EXECUTIVE SUMMARY

DISASTERS WITHOUT BORDERS

REGIONAL RESILIENCE FOR SUSTAINABLE DEVELOPMENT

The Asia-Pacific region is exposed to natural disasters of many types which each year kill thousands of people and wreak vast economic destruction – often striking a number of countries simultaneously. Reducing disaster risk therefore means combining concerted local and national action with effective regional cooperation. Countries across Asia and the Pacific have made some progress, but still have much to do – and must remain vigilant since rapid economic growth, rising populations, and burgeoning cities are exacerbating existing risks and creating new ones.

This is a pivotal year for disaster risk reduction in Asia and the Pacific: 2015 marks the end of the 'Hyogo Framework for Action'. It also marks the beginning of a new 15-year plan – the 'Sendai Framework for Disaster Risk Reduction 2015-2030'. In addition, in 2015 the world is transitioning from the Millennium Development Goals to the Sustainable Development Goals – whose achievement will depend critically on building much greater resilience to disasters.

Over the period 2005-2014 the Asia-Pacific region had 1,625 reported disaster events. Approximately 500,000 people lost their lives, around 1.4 billion people were affected, and there was $523 billion worth of economic damage. Many of these disasters were on a vast scale, but there were also multiple smaller events that never hit the global headlines. Indeed since the 1970s, most disasters in Asia and the Pacific have had fewer than 100 fatalities but cumulatively have affected 2.2 billion people and caused over $400 billion worth of damage. Even these figures are probably underestimates, since there is no standardized methodology for gathering disaster statistics, and many disasters go unreported.

The most disaster-prone subregion has been South-East Asia – many of whose countries lie along the earthquake-prone Pacific 'Ring of Fire', or along major typhoon tracks. There are also high seismic and flood risks in South and South-West Asia. The subregion with the greatest economic damage, however, has been East and North-East Asia which has the greatest concentration of exposed economic assets. In the Pacific island States the absolute number of people affected may be smaller, but this still represents a substantial proportion of their populations. In general, the most vulnerable countries are those with special needs – including small island developing States, least developed countries and landlocked developing countries.

Cross-border threats

Many of the disasters in Asia and the Pacific are transboundary. The region has the world's two most seismically active fault lines which cross many national frontiers. It also has three major ocean basins, so that a cyclone that develops in one of these basins can travel across many countries, causing heavy rainfall and flooding. Countries also share rivers and river basins, so floods too regularly spread across national boundaries. In addition, excessive snowmelt in high mountains, and glacial lake outbursts, can flood a number of countries downstream. And countries affected by the same climatic events can simultaneously be hit by drought.

People at risk – Across Asia and the Pacific 772 million people live on less than $1.25 a day and are particularly vulnerable to disasters. They tend to live in low-value, hazard-prone areas – not just city slums, but also steep slopes, seismic zones, floodplains and river banks or remote areas. The poorest lack the resources to take preventive measures, or buy insurance, and do not have savings to draw upon should disaster strike. Nor can they be sure of adequate government support through social protection. Disasters are likely to further impoverish many people – or push the 'near-poor' into poverty.

Economies at risk – Though the immediate concern is for human life and health, countries across Asia and the Pacific are also concerned about the economic cost – which appears to be increasing. And given the importance of Asia and the Pacific in the global economy, disaster impacts can soon reverberate around the world. Between the 1970s and the decade 2005-2014 damage to property, crops and livestock in Asia and the Pacific increased from $52 billion to over $523 billion – mostly in housing, transport and agriculture, with long-term costs persisting even decades later in some cases. On present trends, by the year 2030, annual losses in the region could average $160 billion per year.

Cities at risk – Half the region's people live in urban areas, and by 2050 that proportion could rise above two-thirds. Many cities already struggle to provide basic services such as roads, water supplies, and sewage disposal, leaving the poorest people, especially those in slum areas, highly exposed to sudden shocks. Around 740 million city dwellers in Asia and the Pacific are now at 'extreme' to 'high' disaster risk – often living in multi-hazard hotspots that are vulnerable to cyclones, earthquakes, floods and landslides.

Environment at risk – One of the best defences against many natural disasters is a healthy natural environment with robust ecosystems. Unfortunately, much of this protection has been weakened. Over the past 50 years, humans have degraded the region's forests, grasslands, deserts, tundra, mountains, and agricultural areas, as well as freshwater and coastal and ocean ecosystems – steadily reducing their capacity to protect against hazards.

An additional factor is climate change. The most significant impacts on ecosystems are likely to be in coastal areas, with risks of sea level rise, greater storm intensity, higher wind speeds,

greater wave action and higher sea surface temperatures. A complex sequence of events involving human activity, climate change and natural disasters then creates a vicious feedback loop. Breaking this cycle will require more effective management of ecosystems – along with measures for social protection, disaster risk reduction and climate change adaptation.

Investing in resilience

Most international assistance for disasters is for emergency response and rehabilitation rather than prevention. Over the period 2004-2013, aid for disasters was $28 billion, of which most was for emergency response. However, the share of international aid going for prevention and preparedness has been rising in recent years.

Investing in disaster risk reduction is cost effective because it averts or minimizes costly damage. Investments in hydrometeorological early warning systems in Asia and the Pacific for example, can have returns between 4 and 36 times the initial investment. Nevertheless, over the last 10 years, countries in Asia and the Pacific have not made sufficient progress. Based on self-assessments for the Hyogo Framework of Action, for around half the countries progress was 'not substantial' or 'relatively small'.

DROUGHT – THE FORGOTTEN DISASTER

One of the region's most devastating natural disasters is drought. But this is a slow and silent killer, and therefore often forgotten, generally receiving less attention from the media, policymakers and politicians. Since 1970, across Asia and the Pacific drought has affected more than 1.6 billion people and cost an estimated $53 billion in damage. These figures are likely to be underestimates because droughts are hard to delineate: there are uncertainties about when they start or finish, and their impact is indirect and often spreads across several countries so it can be difficult to capture the full costs.

In Asia and the Pacific drought can take on distinctive forms. Elsewhere in the world, drought is typically experienced as a long period of low rainfall, resulting in dry, cracked earth, severe crop loss, dying livestock and famine. Asia and the Pacific has these droughts too, but it also has different, shorter forms – during severe winters, for example, or even during erratic monsoons.

Drought has significant impacts on many sectors, including fish and aquaculture, forestry, and industry. This report focuses, however, on agricultural drought, which takes four main forms: prolonged periods of low rainfall; irregularities in the monsoon season; reduced snowmelt or glacial runoff; and winter drought and '*dzud* '– a combination of events leading to inadequate pasture or fodder for livestock.

A prolonged drought will slow down income growth not just in agriculture, but also in related activities, particularly agro-processing, with knock-on effects for employment and

incomes in other parts of the rural economy. Poor farmers respond to drought in different ways. Some may be able to absorb the impact, by migrating, or drawing on savings. But others may resort to 'erosive' coping mechanisms, such as removing children from school, taking high-interest loans, or selling off income-generating assets. In some cases farmers driven into debt have committed suicide.

Water and land management

By 2030, to meet rising demand, food production in Asia and the Pacific will need to increase by 50 per cent. But the region is already reaching its limit of available arable land, so it is vital to increase crop yields, which will rely on reliable sources of water. Some areas can be protected from drought by irrigation systems. However, in many of the region's agrarian countries these systems are not very extensive or have fallen into disrepair. Moreover, in some catchments more groundwater is being withdrawn than is being replenished. Water availability can also be reduced by pollution from seawater or other contaminants.

Drought is particularly damaging when the soil is already degraded. Drought then further weakens the soil structure. In the most extreme cases this leads to desertification. A reduction in vegetative cover can then make the climate even drier, triggering a downward spiral. This makes it difficult to sustain rural development: in some countries soil and water degradation have negated one-third of productivity gains from technical progress.

Exacerbating all of these water and land management factors is the potential impact of El Niño. In 2015, the tropical Pacific Ocean is experiencing moderate El Niño levels. The strongest precipitation will be in South-East Asia and parts of the Pacific, especially in the dry season. In the wet season reduced rainfall could have significant impacts in the Central and Southern islands of the Pacific that depend on subsistence agriculture.

Drought risk will also be increased by climate change. Higher temperatures could result in changes to precipitation patterns, earlier snowmelt, and increased evapotranspiration, which could increase the risk of hydrological and agricultural drought. Glaciers, for example, are already retreating at an alarming rate, and the Northern hemisphere has seen a reduction in spring snow cover. In addition there have been changes in the patterns of extreme climate events. There are also likely to be more frequent heat waves.

Regional Drought Mechanism

Signs of drought can be observed in satellite-based data and images, many of which now come from the region's spacefaring countries: China, India, Japan, the Republic of Korea, the Russian Federation and Thailand. Because many poorer countries lack the institutional capacity to integrate these high-end knowledge products into their operational drought monitoring and early warning systems ESCAP has established the Regional Drought Mechanism – which gathers data and imagery from the spacefaring countries and shares

it with other countries, while building the capacity of experts and officials to use satellite-based data effectively. This service complements WMO's Global Framework for Climate Services by providing more detailed, localized forecasts that can be updated during the growing season – allowing mid-course corrections and measures for drought mitigation.

Building resilience to drought

For drought, as for other disasters, building resilience requires a full disaster management cycle approach: mitigation and adaptation to minimize the risk; preparedness to respond as necessary; relief to assist those in need; and investment in long-term recovery. For this purpose, governments may have a dedicated drought management policy, or they may integrate drought management under disaster management, or address it under other sectoral plans, such as those for agriculture or water.

While the approach will differ from country to country there are often common elements. These should include:

- *Long-term risk management* – If farmers know in advance that there is a strong likelihood of drought conditions, they can plant drought-resistant crops, budget water resources more carefully, or introduce water-saving techniques.
- *A livelihood approach* – Drought mitigation should support poverty eradication as part of inclusive and sustainable development, with investment in rural infrastructure and in rural education.
- *Maintaining ecosystems* – Ensuring healthy watersheds and soil systems.
- *Multisectoral management* – End-to-end drought management requires extensive coordination and planning across all key stakeholders.
- *Using science and technology* – The opportunities have expanded dramatically, particularly in space applications, hydrology and meteorology.
- *Agricultural insurance* – This can be weather based, with payouts triggered by rainfall or temperature thresholds, with opportunities for public-private partnerships.
- *Social safety nets* – Relief packages can include resources or equipment or temporary alternative employment.
- *Regional cooperation* – Opportunities include the Regional Space Applications Programme for Sustainable Development (RESAP) and the Regional Drought Mechanism.

THE VALUE OF EARLY WARNING

A key component of disaster risk reduction is an effective early warning system – which combines science and technology with practical local approaches, and is fully integrated into broader national and regional strategies. The importance of early warning is clearly recognized in the Sendai Framework for Disaster Risk Reduction 2015-2030, whose seventh global target is: "(g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030".

An end-to-end early warning system has four main elements: risk knowledge; monitoring and warning; dissemination and communication; and response capability. Of these the region has made more progress in risk knowledge, and in monitoring and warning, but rather less in communication and response capacity. Across Asia and the Pacific there are still many gaps in early warning chains, particularly at the local level to cover the 'last mile'. The ultimate test of an early warning system is whether it provides timely and actionable information to the most vulnerable people – including children, women, the elderly and people with disabilities.

Where possible, early warnings for individual hazards should be integrated into a multi-hazard system. This brings economies of scale, and is also more efficient and sustainable. And since a multi-hazard system will be activated more regularly it is likely to be better maintained and more readily available for hazards such as tsunamis that occur infrequently. For each hazard, there should be standard operating procedures, with one entity authorized to issue official warnings providing clear and unambiguous information to multiple actors.

Regional cooperation

The same hazard can affect many countries simultaneously – those that share coastlines, for example, or mountain ranges, or rivers. On their own, many countries would be unable to afford a comprehensive warning system for major disaster events, but they can achieve more if they share the costs and expertise with other countries and relevant regional and international organizations. For addressing tropical cyclones, for example, the Asia-Pacific region has two intergovernmental platforms – the ESCAP/WMO Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones, whose activities are backed up by regional specialized meteorological centres in New Delhi and Tokyo. Another major step forward was in 2009 when, with support from ESCAP, governments established the Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) which now has 12 member States and 19 collaborating countries.

A further impetus for regional action came from the 2004 Indian Ocean tsunami. This had a profound impact on the Hyogo Framework for Action – stimulating extensive operational and technical work and triggering greater investment in prevention and mitigation. Another milestone was the establishment in 2011 of the Indian Ocean Tsunami Warning and Mitigation System.

Since then there has been further progress. The necessary technology has reached a high degree of sophistication. But still there are major disparities and gaps, particularly in countries that face high disaster risks but have low coping capacity – in ensuring fast and reliable dissemination of warnings, and in building the knowledge and capacity of communities to act appropriately – especially for transboundary river basin floods, landslides and flash floods.

Developments in forecasting

Many meteorological systems now provide weather information at the global or regional level, but users are increasingly seeking local forecasts. For this purpose, Asia and the Pacific can take advantage of its strength as a hub for science, innovation and good practices. The region has, for example, been adopting 'climate model-based seasonal hydrologic forecasting' – which couples climate scenarios, river-basin hydrology and flood forecasting.

In 2011 RIMES and WMO, with financial support from ESCAP, started a joint effort to strengthen the national meteorological and hydrological service in five high-risk countries, where forecast generators and users now meet in biannual 'monsoon forums'. In the Pacific, a group of countries have cooperated on the WMO-led Severe Weather Forecasting Demonstration Project, which allows smaller countries to take advantage of weather services from neighbouring countries.

Economic benefits of early warning

The costs of early warning systems are generally far outweighed by the economic benefits. In Asia and the Pacific, investments in hydrometeorological warning services could have a benefit-cost ratio of between four and 36. Much of the investment required is in people – specifically the technical staff of national meteorological and hydrological services, to enable them to make forecasts more accurate and user friendly, and to increase warning lead times. For high-frequency, low-impact hazards, such as storms and floods the priority should be to improve local and national warning systems. However, for low-frequency, high-impact hazards, such as tsunamis, it would be more economical to take a collective or regional approach.

To strengthen the sustainability of early warning systems, warning information should be targeted to the needs of end users in multiple sectors of the economy. In this way, the early warning system can become an enabler for sustainable development, with clear economic benefits.

Given the resource constraints, the best way to maximize the impact of finance, especially donor funds, is through pooled funding. One example is the ESCAP Multi-donor Trust Fund for Tsunami, Disaster and Climate Preparedness. Others are the World Bank's Global Facility for Disaster Reduction and Recovery, and the Global Initiative on Disaster Risk Management.

Future priorities

Early warning systems and services are public goods that should be financed by government investment. The priorities should be to:

1. Integrate the concept of 'early warning as a public good' into national planning policy and decision-making.

2. Strive to make early warning systems multi-hazard and people centred – reaching 'the last mile'.
3. Ensure that forecasters take into account the different needs of specific end users and tailor products and services accordingly.
4. Use effective communication channels including broadcast media.
5. Link standard operating procedures with operational tests, including local evacuation drills.
6. Strengthen regional cooperation in early warning, going beyond coastal hazards to include hazards such as transboundary river basins floods.
7. Concentrate external assistance on low-capacity, high-risk countries.

RIGHT INFORMATION, RIGHT PEOPLE, RIGHT TIME

A critical part of disaster risk management is managing the flow of information. Getting the right information to the right people at the right time saves lives and reduces losses, while also boosting people's resilience. Some Asia-Pacific countries now have state-of-the-art disaster information management systems, but others have major gaps in both data and analysis.

Right information – Each phase of the disaster cycle – preparedness, response and recovery has specific tasks. During the response period, for example, these include impact and humanitarian needs assessments, and the coordination of resources.

Right people – Each phase also has its own primary stakeholder groups – disaster risk reduction actors, relief agencies and development practitioners who in turn may be operating at the international, regional, national and local levels.

Right time – There are windows of opportunity for collecting and providing information to each target audience. This requires a degree of predictability through regular reporting structures, as well as elements of flexibility to fulfil ad hoc information requests.

Before disasters happen, all potential risks should be evaluated. These pre-disaster assessments will combine qualitative judgments of vulnerability and exposure with quantitative methods that use multiple layers of geospatial data along with socioeconomic indicators. These assessments should be interactive two-way processes, with exchanges of information between risk assessors, managers, interested groups and the general public.

In the immediate aftermath of a disaster, information needs to be gathered rapidly and presented in situation reports. Again, one of the most valuable resources is satellite imagery, which can provide clear pictures of the situation before and after an event. In Asia and the Pacific, ESCAP, through its RESAP network, helps provide imagery from the region's spacefaring member countries, at no cost, to disaster-affected countries. The International Charter on Space and Major Disasters is a global agreement between space agencies,

aimed at providing a unified system for accessing and delivering fast and free satellite imagery and space data to countries affected by disasters. Another form of technology increasingly used in the aftermath of disasters is unmanned aerial vehicles, though this also raises important ethical issues.

Damage and loss assessment

After disasters, governments as well as other institutions, public and private, need to estimate the damage. In the past such assessments have had a number of weaknesses. One has been a lack of pre-disaster baseline information. Another has been that economic estimates often cover stocks not flows – that is, they assess the destruction of assets but not the cost of the interruption of business, for example, or the shortages of labour.

In 2013, the UN, the World Bank and the EU produced guidelines for producing a post-disaster needs assessment (PDNA) for major disasters. Smaller-scale events can use the same methodology but downscaled to meet local needs. To assist in this process, and increase the speed of evidence-based assessment, ESCAP has produced a rapid assessment manual which combines the PDNA sectoral methodology with the use of real or near real-time satellite data.

When considering investment in disaster risk reduction, governments will want to assess potential future losses. One approach is to consider the average annual loss (AAL). An AAL calculation has three components: hazard modelling; measures of exposure and vulnerability; and risk estimation. It uses both historical experiences and modelled predictions to arrive at a comprehensive picture of what can be expected.

Another approach is based on climate risk assessment – downscaling regional climate change scenarios to the national level. This involves three steps: regional climate modelling, physical impact assessment, and economic assessment. A number of countries now have pilot programmes for comprehensive climate risk assessment. Estimates for five South Asian countries, for example, indicate that climate change will cost these countries on average 1.8 per cent of their annual GDP, rising by 2100 to around 8.8 per cent.

Transboundary information

The region's most established mechanism for transboundary information on disaster events is the Mekong River Commission – which works directly with the governments of Cambodia, Lao People's Democratic Republic, Thailand and Viet Nam. Another is the Regional Flood Information System in the Hindu Kush-Himalayan region – which has helped set up hydrometeorological stations across Bangladesh, Bhutan, Nepal and Pakistan.

ESCAP is supporting these transboundary information efforts in various ways, including developing regional land cover maps. In addition, one of ESCAP's specialized regional

institutions, the Asian and Pacific Centre for Development of Disaster Information Management, is promoting South-South and regional cooperation and helping countries address critical information gaps.

One of the most useful ways of sharing information is through web-based geoportals. ESCAP has worked with developing countries to establish cost-effective, easy-to-maintain portals for 'geo-referenced information systems for disaster risk management' (Geo-DRM). For this purpose ESCAP has been collaborating with UNOSAT, the Asian Institute of Technology, and the Applied Geoscience and Technology Division of the Secretariat of the Pacific Community. Portals have now been established in Bangladesh, the Cook Islands, Fiji, Kyrgyzstan, Mongolia and Nepal.

The Asia-Pacific region also has access to a variety of advanced subregional, regional and global geoportals. They include those developed by: the Indian Space Research Organisation; the Pacific Disaster Center; the International Centre for Integrated Mountain Development; the Global Disaster Alert and Coordination System; and ReliefWeb, a specialized digital service of the United Nations Office for the Coordination of Humanitarian Affairs.

Making communications systems resilient

During disaster events, information management systems are themselves vulnerable so should be designed to absorb shocks and maintain services when faced with limited connectivity or increased traffic volume. ESCAP's Asia Pacific Information Superhighway promotes resilient infrastructure backbones that have a balance of terrestrial and submarine fibre optic connectivity.

Individual items of energy and transport infrastructure, such as bridges or electricity substations, are typically monitored remotely by centralized SCADA (supervisory control and data acquisition) systems. But these are generally standalone and proprietary so need to be integrated as interdependent parts of a critical information network.

Nowadays large volumes of data are also generated by new information sources – smart phones, for example, and social media. Analysis of this 'big data' can give immediate indications of population movements, for example, or other behaviour that can be useful before and after disaster events. Cell phones can also be valuable for general disaster management – receiving text messages and warnings of incoming disasters, or transmitting crowd sourced imagery of damage and impact.

These applications depend on resilient data networks. To make best use of these tools, governments should focus primarily on maintaining the infrastructure – ensuring, for example, that commercial telecommunications networks can cope with disruptive events and handle usage spikes. For this purpose they can also use mobile and airborne base stations. In addition, emergency response teams can be equipped with dedicated communications networks such as terrestrial trunked radio.

A roadmap to effective and resilient information management

Providing the right information to the right people at the right time, entails five principal steps.

Step 1 – *Understanding risk* – Assessing risk in qualitative and quantitative terms, while considering issues of financing and insurance. It also means taking into account the culture and psychology behind risk, and creating partnerships for building resilience.

Step 2 – *Establishing information sharing policies* – Policies on data sharing should be in place before disasters strike. Policies can cover technical issues such as standardization and formats, platforms, procedures and protocols, timeframes, naming conventions, authorization and classification.

Step 3 – *Generating actionable information* – Governments need to establish a classification system for information types, along with the implied actions. As information comes into a disaster risk management system it can then be assigned to an appropriate actor.

Step 4 – *Customizing information and reaching people at risk* – This requires location-based information services and decision support tools – with strong institutional links for coordination between developmental and planning actors.

Step 5 – *Using real-time information* – Coordinating real-time data flows, particularly for disasters with transboundary origins, requires extensive regional and international cooperation.

P*rotecting ICT infrastructure* – Critical infrastructure should be planned and designed with disaster management in mind, as it underpins the functioning of effective and resilient information management systems.

AT THE HEART OF SUSTAINABLE DEVELOPMENT

Disaster risk reduction is an essential component of sustainable development. Measures to reduce the impact of disasters – building stronger infrastructure, for example, or better housing, or better organized communities – also support development in general. But the process works both ways, because countries with higher levels of development are also better able to defend themselves from disasters: as their economies grow, infrastructure becomes more robust and governments that have more resources can provide stronger social protection.

Disaster risk management should therefore be closely integrated with development planning and programming. This makes it a responsibility for every part of government – from education to health to transport to social protection. Just as every sector can be affected by earthquakes or floods or cyclones, so every sector needs to consider how to make its activities disaster resilient.

The Sustainable Development Goals

The understanding of the need for disaster risk reduction and its importance for sustainable development has increased over the years – from the 1987 World Commission on Environment and Development, to the 2005 Hyogo Framework for Action (HFA), to the 2015 Sendai Framework for Disaster Risk Reduction, 2015-2030. Disaster risk reduction is also central to the proposed Sustainable Development Goals (SDGs) which address this priority in goals related to poverty eradication, food security, infrastructure, cities and human settlements, climate change and ecosystems. Activities in all these areas should reduce existing risks and also avoid creating new ones – what is referred to as 'prospective' or 'anticipatory' risk management.

Legal and regulatory mechanisms

Risk management requires a sound legal and regulatory structure. This refers not just to laws covering disaster management but also legislation for all other relevant sectors. Recently, some Asia-Pacific countries have introduced specialized legislation on disaster management. The region's developed countries, however, generally do not have stand-alone national laws but have embedded risk reduction in legislation across various sectors. Another challenge for developing countries is to regulate the private sector – especially when enterprises are constructing critical infrastructure.

Institutional arrangements

In Asia and the Pacific the institutional arrangements for disaster risk reduction broadly follow one of three models. The first is a specialized authority, usually chaired by the head of government. The second is high-level interministerial coordination. In the third model, disaster management is the exclusive responsibility of a single agency or government department. For many years most countries used the third model. This is now giving way to the first or second models, but even these are not yet working effectively. Either the agencies and committees have not met regularly or they have not established the necessary actions and monitoring mechanisms, or are working in silos without effective outreach. Typically their high-level officials have been drawn from the armed forces, police and civil defence, who tend to focus on disaster response and preparedness – rather than integrating disaster risk reduction with other sectors. The HFA prescribed 'multisectoral national platforms, with designated responsibilities at the national through the local levels', but as of 2013 across Asia and the Pacific only 14 out of 64 countries had set up such platforms, and none were meeting regularly.

Policies and planning

Policy implementation broadly differs according to level of development. The region's developed countries have invested enormous resources in structural and non-structural measures –

and have introduced low-cost community-based initiatives for disaster risk reduction. Those countries that face high disaster risks have also started making such investments with some success. But most of the region's developing countries lack the necessary resources and capacity, and initiatives are often driven by UN agencies and donors with little buy-in from local governments. Moreover there may be no clear guidance on how national policies and strategic action plans are to be integrated across government sectors.

Finance and budgets

Countries that have special funds for disaster risk management have mostly used these for disaster response and humanitarian relief. National governments often make a commitment for community-based disaster management but fail to allocate the necessary resources, leaving the agenda in the hands of NGOs who have been managing small pilot projects. The mid-term review of the HFA found that although 86 countries had made local governments legally responsible for local disaster risk management, only 20 had made the corresponding budget allocations. International assistance for such measures is also limited: in the Asia-Pacific region, over the past decade only 0.65 per cent of total ODA was devoted to disaster prevention and preparedness.

Capacity building at all levels

Capacity development for disaster risk reduction should permeate all sectors, at all levels of government, across all stakeholder groups and for all types of hazard, natural and manmade. In the case of construction, for example, this means increasing the capacity of architects, engineers and masons, and designing or retrofitting buildings so as to be earthquake resistant. But it also means enhancing the supervisory and enforcement capacity of government officials.

At the same time countries will want to improve their institutional expertise. Universities and other institutions of higher learning can develop a pool of professionals on disaster risk management, while research institutions can engage in scientific, policy and applied research. Several countries in Asia and the Pacific now have specialized institutes for training on disaster management. ESCAP is partnering with those institutions in China, India and Indonesia to help them share their capacity-building programmes with other countries that have fewer resources.

Strategic frameworks and national guidelines

Integrating disaster risk reduction into development planning requires a strategic framework within the national development plan, complemented with national and sectoral guidelines. In the health sector, for example, these should ensure that programmes, activities, projects and critical infrastructure are protected from the risks of disasters, and further strengthened so that they respond during emergencies with pre-defined operation procedures. Similarly, in

the education sector the aim should be to protect infrastructure, programmes, and activities, while also creating awareness of hazards, and building scientific, technical and professional skills. National guidelines should also cover cross-cutting issues such as poverty reduction, gender equality, child protection and disability.

There should also be guidelines for productive sectors. In agriculture, these can address such issues as soil and water conservation and accurate weather forecasts. In addition, the private sector should be encouraged to factor disaster risk into overall corporate planning and investment not only to protect themselves but also help make society as a whole more resilient. Even if a private businesses factor in the costs of hazards in their internal rates of return they will not generally take into account the external societal or environmental risks they are creating. Governments, on the other hand, should be able to do so – taking a longer-term and broader view and acting in the public interest.

Another priority is resilient infrastructure. All new infrastructure should be constructed with an appropriate margin of safety, and all existing critical infrastructure should be audited and upgraded to cope with worst-case scenarios. Similar considerations apply to buildings generally. Each city needs to identify and reduce the stock of unsafe buildings. This may require demolition or retrofitting – for which there could be both incentives for investment, and penalties for non-compliance.

Many disaster risk reduction measures are similar to those for climate change adaptation – particularly those related to hydrometeorological disasters, such as drought-proofing, flood protection, and saline embankments, and developing alternative livelihoods. Combining the two processes is likely therefore to be more efficient and cost-effective. At the local level in particular, the two must converge with clear plans of action, funding arrangements, and guidelines.

DISASTERS WITHOUT BORDERS

The scale of modern day disasters, combined with instant international communications, means that many disasters, national or regional instantly, become global phenomena. Mounting economic losses, combined with the spectre of climate change, are also bringing disasters to the centre stage of public policy.

There have been many encouraging developments – particularly in preparedness projects which have dramatically reduced disaster mortality. Other positive signs include the success of regional and global cooperation on disaster risk reduction, and the unprecedented participation of countries and other stakeholders in the recently concluded World Conference on Disaster Risk Reduction. The task now is to translate these opportunities and commitments into action throughout Asia and the Pacific – to establish disaster risk reduction at the heart of sustainable development.