UNITED NATIONS
ESCAP
Economic and Social Commission for Asia and the Pacific

DISASTERS IN ASIA AND THE PACIFIC: 2014 YEAR IN REVIEW

Pakistan coping with severe floods: UN Photo/WFP/Amjad Jamal

Although there were no extreme catastrophes in 2014, Asia and the Pacific witnessed 119 disaster events. There were 6,050 fatalities compared to 18,744 in 2013. Economic losses from natural disasters remained high. For instance, 2014 was an atypical year in terms of storms, transboundary floods and landslides,[1] which collectively contributed to the region's total economic losses of US$59.6 billion. Tropical Cyclones, such as Hudhud (India), Lingling and Kajiki (Japan) and Hagupit (Philippines) resulted in economic losses of about US$11 billion (India), US$5.2 billion (Japan) and US$75 million (Philippines) respectively. Transboundary floods that affected India and Pakistan resulted in losses of at least US$18 billion, the largest of which was the river basin flood in India that caused 1,281 fatalities and US$16 billion in damages.

Effective cyclone early warning systems, together with enhanced preparedness, including timely evacuation of communities at risk, saved countless lives. From their ocean-based origin to their landfall, cyclones were tracked and monitored continuously by a constellation of weather satellites, radars and a range of monitoring networks. Regional cooperation was integral in accessing these products and services. Real-time information exchange helped improve the quality of early warning systems by granting sufficient lead time to respond and evacuate people at risk.

2014 Fact Snapshot: Natural Disasters in Asia and the Pacific

US$59.6 BILLION
total cost of economic losses

45+ MILLION PEOPLE
were affected by floods and storms

79.6 MILLION PEOPLE
were affected by natural disasters

TROPICAL CYLONES
Hudhud, Lingling, Kajiki and Hagupit caused US$16.3 billion in economic losses

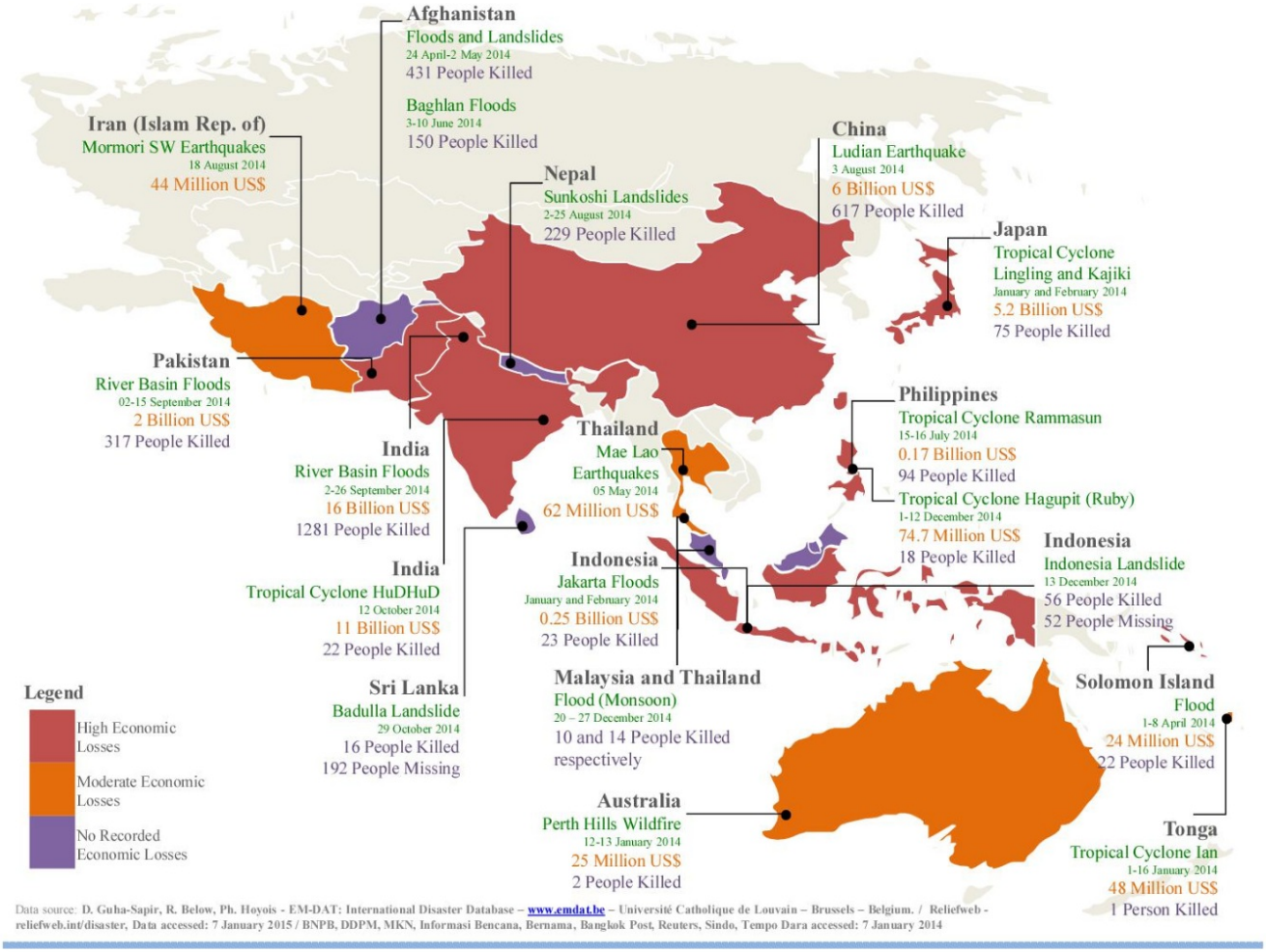
119 DISASTER EVENTS
were recorded in the Asia-Pacific region

FLOODS
resulted in the most fatalities (3,559) & the highest economic losses (US$26.8 billion)

6,050 PEOPLE
lost their lives due to natural disasters

LANDSLIDES
resulted in 657 fatalities & affected approximately 177,781 people

MAP SNAPSHOT: 2014 ASIA-PACIFIC NATURAL DISASTERS



The lessons from 2014 show that building resilience in the Asia-Pacific region remains a key priority in protecting lives and assets. Four areas that require urgent attention: (1) strengthening existing regional cooperation for cyclone/typhoon early warning with a focus on under-served high risk and low capacity countries; (2) establishing regional cooperation mechanisms for transboundary floods and landslides; (3) utilizing innovative technologies for disaster assessment; and (4) communicating the risk of slow-onset disasters through scientific analyses, early warning and impact outlooks to highlight their less publicized impact across various sectors for preparedness and mitigation.

AREAS IN NEED OF URGENT ATTENTION

1. Strengthening existing regional cooperation for cyclone/typhoon early warning

2. Establishing regional cooperation mechanisms for transboundary floods and landslides

3. Utilizing innovative technologies for disaster assessment

4. Communicating the risk of slow-onset disasters through scientific analyses, early warning and impact outlooks

2014: AT A GLANCE

- Out of 226 recorded natural disaster occurrences in the world in 2014, 119 events took place in the Asia-Pacific region. While the region witnessed no major catastrophes caused by earthquakes or tsunamis, the number of natural disasters remained high, reflecting region's continued high exposure to natural hazards.

52.7% IN 2014, OVER HALF OF THE WORLD'S 226 NATURAL DISASTERS OCCURRED IN THE ASIA-PACIFIC REGION.

2013	2014
155 NATURAL DISASTER EVENTS	119 NATURAL DISASTER EVENTS
84.9 MILLION PEOPLE AFFECTED	79.6 MILLION PEOPLE AFFECTED
62.7 BILLION US$ ECONOMIC DAMAGE	59.6 BILLION US$ ECONOMIC DAMAGE

- Natural disasters affected approximately 79.6 million people in 2014, compared to 84.9 million in 2013. In 2014, the number of lives lost was 6,050, lower than the 18,744 fatalities in 2013. One of the most severe events of the year was the river basin floods that took place in India, which resulted in a total of 1,281 deaths.

- Overall economic losses from natural disasters totaled approximately US$59.6 billion in 2014 compared to US$62.7 billion in 2013. Transboundary floods contributed at least US$18 billion to the 2014 total.

TABLE 1: 2014 ASIA-PACIFIC LOSSES BY DISASTER TYPE

Disaster type	Occurrences	Deaths	Total Affected	Economic Losses (US$)
Flood	52	3559	28.6 million	26.8 billion
Storm	37	730	16.3 million	25.8 billion
Earthquake	7	733	1.9 million	6.7 billion
Volcanic activity	5	101	0.17 million	186 million
Drought	5	180	31.5 million	18 million
Landslide	9	657	0.18 million	Not recorded
Extreme Temperature	3	88	1 million	Not recorded
Wildfire	1	2	168	25 million
Total	**119**	**6050**	**79.6 million**	**59.6 billion**

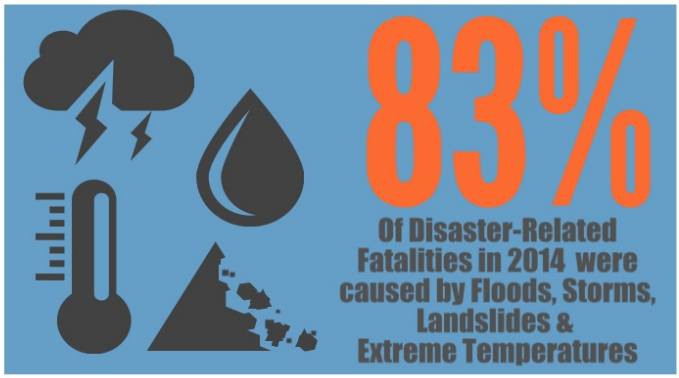
Data source: D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
Data accessed: 9 February 2015

2014: AT A GLANCE

Hundreds of people were killed when a landslide struck in Abi-Barik's Nowabad area in north-eastern Afghanistan following heavy rainfall. UNAMA Photo/Fardin Waezi.

- Hydrological hazards (such as floods and landslides triggered by heavy precipitation) and meteorological hazards (such as storms and extreme temperatures) were the most frequent disasters in 2014. Nearly 85 per cent of natural disasters in 2014 were hydrological or meteorological-related events. These events accounted for 83 per cent of total deaths and 88 per cent of total economic losses in 2014.

- Nine landslide events took place across the Asia-Pacific region, resulting in 657 fatalities and affecting 177,781 people. The most significant landslides occurred in Afghanistan, Indonesia, Nepal and Sri Lanka.



- Seven earthquake-related disaster events were recorded with the Ludian earthquake in China reporting the highest death toll at 617 and economic losses of US$6 billion.

TABLE 2: TOP 5 ECONOMIC LOSSES AND FATALITIES IN ASIA AND THE PACIFIC

5 Top Economic Losses Natural Hazards in 2014

Name	Country	Economic Losses
Riverine Floods	India	16 billion US$
Tropical Cyclone HudHud	India	11 billion US$
Ludian Earthquake	China	6 billion US$
Tropical Cyclone Lingling and Kajiki	Japan	5.2 billion US$
Riverine Floods	Pakistan	2 billion US$

5 Top Fatalities Natural Hazards in 2014

Name	Country	Number of Fatalities
Riverine Floods	India	1281
Ludian Earthquake	China	617
Floods and Landslides	Afghanistan	431
Riverine Floods	Pakistan	317
Sunkoshi Landslides	Nepal	229

Data source: D. Guha-Sapir, R. Below, Ph. Hoyois - EM-DAT: International Disaster Database – www.emdat.be – Université Catholique de Louvain – Brussels – Belgium.
Data accessed: 7 January 2015

6 KEY OBSERVATIONS FROM NATURAL DISASTER EVENTS IN 2014

1. END-TO-END EARLY WARNING SYSTEMS REDUCED DEATH TOLLS

2. ECONOMIC LOSSES REMAINED HIGH

3. TRANSBOUNDARY FLOODS- AN EMERGING TREND?

4. HYDROLOGICAL AND METEROLOGICAL EVENTS WERE THE MOST FREQUENT HAZARD

5. LANDSLIDES TRIGGERED BY HEAVY PRECIPITATION

6. AGRICULTURAL PRODUCTION HAMPERED BY DROUGHT AND DRY SPELLS

1. END-TO-END EARLY WARNING SYSTEMS REDUCED DEATH TOLLS

An example of part of an early warning system: 1 of 52 broadcast towers installed in Sri Lanka. ESCAP Photo.

Tropical Cyclone Hudhud, which made landfall near the Indian port of Visakhapatnam on 12 October as a Category 4 storm, was the second most costly disaster in 2014 (US$ 11 billion). However, the number of fatalities for a cyclone of this strength was relatively low (41)[2]. A similar pattern can be identified in the Typhoon Hagupit experience, which made landfall on the Philippine island of Samar on 6 December as a Category 3 typhoon. While this typhoon itself was weaker than the 2013 Super Typhoon Haiyan (responsible for 6,293 deaths), authorities were also much more prepared, successfully evacuating approximately 165,000 people before Hagupit hit, resulting in the much lower death toll of 18 people.[3]

The success of Hudhud and Hagupit lies not only in the ability to precisely predict the movement and intensity of storms, but also in the capacity to engage and mobilize vulnerable communities in the disaster preparedness process. In the case of Hudhud, the National Disaster Response Force deployed 35 teams across the states of Andhra Pradesh and Odisha. A day before landfall, district administration officials were seen along the coast and seashore villages evacuating people to cyclone shelters.[4] Reports have circulated regarding officials, personally knocking on doors to notify residents of the impending danger. In total, the local government made arrangements to shift half a million people.[5] In addition, all fishing operations were suspended along with the cancellation of flights and trains en route to the neighbouring districts and islands. Timely and massive evacuation saved lives.

Cyclone Hudhud did, however, generate significant damage and losses (US$11 billion) to critical infrastructure including the airport, navy installations, key industries and infrastructure. Authorities have underscored the need for prioritizing the establishment and enforcement of building codes so that structures are better able to withstand high-velocity winds. The indiscriminate denudation of the mangroves and casuarina plantations along the coast and the systematic removal of the thick tree cover on the hills that would have protected Visakhapatnam city from the vagaries of cyclones has also been recognized as a contributing factor to the large-scale infrastructure damage and losses[6]. Mangrove forests and wetland vegetation have long been recognized as natural buffers against storms, flooding, coastal erosion and strong waves, and thus their presence reduces disaster losses.

One of the unforgettable lessons from Hudhud and Hagupit is the value of effective, end-to-end early warning systems that ultimately save lives. These disasters also show, as countries grow rapidly, their assets, and especially their critical infrastructure, are increasingly exposed to disasters. Reducing exposure to disasters should be given due consideration during both the planning and construction phases.

2. ECONOMIC LOSSES REMAINED HIGH

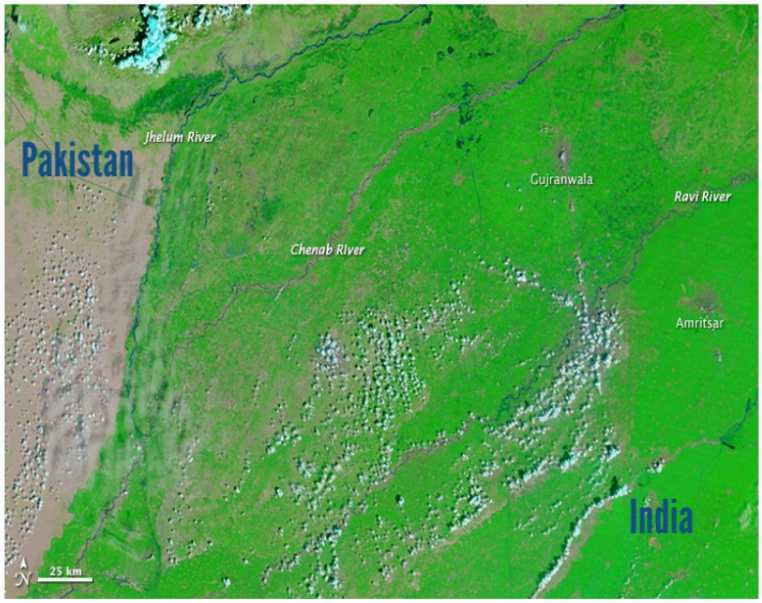
The rising trend of economic losses from disasters continued in 2014 (Tables 1 and 2). In total, annual economic losses in the region amounted to US$59.6 billion. Hydrological and meteorological events such as floods, storms and droughts accounted for US$52.6 billion or 88 per cent of these losses. The highest reported economic losses came from India and China, with India incurring US$27 billion (or 45% of the Asia-Pacific region's total losses) while China reported losses of US$23 billion (or 39%).

3. TRANSBOUNDARY FLOODS- AN EMERGING TREND?

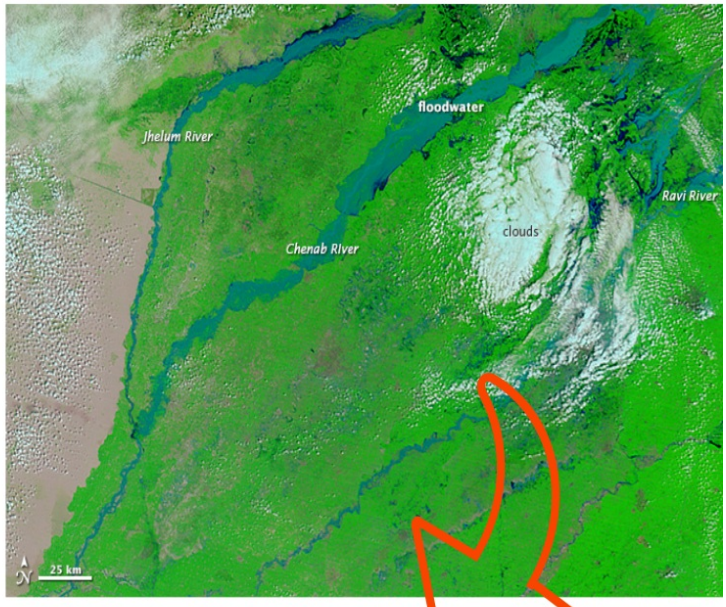
In early September of 2014, transboundary floods in India and Pakistan on Jhelum, Chenab, Ravi and Indus river basins contributed to US$18 billion, approximately 30% of the region's total economic losses (Figure 1). Given that these hazards involve two or more countries, these numbers are notoriously difficult to verify and, therefore, they could very well be underestimated.

FIGURE 1: SATELLITE IMAGES OF BEFORE AND DURING TRANSBOUNDARY FLOODS IN INDIA AND PAKISTAN

Before floods: 31 AUGUST 2014



During floods: 7 SEPTEMBER 2014



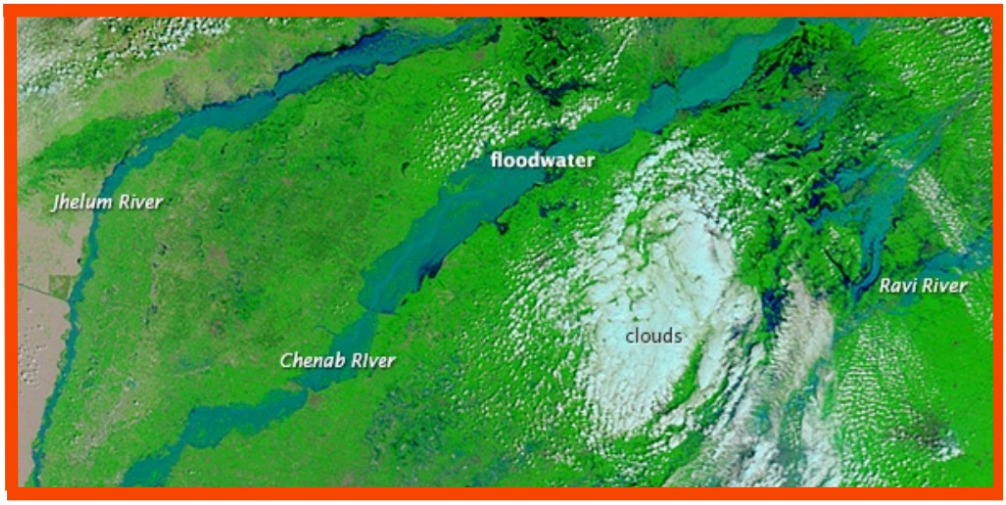
VEGETATION

FLOODWATER

CLOUDS

The Moderate Resolution Imaging Spectroradiometer (MODIS) on NASA's "Terra" satellite captured these images showing the progression of flooding between 31 August 2014 and 7 September 2014. All these 'false-color images' were made from a combination of infrared and visible light (MODIS bands 7-2-1). Water varies in color from blue to black; vegetation is bright green; and bare ground is brown. This band combination makes it easier to spot changes in river dimensions. NASA Photos.

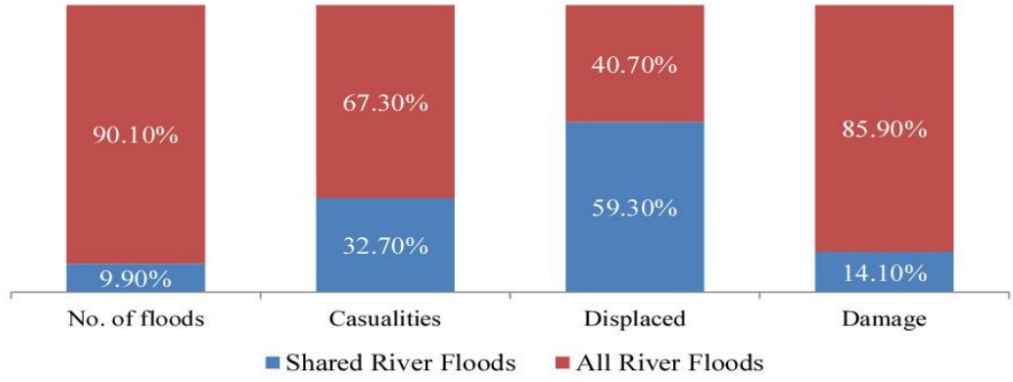
A CLOSER LOOK AT 7 SEPTEMBER 2014



3. TRANSBOUNDARY FLOODS- AN EMERGING TREND? (continued)

Transboundary floods are characterized by a large number of displaced people together with significant casualties and economic losses. A global study conducted over two decades from 1985-2005 asserts that although the occurrence of transboundary floods has historically accounted for less than 10% of the total number of river basin floods reported, they account for close to 60% of people displaced, more than 30% of casualties and close to 15% of the total economic losses (Figure 2).[7]

FIGURE 2: THE IMPACTS OF TRANSBOUNDARY RIVER FLOODS



Data source: After: Bakker 2006

Addressing transboundary floods requires information exchange and joint coordination for implementation of an effective response and overall flood management strategy. For example, risk information regarding a landslide blocking the Sun Koshi River in Nepal which formed a lake that was threatening to cause downstream flash floods in neighbouring districts of India, was shared with key stakeholders on a real-time basis. The governments in both Nepal and India collectively responded to the risk information by evacuating thousands of people along the river embankment, which helped keep the death toll to a minimum. This particular situation highlights the increasing need to foster regional cooperation, enhance the exchange of critical risk information and coordinate an effective management response to transboundary floods.

4. HYDROLOGICAL AND METEOROLOGICAL EVENTS WERE THE MOST FREQUENT HAZARDS

Out of 119 recorded natural disaster occurrences in the Asia-Pacific region, approximately 85% were hydrological (floods and landslides) or meteorological-related (storms and extreme temperatures) events. Among the people in Asia-Pacific affected by disasters in 2014, 28.6 million were affected by floods, while 31.5 million were affected by droughts and 16.3 million by storms (Figure 3). Incidentally, there were no major earthquakes or tsunamis reported in 2014 with the exception of the Ludian earthquake in China which accounted for US$6 billion economic losses, while storms and floods accounted for US$25.8 billion and US$26.8 billion respectively (Figure 4).

A flooded street in Tacloban, Philippines. OCHA Photo.

FIGURE 3: THE 3 NATURAL HAZARD TYPES THAT AFFECTED THE MOST PEOPLE

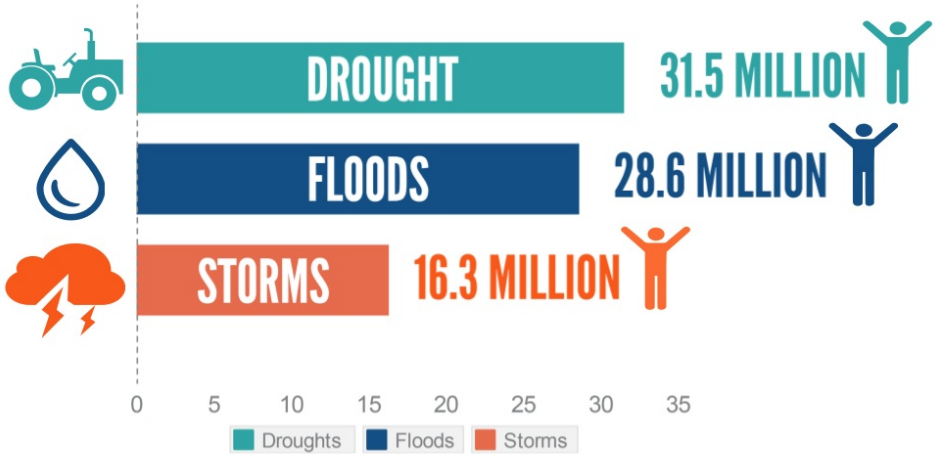
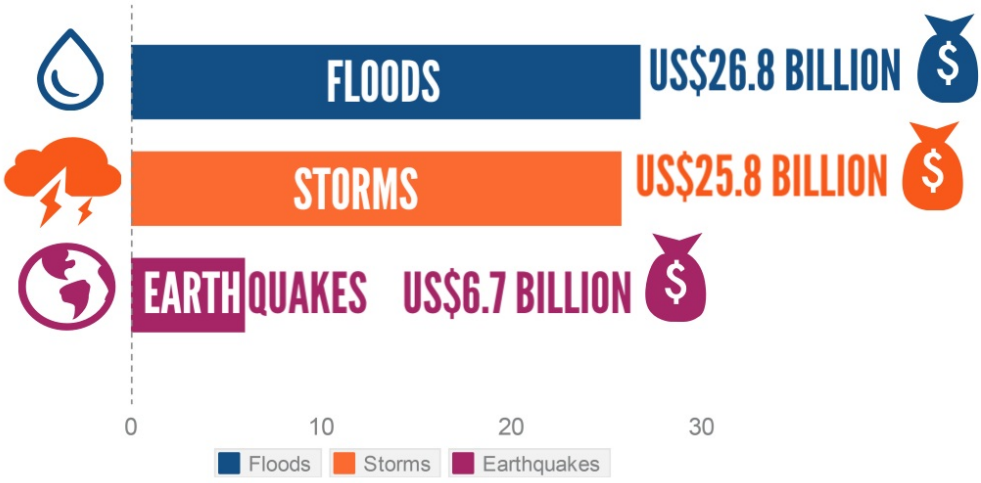


FIGURE 4: THE 3 NATURAL HAZARD TYPES THAT HAD THE HIGHEST ECONOMIC LOSSES



5. LANDSLIDES TRIGGERED BY HEAVY PRECIPITATION

WFP delivers supplies into the landslides zone in Argo district of Badakshan province to over 700 needy families. UNIFEED Photo.

2014 saw nine devastating landslides triggered by heavy precipitation including in Afghanistan, Indonesia, Sri Lanka and Nepal, resulting in 657 fatalities and affecting 177,781 people.

Often, landslide hazards are transboundary in nature. For example, the Badakhshan landslide on 2 May in Afghanistan that killed 431 people was triggered by heavy precipitation in the neighbouring province of Tajikistan. Due to the absence of a transboundary information sharing mechanism, it was not possible to issue an early warning.

Establishing early warning for landslide risk remains a largely unfinished business in the region, and may warrant more attention. Existing measures such as landslide hazard zonation, risk assessment and early warning will need to be significantly scaled up, if countries and communities are to mitigate the impacts of these climate related disasters.[8]

5. LANDSLIDES TRIGGERED BY HEAVY PRECIPITATION (continued)

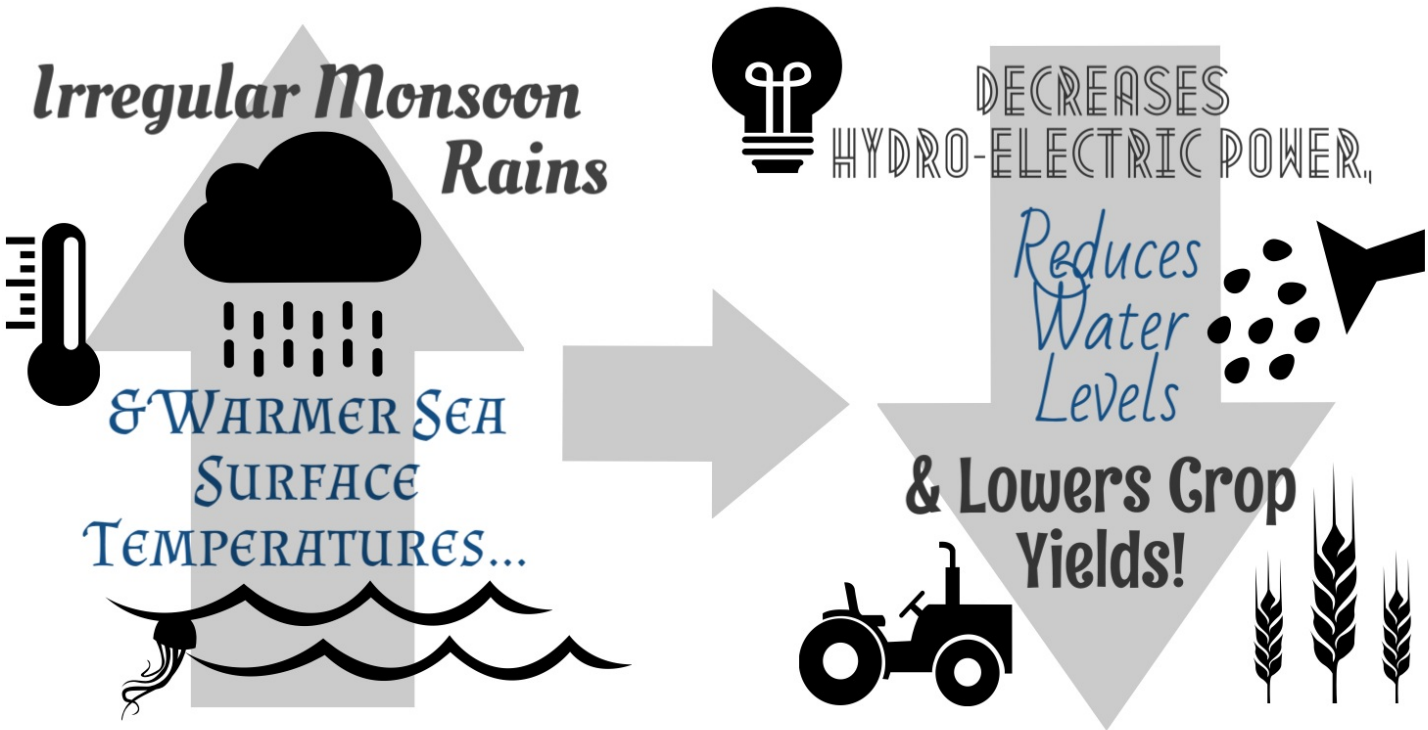
Developing risk reduction strategies for landslide hazards includes understanding: terrain characteristics; weather patterns and severe precipitation events; vulnerable populations; exposure of settlements; and key infrastructure. A more in-depth understanding of these risk factors could strengthen the effectiveness of early warning systems for landslides allowing sufficient lead time to be given to facilitate the timely evacuation of at-risk communities in order to save lives.

6. AGRICULTURAL PRODUCTION HAMPERED BY DROUGHT AND DRY SPELLS

Dryland near Manatuto, Timor-Leste. UN Photo/Martine Perret.

The Asia-Pacific region experienced five drought events in 2014 which affected 31.5 million people, though these estimates may actually underestimate the impact of dry spells in Asia-Pacific. Irregular monsoon rains can also seriously affect crop yield, even though the dry period may only be a few days rather than a prolonged drought period. An initial assessment made by the Food Agricultural Organization (FAO) indicates a contraction registered in rice production for the 2014 monsoon season. In India, irregular monsoon rains were estimated to bring 2014 production down by 2.4%. Similarly, unfavorable weather conditions resulted in reduced agricultural outputs in Indonesia, Cambodia, Nepal, Pakistan, the Philippines, and Sri Lanka. In Thailand, 1.6% decline in crop production is associated with the late arrival of seasonal rain was predicted for 2014.[9]

Adequate, reliable and timely information could help mitigate the impacts in some countries where alternative water resources could be sourced to cover the shortfall, however many countries do not have sufficient alternatives and governments cannot always access information in a timely manner in order to support farmers.



MOVING FORWARD WITH LESSONS LEARNED FROM 2014

A. STRENGTHEN REGIONAL COOPERATION WITH A HOLISTIC APPROACH

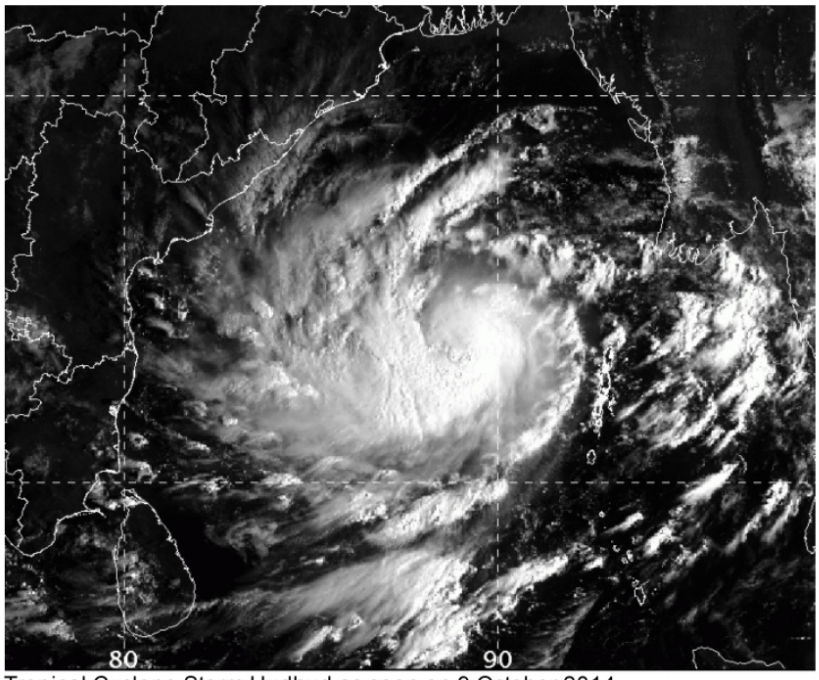
B. ESTABLISH REGIONAL COOPERATION FOR TRANSBOUNDARY FLOODS AND LANDSLIDES

C. UTILIZE INNOVATIVE TECHNOLOGIES FOR DISASTER ASSESSMENT

D. PAY MORE ATTENTION TO SLOW-ONSET DISASTERS

The experience in preparing for and responding to natural disaster events in 2014 highlighted many success stories in the region as well as several challenges. Effective end-to-end early warning systems with regional cooperation to share real-time information for early warning products and services from high-end technologies played a crucial role in success stories, particularly in reducing fatalities from storms and also in building early warning and mitigation mechanisms for drought. Similarly, regional cooperation worked well in sharing real-time risk information between Nepal and India to protect lives in the event of flash floods triggered by landslides upstream. Good practices from these successes need to be replicated in other disaster scenarios and across countries. Innovative solutions need to be found to address the challenges faced by the countries in the region, especially considering that these challenges will continue to hamper the region's overall resilience. It is within this context that the following recommendations for strengthening disaster risk management practices in the Asia-Pacific region are proposed.

A. STRENGTHEN REGIONAL COOPERATION WITH A HOLISTIC APPROACH



Tropical Cyclone Storm Hudhud as seen on 9 October 2014.
India Meteorological Department Photo.

Most of the cyclone-prone countries in the Asia-Pacific region have made considerable investments in modernizing early warning systems supported by strong policy and institutional mechanisms. The progress is quite visible in 2014's cyclone/typhoon experiences. There are meteorological, hydrological and disaster risk reduction components that need to be integrated fully into the early warning products and services. While advanced weather satellites, radars and observational networks have contributed significantly to enhance the meteorological components, more efforts are required for putting in place an integrated approach. Moreover, an effective risk reduction component that requires a holistic approach which considers policies, institutional arrangements and planning infrastructure which allows for coastal protection to be promoted and mainstreamed into the development process.

For more than 40 years, the ESCAP/WMO Typhoon Committee (TC), which services 14 member countries, and the WMO/ESCAP Panel on Tropical Cyclone (PTC), which assists eight member countries in the Bay of Bengal and Arabian Sea, have worked towards improving early warning capacity for typhoons and tropical cyclones. Through the integration of technological innovations in earth observation satellites, weather radar, storm surge and cyclone prediction modeling, it has been possible to significantly enhance the accuracy of cyclone path tracking, landfall predictions and intensity estimation. This has led to more effective early warning systems that have contributed to saving lives.

A. STRENGTHEN REGIONAL COOPERATION WITH A HOLISTIC APPROACH (continued)

Both the TC and PTC have promoted technology transfer, information sharing and large-scale institutional partnership and collaboration. Regional Specialized Meteorological Centres (RSMCs) from India and Japan and the Regional Typhoon Training Centre in China have provided institutional support to PTC and TC member countries. ESCAP and WMO have taken the initiative to enhance the collaboration between TC and PTC, to share experience, knowledge and technologies across the two subregions, with the support of the ESCAP Trust Fund for Tsunami, Disaster and Climate Preparedness.

The current challenge lies in reducing economic losses resulting from natural disasters and addressing the capacity gaps in high-risk and low-capacity member countries. The recommendation is to put in place a twin track strategy for regional cooperation. Track one would enhance the quality of early warning products and services by balancing meteorological, hydrological and disaster risk reduction components. Track two would focus on end-to-end early warning and response in terms of reaching out to the 'last mile' of the community at risk, particularly in low capacity and high risk countries.

B. ESTABLISH REGIONAL COOPERATION FOR TRANSBOUNDARY FLOODS AND LANDSLIDES

Children in Indonesia cross a flooded river to get to school. ESCAP Photo/Maman Sukirman

Addressing transboundary floods calls for regional cooperation. The frequent floods and associated landslides experienced in 2014, which could very well be an indication of an emerging trend, have demonstrated the need for a regional cooperation system in Asia-Pacific to support early warning for these hazards. With recent scientific advances in combining climate, hydrology and flood forecasting models, it is now possible to develop forecasting and dissemination of early warning information across transboundary river basins for floods and landslides. It is only by facilitating this type of information exchange between nations, before a transboundary disaster takes place, that early warning systems can be effective.

With its intergovernmental platform and expertise in regional cooperation, ESCAP is ideally placed to develop such a regional cooperation mechanism for flood forecasting and early warning within a partnership network between specialized knowledge institutions and implementing national organizations operating in transboundary river basins. Similar efforts need to be put in place for addressing landslides. Landslides are more localized than other hazards such as cyclones and floods. ESCAP has plans to initiate the consultative effort of the key stakeholders in the priority mountainous countries taking into account the transboundary risk pattern to outline the framework of regional cooperation.

C. UTILIZE INNOVATIVE TECHNOLOGIES FOR DISASTER ASSESSMENT

A satellite dish installed to gather data in Viet Nam. ESCAP Photo.

Using innovative technologies for monitoring major disasters is becoming even more important as natural hazard occurrences, their intensities, and their impacts are on the rise. For example, ESCAP, in response to disasters in 2014, worked with space-faring countries such as China, India, Japan, Republic of Korea, Thailand and Viet Nam; and UNITAR's Operational Satellite Applications Programme, to facilitate access to more than 100 satellite images and damage assessment maps. The images illustrated affected areas and infrastructure damage caused by floods, landslides, earthquakes and cyclones/typhoons in countries such as Afghanistan, India, Malaysia, Pakistan, the Philippines, the Solomon Islands and Viet Nam.

Such support, particularly in the case of the Badakhshan landslide in Afghanistan and flood affected areas along the Matanikau River in the Solomon Islands, contributed significantly to the post-disaster assessment process (Figure 5).

During the cyclone Hudhud damage assessments, the Andhra Pradesh State Government issued the instruction to use geographic information system (GIS), global positioning system (GPS) and remote sensing technologies to assess damage and upload information onto a satellite map using geo-tagging. This enabled the Government of India to access damage data on an interactive map. The government, with the help of the National Remote Sensing Centre (NRSC), launched an Android App for a crowdsourcing project where residents could upload photos of cyclone damage from their smartphones. In order to avoid data from unauthorized sources, crowdsourcing was enabled only for registered users. With the increasing penetration of smartphones, crowdsourcing is emerging as an important tool to collect primary data for post-disaster damage assessment.

In recent years, China, in addition to using operationally high-resolution earth observation satellite images, has been effectively using aerial platforms and unmanned aerial vehicles (UAV) for landslide related damage and impact assessment. The UAV operate at a very low height and, consequently, allow for better precision and geometric resolution. UAV have the capability of reaching areas that are not otherwise accessible from the ground and are also difficult or dangerous to fly over with manned aircrafts.[10]

Post-disaster assessments help in both recovery and reconstruction. The UN ECLAC Damage and Loss Assessment (DaLA) methodology serves as an important tool for post-disaster impact assessment and identifying the financing needs of recovery and reconstruction. Recently, there has been a growing recognition that rapid assessment of damage and losses is needed for quick disbursement of resources across priority areas for recovery and reconstruction. Rapid assessments are driven by technological advances in space, navigation, geospatial, crowdsourcing, UAV applications and statistical time-series analysis/simulations. ESCAP is currently working with the South Asian Association for Regional Cooperation (SAARC) to develop a standard methodology for conducting a Rapid Assessment of Damage and Loss based on smart DaLA/PDNA tools. This methodology could subsequently be replicated across the region.

FIGURE 5: DISASTER ASSESSMENT MAP

FLOOD AFFECTED AREAS ALONG MATANIKAU RIVER, HONIARA, GUADALCANAL, SOLOMON ISLANDS

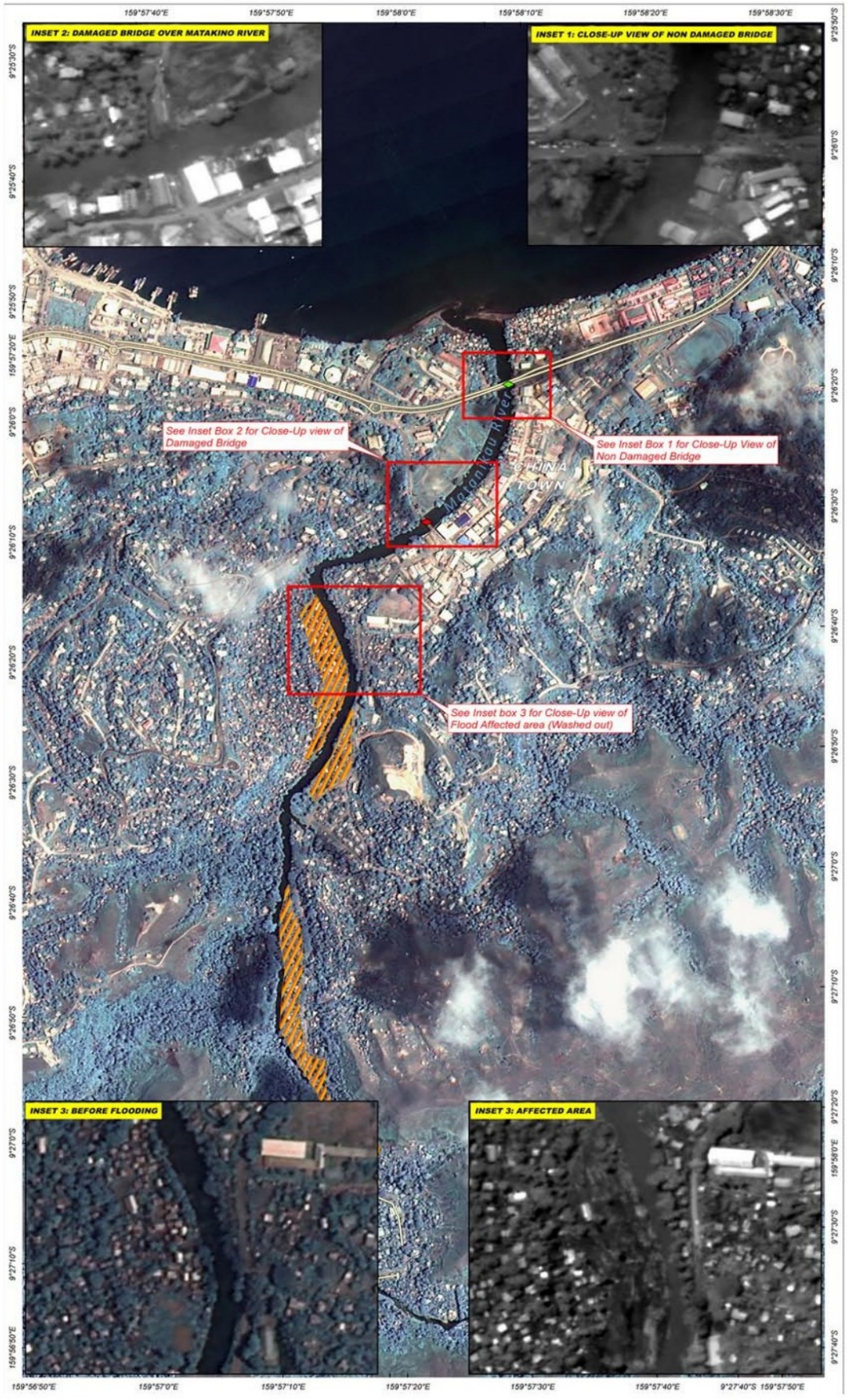
Analysis with Resurs-P Data Acquired 08 April 2014 and Kompsat-2 Data Acquired 16 January 2012

Heavy Rainfall & Flooding Event

Production Date: 09.04.2014

Version 1.0

Glide Number: FL20140405SLB



This map illustrates satellite-detected urban areas that were affected by flash flooding along the Matanikau River in Honiara, capital city of the Solomon Islands. Analysis was conducted using a Resurs-P panchromatic image. Traces of waters can be seen in urban areas along the Matakinau River and several houses seem to have been washed out and/or flooded by the flash flooding event. A bridge in the Chinatown neighbourhood appears to be totally destroyed, however the main bridge further north seems intact. The exact limit of flood affected zones is uncertain because of the sensor characteristics of the satellite data and the nature of the vent (flash flood).This is a preliminary analysis and has not yet been validated in the field. Please send ground feedback to UNITAR / UNOSAT.

LEGEND

- Affected Bridge
- Bridge
- Secondary Road
- Local/Urban Road
- Flood Affected Zone

Map Scale for A3: 1:4'000

0 100 200 300 400 Meters

Satellite Data (1): Resurs-P
Imagery Dates: 08 April 2014
Resolution: 1 m
Copyright: Roscocosmos
Source: Roscocosmos
Satellite Data (2): KOMPSAT-2
Imagery Dates: 16 January 2012
Resolution: 1 m
Copyright: KARI
Source: KARI
Road Data : OSM (via bbbike)
Other Data: USGS, UNCS, NASA, NGA
Analysis : UNITAR / UNOSAT
Production: UNITAR / UNOSAT
Analysis conducted with ArcGIS v10.1

Coordinate System: WGS 1984 UTM Zone 57S
Projection: Transverse Mercator
Datum: WGS 1984
Units: Meter

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D. PAY MORE ATTENTION TO SLOW-ONSET DISASTERS

An example of agriculture affected by drought in the Asia-Pacific region. World Bank Photo.

Unlike floods, cyclones and earthquakes, the impact of slow-onset disasters are often less visible, as they are spread over time with multi-sectoral impacts. These disasters evolve slowly, and thus provide sufficient lead-time to respond if the risk is understood clearly and communicated to the key stakeholders on time for appropriate interventions and mitigation measures. An impact outlook highlights the understanding of the risk at hand and its potential multi-sectoral impacts, and communicates the risk of slow-onset disasters in the form and manner that the stakeholders could 'act' on the risk information.

ESCAP, with partners, has initiated in bringing out regular installments of an impact outlook for slow-onset disasters such as drought by distilling scientific understanding of the risk, projecting sectoral and livelihood impacts, and offering policy advice for both short- and long-term. For example, the ESCAP-RIMES (Regional Integrated Multi-hazard Early Warning System) advisory notes, released in August for Asia and the Pacific region and in November specifically for the Pacific, were an effort to communicate the risk scenarios emanating from the complex El Niño phenomena – the implications of which are currently not well framed at the policy-making level. As such, the advisory notes illustrated the policy implications for the region and included recommendations for key stakeholders.

As an additional early warning system for countries suffering from drought or irregular weather patterns which hamper agricultural production, the ESCAP's Regional Drought Monitoring and Early Warning Mechanism has been currently piloted in six countries. The Drought Mechanism is based on the application of real-time earth observation satellite data, backed by medium-term seasonal forecasts for particular growing seasons. It is a true example of regional cooperation where countries that are more advanced in the use of earth observation data such as China and India, directly support drought-affected countries in accessing and utilizing such data. Mongolia and Sri Lanka have successfully demonstrated the applicability and benefits of the Regional Drought Mechanism which include: enhanced capacity of governments to use space-based data for effective monitoring and early warning; improved capacity in preparedness and response; strengthened institutional coordination and policies at the national level to effectively utilize the information generated; and regional and South-South cooperation and support networks. Steps are taken to extend the drought monitoring to crop monitoring, where the yield and health of the crops can be enhanced, particularly for those countries with economies reliant on agriculture.

D. PAY MORE ATTENTION TO SLOW-ONSET DISASTERS (continued)

Both the impact outlook and drought mechanism promote regional cooperation while simultaneously presenting an innovative approach to bridging the science-policy interface. From these initial successes, much greater support could be established for countries of Asia and the Pacific. This should include building stronger institutional mechanisms at the regional level to support drought monitoring and mitigation, share experiences, and guide the future work of the programme. Building on these successes, the Regional Drought Mechanism can add value to the existing information infrastructure through crop monitoring in countries, upon request. Greater analysis through regular and timely seasonal forecasts would also benefit countries to plan ahead, allowing greater time to adapt to likely climatic fluctuations.

END NOTES:

1. "Landslide" and all natural disaster references in this document are according to "EM-DAT: The International Disaster Database" Available at: http://www.emdat.be/explanatory-notes

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For more information on Disaster Risk Reduction in Asia and the Pacific:

http://www.unescap.org/our-work/ict-disaster-risk-reduction

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