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A STORM IS BREWING... IS ASIA READY?

Lee Kuan Yew School of Public Policy
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Heavy haze in Singapore due to Indonesian forest fires, 2013

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The *Asian Trends Monitoring Bulletin* focuses on the analysis of pro-poor projects and innovative approaches that will contribute to alleviate poverty. The emphasis is put on identifying major trends for the poor in rural and urban areas, highlighting sustainable and scalable concepts, and analysing how these could impact the future of Asia's well-being and future development.

The *Asian Trends Monitoring Bulletin* are designed to encourage dialogue and debate about critical issues that affect Asia's ability to reduce poverty and increase awareness of the implications for pro-poor policy and policy development.

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Houses vulnerable to extreme weather, Inle Lake, Myanmar

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A Storm is Brewing – Is Asia ready?

Southeast Asia is already experiencing climate change effects: typhoons in the Philippines are now four times more frequent than before 1990; sea level rise is increasing the erosion rate in the Mekong river delta, and floods are becoming one of the top concerns of cities in the region. As the world struggles to stabilize GHG emissions, Southeast Asia must face the facts: over 50% of the population still depends on climate sensitive sectors such as agriculture; in addition, it is located at the edge of a massive landmass and in between large oceans. Southeast Asia is highly vulnerable to climate hazards and needs to invest in adaptation strategies, it must get ready.

Climate change mitigation and adaptation strategies are now part of almost every country's national policies. However, with each new disaster that strikes the region, we continue to witness stories of unpreparedness and limited capacity of response that culminate in the loss of lives and livelihoods. To understand the status of adaptation strategies in the region, this issue takes a look at current projects attempting to reduce vulnerability and increase adaptive capacity of communities in Southeast Asian countries.

Successful strategies are the ones with a multidimensional approach: institutions, infrastructure and community should all be considered for a community to build resilience. Nonetheless, a multidimensional strategy requires significant resources and coordination; therefore, as it is shown in this bulletin, such efforts can only be implemented by governments or large international organizations. This type of projects account only for a third of all projects analysed, while the majority of the projects focus on community strategies.

This issue also highlights some of the gaps and limitations in current adaptation policies. Asia is home to roughly 60% of the world's indigenous people, who have historically been marginalized and are among the most vulnerable populations. However, they hold a significant amount of knowledge that will be critical in allowing them to adapt to climate change. We explore why, despite the recognition of the critical role of indigenous knowledge, policies and plans have failed to find a place for it.

Additionally, Southeast Asia is undergoing rapid urbanization, most of which is located in mid and small size cities that seem to be overlooked by adaptation policies. Manila, Jakarta and other megacities are at the centre of the adaptation discussion. However when faced by extreme weather events, small urban places are at greater risk due to three main elements: proportion of affected population, institutional capacity, and distance from the centres of power.

We invite you to share the ATM Bulletin with colleagues interested in pro-poor issues in Southeast Asia. The Bulletin is also available for download at www.asiantrendsmonitoring.com/download, where you can subscribe to future issues. We encourage you to regularly visit our website for more updates and recent video uploads in our blog. Thank you again for supporting the ATM Bulletin, and as always, we gladly welcome your feedback.

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Survivors of cyclone Nargis on an improvised shelter, Myanmar, 2008

Overview of Climate Change in Southeast Asia

by **Sue Helen Nieto and Johannes Loh**

"Warming of the climate system is unequivocal, and it is extremely likely that human influence has been the dominant cause of the observed warming" (IPCC 2013). In the fifth IPCC report, scientists agree that the observed increase in global average temperature in the past 60 years was caused by the anthropogenic increase in greenhouse gas (GHG) concentrations. Moreover, continuing emissions of GHG will cause further changes in all components of the climate system. Unless we make substantial and sustained reductions of greenhouse gas emissions, climate change will continue.

The effects of climate change have become an integral part of the international agenda due to its potential for altering livelihoods around the world. A series of changes have been observed:

- Changes in the atmosphere through the water cycle and air quality;
- Changes in ocean circulation and sea level;
- Changes and reductions of the arctic sea ice.

The IPCC predicts with a probability between 90% and 100% that extreme precipitation events will become more intense and more frequent. Furthermore, the area encompassed by monsoon systems will increase and monsoon precipitations are likely to intensify with

a likelihood of 66% to 100%. Regardless of the exact percentage figures, it is now commonly accepted that hundreds of millions of the world's population will have to adapt to climate-induced changes in their livelihood. In order to limit the effects of climate change both mitigation and adaptation strategies must be pursued, however, due to Southeast Asia's geographic and socio economic characteristics the region must pay special attention to adaptation strategies.

Hansen (2008) stated that a concentration of 350 parts per million (ppm) of CO2 in the atmosphere was a safe limit to avoid a climate tipping point. Nonetheless, the current concentration has increased from 280 ppm from pre-industrial levels to 395 ppm in 2012. The IPCC's realistic goals are focused on stabilizing the concentration at 450 ppm.

Signed in 1997, the Kyoto Protocol was the first international binding agreement that set emission reduction targets. The targets were based on the principle of "common but differentiated responsibilities" which placed higher responsibility on industrialized countries categorized under Annex I. This includes members of the European Union 15 and 27, Japan, Canada, Russia and the United States. The rationale behind this differentiation is that current developed countries were the main source of GHG emissions for over 150 years of industrial activity. Developed countries –excluding the US who never ratified the agreement - set an average reduction target of five percent relative to 1990 levels by 2012. Although some countries did reduce their emissions, at a global level, emissions have continued to rise.

While it is widely accepted that climate change is a reality and that reducing emissions and implementing adaptation strategies are necessary, there is no agreement on the specific form policies should take. A great source of tension continues to be the role and responsibilities of developed and developing economies. The Philippines, Malaysia, and Thailand are among the members of the Like Minded Group of Developing Countries (LMDC) that, along with India and China, have gone as far as to demand compensation. Historically, Southeast Asian countries have had a small contribution to GHG global emissions. Figure 1 shows the historical contribution of GHG emissions by industrialized countries compared to Southeast Asia. The contributions of Southeast Asia as a region have been between 30% and 40% of those of the US alone; and, on average, 50% of those of the 27 European Union members. This stands in stark contrast to the degree of vulnerability to extreme climatic events. Southeast Asia's score on the vulnerability index (See Figure 2) shows that the region is two times more vulnerable

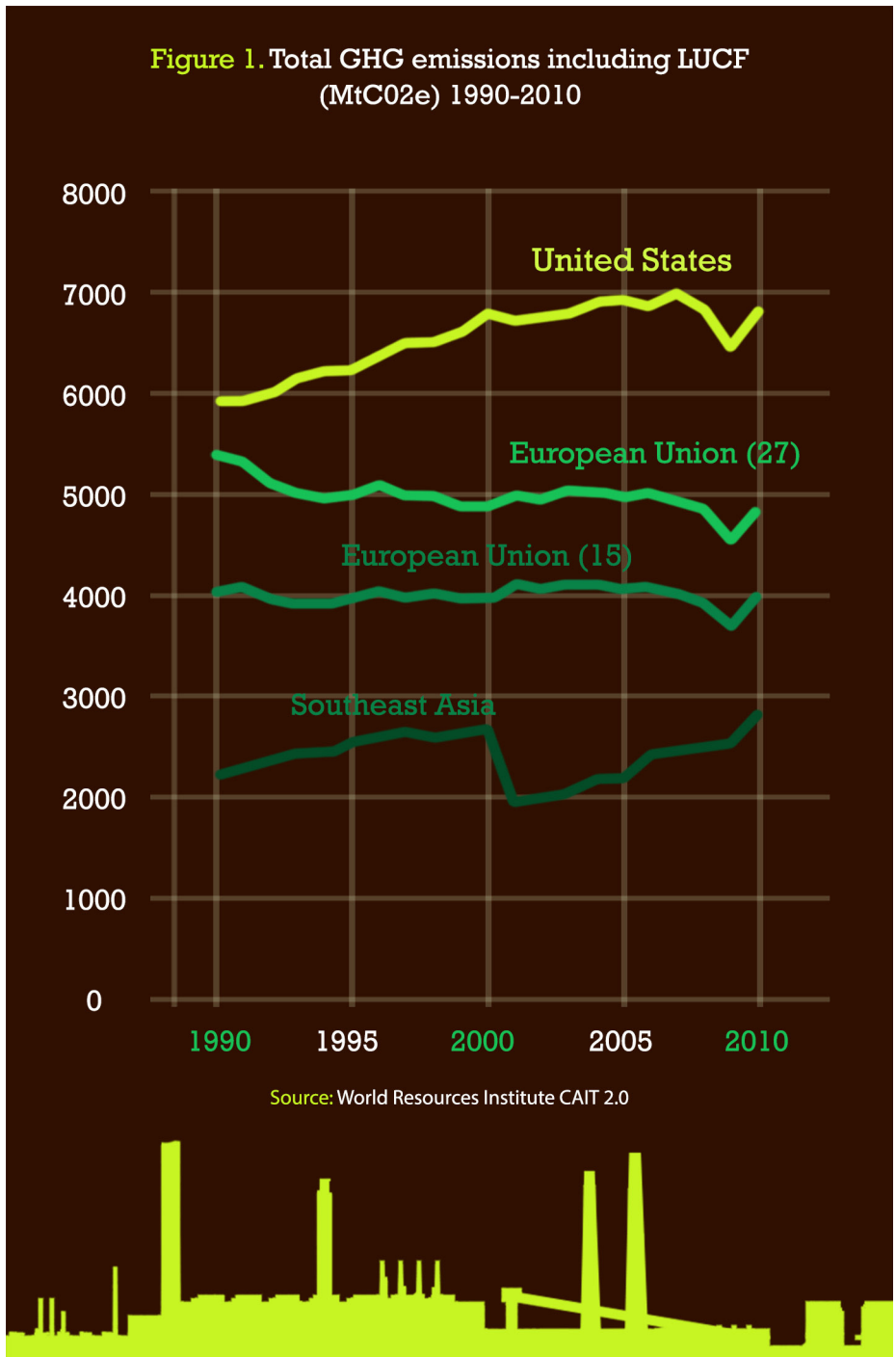
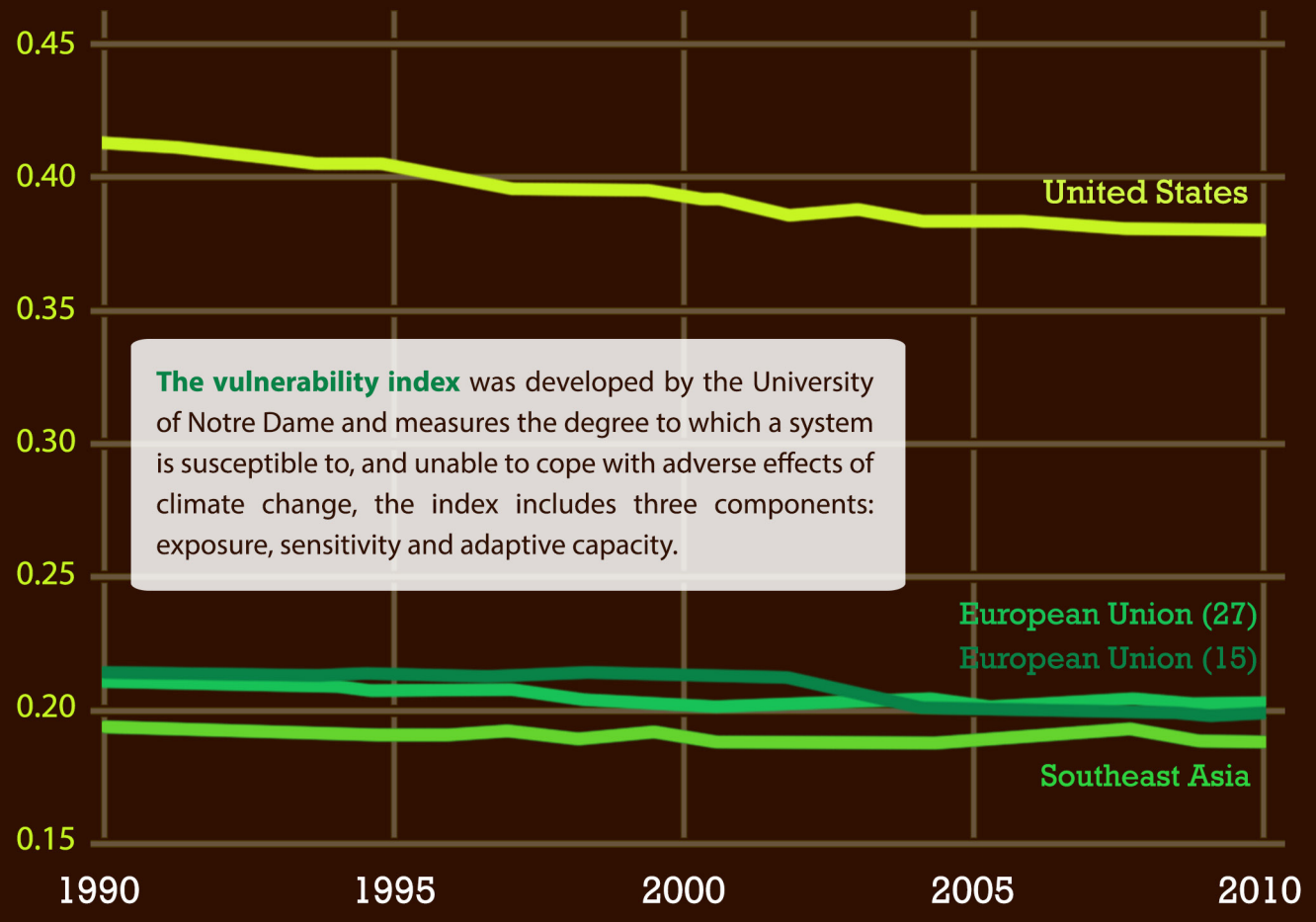
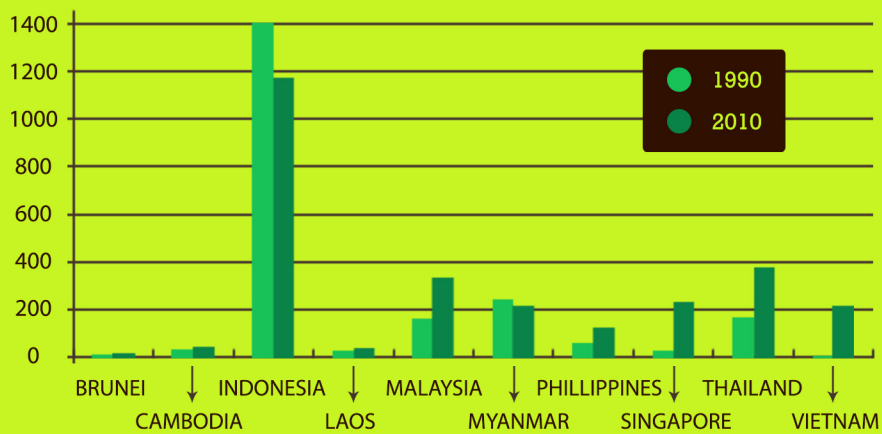


Figure 2. Vulnerability index for Southeast Asia and selected annex I countries (1995-2012)



Source: Notre Dame Global Adaptation Index

Figure 3. Total GHG emissions including LUCF (MtC02e) in Southeast Asian countries 1990-2010



Source: World Resources Institute CAIT 2.0

than the US and illustrates Southeast Asia's position as the most vulnerable in the world.

Within Southeast Asia, Indonesia is the largest contributor to GHG emissions. Indonesian emissions alone accounted for 65% of total emissions in the region in 1990, which dropped to 42% by 2010 (see Figure 3). In addition to being the fourth most populous country in the world, Indonesia has undergone rapid economic growth since the late 1990's. This has led to an average increase of 5.2% in total energy consumption between 2000 and 2006 (CCS, 2013). However, the main source of CO2 emissions comes from land use change and forestry. Deforestation and forest fires are one of the main environmental problems in the region.

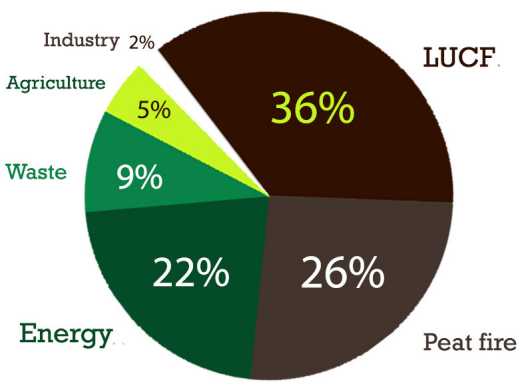
The role of Indonesian Forests in Global Climate Change

Being the world's largest archipelago with over 18,000 islands across the Pacific and the Indian Ocean, Indonesia is a mega-diverse country home to a variety of endemic species. It is the country with the 8th largest forest area and it holds 10% of the world's remaining tropical forests (WB, 2011). It is also the 7th largest emitter of GHG for two main reasons: rapid economic growth based on fossil fuels and rapid deforestation. According to the Rainforest Action Network, as recently as the 1960's, roughly 80% of Indonesia was forested; by 2011 this had shrunk to 51%. Rainforests play a critical role as one of the world's greatest buffers against climate change by storing and absorbing large amounts of carbon. Therefore, when forests are cleared, massive amounts of carbon are released into the atmosphere.

Land use Change and Forestry (LUCF) reflects the CO2 flux from forest land clearing commonly used for croplands or pastures, and it accounts for, approximately, 18% of global GHG emissions. Indonesia is responsible for almost a third of global LUCF emissions (Warr and Yusuf, 2010). LUCF is the main source of GHG representing 36% of Indonesia's total emissions, followed by a 26% contribution from peat fire and 22% from the energy sector. Figure four illustrates the distribution of Indonesia's emissions.

So far, Indonesia has not been able to successfully navigate the dilemma of balancing economic growth versus environmental losses. On the one hand, estimates indicate that palm oil is the main driver of deforestation, on the other hand, palm oil accounted for

Figure 4. Distribution of GHG Indonesian Emissions



Source: Clean Technology Fund Investment Plan for Indonesia

11% of total export's earnings in 2012, making Indonesia the world's largest producer of palm oil providing roughly half of the global supply (FAO, 2012).

The international community has placed great focus on Indonesian deforestation due to its important role on climate change; and has been working on the Reduced Emissions from Degradation and Deforestation (REDD) scheme. Under the REDD scheme, countries will be compensated for slowing the rate at which forests are cleared.

Although the details remain imprecise, in 2010 Norway and Indonesia agreed to a $1billion REDD deal. As part of the deal, Indonesia is implementing a two year extension of the moratorium that prevents new clearing of primary forests. It also created a REDD+ Agency in September 2013. Despite such progress, critics highlight that "the regulation did not create any breakthrough for forest governance improvement, protection and fulfilment of human rights, and forest restoration".

As early as 2004, the Roundtable on Sustainable Palm Oil (RSPO) was created to promote the use of sustainable palm oil through global standards. However, it has been accused of being ineffective in preventing forest fires and limiting GHG emissions associated with the development of palm oil plantations. At a regional scale, destruction of Indonesian forests is a major concern due to the effects of forest fires. During 2013 record levels of smog and haze covered the landscapes of Malaysia and Singapore. An analysis by the World Resources Institute (WRI) using satellite imagery estimated that about 36% of such fires were on land granted as concessions to palm oil, logging and pulpwood companies. Plantations and farmers have been blamed for illegally starting fires as a cheap method of clearing land instead of using machinery and tractors.

The Indonesian government voluntarily committed to a reduction of 26% in GHG emissions by 2020; however, under the current state of affairs, it seems unlikely that Indonesia will reach its goal.

Game over? How Southeast Asia will suffer from climate change in the future

Sitting at the edge of a massive landmass and in between large oceans, Southeast Asian weather is characterized by monsoons, in most countries in the region, there are only two seasons: wet and dry. Moreover, the region has a complex terrain that includes valleys, mountains, islands and coastal zones. Due to its geographical characteristics, the region is expected to undergo severe effects from climate change. Table 1 illustrates some of the observed and predicted effects in the region. Some of the most notable already recorded climatic changes are:

- The South China Sea warmed at a rate of 0.3 -0.4°C per decade since the 1960's;
- Droughts associated with El Nino years caused massive crop failures, water shortages and forest fires during 1997-1998;
- During the period of 1990-2003 there was an average increase of 4.2 in the frequency of cyclones entering the Philippines.
- In the Philippines alone, the number of affected persons due to flood and storms grew from 15 million in 1979 to over 35 million by 2008.

Assuming a 2°C increase by 2040, climate models project unprecedented heat extremes particularly in Indonesia and the southern Philippine islands, which in turn, would reduce rice yields by 22%. Half of all coral reefs are expected to suffer from severe bleaching by 2030, while the relative risk of diarrhea would increase 5-10 percent by 2039.

Southeast Asian countries are caught between their limited contribution to GHG emissions, and therefore, to current climate change, and being among the most vulnerable countries to its predicted effects. Climate change can only be fought with a global strategy that tackles both mitigation and adaptation strategies. However, most countries in the region can only do so much in terms of mitigation with the exception of Indonesia's role due to its forest cover. Given the great vulnerabilities of the region, Southeast Asia needs to focus on building resilient communities that will be able to withstand catastrophic events and be able to emerge stronger from shocks and stresses.

ATM

Table 1. Observed and projected effects of climate change in selected Southeast Asian Countries

Observed Effects	Country	Projected Effects
- Increase in hot days and warm nights - Decreased average monthly rainfall during July and August - 34% of the increase in the erosion rate in the River Delta attributed to the direct effect of sea level rise	VIETNAM	- Decrease in spring rice yield by 2.4% by 2020 - The area of semi deciduous broad leaf forest projected to decrease by 41% in 2020
- Increase of 1 to 1.4 °C in temperature	INDONESIA	- Droughts that will reduce production of wet season rice by roughly 6.5% - At an expected sea level rise of 0.5 meters, parts of six sub-districts of North Jakarta will be permanently inundated.
-Crop losses associated with El Nino -Average increase of 4.2 in the frequency of cyclones for the period 1990-2003 - Decreased rainfall over Luzon and Mindanao; and increased rainfall over the central and western part of the country	PHILLIPPINES	- Temperature rise between 1.2 - 3.9 °C by 2080 - An increase of temperature of 2.0 °C will reduce rice yield by 22%
- An average 1.06°C increased temperature	THAILAND	- Shift in precipitation from north to south, which could lead to over a thousand plant species becoming extinct in the Indo-Burma region

Source: World Bank and IPCC

Houses affected by the Jakarta floods

Fighting Against the Forces of Nature?

by **Sue Helen Nieto**

The Bangkok floods of 2011 were unprecedented, killing more than 700 people, affecting twelve million, and costing the economy approximately US$45 billion by disrupting businesses in one of Thailand's biggest industrial parks. The response of politicians was to blame climate change. Finance Minister Kittiratt Na-Rong declared "If you ask me whether the government is responsible because of its malpractice, mismanagement or ignorance, I have no evidence to believe so; the flooding has to be the result of climate change and global warming". Prime Minister Yingluck Shinawatra added that "we are fighting against the forces of nature".

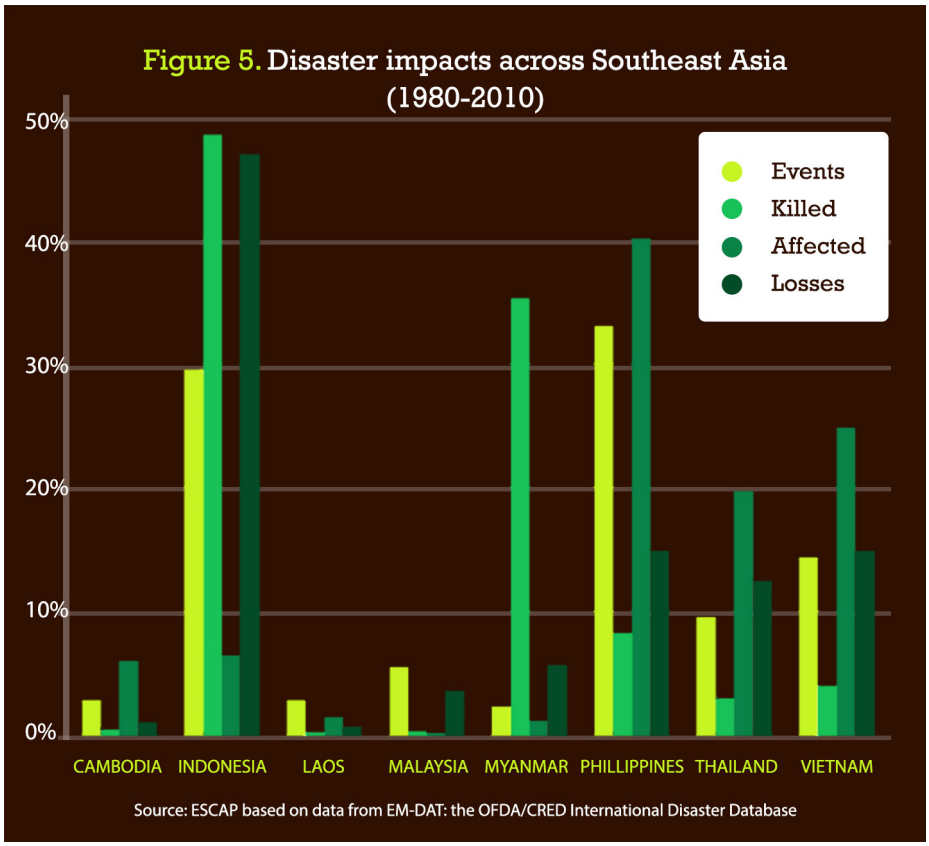
Placing the blame on climate change gave politicians the opportunity to avoid issues such as mismanagement of dams (which failed to release water early enough in the monsoon season), unplanned urban growth, and lack of coordination across government levels. While it is true that rainfall was considerably higher than other years, the severity of the impacts on the population were mainly due to human factors. When a natural disaster strikes, it is human failure that turns it into a humanitarian disaster. Unless governments understand and address the root causes of vulnerability, the number of affected people and economic losses will only increase.

Even if efforts to reduce GHG emissions are successful in the future, it is no longer possible to avoid some degree of global warming and climate change. However, we need to ask tough questions: What is behind the severity of the impacts? What is the human element in climate related disasters? Answering these questions will allow Southeast Asia to better understand its vulnerability, thus improving adaptation policies.

Southeast Asia is one of the most affected regions in terms of disasters. Out of 3,886 global disasters over the period 1980-2012, 45% were in the Asia-Pacific region, making it the region with the largest increase in disasters over the past decade. The international disaster database records three types of impacts: number of people killed, number of people affected, and economic losses. Figure 5 illustrates the distribution of impacts across Southeast Asia.

As expected, Indonesia and the Philippines have the largest number of disasters; however, this does not mean that they also have the largest percentage of affected people. The uneven

Mother and daughter outside their former house after typhoon Haiyan



distribution is an indication that the impacts are not only related to the events itself but to the preparedness and vulnerabilities of each country.

Understanding Southeast Asia' extreme vulnerability is a critical issue for developing effective adaptation policies. The IPCC defines vulnerability as: the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change; and is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity and its adaptive capacity.

Exposure refers to the location of people or assets in hazard prone areas, sensitivity refers to the degree to which a system might be affected and adaptive capacity is the availability of economic social and institutional resources to cope with and adapt to climate change.

As the previous section shows, exposure in Southeast Asia is high. Exposure for the region is based, for example, on the projected decrease of 22% in rice yield due to droughts, a projected increase in frequency and severity of cyclones; and the fact that roughly 10% of the land in Southeast Asia is less than ten meters above sea level.

To make matters worse, some countries in the region are highly dependent on climate sensitive sectors such as agriculture. In Cambodia, 80% of the population still lives in rural areas. In urban areas, it is estimated that four out of five urban settlers live in slums. Figure 6 shows the distribution of rural, urban and slum populations across the region.

The population in rural areas is highly dependent on locally produced food, and survives mainly on subsistence farming with few buffers against climate shocks. Similarly, people living in slums are highly sensitive to climate related hazards since they often lack access to basic services such as improved water, sanitation, sufficient living area, and durability of housing. Manila's slum dwellers, for example, live at constant risk of storms and floods with little to no access to essential services (Loh, Pocock &

Indrakesuma, 2012).

Given that the region has high exposure and high sensitivity, how prepared is it to adapt? Adaptive capacity is defined by the available resources to cope with climate hazards. The ND-GAIN vulnerability index measures the adaptive capacity by considering social, economic and institutional factors such as: government spending, business freedom, perceived corruption, government stability, and rule of law. The index ranks 187 countries with values ranging from .029 for the country with the highest capacity (Switzerland) to .838 (Somalia) with the lowest. Within the region, Cambodia, Laos and Myanmar have the lowest adaptive capacity ranking among the last 20 countries. Malaysia and Thailand are better prepared and are positioned in the middle of the ranking (See Figure 7).

The geographical characteristics of the region make it highly exposed to the projected effects of climate change. Moreover, livelihoods in Southeast Asia largely depend on climate sensitive sectors such as agriculture and tourism. They also have a high concentration of population and economic activity in coastal areas. With high incidence of poverty, limited access to basic services such as health and education (Refer to ATM Bulletin #20 & #22), people are left highly vulnerable and with limited resources to cope with climate change.

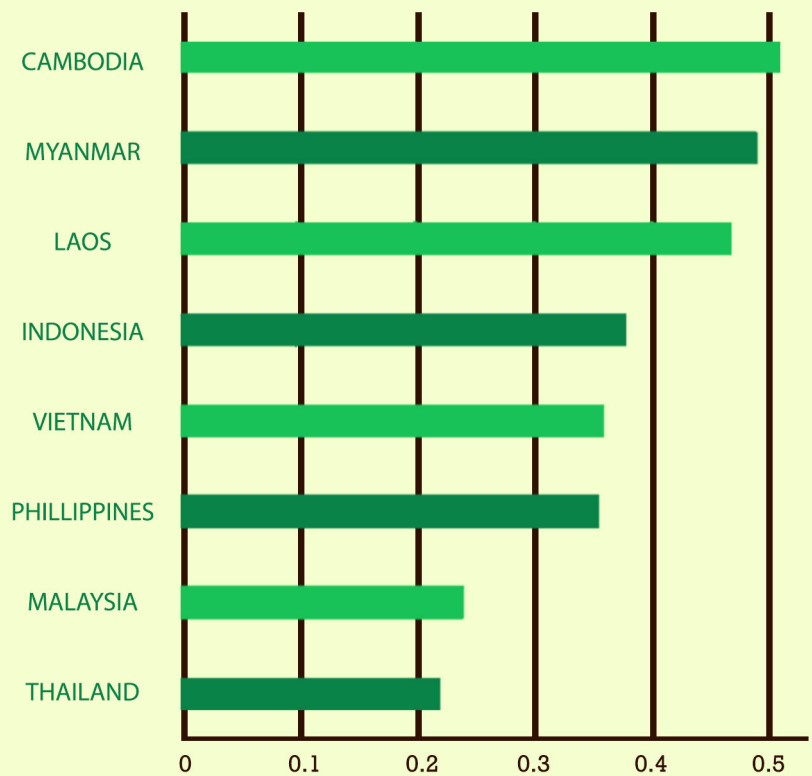
Although the increase in extreme events is likely the result of climate change, the severity of the impacts in human and economic losses will be determined by how prepared countries are. Effective management and adaptation policies are an important component in "fighting against the forces of nature" – as described by Thailand's Prime Minister Yingluck Shinawatra. Unless governments take responsibility for and mitigate human contributions to natural disasters, people in the region will continue to suffer disproportionately from extreme climatic events. **ATM**

Figure 6. Distribution of population in Southeast Asia (2012)

Country	Rural %	Urban %	Urban in Slums %
CAMBODIA	80	20	80
INDONESIA	49	51	23
LAOS	66	44	80
MALAYSIA	27	73	-
MYANMAR	67	33	46
PHILLIPPINES	51	49	41
THAILAND	66	44	27
VIETNAM	59	31	35

Source: World Bank and UN

Figure 7. Adaptive capacity index for Southeast Asian Countries (2012)



*0 = high adaptive capacity; 1= low adaptive capacity
Source: ND-GAIN Global Adaptation Index

Highly exposed housing, Inle lake, Myanmar

The Storm is coming: Adaptation Trends in Southeast Asia

by **Sue Helen Nieto & Johannes Loh**

The high vulnerability of Southeast Asia towards climate change is the result of an interaction of natural, socio-economic and institutional factors. To address this, adaptation strategies must be equally multidimensional. Hence international organizations, governments and communities are focusing on building resilience. Resilience is the capacity of a system to survive, adapt and grow in the face of stresses and shocks; it is about making people, communities, and systems prepared to withstand catastrophic events and be able to bounce back more quickly while emerging stronger from these shocks (Zolli and Healey, 2013).

Sovacool developed a study to identify adaptation efforts in four least developed countries: Bhutan, Bangladesh, Cambodia and the Maldives and concluded that successful adaptation programs and policies work across three

INSTITUTIONAL RESILIENCE

Building institutional resilience means fostering strong, permanent and legitimate organizations to respond to climate issues.

INFRASTRUCTURAL RESILIENCE

Infrastructural resilience refers to creating or rehabilitating relevant, robust and flexible technologies.

COMMUNITY RESILIENCE

Community resilience is built by enhancing local ownership over assets, building capacity and creating networks that help ordinary people learn and adapt to climate change.

dimensions: institutional, infrastructure and community.

Following this framework, the ATM team performed an exploratory analysis of 124 adaptation projects across Southeast Asia. All the projects were recognized either by a UN agency or a national government as an example of "best practices" in building resilience. The exploratory analysis provides insights into the focus of adaptation efforts across the public, private and non-profit sector in the region.

For the purpose of this analysis, a project was considered to contribute to institutional resilience if: it was officially recognized as part of a government initiative, plan or policy; at least one level of government was involved in designing, planning, funding or implementing. Under infrastructure resilience we categorized all projects that required the construction or rehabilitation of physical infrastructure. Finally, community resilience encompasses community awareness raising, community work such as reforestation, and capacity building activities such as income diversification, technical and management training. A project was categorized as a public, private or non-profit initiative according to the organization leading the project, if the leading organizations were from different sectors it was considered collaboration.

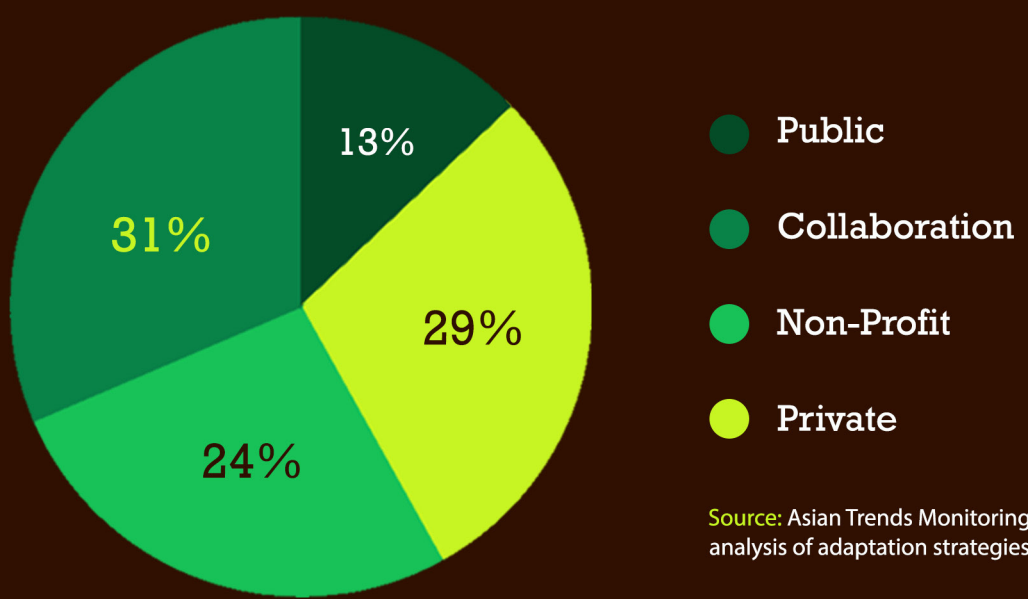
31% of the projects revised are collaboration efforts between at least two sectors, while 29% are part of the private sector, mostly through their Corporate Social Responsibility programs (See Figure 8). An additional 27% are led by non-profits or international organizations, and only 13% are led solely by the government.

When looking at the distribution by type of resilience, we found that only one of the 124 projects focused only on building institutional resilience (See Figure 9 below). This might be an indication that governments are increasingly collaborating with other sectors to implement projects across different dimensions. Projects only tackling physical infrastructure issues are rare. In contrast, 46% of the projects address only community resilience, as mentioned earlier, these include awareness raising and capacity building. The high level of projects targeting only community resilience could be explained by the fact that such projects require less financial resources and less coordination with governments. They are also more easily implemented by small local organizations.

It is worth noting that only twelve percent of the initiatives address all three types of resilience at the same time, this group includes public-private-partnerships, and projects led by major international organizations such as UN agencies and the German aid agency GIZ. Clearly, implementing ambitious projects addressing multiple dimensions of resilience requires high coordination capacity and funding, which might explain their relatively low prevalence.

Community resilience is definitely the most common type across all sectors. 18% of all projects address institutional and community resilience together, while 21% address infrastructure and community resilience. The former implies that governments are increasingly working with communities to implement adaptation strategies. Given that physical infrastructure by itself cannot solve any problems, it is not surprising

Figure 8. Distribution of adaptation projects by sector leading the initiative



Source: Asian Trends Monitoring analysis of adaptation strategies

that almost all of the projects related to infrastructure also have a community component.

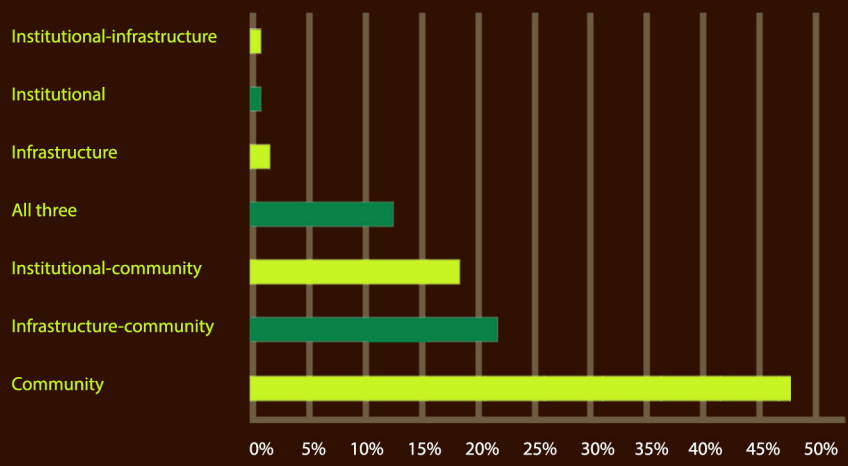
For both private companies and non-profit organizations, there is a strong preference for community resilience projects with 52% and 63% respectively (see Figure 10). This might be due to the relative ease of implementing such strategies compared with the resources necessary to coordinate or build infrastructure. For companies, it is also a relatively cheap way of achieving CSR goals. All public initiatives inherently have an institutional resilience component. Surprisingly, only 4% of public adaptation projects include an infrastructure component, while 35% cover all three types of resilience.

Following Sovacool, the most effective adaptation projects should address all three types of resilience: they should enhance government institutions, plans and policies, strengthen communities' adaptive capacity and develop the necessary physical infrastructure. It appears that there is a strong emphasis on building community resilience through intense awareness raising and capacity building activities. Although it is crucial for communities to adapt to the effects of climate change, on their own these types of projects are not enough to ensure resilience.

This analysis shows that the number of projects addressing all three types of resilience is very low, which could be explained by the high coordination and financial costs required to coordinate and implement them. The need for high resources also explains why roughly two thirds of projects under this category are led by governments, while one third is led by major companies.

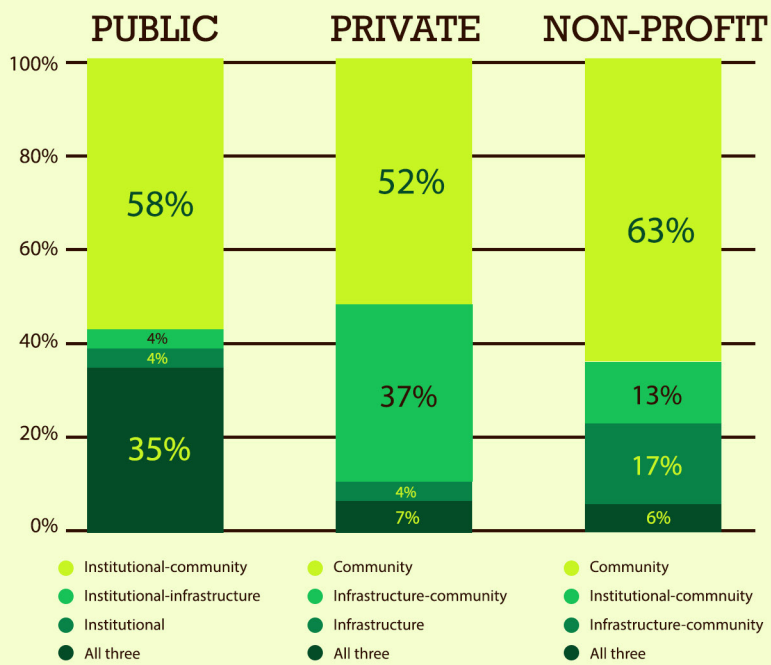
The fact that just one in every ten dollars spent on dealing with disasters is spent on preparedness and prevention partly explains the severe impacts on the population (ODI, 2013). The current trends point to policy makers' failure to understand that adequate adaptation policies save lives and money, costing only a fraction of what is currently spent on disaster response and recovery. True resilience can only be achieved by working across the socio-economic, political and physical dimensions. When faced with extreme shocks and stresses, only communities that were able to build comprehensive resilience will be able to adapt and emerge stronger from external shocks. **ATM**

Figure 9. Distribution by type of project



Source: Asian Trends Monitoring analysis of adaptation strategies

Figure 10. Distribution of initiatives by sector and type of resilience



Storm-resistant housing for climate battered Vietnamese villages

"For people in the communities, climate change means something very specific: floods and typhoons. Adaptation at the local level is about preparing for those events, not about temperature or sea level rise"

Nguyen Tri Dzung,
Vietnam Representative, Challenge to Change.

Central Vietnam is highly susceptible to typhoons that cross into the South China Sea. After typhoon Ketsana caused an estimated damage of $785 billion in 2009, Challenge to Change (CtC) developed a project of rehabilitation and disaster risk reduction. Through participatory methods and the execution of Hazard, Capacity and Vulnerability Assessments (HCVA), the project focused on: building flood and storm resilient housing, community shelter locations, and community based emergency response teams.

When typhoon Ketsana hit, Ms Nguyen Thi Chat's house was severely damaged, however, it wasn't until the torrential rains of 2010 that the house finally collapsed. Her family, including three women and two children, had to move to a small shelter made of clay soil and rotten woods covered by a plastic roof. Such a weak structure left them highly vulnerable to rainfall, sunshine, and wind blow. Although the family qualified for the government's Fund on Extreme Poverty Relief, they have not received any government support yet.

For the project, each community voted to make a priority list of most vulnerable families in the village that would receive the support first. The objective of the project is to build a "bunker" or Typhoon-Resistance Annex (TRA). The room is built with concrete roof and steel-reinforced concrete frame and brick walls in an area between 10m2 and 15m2; and it is built to withstand typhoons of storm force 11 to 13. The cost of materials ranges from US$1,000 to US$1,900 plus labour costs. The contribution by CtC ranges from 35% to 80% depending on the needs of the beneficiaries, their resources and vulnerability. By August 2013, 22 houses were built in three districts of Quang Binh province.

Knowing that the TRA might not be enough for withstanding typhoon and floods, CtC developed an additional storm-resistant

Building the Typhoon-Resistance Annex for a house in Vietnam

housing model. As part of the Asian Cities Climate Change Resilience Network (ASCCRN) supported by the Rockefeller Foundation, CtC piloted the design in five houses in Quy Nhon city and is expected to expand the project.

According to Mr. Nguyen Tri Dzung the success of the initiatives is based on the following factors:

1. Community participation
2. Housing design based on local materials and affordable cost
3. Technical training to transfer construction techniques to community and relevant local agencies
4. Coordination with local authorities.

Adequate infrastructure is a crucial component in building resilient communities; adaptive capacity will depend on the ability of communities to maintain their assets and livelihoods.

Challenge to Change (CtC) is a UK based organization working in Vietnam focused on climate change adaptation.

Destruction after typhoon Haiyan in the Philippines

Action for Development: Building Resilient Communities

"We live under uncertainty, weather has become unpredictable. One year we were expecting floods but there was no rain at all, so the crops died; the following year we experienced heavy rains and the crops were destroyed too"

Mr. Rith Bunroeun, Executive Director, Action for Development Cambodia.

Action for Development is a small non-profit organization working in Kampong Thom province in Cambodia. Its work targets 39 villages in five districts.

The major problem for the communities in the region are the devastating effects of droughts and floods. Farming is their main economic activity. To tackle the issue, AFD works in three main areas: good governance, DRR and climate change; and securing livelihoods.

The organisation collaborates with local governments in developing the Commune Investment Plan (CPI). In 2001, Cambodia implemented new laws on commune administration and management, with the objective of improving democratic local governance through decentralization. Taking advantage of the CIP model, AFD collaborates in the organization of participatory workshops and meetings to embed strategic projects on climate change adaptation.

On the infrastructure side, given the need for measures that minimize the impacts of droughts, the organization built a small irrigation system with funds from UNDP. The system gives farmers the ability to store water year round, and allows them to plant crops two to three times a year. In addition, the communities engaged in rehabilitation of small canals to further increase water access.

An important component of AFD strategy is to provide technical training on diversification of crops and economic activities. AFD provides farmers with information on different crops that are less water intensive and require less time to be harvested. By focusing on less water intensive crops, the impact of droughts is minimized. By focusing on crops that require less time, if they lose one harvest, they can still plant on the same year. The training also teaches them to build a flood resistant shelter for vegetable and seeds which will allow them to continue their activities after a flood. Action for development represents an example of a small organization that is able to address climate change adaptation from a multidimensional perspective by focusing on a particular geographic area. It strengthens local governance by contributing to the CIP, contributes to the improvement of physical infrastructure, and increases the adaptive capacity of the communities.

Adapt or Drown!

by **Sue Helen Nieto**

Indigenous populations are among the most marginalized and vulnerable due to their dependence on climate sensitive activities such as fishing and agriculture. They occupy or use resources on approximately 22% of the global land area, which in turn, holds roughly 80% of the world's biological diversity. Asia is home to around 60% of the world's indigenous peoples (Persoon et al, 2007). They have also accumulated a wealth of knowledge that should be used in climate change adaptation.

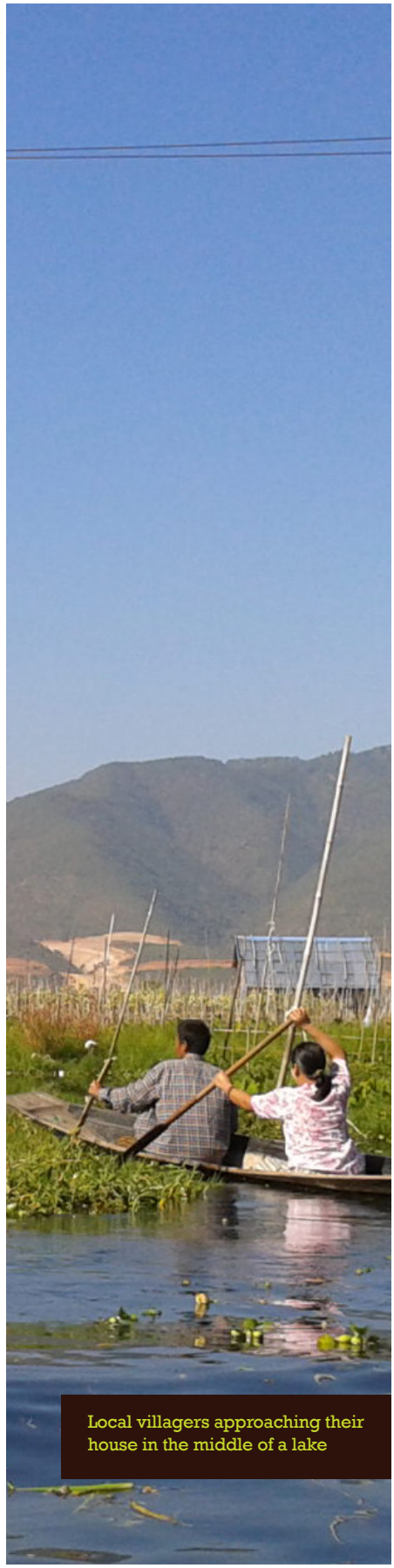
Indigenous knowledge refers to a "cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission about the relationships of living beings with one another and with their environment" (Berkes et al, 2000).

Indigenous communities are the epitome of populations that have contributed the least to climate change but suffer most from its effects. However, this does not mean that such communities are defenseless. Due to their close traditional relationship with the environment, indigenous people are uniquely positioned to adapt to climate change. They have lived in the same environment for hundreds of years and have accumulated an important wealth of knowledge. Sahel (2007) states that local knowledge is important because: it adds cultural context; it is often appropriate and sophisticated; it increases community buy in; it promotes equity, efficiency and the environment; and it increases communication and understanding. The goal of adaptation strategies is to help communities adjust to the local changes affecting their livelihoods. In practice, however, climate models are not very good at providing information about changes at the local level; while common approaches, often top down, fail to account for the socioeconomic realities of local people.

The IPCC in its 4th assessment report in 2007 recognized the role of local and indigenous knowledge in adaptation and sustainability research. Despite the increasing need for traditional knowledge to be integrated into adaptation plans, examples are isolated. Although traditional knowledge is widely used in other fields such as agro forestry, ecological conservation, and traditional medicine, its role in climate change adaptation policies is limited. Possible reasons include: marginalization of traditional knowledge by western science; the challenges of gathering and processing information; and difficulties in understanding how this knowledge can be officially integrated into policy making.

For western science it is difficult to recognize traditional knowledge partly due to its connection to religious beliefs and cultural constructs. Nonetheless, indigenous knowledge, like western science, is based substantially on observation and in some cases, experimentation. So far, studies on the topic have focused on three aspects of local knowledge: weather forecasting; observation of changes through time; and implementation of adaptation tools and strategies.

Traditional weather forecasting is a debated issue due to its strong connection with religious and spiritual practices; however, local knowledge is a crucial element. Scientific forecasting is usually done at a larger scale providing limited use for local communities. In an attempt to integrate traditional and scientific forecasting, a project by Future Agricultures in Kenya brought together traditional "rainmakers" and meteorologist. The objective was to explore the possibilities of using both sets of knowledge to produce more intelligible, robust, and locally useful



Local villagers approaching their house in the middle of a lake

City life in the middle of the 2012 Jakarta flood

Houses vulnerable to extreme weather, Inle Lake, Myanmar

seasonal forecasts. Three elements were key to the success of the project:

1. A focus on the forecasts and not on the traditional methods used to formulate them;
2. A reciprocal process where meteorologist helped rainmakers understand scientific forecasts;
3. A high and repeated level of convergence between the results of the two forecasts, which was crucial to the credibility of the traditional knowledge in the eyes of scientists.

Understanding the evolution of climate change effects in remote areas is difficult, in most cases, there is no scientific data at the local level; nonetheless, indigenous communities have collective historic memory that has helped them track observed changes. For example, studies like Vassal (2006) have focused on the arctic region where the Inuit people have helped scientists understand recent environmental changes and its impact on local activities such as hunting and reindeer herding, similar efforts have successfully been done in Alaska and the Himalayas.

Both forecasting and understanding local climate change effects are tools that help communities plan and adapt. Many communities are already implementing adaptation strategies in Southeast Asia. For example, the Kenyah tribe in Borneo - whose livelihood is based on agriculture - have come to understand the effect of El Nino droughts. As a result, they plant new crops in the drying river beds during droughts. The tribesmen have also moved to diversify their food sources with wild foods, such as extracting starch from wild Sago palms (Salick and Byg, 2007). However, as climate change progresses, these local strategies might be insufficient.

It is important to highlight that there are also risks inherent to traditional knowledge. As climate patterns become more unpredictable, traditional knowledge might become inaccurate and ineffective. One example for that, says Mr. Rith Bunroeun from Action for Development in Cambodia, is looking at spider's behavior in coming down their webs supposed to indicate impending rain fall, a practice that has now been dismissed as outdated and inaccurate. Another study on vulnerability and adaptation of indigenous communities in northern Vietnam found that most adaptation strategies are short-term coping responses; while long-term adaptation actions that address the drivers of vulnerabilities are still scarce (Ngoc Ho, 2011).

Adaptation to climate change at the local level is a complex process that requires synergies between scientist and traditional knowledge. An ideal model would draw upon both sets of knowledge to contribute to the creation of local strategies; however this might require a significant investment of resources. Although it is clear that adaptation planning must learn from the historical view and knowledge that communities have gathered throughout the years, it is still not clear how it feed into formal national policies and plans. As indigenous communities continue to suffer from the adverse effects of climate change, governments will increasingly need to engage in understanding and integrating local knowledge into their adaptation strategies.

Taking on the challenge: Integrating traditional knowledge into policies

Interview with ***Lisa Hiwasaki*** on her project ***"Strengthening Resilience of Coastal and Small Island Communities towards Hydro Meteorological Hazards and Climate Change Impacts"***

Programme Specialist for Small Islands and Indigenous Knowledge, United Nations Educational, Scientific, and Cultural Organization (UNESCO) Office in Jakarta.
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You have been involved in a project that aims to strengthen the resilience of coastal and small island communities. Tell me about the project…

The project started in 2011; the focus is on climate change adaptation and disaster risk reduction, of hydro-meteorological hazards such as storms, cyclones, hurricanes, typhoons, storm surges, flooding, coastal erosion and landslides. The aim of the project is to increase the resilience of coastal communities in Indonesia, the Philippines and Timor-Leste to deal with climate-related hazards that are being exacerbated by climate change, using their local and indigenous knowledge.

We selected these countries for two main reasons: First, Indonesia and the Philippines are famous for being "supermarkets for disasters" (they're open 24/7 and you can get anything!); and second, they are very culturally diverse, which means that there are different local and indigenous knowledge systems that help communities deal with disasters and impacts of climate change. During the first phase (2011-2012) we identified and documented local and indigenous knowledge in three sites in each country; and in the second phase (2012-2013) we "validated" this knowledge against scientific knowledge or empirical evidence. Validation, of course, is contentious. For our project, it was a process that involved communities and scientists: we gathered information from certain members of communities; we validated that knowledge with the rest of the community in terms of whether people think is effective; whether the knowledge is widely held; and whether it has been in the community for more than one generation. We then sought scientific explanations for the knowledge that was validated by the communities; and took the results back to the communities. Finally, we selected some "validated" knowledge for integration with science. During my time at LKY I've been working on a document that UNESCO will publish early 2014, which describes this process, based on experiences from the three countries. I am also writing journal articles on this topic.

In my view, going through this process of observation – documentation – validation – integration with science is important. It allows communities to categorize local and indigenous knowledge, after which they can choose which knowledge can be used for wider use, such as for policy making, education, or further research; and at the same time, enables communities themselves to use their knowledge to strengthen their resilience.

After knowledge integration, in the third phase of the project (2013-2014), we will try to influence policy. We will work in selected sites in each country and try to incorporate local and indigenous knowledge in their community disaster risk management plans. We will also have workshops with government officials to increase their awareness on the importance of including local and indigenous knowledge in disaster risk reduction and climate change adaptation policies and plans.

From our experience, I would say a lot more can be done to incorporate local and indigenous knowledge in disaster risk reduction and climate change adaptation plans. Such knowledge hasn't really been included, at least in Indonesia, the Philippines and Timor-Leste, and the question is, why?

Portrait of traditional tribal warrior, Indonesia

Why do you think local knowledge has not been formally included into plans and policies?

Part of the reason is because it is just really hard to incorporate it. The process that we went through is long and very place-based. In an ideal world, we would do this process in every single community and not just the project sites, but considering how diverse each country is, it is not an easy task. You need time, resources, and willingness of people (by policy-makers, scientists and communities) to go through this process. Everybody has to be committed to go through it.

What kind of climatic changes have the communities observed?

In Sayung, Central Java, Indonesia, communities are experiencing coastal flooding due to land subsidence and coastal erosion. However, this is not simply due to climate change, but also other factors such as infrastructure: communities say that the erosion got worse after a wave breaker was built along the coast. Now, 8km of coastline has been lost, and communities are suffering: many have had to move inland, and farmers have now become fisherfolk.

In Timor-Leste, people have noticed things like longer dry season and rain coming at odd times of the year. There was a dry and a wet season, but when the rain comes is becoming increasingly uncertain, which in turn affects the timing of planting and harvesting. This is further complicated by El Niño Southern Oscillation (ENSO) climate variability. It affects their entire livelihoods.

Why should we make an effort to include traditional knowledge?

There are two aspects to this. From a scientific and policy point of view, if you want to make "better" policy, you need to base the policy in the best available knowledge. Science and technology by themselves are clearly not enough. Hence, when complemented by local and indigenous knowledge, climate change adaptation solutions, for example, will become more place-appropriate. I am not propagating local and indigenous knowledge as a panacea, but I think scientific knowledge can be strengthened with local and indigenous knowledge. Such knowledge makes science and policy stronger because you operate on a wider knowledge-base to make decisions.

The second reason is from an advocacy point of view. Indigenous people have been marginalized, are on the frontlines of climate change, are vulnerable to its impacts, and depend on natural resources for their livelihoods, but they usually have had nothing to do with causing anthropogenic climate change. From a human rights point of view it makes sense to involve them and incorporate their knowledge.

Why hasn't traditional knowledge been really absorbed in climate change unlike other disciplines?

Actually, I think there is quite a large number of research that documents traditional weather forecasting or local observations of climatic changes, especially in the Arctic and the Pacific. Unfortunately, though, these haven't been successfully used in climate change assessments.

Many scientists are already aware that local and indigenous knowledge is critical for climate change science. For example, in 2007, the IPCC in its Fourth Assessment Report acknowledged indigenous knowledge as important. They had a whole section on indigenous knowledge in the case studies section, which I think is a great start, but it needs to be more mainstreamed, more work needs to be done. It probably has not been done because it is not easy. Climate change is global, but the impacts are felt locally, so you have to go to each community and go through that observation – documentation – validation – integration process, which is time-consuming. There's not enough people doing this work, but I wish more people would!

What are the potential risks of traditional knowledge?

Local and indigenous knowledge shouldn't be considered as a panacea, or be romanticized. Some traditional practices can reinforce existing inequalities of certain members of communities, which can increase their vulnerability. In Timor-Leste, we noticed that there are a lot of practices and knowledge that are not accessible to women. For example, many rituals and ceremonies related to storms or rain are practised by men. Or, knowledge on predicting storms is owned by only fishermen. When we took back such knowledge for community validation, women didn't have a clue about such knowledge. Considering that women are disproportionately more victimized by disasters than men, this is a serious issue that we have to address.

So how could or should traditional knowledge be included into policy making?

That's the million dollar question that I've been trying to figure out in my time at LKY School!

I think we need to do more work at the local level. For example, integrating local and indigenous knowledge into climate change adaptation policies at the local level, which needs to be done by going through the whole participatory process we went through that leads to knowledge integration and knowledge co-production. This requires the commitment of the communities, the government and the scientists. The real challenge, though, is at the national level. For example, in 2012 the Indonesian government asked me to help them emphasize the importance of local and indigenous knowledge in their national policy on climate change adaptation. One thing they said to me was: "give me some good examples". If you have a lot of good examples from other places around the world, it will be easier to convince people that this works. In my view, if we have a lot of local-level success stories, they will lead to additional good examples and can help policy makers at the national level realize its importance. It will also encourage them to develop policies to support the implementation of such processes. Unfortunately we're not quite there yet, but I am convinced that our project is a step in the right direction.

Children in front of a traditional house in Alabat Island, Philippines

Navigating the urban hierarchy

by **Sue Helen Nieto**

Urban governance and climate change adaptation strategies often have a heavy focus on megacities. There is a vast literature on the risks and vulnerabilities of megacities around the world. Given that Southeast Asia is home to three of the world's 20 largest cities, such focus might seem justified. However, roughly 88% of the population in SEA lives in agglomerations of less than one million people. What are the implications of focusing on Megacities? What are the particular vulnerabilities of small cities? Understanding the different levels and types of vulnerabilities across different cities, might provide insights on how to implement effective adaptation strategies in small urban places.

Defining small cities is a challenge - it goes beyond measures of population, and should also include indicators of attitudes and underdevelopment. Smallness is also about reach and influence, it is not just size but what you do with it. The size of a city is also determined by its relationship towards other cities. Small urban places lack the political and economic influence of megacities. They are caught between the overwhelming influence of global metropolis and the global concerns for rural populations. However, categorizing the size of cities through an integrated approach has proven to be challenging. Hence, the focus continues to be on population size. Experts differ on what constitutes a small city, ranging from less than 50,000 to less than 1 million inhabitants, nonetheless, what is clear is that they are not national or regional capitals, nor places of commercial or touristic relevance (Ofori-Amoah, 2006).

Regardless of the criteria to define small urban places, the reality is that they are losers. They cannot compete with the agglomeration advantages of big cities. Big cities enjoy the benefits of location and urbanization economies, they compete among each other to attract resources, business, and tourists. Small cities struggle to find their place in the urban hierarchy by providing cheap labour or affordable living spaces. In light of rapid rural-urban migration with hundreds of millions of new urban migrants each year, small cities will play an increasingly strategic role in the future.

The characteristics of small cities become highly relevant in the context of climate change adaptation and DRR. When faced by extreme weather events, small urban places might be at greater risk due to three main elements: proportion of affected population, institutional capacity, and distance from the centres of power.

While is true that megacities have larger absolute numbers of population at risk; due to its size, in small cities higher portions of the population might be at risk. It is unlikely that a disaster will interrupt all economic activity of a megacity. However, in a small city with one major industry or employer dominating the local economy, the risk of affecting the source of income of the majority of the population is high. According to Andrew Rumbach, in big cities, the risk is concentrated in the most vulnerable

An elderly woman finds the remains of her house after typhoon Haiyan hit the Philippines

groups such as slum dwellers, but in small cities, the risk is shared across all social strata.

A second source of great vulnerability is the limited institutional capacity of small cities, more often than not; local governments are not the providers of basic services or infrastructure and rely on regional and national governments. This limits the response capacity in case of an emergency. Furthermore, poor governance in cities also means the perpetuation of unplanned urban development and uncontrolled growth, which is already one of the main drivers of vulnerabilities in the region.

Finally, there is the matter of distance. Small cities tend to be far from the centres of power, not only in physical terms but also in terms of political relevance. They have limited to null influence on the political agenda, and the design of policies, which creates a gap between policy makers and affected communities.

Considering the particular vulnerabilities of small cities in the context of climate change, it is necessary for both governments and academia to deepen the understanding of small urban places. The majority of the population in the region does not live in megacities; therefore, the failure to pay attention to small urban agglomerations could potentially have catastrophic consequences. Small cities in Southeast Asia are particularly exposed to climate hazards due to their predominantly coastal locations. To equip Southeast Asia with better preparedness for changing climates, the focus of adaptation policies must balance the economic and political relevance of big cities and the potential risks embedded in small urban places. **ATM**

"That was my house" a girl stands around destroyed houses after typhoon Haiyan

Disasters slow down long term development; children drying out their school materials after typhoon Haiyan

A storm is brewing... Is Asia Ready?

by **Sue Helen Nieto**

As evidenced by the effects of typhoon Yolanda in the Philippines that left behind 13 million affected people and economic losses surpassing US$ 500 million, Southeast Asia has a long way to go before it can say it is ready. Yolanda showed that when extreme climate events strike, not only is the population not fully prepared, but disaster recovery and response mechanisms might not be either.

It is true that the region has particular geographic characteristics that make it highly vulnerable. Nonetheless, as emphasized by a 2008 Oxfam report, "If natural forces alone were to blame, disasters would have an equal impact on all people". As experience has shown, this is hardly the case. Southeast Asia has a high incidence of poverty, exclusion, social inequalities, and poor development policies, all of which are human shaped elements that determine people's vulnerabilities. If adaptation policies are to be successful, these human shaped elements need to be addressed. These elements are the ones that make a climate hazard become a humanitarian disaster.

As global warming increases the frequency, severity, and unpredictability of extreme weather events, disasters will not only continue to cause immediate losses; but will also hold back long term development in already underdeveloped areas. To minimize the losses of climate events, policies need to target the groups at greatest risk either slum dwellers, indigenous people, or small urban places.

For policy makers it is hard to resist the temptation of focusing on the centres of economic and political power; however, attention must be paid to those who are the hardest hit and exposed to the greatest risks.. Only the understanding that appropriate policies and preparations save lives and money in the long term, will set Asia on the way to building resilience communities. **ATM**

Destroyed school after typhoon Haiyan

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Logging in Indonesia

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