture, forestry, and cattle raising; natural resource and biodiversity conservation and use; infrastructure; water resources; land use planning; and hydropower. The Abt team then developed pre-feasibility assessments for each intervention, including cost-benefit analyses and needed capacity building.

Developed final climate change adaptation plan for the watershed

The final Climate Change Adaptation and Watershed Management Plan for the Grijalva-Usumacinta Basin is a clear roadmap for adaptation to climate change and the sustainable use of natural resources. The final document included a land-use action plan, investment requirements, and institutional and governance arrangements for its implementation. It also identified priorities for investments, institutional development, and research to address climate change. Coordination mechanisms, e.g., the creation of regional committees to vet investments, were proposed for the six key sectors, as well as local and national governments.

Digital elevation models and climate change simulations identified dwellings at risk of flooding in Chiapas. The darkest red areas indicate dwellings at the highest risk for flooding.