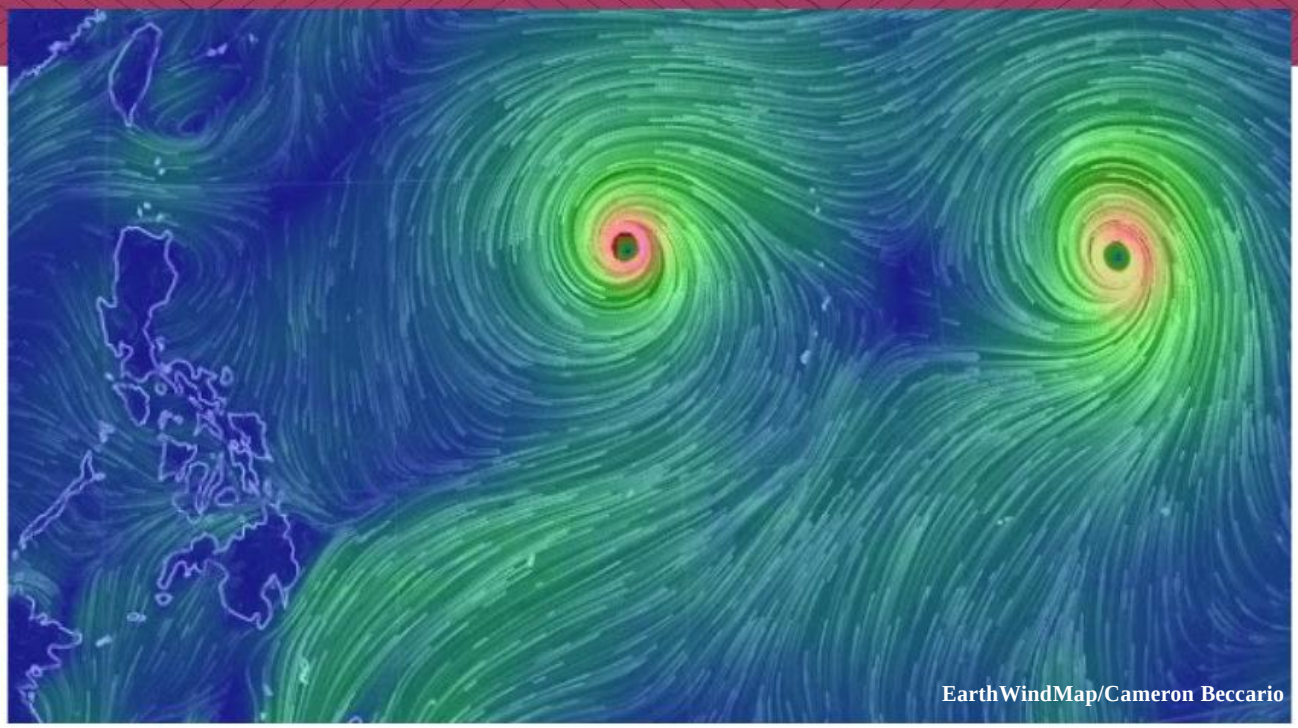
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

Disasters in Asia and the Pacific: 2015 Year in Review



Typhoon Koppu approaching the Philippines in October 2015

Source: Available from http://earth.nullschool.net (Accessed October 2015).

In 2015, Asia-Pacific continued to be the world's most disaster prone region. 160 disasters were reported in the region, accounting for 47 per cent of the world's 344 disasters.[1] The region bore the brunt of large scale catastrophic disasters with over 16,000 fatalities — more than a two-fold increase since 2014. South Asia accounted for a staggering 64 per cent of total global fatalities — the majority was attributed to the 7.6 magnitude earthquake that struck Nepal in April which caused 8,790 deaths.[2] Asia and the Pacific incurred more than US$ 45.1 billion in economic damage in 2015 and even higher indirect losses. These numbers, however, are gross underestimates as there is no systematic assessment of the cost of all disasters that struck the region, especially slow-onset disasters such as droughts, heat waves, forest fires and haze.

2015 Fact Snapshot: Natural Disasters in Asia and the Pacific

US$ 45.1 billion
total cost of economic damage

59.3 million
affected by disasters

160 disasters
were recorded in the Asia-Pacific region

16,046 deaths
due to natural disasters

Earthquakes
had the highest number of fatalities; with 8,790 killed in the Nepal earthquake

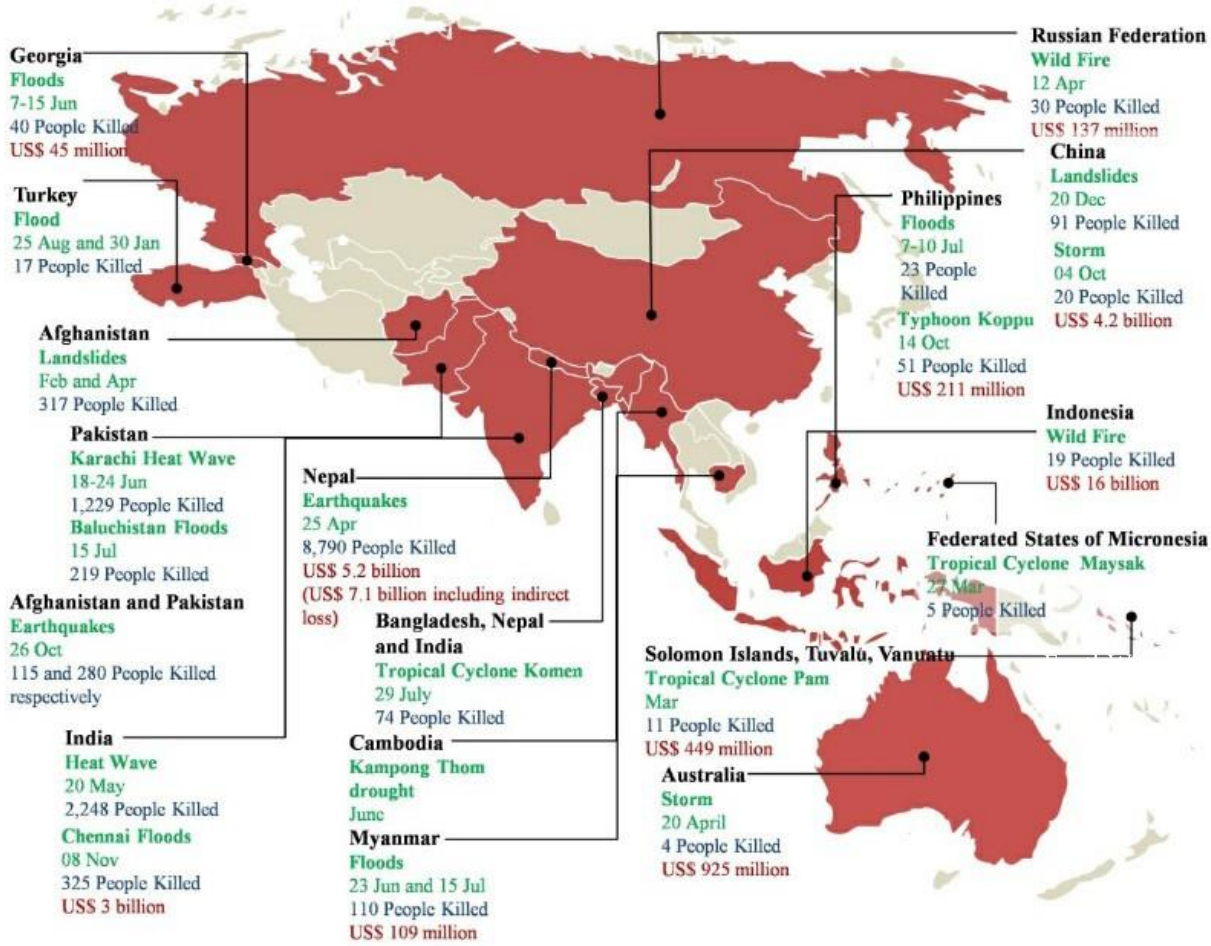
Floods
were the most frequent disaster; and floods and storms were the costliest in terms of economic damage

South and South-West Asia
was the most affected subregion

The range of disasters that affected the region includes earthquakes in Nepal, Afghanistan, Tajikistan and Pakistan; tropical cyclones that struck South-East Asia and the Pacific; floods in China, India, Indonesia, Myanmar, Pakistan and Sri Lanka; and droughts that affected many countries in the region. Out of 90 storms reported across the globe, 43 hit Asia-Pacific countries, of which 33 were high-intensity cyclones. 2015 was also the hottest year on record and saw several intense heat waves striking India and Pakistan between May and June that resulted in 2,248 and 1,229 deaths, respectively.[3] The El Niño phenomenon triggered droughts in several parts of the region, while producing severe rainfall in other places. Many disasters, be they floods, earthquakes or storms, had considerable impacts on urban centres which were not adequately prepared to handle disasters.

The year also saw unprecedented international efforts to prioritize actions to achieve sustainable development. The adoption of both the 2030 Agenda for Sustainable Development along with the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) were landmark events. The 2015 Paris Climate Conference (COP21) resulted in a historic agreement of 195 nations to combat the effects of climate change.[4] These global agendas and debates serve as a collective impetus for future actions towards building resilience in Asia and the Pacific — the most disaster prone region in the world.

Figure 1. Asia-Pacific natural disasters in 2015



Source: EM-DAT International Disaster Database-www.emdat.be &
Reliefweb-reliefweb.int/disaster (Accessed 23 February 2016).
Nepal earthquake data is from Nepal 2015, Post Disaster Needs Assessment.
Tamil Nadu flood damage and loss data is from media.

Main Trends

Urban areas are being severely impacted by natural disasters, particularly floods

Post-disaster response from neighbouring countries is increasing

Higher incidence of disasters with transboundary origins and cascading effects

The 2015-2016 El Niño continues to severely impact the region

Extreme weather conditions are causing a great number of fatalities

Innovative disaster assessment techniques and data gathering tools are increasingly being used

The key lessons from 2015 point to areas that require urgent attention: (1) building urban resilience; (2) promoting regional cooperation for transboundary river basin floods and other cross-border disasters; (3) addressing slow-onset disasters like drought; (4) enhancing end-to-end multi-hazard early warning systems; and (5) promoting the use of innovative technology.

AREAS IN NEED OF URGENT ATTENTION

- Building urban resilience
- Strengthening regional cooperation
- Addressing slow-onset disasters
- Enhancing end-to-end early warning systems
- Promoting use of innovative technology

1. 2015 AT A GLANCE

• 160 out of the 344 globally recorded natural disasters hit Asia-Pacific, accounting for 16,046 lives lost - more than a two-fold increase from 2014.

• The total population affected by disasters in the region decreased from 79.6 million people in 2014 to 59.3 million people in 2015. However, these numbers would be significantly higher if slow-onset disasters such as droughts, heat waves, and forest fires and haze were taken into account.

• The most disaster prone subregion was South Asia, recording 52 disasters and 14,647 deaths - a staggering 64 per cent of the global fatalities in 2015.

• Reported economic damage (not including damage from slow-onset disasters) in the region totalled more than US$ 45.1 billion.

• Floods were the most frequent disaster and had large-scale economic impacts. They comprised two-fifths of all disasters in 2015 and were responsible for 25 per cent of the total economic damage and 37 per cent of the total disaster affected population.

• Around half of the 90 storms recorded globally occurred in Asia-Pacific, affecting over 9 million people with US$ 11.8 billion in economic damage.

Table 1. 2015 Asia-Pacific losses by disaster type

Disaster Type	Occurrence	Deaths	Affected	Economic Damage (US$)
Flood	63	1,863	21,661,443	11.5 billion
Storm	43	446	9,135,551	11.8 billion
Earthquake	17	9,327	6,484,533	5.2 billion
Landslide	15	626	45,234	-
Extreme temperature	4	3,536	1,045,000	-
Others*	18	248	20,883,788	16.7 billion
Total	160	16,046	59,255,549	45.1 billion

*Data on slow-onset disasters are not yet available

Source: EM-DAT (Accessed February 2016).

Table 2. Country rankings: Economic damage and fatalities from disasters in Asia-Pacific in 2015

Top 5 Economic Damage Ranking		
Disaster type	Country	Economic Damage (US$)
Wildfire	Indonesia	16.1 billion
Earthquake	Nepal	5.2 billion (7.1 billion)*
Storm	China	4.2 billion
Flood	India	3 billion (7 billion)*
Flood	China	2 billion

Top 5 Fatalities Ranking		
Disaster type	Country	Fatalities
Earthquake	Nepal	8,790
Extreme Temperature	India	2,248
Extreme Temperature	Pakistan	1,229
Flood	India	325
Flood	India	293

*Numbers in parenthesis include losses

Source: EM-DAT (Accessed February 2016).

2. KEY OBSERVATIONS

Flooding at the airport in Chennai, India in December 2015

1. Impact of disasters in urban areas was significant

Unplanned and unsustainable growth in many cities has exposed its residents to multi-hazard risks with potentially devastating and costly impacts. The year 2015 witnessed a number of urban disasters, including a high incidence of urban flooding. For example, in February, widespread flooding struck Jakarta, Indonesia. In September, the Japanese city of Joso experienced flooding that killed at least eight people and destroyed many homes.[5] In June, the monsoon rainfall caused extensive floods submerging multiple urban areas in Dhaka. The same monsoon season brought Mumbai to a standstill with waterlogged roads and major disturbances in power networks. The Chennai floods in December 2015 demonstrated the serious impact of urban flooding. Economic losses from those floods were more than US$ 7 billion while 325 fatalities were recorded.[6] Similarly, the damage and losses from the Nepal earthquakes that amounted to one-third of the country's GDP were largely attributed to the earthquakes' impacts on the capital city of Kathmandu. While the housing sector was severely affected, productive sectors including tourism, agriculture and commerce saw damage and losses of US$ 1.78 billion.[7] The massive economic damage and the loss of lives from urban disasters call for urgent actions to enhance disaster resilience in cities.

2. Transboundary river basin floods continued to devastate the region

As in other years, many of the large-scale floods that affected the region were transboundary in nature. For example, in July, heavy torrential monsoon rains flooded Pakistan and India.[8] In addition, outbursts from glacial lakes led to flash floods and the flooding of the Indus River in several locations across Pakistan. Similarly, the state of Assam in India and parts of Bangladesh were affected by flooding in the Brahmaputra river basin. While no estimates of economic impact from transboundary floods are available for 2015, ESCAP's 2014 Year in Review highlighted that transboundary floods in the Indus river basin across India and Pakistan attributed to 30 per cent, equivalent to US$ 18 billion, of the economic impacts in the subregion.[9] The transboundary nature of the river-basin floods calls for stronger regional cooperation to coordinate response measures and assess impacts accurately.

The aftermath of Cyclone Komen that struck in July 2015

3. Cross-border disasters had severe cascading impacts

Disasters in Asia-Pacific often tend to affect multiple countries and bring about cascading impacts. In 2015, 48 per cent of all storms in the world occurred in Asia-Pacific countries. Many cyclones also triggered urban flooding, landslides, coastal erosion and several related disasters. In July, tropical cyclone Komen hit India, Bangladesh and Myanmar, causing consecutive floods and landslides and affecting nearly two million people. Komen first made landfall in Bangladesh. It caused floods and landslides in many states and regions of Myanmar, killing 39 people and affecting over 200,000 in Myanmar alone.[10] The cyclone also affected the state of Odisha in India, which was already reeling from the devastation caused by floods. It is a concern that the same communities tend to get repeatedly hit by a series of disasters, seriously eroding their capacity to recover. Other hazards showed a similar pattern. The Nepal earthquake in April impacted the neighbouring countries of Bangladesh, China and India and triggered six landslides – five in Nepal and one in the Tibet Autonomous Region of China – that blocked rivers and increased the risk of flooding.[11] Similarly, the Afghanistan/Pakistan earthquake in October affected neighbouring countries, while the November earthquake in Central Asia impacted Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan.

4. The hardest hit were the Countries with Special Needs

A single catastrophic disaster can wipe away hard earned development gains. Countries with Special Needs (CSNs) were among those most vulnerable to disasters. The devastating earthquake that hit Nepal in April caused large-scale human and economic loss and may have pushed an estimated 2.5-3.5 per cent of the population into poverty.[12] The 7.5 magnitude earthquake that hit Afghanistan in October killed at least 115 people and injured 538.[13] For many CSNs, the small absolute numbers of fatalities and economic losses disguise the high impact of disasters relative to the scale of the countries' population and economies. For example, in Vanuatu, Cyclone Pam in March 2015 caused approximately US$ 450 million in damage and losses, which was roughly equivalent to 64 per cent of its GDP.[14]

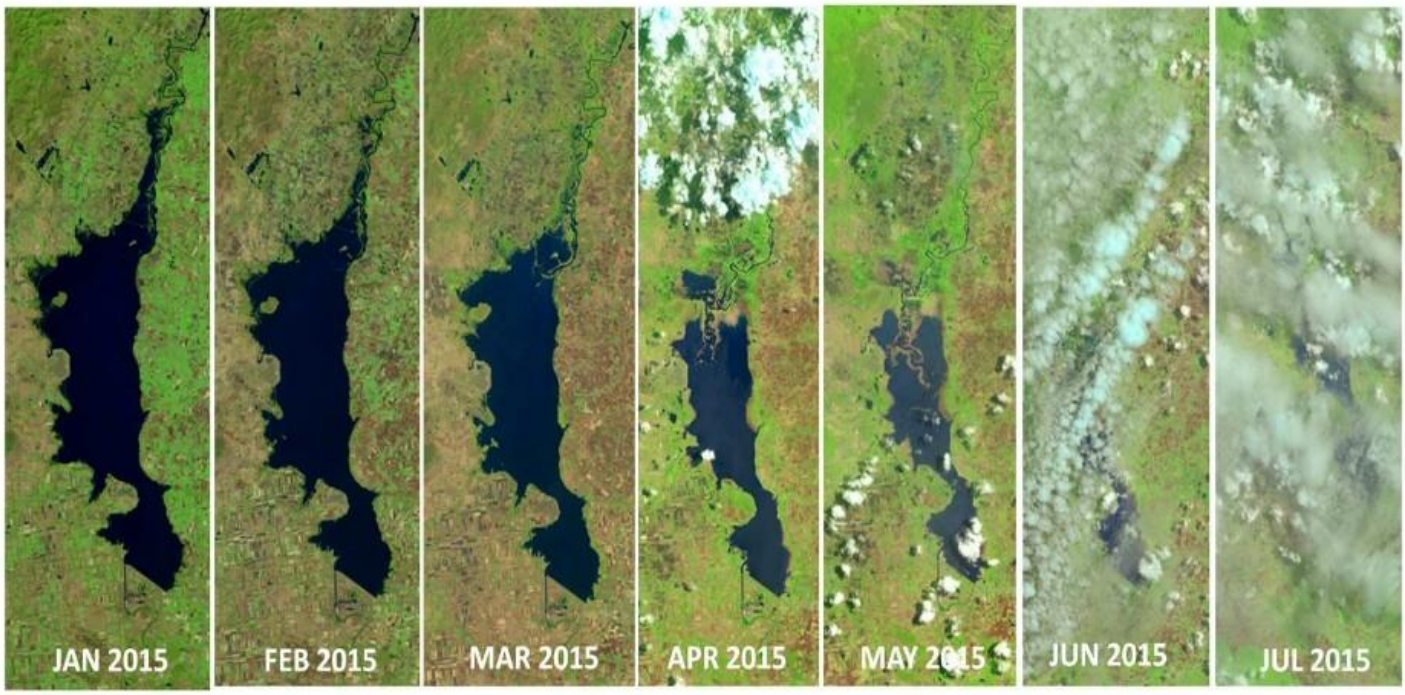
5. Widespread drought

Triggered by the severe El Niño which began in 2014, a weak monsoon season led to drought in a large swath of South and South-East Asia, and the Pacific. It is estimated that more than 20 million people have been affected by drought in 2015, though this figure is likely to be significantly lower than the reality, as drought is not well recorded.

In South Asia, India bore the brunt of drought impact, recording a 14 per cent deficit in the southwest monsoon compared to the annual average. This was the second straight year of sub-par rains in the country. The Indian Ministry of Agriculture reported that 18.93 million hectares of crop area in seven states were affected. In South-East Asia, drought was widespread across many countries. In Thailand, insufficient rainfall depleted water levels in reservoirs across the country, with 17 reservoirs having between 1 and 20 per cent useable storage in July 2015.[15] In Cambodia, drought affected almost 250,000 hectares of cropland in 2015, and destroyed over 40,000 hectares of rice.[16] In Timor-Leste, El Niño caused a prolonged drought which may affect food security. Due to drought, farmers in Thailand postponed or avoided planting of crops.[17] Many farmers found that they faced substantial debt, and many provinces across several South-East Asian countries were declared disaster zones due to drought.[18,19,20]

El Niño was also responsible for triggering drought in parts of East Asia and the Pacific. By October 2015, Mongolia was suffering from a severe drought which reduced wheat harvests by almost 50 per cent from 2014, and 40 per cent below the five-year average.[21] It had been estimated that the carrying capacity for livestock was only 60 per cent of what would be needed without the dzud (a combination of drought and severe winter weather that leaves no fodder or pasture for livestock) which now affects the country.[22] By December 2015, drought warnings were in force for Papua New Guinea, Fiji, Tonga and Samoa; a "drought watch" was in place for the Solomon Islands and the Federated States of Micronesia, and alerts had been issued for Vanuatu and Palau.[23] Since then, a state of emergency has been called in the Marshall Islands with 23 per cent of the population severely affected by drought.[24]

Figure 2. Diminishing water levels in Pasak Chonlasit Dam, Lopburi province, Thailand in 2015



Source: GISTDA, 2015

6. Intense heat waves led to many deaths

South Asia observed anomalous weather conditions with Pakistan and India hit by extreme heat waves. It led to around 3,477 deaths in the two countries, with the majority of deaths among the elderly and manual labourers.[25] According to the Indian Meteorological Department, the soaring heat wave across the country was the worst observed in a decade. An unusual north-westerly wind movement, which led hot air from the north-western desert to spread across India and Pakistan, was reported to be the main cause of the extreme temperatures.[26] The severe nature of heat waves underscores the need for viable heat wave crisis management plans and sustained public awareness campaigns to prevent the loss of lives.

7. The alarming economic cost of forest fires and haze

Forest fire and haze across South-East Asia affected Indonesia as well as the neighbouring countries of Singapore and Malaysia in October. The haze reportedly killed at least ten people and caused respiratory problems for over 500,000 in Indonesia alone.[27] The Centre for International Forestry Research estimated that the economic losses may have reached around US$14 billion.[28]

Increased incidence of haze in urban areas

8. The ongoing El Niño is likely the strongest since 1997-1998

The El Niño caused severe atypical weather patterns in many parts of Asia-Pacific in 2015, and is expected to continue through the first half of 2016.[29] So far, El Niño-induced drought has affected many people in the Pacific and this is likely to continue into 2016, possibly leading to water scarcity in most islands, with the exception of Kiribati and Nauru. Kiribati is likely to see continued high temperatures and more intense rainfall, decreasing the likelihood of drought but increasing the chance of floods and storms.[30] The ESCAP and RIMES El Niño 2015-2016 Impact Outlook and Policy Implications indicated that there was a potential increase in the risk of tropical cyclones for Fiji, the Cook Islands, Samoa, the Solomon Islands, Tuvalu and Vanuatu, which was demonstrated with Cyclone Winston.

Drought-struck land

In other parts of the region, it is anticipated that a prolonged drought from El Niño will impact the southern parts of Sumatra, Java and eastern parts of Indonesia until April 2016, as well as central and southern parts of the Philippines and Timor-Leste (Box 1). Dry conditions are likely to affect 85 per cent of the Philippines by the end of March 2016.[31] As predicted, many parts of Mongolia are also currently experiencing severe dzud, leading to inadequate pasture and fodder for livestock.[32]

Box 1. El Niño drought impacts in Timor-Leste

The 2015–2016 El Niño is responsible for a prolonged drought period in Timor-Leste, with coastal areas being particularly hard hit. El Niño has delayed the wet season and reduced rainfall during the planting season.

As of early 2016, late rains and inconsistent rainfall are negatively affecting the agriculture sector and may lead to food security issues in the country. Some projections indicate that up to 50 per cent of Timor-Leste could become food and water insecure by mid-2016.

Furthermore, aquifers - the main water source - are drying up due to drought and around 220,000 people in rural communities are likely to be affected by El Niño. The lack of water resources has also affected hygiene and sanitation among the population and led to a decline in school attendance.

In 2015, the government of Timor-Leste facilitated various inter-ministerial discussions to assess the situation. All ministries were tasked with contributing to a coordinated response for addressing impacts on agriculture, fisheries, water and health, with the Minister of Interior leading national efforts to cope with the drought.

Source: Interim Advisory Note, Timor-Leste 2015-16 El Niño Drought Impact Outlook & Policy Implications

The region's response to disasters in 2015 demonstrates that a lot more needs to be done to build resilience and protect sustainable development gains. Urban resilience should be given high priority due to the increasing occurrence and severe intensity of urban disasters, and the rapidly rising exposure of urban population, and their livelihoods and assets to disasters. The value of regional cooperation cannot be overemphasized for effective management of transboundary disaster risks and vulnerabilities. Often neglected slow-onset disasters such as drought, heatwaves and forest fires and haze may well be exacerbated by climate change, and need urgent attention from the region's policymakers. The effective use of end-to-end multi-hazard early warning systems and emerging innovative technologies are increasingly possible, and they are critical for regional resilience.

Recovery efforts in Nepal following the earthquakes in April 2015

1. Urban resilience needs urgent attention

As reported in the Asia-Pacific Disaster Report 2015, approximately 742 million city dwellers in the region are at 'extreme' to 'high' disaster risk – often living in multi-hazard hotspots that are vulnerable to cyclones, earthquakes, floods, and landslides. This population is projected to increase to 980 million by 2030. By 2030, this population will increase to around 980 million. A recent study of 1,300 cities globally found that among the top 100 cities that are most exposed to natural hazards, more than half belong to four countries in Asia-Pacific: Bangladesh, China, Japan and the Philippines.[33]

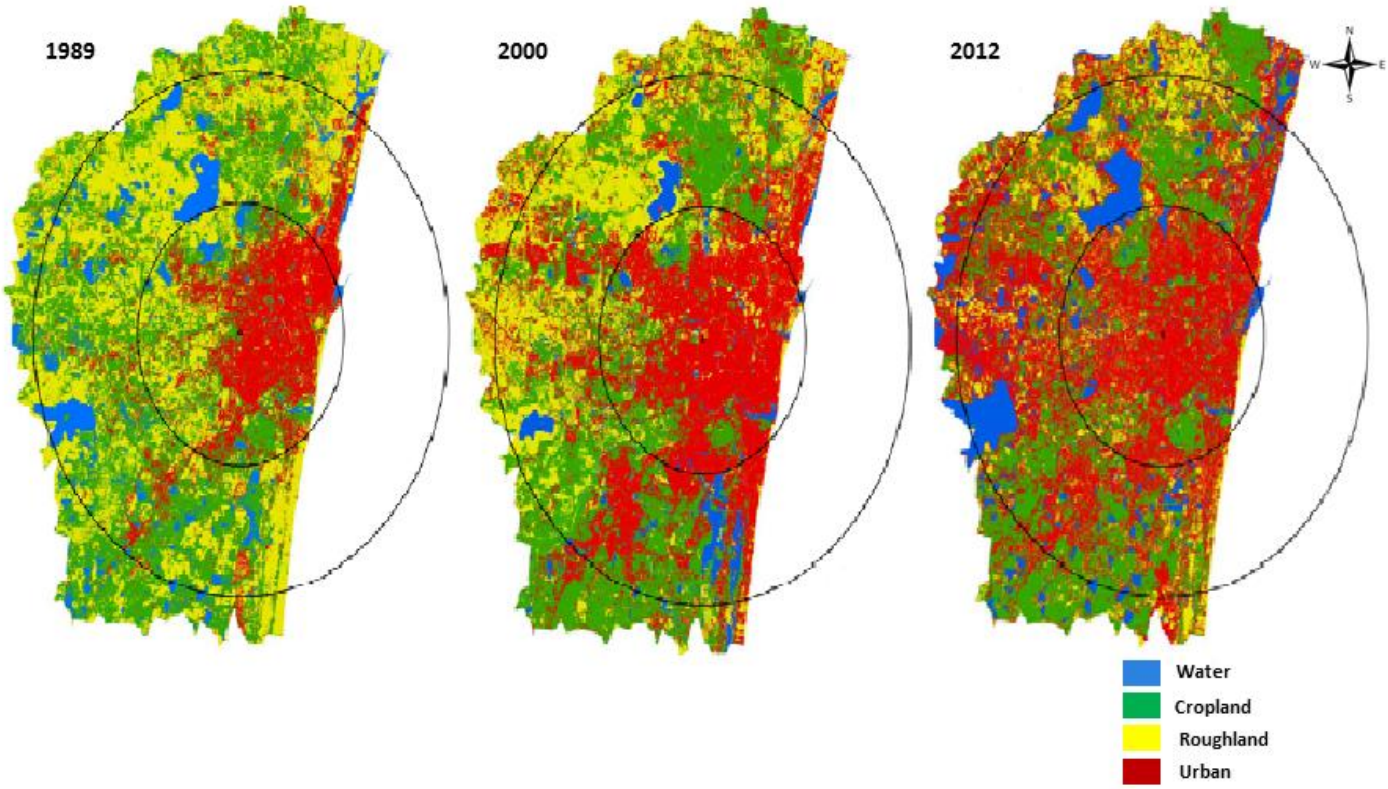
Disaster risk across urban areas in South and South-West Asia is increasing. In Dhaka, more than 4 million people live in slums along flood-prone areas where heavy rainfall during the June 2015 monsoon season caused severe flooding, submerging many urban areas, and leaving tens of thousands of people marooned on higher grounds in the city.[34] Mumbai is one of the top 10 most vulnerable cities in terms of risk from floods, storms and earthquakes and is home to more than 6 million slum dwellers.[35] In June 2015, the heaviest rainfall in 10 years brought the city to a standstill leading to disruptions in the power networks and waterlogging major roads.[36] Floods and landslides in the Kathmandu valley put 1.5 million people at risk

every year.[37] This is in addition to the high earthquake risk of the region, where the recent Nepal earthquakes caused massive devastation in the capital.

Besides the rapid growth in urban population, factors such as the gradual erosion of ecological buffers can contribute to risks that cities face. Chennai, for example, has been slowly losing environmental buffers like wetlands over a number of years.[38,39] The figure below illustrates the extent of urban expansion into cropland and water bodies in the Chennai Metropolitan area within the past few decades (Figure 3). India's National Institute of Disaster Management reported that only 27 out of the city's network of about 650 water bodies still remain today; the rest have all been subsumed by rapid urbanization.[40] The erosion of these ecological buffers could have potentially exacerbated the impacts of widespread flooding during the torrential rainfall in December 2015 in the city. Critical infrastructure including the airports; and productive capital including automobile manufacturing, plants and IT centres; as well as houses built on floodplains were inundated for days.

The challenges faced by Chennai are common to many big cities across the region. One of the ways to mitigate the impact of river and coastal erosion is through the implementation of an ecosystem-based disaster risk reduction approach. Ecosystems provide valuable services and act as natural buffers against hazards. This necessitates safeguarding the environmental buffers, particularly in the urban context.

Figure 3. Land use/cover classification for three years in Chennai (1989, 2000 and 2012)



Source: From REAL CORP 2014 conference paper/Vijayalakshmi Rajendran & Toshiyuki Kaneda (May 2014).

The rising risks of urban disasters and lessons of last year emphasize the need to shift the region's urban governance paradigm from a response-recovery approach to a risk-sensitive development approach. Effective city planning and enforcement of regulations related to building codes and environmental buffers are critical (Box 2). In many big cities in the region, much of the infrastructure is old and built without attention to disaster resilience. Retrofitting both critical and older infrastructure is necessary; particularly water, drainage, sewage and mass transport systems that should be prioritized to mitigate disaster impacts. Financing risk-sensitive urban development continues to be a challenge. These issues can only be tackled with strong political commitment, increased collaboration between national and subnational level governments, and active engagement of all stakeholders, especially the private sector that incurs disproportionate losses during urban disasters.

Regional Snapshot: Floods in Asia-Pacific

Floods in 2015: Most widespread and frequent disaster in the region

Floods made up 40% of disaster occurrences

22 million people affected

US$11 billion in damages

Urban floods in Asia-Pacific

More than US$46.5 billion in damages and indirect losses

Damages estimated to exceed US$1.6 billion

Damage and losses are estimated to be US$3 billion to US$7 billion respectively

Urban populations living in high to extreme regions of risk set to rise

2015 — 742 million people

2030 — 980 million people

Box 2. Good practice of enforcing regulations

Despite the existence of building codes in many countries of Asia-Pacific, enforcement of regulatory frameworks for safety in building and construction continues to be a challenge. However, successful efforts have been made in the region.

For example, when a 6.4-magnitude earthquake affected the city of Tainan near Kaohsiung city, Taiwan, Province of China, it resulted in the collapse of many buildings including high-rise residential complexes. Upon close investigation of one of the collapsed buildings, it was discovered that the building had many flaws in its construction. The city's prosecutors immediately held the developer legally accountable.

Holding builders accountable for the safety of the residents of their buildings can set a precedent to enforce building codes, particularly in countries that are vulnerable to earthquakes and other disasters.

Source: AFP, 2015
Available from http://www.bangkokpost.com/news/asia/859164/taiwan-developer-grilled-over-collapse-of-quake-building

2. Manage transboundary river basin floods through innovation and regional cooperation

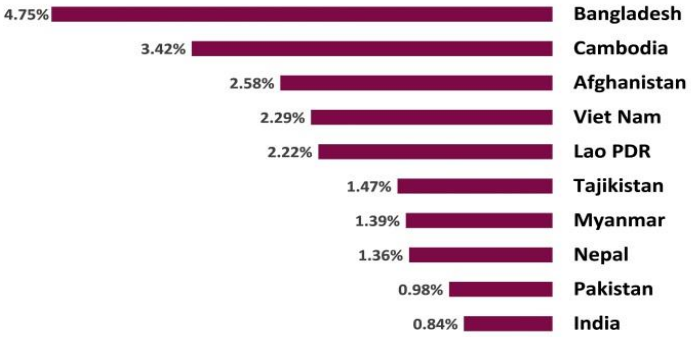
According to the World Resources Institute (2015) nearly 80 per cent of the global population exposed to flood risk lives in 15 countries.[41] Of these, 10 countries are in the Asia-Pacific region. They are, by order of population exposed to flood risk, India, Bangladesh, China, Viet Nam, Pakistan, Indonesia, Myanmar, Afghanistan, Thailand and Cambodia (Figure 4). Many of these are riparian countries, where transboundary river-basin floods occur frequently with large scale impacts, especially on the poor and vulnerable populations who are dependent on agriculture.

Around 40 per cent of the world’s poor live on or close to the major transboundary river-basin systems in South Asia; two-thirds of this population live on the Indus, Ganges and Brahmaputra basins.[42] To tackle poverty and achieve sustainable development in the region, it is critical to manage transboundary river-basin floods.

Recent advances in simulated weather forecasting have enabled longer lead times, of up to 5-8 days, for flood forecasts (Box 3).[43] These advances in science rarely reach the communities who live along these vast rivers. On average, they get one-day notice for evacuation. To provide wider access to these scientific innovations, ESCAP is developing a pilot project to establish a regional cooperation mechanism for flood forecasting in the major transboundary river-basins in the region.

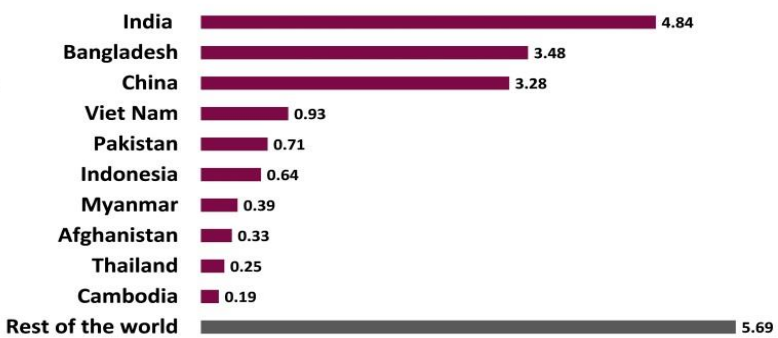
Figure 4. River-basin flood impacts among countries in Asia-Pacific

Countries in Asia-Pacific with the highest percentage of GDP affected annually by river floods



Estimated GDP affected by inland flooding as a percentage of country's total GDP

Countries in Asia-Pacific accounting for 70% of the global population exposed annually to river flood risk



Annual expected population affected by river floods (millions)

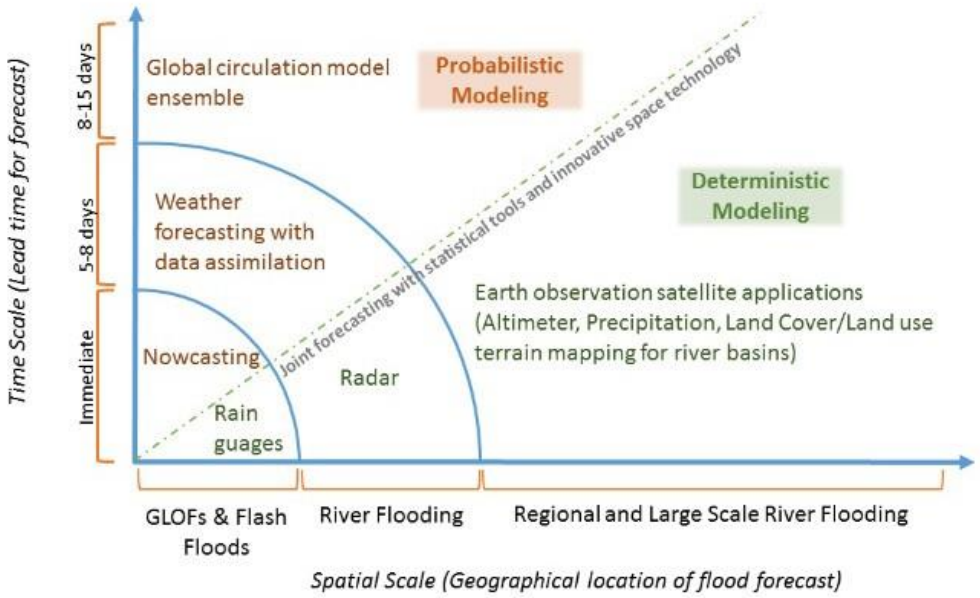
Source: ESCAP based on data from World Resource Institute, 2015 (Accessed February 2016).

Box 3. Using innovative technology for flood forecasting and warning system

An important technological innovation in 2015 was the demonstration of Satellite Altimetry from Jason-2 and SARAL satellites for the Bangladesh Flood Forecasting and Warning System which forecasted river heights up to eight days ahead of time.[44] These satellites can provide crucial information on the heights of rivers that form the key inputs in forecast models for large river-basins with transboundary origins and enable a lead time of up to 15 days. These advances in science rarely reach the communities who live along these vast rivers. On average, they are given anywhere from a few hours up to a one-day notice for evacuation.

To provide wider access to these scientific breakthroughs, ESCAP is developing a pilot project to establish a regional cooperation mechanism for flood forecasting in the Ganga-Brahamputra-Meghna transboundary river-basins (Figure 5). The project provides a successful model that integrates new statistical techniques in modelling the probability of flood timing with innovative space applications that can indicate the geographical location of the floods. In tandem, these can produce longer lead times, enabling populations living in the river basin areas to evacuate safely and protect their assets.

Figure 5. Integrating modelling and innovative space technology to enable longer lead times for floods



Source: ESCAP based on presentation from NCAR/Tom Hopson, RIMES-World Bank Workshop on Early Warning Systems (23 November 2015).

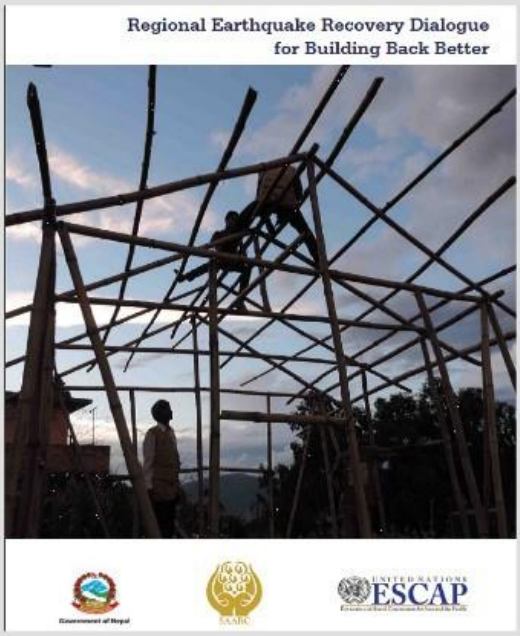
3. Encourage cross-border assistance and learning

As disasters continue to span multiple boundaries, regional cooperation in disaster response, and sharing of good practices and knowledge would greatly benefit those at risk. Neighbouring countries can play an important role in disaster response because during a catastrophic disaster, the first few hours are critical for minimizing the death toll. In the aftermath of the Nepal earthquake in April 2015, India was the first neighbouring country to provide urgently needed humanitarian relief operations by sending aircrafts carrying disaster relief personnel within hours after the first quake.[45] China followed suit and sent its international search and rescue team to Kathmandu, along with medical workers, seismic experts, and other relief materials.[46] Similarly, during the devastating Cyclone Pam in Vanuatu in March, neighbouring countries of Australia, Fiji and New Zealand sent immediate aid. These swift actions taken by neighbouring countries in the spirit of regional cooperation and trust helped to mitigate the immediate repercussions of disasters for low capacity high-risk countries. This is a good practice that needs to be encouraged and replicated wherever such a need is solicited.

The wealth of experience in this region can also provide useful lessons and good practices for vulnerable countries. One such example of cross-border sharing of knowledge and experience was the Regional Earthquake Recovery Dialogue for Building Back Better, held in Kathmandu in October 2015 (Box 4). The dialogue, organized by ESCAP together with SAARC Disaster Management Centre, and the National Planning Commission of the Government of Nepal, brought together premier earthquake experts from India, the Islamic Republic of Iran and Pakistan that have had hands-on experience in mega-earthquake recovery and reconstruction efforts in their countries. Strategies such as innovative retrofitting technologies to protect cultural sites, low-cost housing, recovery financing models and new techniques to help rebuild settlements and infrastructure in mountainous terrain were discussed with Nepalese authorities in charting the way forward. The dialogue was later followed up by in-situ capacity building for senior policymakers of Nepal in Gangtok, Sikkim and Bhuj, Gujarat based on lessons from the recovery and reconstruction efforts of 2011 Sikkim earthquake and 2005 Bhuj earthquake respectively.

Box 4. Building back better with regional earthquake recovery dialogue

The Regional Earthquake Recovery Dialogue for Building Back Better aimed to provide a roadmap for recovery process for Nepal by harnessing the expertise of earthquake experts from India, the Islamic Republic of Iran, and Pakistan.



Key lessons learnt

1. Recovery is a time consuming process.

2. Sustainability is a fundamental principle for building back better.

3. Institutional arrangements need to be collaborative and incrementally involved.

4. Keep people at the centre, and focus on processes.

5. Technical approaches need to be detailed and context specific.

6. Capacity building is a must for long-term self-reliance.

7. Quality and accountability are key to a successful reconstruction programme.

Source: SAARC, NPC, & ESCAP, 2015. Regional Earthquake Recovery Dialogue for Building Back Better.

4. Address slow-onset disasters – The case of drought

Drought reappeared as a major disaster affecting many countries of Asia-Pacific in 2015, exacerbated by the severe El Niño which developed in late 2014. Some forecasts indicate that the situation will get worse before any respite. Though clear warnings and indications of the impending crisis, as far back as 2014, were broadcast globally and regionally, many in the region still faced severe impacts from drought, resulting in emergency response and relief. If farmers had known sufficiently in advance, they could have adapted and been better prepared, for example through planting drought-resistant crops, conserving and planning for water shortages, or seeking supplementary income in advance of the difficult season.

This highlights the fact that drought is a forgotten and neglected disaster. Compared with other rapid-onset disasters like earthquakes, cyclones and floods, drought is a creeping disaster that quietly undermines basic household needs – food and water. Most often though, drought is dealt with only when it becomes an emergency and quickly forgotten when rain returns.

It is now timely to review the way drought is managed while the impacts to households and economies are clear in the minds of policymakers, particularly considering the potential impacts of climate change which could make drought conditions worse or more frequent in the future. Some countries have already been developing and revising these policies and plans, and many other policymakers can learn from their experience.

The Asia-Pacific Disaster Report 2015 discusses eight key areas for developing a comprehensive drought management strategy, and illustrates them with examples from the region.[47] Specifically, drought needs to be addressed from a long-term perspective, recognizing that it is a cross-sectoral issue that needs to consider the livelihoods that it will impact and the natural resources that support these livelihoods.

Science and technology can do much to support early warning, preparedness, adaptation and mitigation of drought conditions, and can be accessed more easily through regional cooperation. ESCAP's Regional Drought Mechanism is a good example of how, through regional cooperation, drought-prone countries can monitor and develop early warning systems for drought. Spacefaring countries of the region share satellite information, tools and services to drought-prone countries, along with their knowledge in using and interpreting such information, and their experience in managing drought. Pilot countries are then able to develop and utilize their own monitoring and early warning system, as a basis for response and for longer-term planning.

From every crisis, there is an opportunity to trigger policy reforms and consider alternative ways to mitigate the effects in the future. As an example, a crop insurance scheme was introduced by the Government of India aimed at providing immediate relief to farmers. The cost-effective scheme capitalizes on innovative technologies and relies on real-time data from smart phones, drones and remote sensing to enhance the effectiveness and coverage of agricultural insurance. Such schemes can be equally applicable in many countries.

5. End-to-end multi-hazard early warning systems are critical

The Asia-Pacific Disaster Report 2015, while highlighting the value of early warning systems, emphasized the need to make these systems multi-hazard and people-centric. Estimates of cost-benefit ratios of early warning systems suggest that every dollar invested in early warning systems can potentially generate US$ 4 to US$ 36 in benefits to countries in terms of reduced losses, particularly for weather-sensitive sectors such as agriculture.[48] The multitude of disasters in the region clearly highlights the need for cooperation, including in the establishment of Multi-Hazard Early Warning Systems (MHEWS) at both national and regional levels.

Additionally, there is a need to invest in maintenance of early warning equipment, which forms part of the national and regional early warning systems. For example, a particular gap has been highlighted for tsunami early warning, as sophisticated but expensive buoys were deployed in the Indian Ocean after the 2004 Tsunami, but currently risk falling onto disrepair. The information from the buoys complements information provided from seismic observation and tsunami modelling, and thus plays an important role in making warning information credible and timely.

The development and implementation of these MHEWS is in progress. Under the ESCAP-WMO Typhoon Committee (TC) and the WMO-ESCAP Panel on Tropical Cyclones (PTC), the Severe Weather Forecasting Demonstration Project (SWFDP) addresses the multi-hazard early warning needs of high-impact extreme weather patterns through simulation techniques as well as high resolution forecasts for wind, precipitation and temperature. The SWFDP is implemented as a number of regional projects, each using a "Cascading Forecasting Process" (global to regional, to national) and is specially designed to strengthen the capacity of high risk low capacity countries.

Funded under the ESCAP Multi-Donor Trust Fund for Tsunami Disaster and Climate Preparedness, the joint development of the Synergized Standard Operating Procedures (SSOP) for Coastal Multi-hazard Early Warning System by the TC and the PTC is an effort to promote integrated early warning systems, especially for coastal hazards. In its fourth session held in October 2015, a similar system was requested by the Committee on Disaster Risk Reduction of ESCAP for the Pacific countries. The Climate Risk Early Warning Systems (CREWS) initiative, launched at COP21 in Paris on 2 December 2015, is a further initiative that complements regional and national actions to improve the quality of multi-hazard early warning systems, particularly in high-risk and low capacity countries.

6. Capitalize on innovative space technology applications and emerging technologies

Despite large amount of data, including geospatial information, being freely available, the majority of developing countries still do not have the technical capacity to acquire or use these data. To address these concerns, ESCAP, in collaboration with the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre), have developed procedural guidelines to standardize acquisition, sharing and utilization of geospatial data during emergency response. These guidelines are being converted into Standard Operating Procedures (SOPs) and hazard specific protocols that can be used widely across relevant government agencies.

Last year, ESCAP and the SAARC Disaster Management Centre (SDMC) jointly developed a guide on the Rapid Assessment for Resilient Recovery. It is a step-by-step guide for conducting rapid damage assessments across housing, infrastructure and agriculture and other critical economic sectors using space technology applications, geospatial modelling, crowdsourcing and other web-based technologies. It is designed to assist decision makers in making quick financial decisions in the aftermath of a disaster, and to provide inputs to the comprehensive Post-Disaster Needs Assessment (PDNA).

A UAV in operation

Another recent advancement in disaster response is the use of Unmanned Aerial Vehicles (UAVs), which is fundamentally changing the traditional ways that earth observation data and imagery are acquired and used. UAVs are increasingly being used by humanitarian organizations to reach areas that are inaccessible by ground or difficult to fly over with manned aircrafts. They help collect data for detailed damage assessments.

China, for example, has been using aerial platforms effectively for damage and impact assessment from landslides. However, in addition to poor public perceptions of UAV safety, the use of UAVs is currently fraught with legal and regulatory challenges. Some countries have banned their use for civilian purposes altogether while others have lengthy user-authorization processes or have classified UAVs as concealed communication equipment needing declaration for import and export.

The Government of Nepal, for instance, installed new regulations regarding use of UAVs to collect news and pictures following complaints from local residents. Thus, standardized legislations and regulations are needed to effectively use UAVs for disaster management and response.

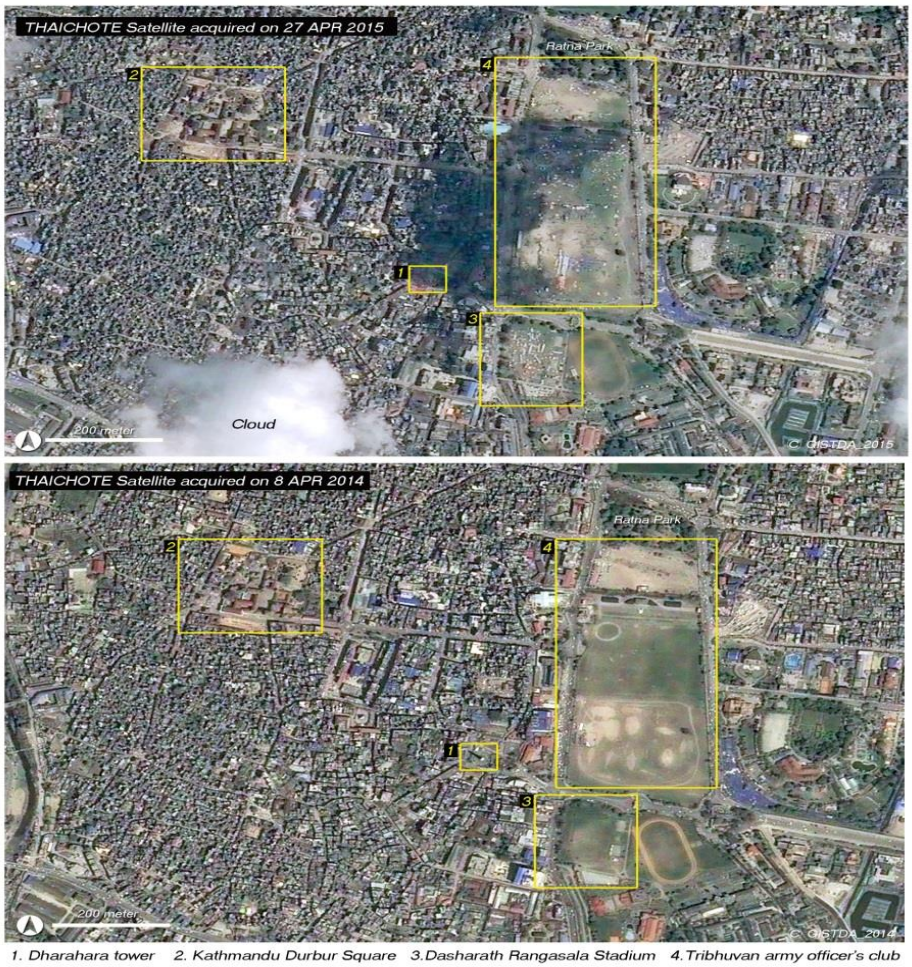
Given the potential of this technology, more work may be required in developing guidelines and documenting good practices in integrating aerial observation and data collection for damage and needs assessments, search and rescue operations, and other humanitarian efforts.

7. Political leadership critical for the success of disaster risk reduction and management

While Asia-Pacific faced numerous catastrophic disasters in 2015, it has also seen significant progress in the political leadership in disaster preparedness and response. An example worth highlighting is the experience of the Philippines. In the aftermath of the widespread damage caused by Typhoon Haiyan in 2013, the Government of the Philippines announced a "Zero Casualty" policy.[49] The policy entailed effective and timely communication of early warnings and targeted evacuations through efficient mobilization of government resources and engagement of vulnerable communities. At the national level this includes cooperation of the National Disaster Risk Reduction and Management Council (NDRRMC) with various government agencies, private sector firms and development partners on disaster preparedness and response strategies. At the local level, the President Benigno Aquino emphasised the importance of all local government units and communities in taking collective action, communication and targeted measures in high-risk areas. Government resources including airplanes, boats and other assets of the armed forces and the coast guard were mobilized to ensure safe and effective evacuation in times of disasters.

The "Zero Casualty" policy resulted in a significant improvement from past experiences in terms of lives lost and number of people affected, which was shown in the case of Typhoon Koppu in October 2015. When the typhoon hit the Philippines, all systems were on alert and necessary steps were taken to implement the "Zero Casualty" policy. The efforts of the Government of the Philippines have been praised internationally and the experience can be shared regionally with other countries to reduce the impact of disasters in the future.[50]

Satellite image of Kathmandu city centre before and after the Nepal earthquakes in April 2015



Source: GISTDA, 2015

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