

## ESCAP and innovative risk financing for disaster risk reduction and resilience

### Overview

Innovative financing for disaster risk reduction is especially important for Asia and the Pacific - the most disaster-prone region in the world which bears around half of the global total damage, 60 per cent of fatalities and 80 per cent of people affected from natural disasters during the last decade. The needs for such financing mechanisms have been highlighted by member States in various fora. At the *High-level Dialogue on Regional Economic Cooperation and Integration in Asia and the Pacific*, held in Bangkok from 20-21 April 2017, participants identified promoting regional peer learning on index-based (or parametric) insurance and risk pooling as one of the three actions points. Participants also suggested that ESCAP should provide the analytical infrastructure for peer learning by establishing a regional knowledge platform to promote sharing of experiences in disaster risk financing and in operationalizing parametric insurance amongst countries in Asia-Pacific and in other regions as well, including in Latin America and Africa.<sup>1</sup>

In addition, at the Regional Learning Platform on the theme *Mainstreaming Disaster Risk Reduction and Resilience into Sustainable Development with a Focus on Poverty Eradication*, which was organized by IDD in March 2017 under a Development Account-funded project, many participants noted the growing interest of countries in parametric insurance as a disaster risk reduction strategy. However, they noted that there is a general lack of awareness and capacity to start an initiative on this area. There were specific requests on analytical policy research on innovative disaster risk financing, identifying good practices and lessons, and building capacity for disaster risk financing.<sup>2</sup>

The ESCAP secretariat recognizes the need to establish a Regional Facility which will offer the following:

- a variety of knowledge and innovation based products (e.g. parametric insurance);
- advisory services to LDCs on available products, policy options and related technical assistance;
- capacity development including e-learning platform;
- peer learning as well as regional/South-South cooperation opportunities; and
- funding for regional initiatives (e.g. pooling).

As a first step, ESCAP will carry out a scoping study of good practices, as well as the lessons learnt in disaster risk finance and identifying innovative and new financial instruments, such as index-based parametric weather insurance schemes to enhance the knowledge base of the region. Based on the results of this study, a regional training seminar will be organized to raise the awareness of countries on i) what practices work; and ii) what resources/support (technical and otherwise) are available in the region to go about adopting these good practices in their own countries; and iii) how regional cooperation can best help in transferring knowledge to high-risk, low-capacity countries.

In support of this undertaking, ESCAP will seek the support of Pacific Island Countries which have experience with a risk pooling mechanism with the Pacific Catastrophe Risk Insurance (PICRAFI) mechanism that allows five Pacific Island Countries (Marshall Islands, Samoa, Solomon Islands, Tonga and Vanuatu) to secure US\$45 million of earthquake, tsunami and tropical cyclone catastrophe coverage on the international reinsurance market at an attractive price.

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<sup>1</sup> Chair's Summary, High-level Dialogue on Regional Economic Cooperation and Integration in Asia and the Pacific, held in Bangkok from 20-21 April 2017,

<sup>2</sup> Summary Report of the Regional Learning Platform on the theme Mainstreaming Disaster Risk Reduction and Resilience into Sustainable Development with a Focus on Poverty Eradication, 29-31 March 2017

ESCAP strives to ensure that resilience building strategies are inclusive and promote sustainable development.

### **ESCAP's prior experience with disaster risk transfer**

In recognition of the fact that resilience to disasters can be built through regional cooperation and that this is a priority for sustainable development, Member States through Resolution 71/12, Article 4(d) mandated ESCAP to “guide actions at the regional level through agreed regional and sub-regional strategies and mechanisms to strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems, particularly those related to hydro-meteorological issues, by deepening existing regional cooperation mechanisms”. This mandate defines the secretariat's role in deepening regional cooperation mechanisms and ESCAP has leveraged these mechanisms to strengthen the delivery of its analytical findings. More specifically, ESCAP has facilitated the development of, and advocacy for, parametric insurance products through its multi-hazard risk analysis. ESCAP has also conducted an initial analysis of the regions' practices vis-à-vis trends in risk assessment and modelling. The Annex contains further details on ESCAP's recent publications and research.

This was followed by resolution 72/8 which recognises the need to respond to the climate change challenge in the region. Member States requested ESCAP to facilitate the exchange of best practices and information sharing in the context of taking urgent action to combat climate change and its impacts, and to promote capacity building of member States, in particular least developed countries and Small Island developing States.

#### ***Leveraging the Space Programme to Inform the Regional Drought Mechanism***

First, ESCAP's regional drought mechanism takes advantage of the space-derived information, products and services generated by ESCAP's 20 year old Regional Space Applications Programme (RESAP). In the programme, the region's space-faring countries – China, India, Japan, Thailand and others – share information with other countries, especially those perennially prone to drought. This service complements the World Meteorological Organization's Global Framework for Climate Services by providing more detailed, localized forecasts and monitoring that can be updated during the growing season. Typically, droughts in the region have distinct and diverse sub-regional specificity, primarily driven by hydrology of snow and river basins, aridity anomalies and monsoon variability. ESCAP's drought mechanism products and services address that specificity, which directly supports index based parametric insurance. For example, ESCAP's drought mechanism products for Mongolia are the synthesis of various drought indices: Normalized Difference Drought Index (NDDI), Vegetation Supply Water Index (VSWI) and Thermal Condition Index (TCI).

#### ***Leveraging the Multi-donor Trust Fund***

Secondly, the ESCAP Multi-donor Trust Fund on Tsunami, Disaster and Climate Preparedness has funded partner institutions for developing a variety of innovative risk models to promote index-based parametric risk insurance, particularly in high-risk / low-capacity development countries of the region. For example, in Myanmar, there is a scenario based earthquake impact forecast and assessment; in South Asia, there is the internet-based simulation platform for tsunami inundation and risk evaluation (INSPIRE), and there are regional climate models of the coordinated downscaling experiment (See Annex).

Looking forward, the new strategic plan of the Multi-donor Trust Fund is focused on funding regional initiatives that promote impact-based forecasting and risk-based early warning for extreme weather events, including slow-onset disasters, earthquakes, and tsunamis.

The Fund presents a readily implementable mechanism under which through the establishment of a second financing window that complements the technical cooperation window, a regional facility for parametric index-based insurance could seamlessly be established.

### ESCAP initiatives on parametric insurance

ESCAP used its Trust Fund on Tsunami, Disaster and Climate Preparedness to support the development of several risk assessment products to support parametric insurance:

#### ShakeCast customized model for scenario-based earthquake impact assessment in Myanmar

ShakeCast, developed by the U.S. Geological Survey (USGS), is an online tool for rapid assessment of real-time earthquake risk to populations and structures. It uses seismic data, generated minutes after an earthquake. Potential impact estimates are sent to registered users by SMS, fax, and email.

ShakeCast customization involves integration of higher resolution exposure datasets, allowing for two levels of analysis: township level population data and building usage data from Google Earth for coarser analysis, and village level population data and building materials, usage, and number of floor data from field survey for select districts for more refined analysis. Building type-specific fragility data are yet to be integrated, as these data are not yet available for Myanmar. Default thresholds are used for now.

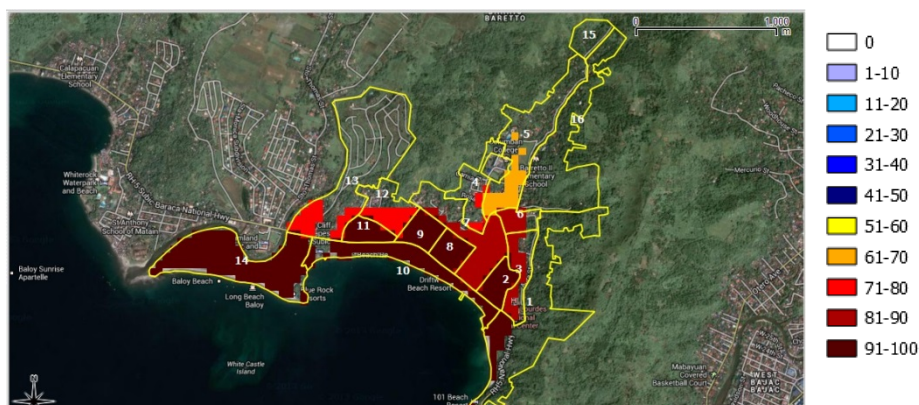
System notifications include: a) notification and earthquake parameters; b) bulletin on potential damage, including building names, location coordinates, usage, potential impact, and shaking intensity, along with summary of number of buildings affected at different damage potentials; c) bulletin on potential impact on populations, with village, village tract, and township names, location coordinates, potential impact, and shaking intensity, along with a summary of the number of villages affected at different impact potentials. Bulletins are updated based on improved earthquake parameters for the event.

#### Internet-based Simulation Platform for Tsunami Inundation and Risk Evaluation (INSPIRE)

INSPIRE is web-based portal that provides modules for identifying tsunami sources, simulating tsunami propagation and inundation, integrating exposure data, and performing tsunami loss estimation. The analysis modules can handle multi-dimensional vulnerability data and different levels of data accuracy. This allows users to undertake preliminary risk assessment using existing data.

INSPIRE outputs include: a) tsunami inundation maps, showing maximum inundation depths, maximum flow velocities, and estimated tsunami arrival times; and b) tsunami loss estimates based on the probability of casualty, probabilities of building collapse and severe damage for different building types, and the number of buildings that could be inundated at an inundation depth range for buildings of different construction types and occupancy types.

*Figure: Collapse ratio (%) for non-solid buildings*



### **Climate risk assessment tools for Cambodia, Lao PDR, Myanmar, Pakistan, and Sri Lanka**

ESCAP funded the Regional Multi-hazard Early Warning System for Asia and Africa (RIMES) – an intergovernmental organization created by the ESCAP's Trust Fund on Tsunami, Disaster and Climate Preparedness, to develop the climate risk assessment products based on the customization of the downscaled climate projections for the operational use of the National Meteorological and Hydrological Services (NMHSs) in Cambodia, Lao PDR, Myanmar, Pakistan, and Sri Lanka.

ESCAP's support on the generation and the application of downscaled climate change projections has contributed to climate-resilient development planning and improved resource management in Cambodia, Lao PDR, Myanmar, Pakistan, and Sri Lanka by:

- Equipping climate-sensitive sectors in Myanmar, Pakistan, and Sri Lanka with downscaled climate projections and capacity to interpret and use these projections in climate risk analysis and adaptation planning;
- Robust climate information provider-user forums in Cambodia, Lao PDR, and Pakistan for application of climate risk information in resource management

Some of the specific accomplishments include:

- Myanmar: Projections of rainfall and temperature from 2021 through 2100 available for 17 states/regions for a range of the representative concentration pathways (RCPs) 4.5 and 8.5
- Pakistan: Projections of rainfall and temperature for 2010-2050 are available for 5 provinces for RCP 4.5 and 8.5
- Sri Lanka: Projections of rainfall and temperature from 2020 through 2090 under RCP 4.5 and 8.5 are available for the country's 3 climatological zones
- Products delivered to users through user workshops in Myanmar and Sri Lanka. In Pakistan, key users were involved in the national training on downscaled projection generation
- Climate Data Access and Analysis System (CDAAS) provides online access to and analysis of downscaled datasets, for generation of downscaled projections. Customized landing pages link to websites of respective NMHSs in Myanmar, Pakistan and Sri Lanka, to facilitate access from the project countries.
- Downscaled climate projection outputs reached and were introduced to 81 institutions
- Technical guide on using downscaled climate projections in risk analysis and adaptation planning prepared, and may be accessed by users in the countries through respective NMHSs
- Total of 9 forums held: 3 in Cambodia, 4 in Lao PDR, and 2 in Pakistan
- Forums articulated user needs and demands, which were noted by respective NMHSs for action, and a number of which were implemented within the project's duration

### **Climate Data Access and Analysis System (CDAAS)**

CDAAS is a web-based tool for accessing and analysing of climate data and scenario products. It generates downscaled climate projections for any area of interest within the domain 19.43°E – 150.61°E, 18.04°S – 50.87°N. It contains datasets from: 8 Global Climate Models (CMIP5 GCMs), 6 models from the NASA Earth Exchange (NEX), and 6 Regional Climate Models (RCMs) of the Coordinated Downscaling Experiment (CORDEX) South Asia. CDAAS also includes 2 future emission scenarios: RCP 4.5 (moderate) and RCP 8.5 (high). Each model data has a baseline period from 1980-2005 and future projections for the period until 2100. These datasets enable telescopic downscaling of climate baseline and projections, from coarse resolution GCMs (~180km) to downscaled information of up to ~25km, from multiple climate models, enabling development of robust climate change projections, with uncertainty levels.

Through an easy graphical interface, CDAAS has the capability to extract smaller subsets of data from large climate model datasets, archived in the backend server. The climate data analysis engine is capable of a variety of climatological analysis, including analysis of extremes.

## ESCAP analytical work

Several ESCAP studies relating to the issue have also been reported and published in recent years, including:

- Economic and Social Commission for Asia and the Pacific (2015) Financing Disaster Risk Reduction for Sustainable Development in Asia and the Pacific, Discussion paper presented in the Third International Conference on Financing for Development, WP/15/09, Addis Ababa, July 2015
- Economic and Social Commission for Asia and the Pacific (2015) Building Resilience to Droughts: Scaling up Weather Insurance in China, India and Thailand, case study presented during the INR 1.3 AP session on building Resilience to Weather-Related Disasters in Asia Pacific Region, World Water Forum, April 2015.
- Economic and Social Commission for Asia and the Pacific (2015). Financing Disaster Risk Reduction for Sustainable Development in Asia and the Pacific. Draft discussion paper for the Asia-Pacific High-Level Consultation on Financing for Development meeting, Jakarta, Indonesia, 29-30 April.
- Economic and Social Commission for Asia and the Pacific (2014). Weather insurance for adaptation to climate risk: Emerging trends from Asia and the Pacific – UNFCCC Adaptation Committee Cancun Adaptation Framework  
[https://unfccc.int/files/adaptation/cancun\\_adaptation\\_framework/adaptation\\_committee/application/pdf/session\\_5\\_unescap\\_weather\\_insurance.pdf](https://unfccc.int/files/adaptation/cancun_adaptation_framework/adaptation_committee/application/pdf/session_5_unescap_weather_insurance.pdf)
- Economic and Social Commission for Asia and the Pacific and Regional Integrated Multi-Hazard Early Warning System for Africa and Asia, El Nino 2014/2015: Impact Outlook and Policy Implications for Pacific Islands (November 2014).
- Economic and Social Commission for Asia and the Pacific and Regional Integrated Multi-Hazard Early Warning System for Africa and Asia, El Nino 2014/2015: Policy Implications for Asia and the Pacific (August 2014).
- Economic and Social Commission for Asia and the Pacific and Regional Integrated Multi-Hazard Early Warning System for Africa and Asia, El Nino 2015/2016: Impact Outlook and Policy Implications for Asia and the Pacific (December 2015).
- Techniques for Assessing Damage and Loss: Tools for Mainstreaming DRR in Development by ESCAP:<http://www.unescap.org/resources/techniques-assessing-damage-and-loss-tools-mainstreaming-drr-development-escap>;
- Financing Disaster Risk Reduction for sustainable development in Asia and the Pacific:  
[http://www.unescap.org/sites/default/files/9-ESCAP-Financing%20Disaster-July2015\\_share.pdf](http://www.unescap.org/sites/default/files/9-ESCAP-Financing%20Disaster-July2015_share.pdf)
- Disasters Without Border - Regional Resilience for Sustainable Development:  
<http://www.unescap.org/sites/default/files/APDR2015%20Full%20Report.pdf>