

Climate change adaptation readiness in the ASEAN countries

Author(s): Albert Salamanca and Ha Nguyen

Stockholm Environment Institute (2016)

Stable URL: <http://www.jstor.com/stable/resrep02771>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at <https://about.jstor.org/terms>



Stockholm Environment Institute is collaborating with JSTOR to digitize, preserve and extend access to this content.

JSTOR

Climate change adaptation readiness in the ASEAN countries

Climate change poses significant challenges to Southeast Asia. The region is highly exposed to extreme weather events, and both warming and extreme events – high temperatures and heavy precipitation – are projected to increase in future decades.¹

Agriculture, which accounts for more than 10% of GDP in most countries in the region, is highly sensitive to climate impacts, and persistent poverty in rural areas, low levels of education, spatial isolation, and neglect by policy-makers, can amplify those impacts.² Vulnerability is particularly high in rural areas, which are home to more than three-quarters of the region’s poor people, many of them smallholders or subsistence farmers.³ Building resilience in agrarian communities is thus a priority.⁴

Increasing agricultural productivity is central to the Association of Southeast Asian Nations (ASEAN) countries’ efforts to lift rural areas out of poverty. Climate change could undermine those efforts, so effective adaptation is crucial.⁵ This discussion brief summarizes a desk review commissioned by GIZ of the adaptation readiness of ASEAN Member States⁶. The focus of this brief is on smallholders – defined here as farms of less than 2 hectares, using household labour.

Smallholders are central to Asian agriculture,⁷ and their situation can be precarious, their livelihoods and food supplies dependent on the timely availability of water and the absence of hazards that can lead to crop losses and livestock deaths. The review summarized here assessed the steps taken so far to reduce rural populations’ vulnerability, aiming to identify gaps and key concerns for future research and action, and, most important, help policy-makers to more effectively reduce vulnerability.

Adaptation readiness

The concept of “adaptation readiness” provides a framework to describe where countries are with regard to formulating and achieving their goals of adapting to the impacts of climate change and implementing key policy priorities.⁸ Adaptation readiness is defined as “the extent to which human systems (e.g. nations, regions, businesses, communities etc.) are prepared to adapt, providing an indication or measure of the likelihood of adaptation taking place”.⁹ Its components include political leadership; usable science and data to inform decision-making;



Rice farmers in Kompong Khleang, a community on the Tonlé Sap lake in Cambodia, transplant rice into the rich sediment in the off-season.

© SEI photo / Reengchai Kongmuang

institutional structures for adaptation planning, stakeholder involvement and implementation; finance for planning, activities and evaluation, and public support.

This framework highlights the understanding that adaptation is not an outcome but a “systemic process”.¹⁰ Achieving success is complicated by the fact that “adaptation is typically not just to one climate risk, but to multiple interacting ones (unfolding across geographic scales, spatial and sectoral boundaries, ecological systems, and social strata) against a backdrop of non-climatic stresses and conditions”.¹¹ Given that adaptation efforts are at a relatively early stage in the ASEAN region, an evaluation of adaptation readiness may provide the most useful way to improve national adaptive capacity.

Our review shows that readiness results, in a large part, from how governments perceive their country’s vulnerability, and the priority given to responses by different actors. These priorities may be driven by internal constituencies, or by the concerns of bilateral or multilateral organizations.¹² We group the ASEAN countries in three categories: *adaptation pioneers* (Philippines and Vietnam), *emerging champions* (Cambodia, Indonesia and Myanmar), and *wait-and-see adaptors* (Laos, Malaysia and Thailand).¹³

The pioneers see adaptation as an urgent need and have implemented new institutional arrangements to address it. The emerging champions are following close behind, taking new approaches to adaptation. In some countries – most notably the Philippines and Vietnam – disasters have acted as “focusing events” that stimulate policy engagement. Conversely, countries with less exposure to disasters have tended to be complacent about adaptation, such that policies and programs in place are disjointed, weak or limited in impact. This appears to be the case in Malaysia, where the government perceives climate change-related vulnerabilities as generally low compared with other countries in the region. As a result, the government has subordinated adaptation action to the pursuit of economic development.¹⁴

The adaptation pioneers

The Philippines and Vietnam have implemented significant elements of adaptation readiness. Due to its geography, the Philippines is highly susceptible to hydro-meteorological hazards in particular, and vulnerability is exacerbated by poverty, making adaptation measures very important.¹⁵ The Philippines’ adaptation framework is provided by the Climate Change Act of 2009 (RA 9729), the National Framework Strategy on Climate Change (2010–2022) and the National Climate Change Action Plan (2011–2028), along with the establishment of a funding mechanism.

In Vietnam, the institutional framework for adaptation is provided by the National Strategy on Climate Change 2012 and the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development Sector Period 2008–2020. A prominent component in Vietnam’s approach to adaptation is its National Target Program to

Respond to Climate Change (NTP-RCC). It is driven by a recognition that the impacts of climate change in Vietnam are severe,¹⁶ and that acting in a timely and comprehensive way to address them has potential co-benefits to the economy, such as access to finance.¹⁷ Although the target program has been described as a technocratic approach heavily influenced by Vietnam's science culture¹⁸ and donor priorities,¹⁹ the setting of targets enables planning, monitoring and evaluation.

Emerging champions

Cambodia is an emerging climate change adaptation champion, as it is a priority country for the Climate Investment Fund/Asian Development Bank's Pilot Program on Climate Resilience (PPCR).²⁰ Cambodia has a National Climate Change Committee (NCCC) to prepare, coordinate and monitor the development and implementation of climate policies, strategies and programmes; a Climate Change Technical Team (CCTT) to provide technical support to the NCCC; and a Climate Change Department (CCD) which serves as the NCCC secretariat and coordinates the activities of the CCTT.²¹

The NCCC has led the process of developing the Cambodia Climate Change Strategic Plan 2014–2023. In 2014, the Ministry of Agriculture, Forestry and Fisheries released a climate change action plan for those sectors, covering the period 2014–2018. Finance for adaptation projects is available through the Cambodia Climate Change Alliance Trust Fund, administered by the United Nations Development Programme (UNDP).²²

Though Indonesia has yet to fully implement its recently crafted National Action Plan for Climate Change Adaptation (RAN-API), the plan is an important step forward. It harmonizes previously disparate government policies, including National Action Plan Addressing Climate Change, the Indonesia Climate Change Sectoral Roadmap, and the Annual Government Work Plan.

RAN-API recommends an adaptation framework composed of three pillars: ecosystem resilience, livelihoods resilience (comprising health, settlement and infrastructure), and economic resilience (comprising food and energy security). A Climate Change Coordination Team was set up by the Ministry of National Development Planning (BAPPENAS) to coordinate central-level ministries.²³ The Indonesia Climate Change Trust Fund, a national body, pools and coordinates national and international grants for climate activities.²⁴

Myanmar has significant climate related sensitivities,²⁵ but there have been a number of initiatives to address these, especially in disaster-prone areas,²⁶ and through the ongoing national adaptation plan (NAP) process. The National Environmental Conservation Committee (NECC) is the focal point for activities under the United Nations Framework Convention on Climate Change (UNFCCC) and other environmental conventions. The Myanmar National Adaptation Program of Action 2012 (NAPA) is the key guiding document on adaptation, and also serves to communicate priority adaptation projects for funding.²⁷

Wait-and-see adaptors

As upper middle-income countries, Thailand and Malaysia are not dependent on external funds to implement adaptation plans and strategies, but this, coupled with low risk indices compared with other countries in the region,²⁸ has arguably made them complacent, which could be their undoing.



Local champions have important roles to play in responding to the impacts of climate change. Here, members of a livestock farming community in Lombok, Nusa Tenggara Barat, Indonesia, discuss coastal adaptation.

The 2011 floods in Central Thailand would have been an opportunity to address climate change and its other associated causes, but political turmoil in the ensuing years got in the way.²⁹ Thailand's master plan on adaptation is awaiting approval and implementation. Thailand's climate change policies are expressions of the goals and objectives of the country's National Economic and Social Development Plan, which is now in its 11th round.

The government's key climate policies are the National Environmental Quality Management Plan (2012–2016) and the draft National Master Plan on Climate Change (2011–2050). The activities that underpin those policies, in turn, are built into the different sectoral plans, such as the National Industrial Development Master Plan (2010–2014) and the Strategic Plan on Climate Change in the Agricultural Sector.³⁰ While "mainstreaming" adaptation into sectoral policies is common and widely recommended,³¹ in Thailand it has had the effect of subsuming adaptation under economic strategies.

Malaysia's key climate policy is the National Policy on Climate Change. One of its objectives is to mainstream climate change through wise management of resources and enhanced environmental conservation, resulting in strengthened economic competitiveness and improved quality of life. However, many of the approaches in the policy relate more to mitigation than adaptation, and the two are often combined. Strategic thrust No. 4, for instance, stipulates that the State should adopt balanced adaptation and mitigation measures to strengthen environmental conservation and promote the sustainable management of natural resources.³²

Adaptation planning is very recent in Lao PDR, the only landlocked country in Southeast Asia, and is mostly promoted by international cooperation agencies. The National Steering Committee on Climate Change (NSCCC), an inter-ministerial agency, provides guidance and inputs for climate change policies and programmes, but it does not coordinate among and between ministries.

The Climate Change Office serves as the secretariat of the NSCCC. It acts as the focal point on climate change initiatives, and coordinate the government's activities related to the UNFCCC.³³ Eight technical working groups were formed within the line ministries to assess impacts and outline prioritized actions for adaptation and mitigation in their respective sectors. However,

the agencies and working groups have overlapping mandates and do not cooperate; they lack a commitment to climate issues, and they are also not well resourced, with only small budgets and a lack of access to funding, knowledge and expertise.³⁴

Collective insights

The ASEAN Member States have very different experiences with adaptation, but collectively they offer valuable lessons, insights and examples on how to prepare for and respond to the impacts of climate change. For instance, other countries can learn from the Philippines' efforts to develop a legal framework for adaptation, and its establishment of an adaptation finance scheme (the People's Survival Fund). Although money has only recently flowed into the fund, its creation highlights the need for such a mechanism.

Indonesia's efforts to establish a Climate Change Trust Fund to serve as the national implementing entity for major climate financing schemes, though they failed, also offer useful insights about the process required and the support needed to succeed. Thailand and Vietnam, which are planning to create a similar fund, and Cambodia, which is in the process of instituting one, could learn from Indonesia's experience.

Thailand, meanwhile, offers insights on how to adapt in the water sector, as Thailand leads in key water management and irrigation schemes. It also provides an example for how national funds may be used to finance adaptation research, as the Thailand Research Fund has done.

Malaysia, which has integrated adaptation into its broader climate and economic strategies, can offer insights on combining adaptation with mitigation and economic development activities. Lastly, Vietnam's National Target Program to Respond to Climate Change (NTP-RCC) provides insights on how to set targets so that adaptation goals are realistic and achievable. It provides a clear focus on sets of activities, integrates with development planning, and draws in the whole government. Activities are planned in phases, with targets set for each phase. Such an approach provides an opportunity for better monitoring and evaluation of outcomes, and thus enables reflection and learning.

This review also identified critical deficits in adaptation readiness, however, which require follow-up. First, funding, an important component that can determine what activities and priorities are pursued, is a bottleneck in many cases. Second, adaptation demands multi-level action (from national,

to provincial, to district/regency and village), but countries' efforts are still focused on the national level. There are some local adaptation actions, but they are not widespread enough to create a multiplier effect and energize a broader local constituency for adaptation. Moreover, opportunities are being missed to learn from local practices and knowledge that could inform adaptation actions – for example, the *subak* and *sasi* systems in Indonesia.

Third, it is unclear how well climate change impacts are understood and addressed in adaptation planning. Interventions so far have mostly addressed the risk of natural hazards, but not cumulative and indirect climate change impacts, or non-climate stressors. In other words, much of the work on adaptation planning to date has focused on impacts, failing to address the multi-faceted nature of climate risk, and neglecting key factors that determine adaptive capacity.³⁵

Major sources of vulnerability, linked to social structures and poverty, are not being addressed. As the Intergovernmental Panel on Climate Change (IPCC) notes in its *Fifth Assessment Report*, efforts to build climate-resilient development pathways “will have only marginal effects on poverty reduction, unless structural inequalities are addressed and needs for equity among poor and non-poor people are met”.³⁶ This means that vulnerability is likely to persist even if measures are taken to reduce the physical impacts of climate change.

A closely related problem is that adaptation efforts are failing to engage and listen to vulnerable populations in adaptation discussions and decision-making. There is also a need also to test whether ongoing interventions, or adaptation pathways, could in fact be leading to maladaptation; instead, adaptation measures need to enable learning, so that adaptive capacities are built over the longer term.

Amidst these deficits, the needs of smallholders and subsistence farmers stand out as they are the face and important stakeholders of rural and agricultural Southeast Asia. A critical component of ASEAN Member States' priorities for climate change adaptation moving forward should, therefore, concern the interests and potentialities of these groups. It is not just that they have a lot to lose and are particularly vulnerable to climate change, but policy makers and scholars also have a great deal to learn from them.

Recommendations for adaptation readiness in the region

Based on this review, we offer several recommendations:

Develop a regional agenda for the adaptation of smallholders.

As noted above, adaptation efforts in the region have failed to address social aspects of vulnerability. A regional adaptation agenda needs to be developed that targets the needs of vulnerable groups. Investments in “no-regret” options such as new crop varieties, climate smart extension services, climate change ready agronomic practices, and livelihoods support could be introduced, but these need to be sensitive to, and cognizant of, the everyday lives of poor(er) groups and individuals.

Directly engage smallholders in adaptation planning and decision-making.

The IPCC *Fifth Assessment Report* finds with high confidence that engaging rural people in decision-making, especially to understand autonomous adaptation and the interplay of informal



The 2011 monsoon season brought severe floods to Thailand, reaching the mouth of the Chao Phraya and inundating parts of Bangkok in October.



© SEI photo / Reengchai Kongmuang

The abundant fish catch in the Tonlé Sap River in Cambodia will suffer if water flow is reduced and erratic.

and formal institutions, plays an important role in strengthening public decision-making.³⁷

Farmers need to have a strong voice in adaptation processes, so they can articulate their concerns and priorities, as their views are grounded in their daily lives and experiences. Smallholders' concerns can be quite different from those of scientists; for example, a case study in the Lower Mekong Basin found that while scientists were focused on long-term shifts in average temperature and rainfall, community members were most concerned about irregular rainfall patterns during the growing season and/or periods of extreme temperature that intensify annual droughts.³⁸

Support sub-national networks and processes to advance adaptation.

There is a need to proactively engage sub-national actors in adaptation planning and policy, and this includes supporting sub-national networks and processes. This will also facilitate engagement with key populations such as smallholder farmers. In countries where adaptation policies and plans are already fairly advanced, national governments could increase outreach to sub-national stakeholders, to increase awareness of these policies and plans and provide opportunities for feedback. What is notable is that some of the poorest countries with the least capacity have something to teach their richer and apparently more capable neighbours. This therefore upturns the usual pattern of knowledge production and dissemination in the region.

Build public support for adaptation.

Public support for adaptation is generally lacking in the ASEAN countries, and needs to be generated on the ground. One key strategy is to engage smallholders in adaptation planning. Drawing on experiences in the region such as in Indonesia, one suggestion is to consider developing farmer field schools focused on adaptation, to demonstrate the cultivation of climate-resilient crop varieties and to enable knowledge-sharing among farmers.

Facilitate sharing of adaptation insights and experiences.

ASEAN countries that are currently developing their adaptation frameworks and approaches, such as Cambodia, Laos and Myanmar, will gain from the experiences of other countries that have made substantial headway in their planning for adaptation. Institutionalizing a platform for knowledge-sharing at the regional level could create synergies among existing knowledge portals.

With its convening power and ability to draw in resources and expertise from regional and international actors, GIZ's Forestry and Climate Change (FOR-CC) programme in the ASEAN countries could play a valuable role in this context. The programme could provide a framework to regularly track adaptation in the agriculture and forestry sectors, particularly in reviewing barriers to adaptation that are encountered, and facilitate the sharing of information and insights cross-nationally.

Set up strong monitoring and evaluation systems to facilitate learning from adaptation actions.

Effective monitoring and evaluation (M&E) can facilitate learning by providing a structured approach for measuring success and understanding what factors are critical for success. FOR-CC could support impact evaluations of recently concluded adaptation projects, using GIZ's own M&E system for national adaptation action, or one of several other available M&E frameworks, such as Tracking Adaptation and Measuring Development (TAMD) by the International Institute for Environment and Development, or UK CIP's ADAPTME. Guidance is also available from the now-defunct Southeast Asia Climate Change Monitoring and Evaluation Communities of Practice.

Strengthen funding for adaptation planning and action.

There are several funding opportunities available bilaterally and multilaterally, with some of them established recently through the UNFCCC process. These include the Adaptation Fund, the Least Developed Countries Fund, the Special Climate Change Fund, and Global Climate Change Alliance. There is also funding through philanthropic organizations, and there are efforts within the field of adaptation to match global funding sources with national priorities, such as through the U.S. Agency for International Development (USAID) Adapt Asia Pacific.

As adaptation is local, and local capacities need to be built, it is important that these funding opportunities are also made available to local community groups and civil society organizations. ASEAN, through the ASEAN Climate Resilience Network (ASEAN-CRN) or related technical working groups,



© IHH Humanitarian Relief Foundation / Flickr

A woman retrieves her belongings after the devastation of Typhoon Haiyan in Tacloban, the Philippines.

could establish a funding window, possibly small grants, for these organizations, perhaps to provide rapid response to a potential crisis or to build capacities for a foreseen climate or weather-related risk. The Samdhana Institute, an NGO based in Bogor, has experience providing such small grants, and could serve as an example.

Given the importance of having a national or regional implementing entity (NIE/RIE) to secure finance through the Adaptation Fund and the Green Climate Fund, it may also be worthwhile to explore how the ASEAN Secretariat could be accredited as a regional implementing entity, to expand these countries' access to the two funds. The ASEAN Secretariat has already acted as a conduit for an EU peatlands project.

Conclusion

Most of the adaptation policies currently implemented in ASEAN Member States are still relatively new; and hence, there are limited lessons to be drawn. Yet adaptation efforts are increasing. Over time, "best practices" could be drawn from successes, and cautionary lessons from failures, to inspire and inform further action in other places, sectors or domains. Thus, a key take-away from this assessment is that there is a need to carefully document what each country is doing, track progress over time, and provide opportunities to evaluate experiences and draw and share lessons.

Endnotes

- IPCC (2013). *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. T.F. Stocker, D. Qin, G.-K. Plattner, M. M. B. Tignor, S. K. Allen, et al. (eds.). Cambridge University Press, Cambridge, UK, and New York. <http://www.ipcc.ch/report/ar5/wg1/>.
- Hijioka, Y., Lin, E., Pereira, J. J., Corlett, R. T., Cui, X., Inzarov, G., Lasco, R., Lindgren, E. and Surjan, A. (2014). Asia. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. V.R. Barros, C. B. Field, D. J. Dokken, M.D. Mastandrea, K.J. Mach, et al. (eds.). Cambridge University Press, Cambridge, UK, and New York. 1327–70. <https://www.ipcc.ch/report/ar5/wg2/>.
- Dasgupta, P., Morton, J. F., Dodman, D., Karapinar, B., Meza, F., Rivera-Ferre, M. G., Sarr, A. T. and Vincent, K. E. (2014). Rural areas. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. C.B. Field, V. R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastandrea, et al. (eds.). Cambridge University Press, Cambridge, UK, and New York. 1327–70. <https://www.ipcc.ch/report/ar5/wg2/>.
- Zhai, F. and Zhuang, J. (2009). *Agricultural Impact of Climate Change: A General Equilibrium Analysis with Special Reference to Southeast Asia*. ADBI Working Paper Series No 131. Asian Development Bank, Manila. <http://www.adb.org/publications/agricultural-impact-climate-change-general-equilibrium-analysis-special-reference>.
- ADB (2012). *Sector Briefing on Climate Change Impacts and Adaptation: Agriculture*. Asian Development Bank, Manila. <http://www.adb.org/publications/sector-briefing-climate-change-impacts-and-adaptation-agriculture>.
- ASEAN (2014). *ASEAN Joint Statement on Climate Change 2014*. <http://www.asean.org/index.php/news/asean-statement-communicues/item/asean-joint-statement-on-climate-change-2014>.
- ASEAN (2014).
- The views presented here are of the authors and may not reflect the views of GIZ.



Ripening rice in the Bali Cultural Landscape, a UNESCO World Heritage Site. Indigenous engineering practices have sustained the people and its landscape and could inspire creative adaptation to the impacts of climate change.

- Thapa, G. and Gaiha, R. (2011). *Smallholder Farming in Asia and the Pacific: Challenges and Opportunities*. Presented at the IFAD Conference on New Directions for Smallholder Agriculture, 24–25 January, Rome. International Fund for Agricultural Development. <http://www.ifad.org/events/agriculture/doc/papers/ganesh.pdf>.
- Ford, J.D., Berrang-Ford, L., Lesnikowski, A., Barrera, M. and Heymann, S. J. (2013). How to track adaptation to climate change: a typology of approaches for national-level application. *Ecology and Society*, 18(3). Art. 40. DOI:10.5751/ES-05732-180340.
- Ford, J.D. and King, D. (2015). A framework for examining adaptation readiness. *Mitigation and Adaptation Strategies for Global Change*, 20(4). 505–26. DOI:10.1007/s11027-013-9505-8.
- Ford and King (2013), p.509.
- Eakin, H.C. and Patt, A. (2011). Are adaptation studies effective, and what can enhance their practical impact? *Wiley Interdisciplinary Reviews: Climate Change*, 2(2). 141–53. DOI:10.1002/wcc.100. p.142.
- Moser, S.C. and Boykoff, M. (2013) Climate change and adaptation success: the scope of the challenge. In: *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World*, S.C. Moser and M.T. Boykoff (eds.). Routledge, London. 1–33. Quoted passage is on p.16.
- In the case of Vietnam, see Bruun, O. (2012). Sending the right bill to the right people: climate change, environmental degradation, and social vulnerabilities in Central Vietnam. *Weather, Climate, and Society*, 4(4). 250–62. DOI:10.1175/WCAS-D-11-00040.1.
- For details about each country's activities and key institutions, see Tables 1–5, available online at <http://www.sei-international.org/publications?pid=2881>.
- Pereira, J.J., Tiong, T.C. and Komoo, I. (2010). Mainstreaming climate change adaptation and disaster risk reduction: A Malaysian approach. *Climate Change Adaptation and Disaster Risk Reduction: An Asian Perspective*, R. Shaw, J. Pulhin, and J.J. Pereira (eds.). Vol. 5. Emerald Group Publishing Limited, Bingley. 147–67.
- Solar, R. (2011). *Scoping Assessment on Climate Change Adaptation in Malaysia*. Regional Climate Change Adaptation Knowledge Platform for Asia, Bangkok. <http://www.apan-gan.net/resource/scoping-assessment-climate-change-adaptation-malaysia>.
- See, e.g., Kent, A. (2014). *In the Shadow of the Storm: Getting Recovery Right One Year after Typhoon Haiyan*. Oxfam International. <https://www.oxfam.org/en/research/haiyan-shadow-storm>.
- Fortier, F. (2010). Taking a climate chance: A procedural critique of Vietnam's climate change strategy: Taking a climate chance. *Asia Pacific Viewpoint*, 51(3). 229–47. DOI:10.1111/j.1467-8373.2010.01428.x.
- Zimmer, A., Jakob, M. and Steckel, J.C. (2015). What motivates Vietnam to strive for a low-carbon economy? On the drivers of climate policy in a developing country. *Energy for Sustainable Development*, 24. 19–32. DOI:10.1016/j.esd.2014.10.003.

- 18 Bruun (2012).
- 19 Fortier (2010).
- 20 See <https://www.climateinvestmentfunds.org/cifnet/investment-plan/cambodias-ppcr-strategic-program>.
- 21 National Climate Change Committee (2013). *Draft Cambodia Climate Change Response Strategic Plan 2014–2023*. Phnom Penh. <http://www.kh.undp.org/content/dam/cambodia/docs/EnvEnergy/CCCAProjects/Cambodia%20climate%20change%20strategic%20plan%202014-2023.pdf>.
- 22 Irawan, S., Ponlok, T., Keo, K. and Heikens, A. (2012). *Case Study Report: Cambodia Climate Change Alliance Trust Fund*. United Nations Development Programme, Bangkok. http://www.asia-pacific.undp.org/content/rbap/en/home/library/climate-and-disaster-resilience/NCF_Cambodia_CC_Trust_Fund.html.
- 23 Ministry of National Development Planning (BAPPENAS), Ministry of Environment, National Council on Climate Change, and Climatological Meteorological and Geophysical Agency (2013). *National Action Plan for Climate Change Adaptation (RAN-API): Synthesis Report*. Jakarta. https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/programme-info/RAN-API_Synthesis_Report_2013.pdf.
- 24 Tänzler, D. and Maulidia, M. (2013). *Status of Climate Finance in Indonesia – Country Assessment Report*. GIZ and adelphi, Jakarta. <https://www.adelphi.de/en/publication/status-climate-finance-indonesia>.
- 25 Harmeling, S. and Eckstein, D. (2012). *Global Climate Risk Index 2013 – Who Suffers Most from Extreme Weather Events? Weather-Related Loss Events in 2011 and 1992 to 2011*. Germanwatch, Bonn. <https://germanwatch.org/en/5696>.
- 26 RIMES (2011). *Managing Climate Change Risks for Food Security in Myanmar. Technical Report*. Regional Integrated Multi-Hazard Early Warning System, Bangkok. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.468.5318&rep=rep1&type=pdf>.
- 27 National Environmental Conservation Committee, Ministry of Environmental Conservation and Forestry (2012). *Myanmar's National Adaptation Program of Action (NAPA) to Climate Change*. Napyadaw. <http://unfccc.int/resource/docs/napa/mmr01.pdf>.
- 28 Alliance Development Works (2013). *World Risk Report 2013*. Berlin. <http://www.worldriskreport.org>.
- 29 Marks, D. (2015). The Urban Political Ecology of the 2011 Floods in Bangkok: The Creation of Uneven Vulnerabilities. *Pacific Affairs*, 88(3). 623–51. DOI:10.5509/2015883623.
- 30 Sansayavichai, P. and Somnam, T. (2013). *Climate Change Mitigation Using Innovative Assessment Tools and Techniques – Thailand*. Presentation at Strengthening Policies and Practices for Low-Carbon Green Growth in Southeast Asia. <http://www.adbi.org/files/2013.07.17.cpp.d2.s4.2.4.country.ppt.thailand.pdf>.
- 31 Bhaktikul, K. (2012). State of knowledge on climate change and adaptation activities in Thailand. *Procedia - Social and Behavioral Sciences*, 40. 701–8. DOI:10.1016/j.sbspro.2012.03.252.
- 32 Ministry of Natural Resources and Environment Malaysia (2010). *National Policy on Climate Change*.
- 33 UNDP, WREA and GEF (2009). *National Adaptation Program of*



© Albert Salamanca

Reef cleaning at intertidal pools and seagrass beds during sunset is an important activity of coastal inhabitants in archipelagic Southeast Asia.

- Action to Climate Change (NAPA)*. Vientiane. <http://unfccc.int/resource/docs/napa/laos01.pdf>.
- 34 EcoLao (2012). *Scoping Assessment of Climate Change Adaptation Priorities in the Lao PDR*. Partner Report Series. Regional Climate Change Adaptation Knowledge Platform for Asia, Bangkok. <http://www.apan-gan.net/resource/scoping-assessment-climate-change-adaptation-priorities-lao-pdr>.
- 35 Vermeulen, S.J., Challinor, A.J., Thornton, P.K., Campbell, B.M., Eriyagama, N., et al. (2013). Addressing uncertainty in adaptation planning for agriculture. *Proceedings of the National Academy of Sciences*, 110(21). 8357–62. DOI:10.1073/pnas.1219441110.
- McGray, H., Hammill, A., Bradley, R., Schipper, E.L.F. and Parry, J.-E. (2007). *Weathering the Storm: Options for Framing Adaptation and Development*. World Resources Institute, Washington, DC. <http://www.wri.org/publication/weathering-the-storm>.
- 36 Olsson, L., Opondo, M., Tschakert, P., Agrawal, A., Eriksen, S. H., Ma, S., Perch, L. N. and Zakieldean, S. A. (2014). Livelihoods and poverty. In *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, et al. (eds.). Cambridge University Press, Cambridge, UK, and New York. 793–832. <https://www.ipcc.ch/report/ar5/wg2/>.
- 37 DasGupta et al. (2014).
- 38 Gustafson, S., Cadena, A.J. and Hartman, P. (in press). Adaptation planning in the Lower Mekong Basin: merging scientific data with local perspective to improve community resilience to climate change. *Climate and Development*.

Published by:

Stockholm Environment Institute - Asia
15th Floor, Witthayakit Building
254 Chulalongkorn University
Chulalongkorn Soi 64, Phyathai Road,
Pathumwan, Bangkok 10330, Thailand
Tel: +(66) 2 251 4415

Author contact:

Albert Salamanca
albert.salamanca@sei-international.org

Media contact:

Marion Davis, SEI Communications
marion.davis@sei-international.org

sei-international.org

2016

Twitter: @SEIresearch, @SEIclimate

This discussion brief was written by Albert Salamanca and Ha Nguyen, as part of the Adaptation and Mitigation in support of AFCC project commissioned by GIZ ASEAN Jakarta. The review was funded by Forest and Climate Change (FOR-CC), one of the modules of the ASEAN German Programme on Response to Climate Change in Agriculture and Forestry (GAP-CC) of the German Federal Ministry for Economic Cooperation and Development (BMZ). FOR-CC is a technical cooperation implemented by GIZ in close cooperation with ASEAN during 2015 to 2017. The authors would like to thank Jonas Dallinger and Imelda Bacudo of FOR-CC for their support and advice. This discussion brief has also benefited from comments from Dennis Wichelns and Jonathan Rigg. Any shortcomings solely belong to the authors.