

Climate Early Warning and Capacity Building Unit

Proposed case studies

i) Enhancing Early Warning Systems to build greater resilience to hydro-meteorological hazards in Timor-Leste

Project ID: FP 171

National - Small Island Development States (SIDS)

An early warning system for disasters takes shape in Timor-Leste

Timor-Leste has a rich ecosystem of marine biodiversity coral reefs and mangroves. But this island nation in South East Asia is also one of the most vulnerable to extreme weather and slow-onset climatic events, like sea level rise.

In 2021 flash floods there killed more than 30 people and destroyed more than 4,000 homes. These were the worst floods in over 50 years and highlighted how unprepared Timor-Leste is for the climate crisis.

But that is changing.

The United Nations Environment Programme (UNEP) is helping the country build a cutting-edge early warning system for a range of climate-related disasters. Financed by the Green Climate Fund, it is expected to be operational around 2026.

"The simple fact is that early warning systems save lives."

Jian Liu, UNEP

It will include a battery of radars and underwater sensors that will help government meteorologists better forecast extreme weather and issue alerts to Timor-Leste's 1.3 million people. The project is much needed as climate change is expected to bring more floods, heatwaves, droughts and storms to Timor-Leste, while raising sea levels.

"The simple fact is that early warning systems save lives and help protect ecosystems," said Jian Liu, the Director of UNEP's Early Warning and Assessment Division. *"As the planet's climate changes, it's crucial that developing countries have access to state-of-the-art technologies, tools and capacity development support."*

Timor-Leste is one of the world's least developed countries and a small island developing state. Less than half of least developed countries and only one-third of small island developing states have multi-hazard early warning systems, which can detect a range of potential disasters, from floods to chemical leaks. As a result, people in small island states are 15 times more likely to die from climate disasters, deaths United Nations Secretary-General António Guterres has called "preventable".

Globally one out of three people lack access to effective early warning systems. Guterres declared last year that every person in the world should be covered by these systems by 2027. To make that a reality, he launched the Early Warnings for All initiative, a sprawling effort that includes multilateral development banks, humanitarian organizations, civil society, insurance and IT companies.

"Now it is time for us to deliver results. Millions of lives are hanging in the balance," Guterres has said. *"It is unacceptable that the countries and peoples that have contributed the least to creating the crisis are paying the heaviest prices."*

UNEP's work on Timor-Leste's system began last year. UNEP is helping the country to build an end-to-end early warning system that will raise the alarm about multiple hazards, including floods, heatwaves, cyclones, and storm surges.

The system will include a new national forecasting centre and improved observation equipment, such as automatic weather stations, Doppler radars and ocean sensors. Local monitoring equipment, megaphones and signboards will warn residents of impending disasters while the alert will also be sounded on radio and through both text messages and social media. The project is expected to directly benefit 80 per cent of Timorese.

Last month, the UNEP-Green Climate Fund project surveyed women and people with disabilities in far-flung communities, which receive limited early warning information. The meetings are designed to help ensure that especially vulnerable groups can benefit from the early-warning system.

Meanwhile, in the capital, Dili, a test low-cost weather station has been installed at Timor-Leste's National Directorate for Meteorology and Geophysics with the support of the International Centre for Theoretical Physics. More low-cost stations are planned to be installed in remote locations across the country.

At the same time, the Systematic Observations Financing Facility, a UN multi-partner trust fund, has approved Timor-Leste in its first batch of programming countries. A foundational element in the Early Warnings for All initiative, the facility will provide long-term technical and financial assistance to sustain basic weather and climate observations in Timor-Leste. It will fill critical weather and climate data gaps that affect the quality of forecasts everywhere.

It is estimated that early warning systems can provide a 10-fold return on investment. Even 24 hours' notice can reduce the damage of an impending disaster by 30 per cent. The Global Centre on Adaptation estimates that if US\$800 million was spent on systems in developing countries, US\$3 billion to US\$16 billion per year would be saved in losses.

Beyond the economic benefits, early warning systems can reap dividends for planetary health. Improved observations and hazard mapping help identify ecosystem vulnerabilities to inform environmental policy and the creation or restoration of protected areas. Early warnings translated into early action can minimize ecosystem damage through rapid identification of environmental hazards. This can prompt preventative measures to safeguard natural resources.

"Climate hazards are increasing in frequency and intensity," said UNEP's Liu. "Investing in climate science and early warning systems that leave no one behind is essential for effective climate action and reducing disaster risks."



*Climate change is expected to bring more floods, heatwaves, droughts and storms to Timor-Leste while raising sea levels.
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