

 Early Warning System

ADB-57319-001

Big Data Analytics in Agriculture and Seaports



Quick Facts

Countries	Bangladesh, Indonesia
Specific Location	Chittagong, Matarbari Channel (Bangladesh), Tanjung Perak (Indonesia)
Financial Institutions	Asian Development Bank (ADB)
Status	Approved
Bank Risk Rating	U
Voting Date	2024-01-31
Borrower	Government of Indonesia, Government of Bangladesh
Sectors	Agriculture and Forestry, Climate and Environment, Industry and Trade, Law and Government, Technical Cooperation, Transport
Investment Type(s)	Advisory Services
Investment Amount (USD)	\$ 0.23 million
Grant Amount (USD)	\$ 0.23 million
Project Cost (USD)	\$ 0.23 million



Project Description

As stated by the ADB, climate change is a significant contributor to extreme weather events, causing widespread damage to both the environment and communities worldwide. The Asia-Pacific region is particularly vulnerable to these impacts primarily due to the region's heavy reliance on agriculture and densely populated coastal areas. Unfortunately, human activities play a crucial role in making these events more frequent and severe.

This TA explores climate change from these two perspectives. Firstly, it acknowledges the impact of climate change on agriculture production and food security, and explores effective adaptation strategies. Secondly, it recognizes the influence of human activities on the environment and the need to understand and minimize this. The complex relationship between climate change and human activities in diverse local contexts necessitates further research to inform effective mitigation and adaptation strategies.

From the first perspective, this TA explores the impact of climate change on agricultural production and food security, and effective adaptation strategies to mitigate climate risks. According to estimates by the United Nations Food and Agriculture Organization (UN FAO), between 2008 and 2018, Asia alone suffered disaster-related crop and livestock production losses worth approximately USD 207 billion, accounting for about 74 percent of the global loss. Most of these losses occurred in China, which accounted for 55 percent of the global total, amounting to USD 153 billion. With climate change expected to intensify extreme weather events, this situation is likely to worsen without timely adaptation actions. The majority of farmers in the region are smallholders who rely on their produce for both food and income. Therefore, agricultural losses could directly lead to increased hunger and malnutrition, as well as reduced income and well-being for the poorest populations. Additionally, large-scale production reductions could trigger food price volatility and create food crises at national and regional levels.

To tackle these challenges, the initial step involves data analysis of the impact of climate change on agricultural production and food security. By utilizing historical data on climate and crop production, we will develop models to analyze the relationship between climate variables and crop yield, as well as to estimate crop losses due to extreme weather events. With advancements in meteorology and climatology, we now have access to future climate projections with higher spatial and temporal resolution, enabling more precise and geospatially granular forecasting of the potential impacts of climate change on agricultural production. Furthermore, our research may include adaptation strategies, such as agricultural insurance, climate-resilient seeds, improved irrigation systems, if data are available.

From the second perspective of human impact on climate change, the TA will focus on human activities at coastal waters, specifically, at seaports. In facilitating the delivery of goods and services across global supply chains, seaports play a crucial role. It serves as a hub for international trade and provides temporary storage and handling facilities. As such, Asian Development Bank has a number of projects focusing on the development of seaports. Numerous studies have explored seaport performance indicators, highlighting their significant impacts for economic growth, and this economic impact has shown to be increasing in developing member countries (DMCs), e.g., Indonesia. Nevertheless, it is equally important to recognize that seaport development has environmental consequences.

Multiple organizations, such as OECD and US EPA, have emphasized the role of seaports in the aquatic ecosystem. The discharge of wastewater, containing organic waste, nutrients, and heavy metals from various onboard activities, introduces a new set of challenges. Pollutants like nitrogen and phosphorus from human waste and detergents can trigger eutrophication in coastal waters, fostering excessive algal growth and oxygen depletion. At seaports, where ships linger for extended periods, uncontrolled activities could potentially lead to habitat degradation, poor water quality, public health hazards, and loss of biodiversity. In this SSTA, depending on data availability, key seaports of select DMCs will be identified and analyzed using non-traditional, satellite data with high spatial and temporal resolution to explore potential environmental indicators that could provide more granular and timely information.



Investment Description

- Asian Development Bank (ADB)



Contact Information

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No contacts provided at the time of disclosure.

Executing Agency - Asian Development Bank:

No project contacts provided at the time of disclosure.

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