

“most households rely ... on reactive measures to adapt”

Adaptation Choice	Frequency	Percentage
No Adaptation (Y=0)	99	5.8
Reactive Measures (Y=1)	1,090	63.7
Proactive Measures (Y=2)	522	30.5
Total	1,711	100.0

Classification of mutually exclusive household adaptation strategies in selected SEA countries

→ responded to extreme climate events. It also assesses the factors that influence their behaviour.

The study is the work of a research team led by Dr. H.A. Francisco from EEPSEA. It finds that most households rely on reactive measures (such as evacuating their homes), while richer households use more proactive measures (such as building dykes) to respond to storms, floods and other extreme weather events. As proactive adaptation measures are generally more effective at reducing the damage caused by extreme climate events, especially in the longer term, there is a need to promote such measures. The study suggests various potential strategies to do this, including improving information provision and promoting collective action.

The Extreme Weather Challenge

The Intergovernmental Panel on Climate Change's (IPCC's) 4th Assessment Report states that Southeast Asia is expected to be seriously affected by the adverse impacts of climate change. As mentioned above, the region already has the greatest number of people at risk from climate change and it is expected to experience increases in the frequency and intensity of tropical cyclones, storm surges and floods. Across the region, climatic change is expected to severely affect those most dependent on

natural resources for their livelihoods, such as poor farming and fishing households. What's more, many poor people live in coastal areas and in low-lying deltas and these communities are expected to bear the brunt of any sea-level rises. They are also expected to suffer the most from any intensification in storm surges.

When it comes to the response to climate change, it is widely recognized that controlling carbon emissions is the only way to provide a long-term solution; however it is also clear that it is important to support adaptation efforts in those areas that are most vulnerable to the impacts of climate change. This was recognized at the United Nations Climate Change Conference held in Bali, Indonesia, in December 2007. There are now several avenues through which adaptation support can be channelled. These include the United Nations Framework Convention on Climate Change (UNFCCC) and various bilateral and multi-lateral agencies. Various aid and non-government agencies are also being mobilized to support adaptation efforts in developing and least developed economies.

How Do Households Adapt to Climate Change?

Francisco's team analysed the decisions that households take in response to extreme climate events.

Their study also looks at the factors influencing a household's choice of adaptation strategies. The study was based on the premise that, since climate change manifests itself in an increased intensity and frequency of extreme climatic events, the way in which households respond to these events indicates how they will respond to climate change. The study was undertaken because research on adaptation behaviour – and the needs of countries vulnerable to climate change – is needed to help policy-makers who are deciding how best to use and allocate adaptation funds. Understanding adaptation is also important to help quantify the impacts of climate change.

The study was conducted in areas that are most vulnerable to different extreme climate events (namely, coastal regions, low-lying deltas and upland areas). The countries covered by the study are Thailand, China, Vietnam, Indonesia and the Philippines. The specific study sites include: Chiang Mai Province in Thailand, which was hit by floods in 2005; Pingyang County in China which was hit by Typhoon Saomai in 2006 (the strongest typhoon in mainland China since 1951); and Muara Baru in Indonesia, which was affected by floods in 2007; here, flood waters reached heights of up to two meters and crippled more than 4,000 households.

The study used primary and secondary data to analyse household adaptation behaviour. Primary data was collected through key informant interviews, focus group discussions, and household surveys. This data gathering exercise covered 2,004 households over the five study countries.

Proactive or Reactive Measures?

The household adaptation strategies in the five countries were categorized depending on whether they were reactive or proactive measures. Reactive measures are actions that are done at the very last minute or when a weather event is already happening. Proactive measures, on the other hand, are those in which households prepare for an extreme weather event in advance by, for instance, relying on and acting on early warnings, constructing elevated housing units or building concrete walls and dykes to prevent flooding.

The survey results show that the most popular behavioural adaptation measures were evacuation and moving properties to safer places. These measures were adopted by most of the respondents across the five countries. In the case of the Philippines, Vietnam and China, households also stored food, drinking water and other necessities in preparation for extreme weather.

Households also took other reactive measures including reinforcing their housing structures in response to the onset of a storm – for example in the Philippines and Vietnam households used a bamboo frame to protect their roofs. Households also put hollow blocks or heavy metal objects on top of their roofs, while others tied their houses to trees or poles. In Thailand, sandbags were often used as a protective measure against floods although some households used concrete dykes for the same purpose. In Vietnam, 25% of the respondents reinforced ponds and dykes.

It was mainly relatively well-off households that took proactive measures such as building protective structures (e.g. dykes). These households also relied heavily on early warning systems in order to take the necessary safeguards against extreme climate events. Building a mezzanine or second floor was yet another pro-active adaptation strategy used by some households in Indonesia (8%) and Vietnam (9%) and to a smaller extent, in China and Thailand.

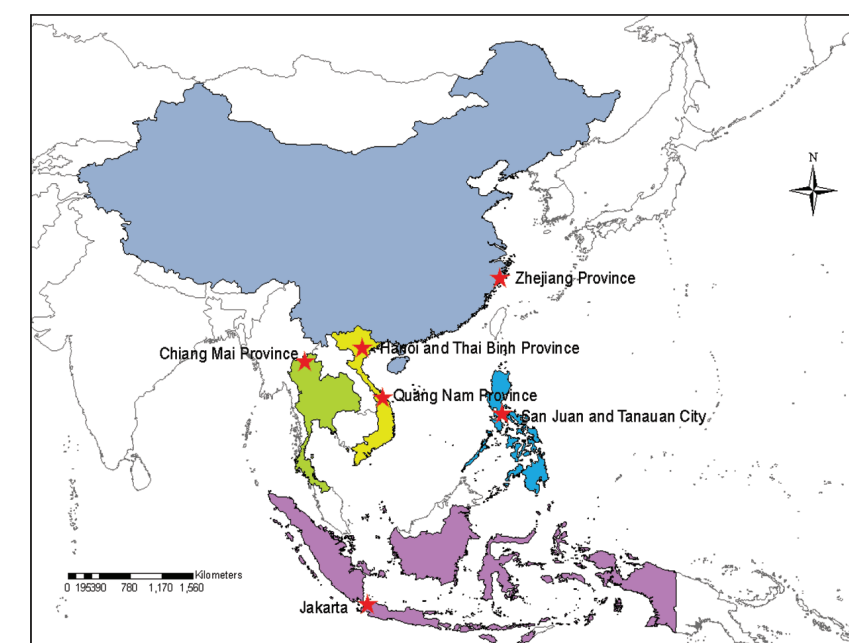
Using Technology and Finance

When technological adaptation measures were assessed, it was found that not many of the households relied on early warning systems to prepare for extreme climate events. (The Philippines was an exception – in this country 55% of the respondents relied on early warning systems.) There were even fewer households that used other

technological means, such as changing cropping patterns and using pumping machines, to reduce potential damage.

Other adaptation measures practiced by the households were classified as financial strategies. As was the case for the use of early warning systems, not many households were able to diversify their income sources to improve their economic position so that they could cope with extreme weather more easily. Nor were they able to borrow money from other sources. Only 46% of the households in China, 18% of those in Vietnam, 12% of those in Indonesia and 2% from the Philippines managed to carry out one or both of these measures.

Interestingly, none of the households opted to buy disaster insurance. However, when they were asked whether they would be willing to buy such insurance in the future, a



Study Sites

sizable number expressed interest. The proportion of those willing to pay for insurance was: 46% among the Chinese respondents, 37% among the Thai respondents, 33% among the Filipino respondents and 20% among the Vietnamese respondents.

Overall, most households used more than one strategy to cope with extreme weather events, but generally, choices were mostly of the reactive type: 64% of the households relied on reactive measures and only about 31% on proactive measures.

What Factors Influence Household Behaviour?

As said, the study analysed the factors that affected the adaptation strategies choices that households made. This allowed the research team to see why households chose reactive or proactive adaptation options. The factors that the study assessed included household experience, exposure and sensitivity to extreme weather events, their wealth, their social characteristics and belief systems, and their social capital. Adaptation barriers and constraints at both the community and household levels were also examined.

It is clear that a household's adaptation decisions were significantly influenced by economic circumstances. In particular, the choice of being proactive or reactive was significantly influenced by the

following factors: housing type, household size and level of education.

Adaptation barriers at the individual household level were not limited to financial constraints. Other adaptation barriers were: (a) a lack of timely information about the occurrence of a weather event, (b) a lack of knowledge of what the households could do to adapt, and (c) an inaccurate assessment by the household of the severity of the event. Some of the households who did not want to relocate in response to extreme weather gave reasons such as "they were too used to living in their homes" and that "their work places were nearby". These responses indicate that there were other factors at work as well.

How Should Policy Makers React?

It is generally considered that proactive adaptation measures are more effective than reactive measures in reducing the impact of extreme climate events, especially in the long term. Given the findings of this report – that the majority of households in vulnerable areas are not choosing proactive measures – there is an obvious need to promote such measures and help households make the most effective choices.

The analysis shows that the probability of a household choosing a reactive adaptation measure could be reduced, and the likelihood of it

selecting proactive measures could be raised, through the following actions: (a) providing support to households for more permanent or stronger and higher housing units; (b) providing higher education and training opportunities for household members; and (c) reducing households' economic dependence on others.

A lack of information about the occurrence of climate events was found to limit the extent of climate change adaptation. It is therefore important that government policies should ensure that household have access to adequate and timely information related to climate events.

At the community level, adaptation was found to be hampered by a lack of cooperation among the various stakeholders and constituents. This was particularly true in urban areas. Government and non-government organizations should thus play a stronger role in strengthening community-based climate change adaptation action. The study also found that promoting collective action was likely to encourage households to buy climate-related disaster insurance. Therefore, community structure needs to be strengthened.



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The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA supported research projects, as presented in detail in *EEPSEA Research Reports*.

Adapting To Climate Change – A Study Of Household Choices From Across Southeast Asia

EEPSEA POLICY BRIEF • No. 2011-PB5

In Asia and the Pacific more people are affected by floods, droughts, and storms than in any other part of the world. This problem is set to get worse as the impact of climate change becomes more pronounced and extreme weather events become more frequent. To try and assess how best to help people respond to this challenge, a new EEPSEA study looks at how households in a range of Southeast Asian countries have adapted and →

A summary of EEPSEA Research Report No. 2011-RR5: 'Determinants Of Household Decisions On Adaptation To Extreme Climate Events In Southeast Asia' by H.A. Francisco, C.D. Predo, A. Manasboonphempool, P. Tran, R. Jarungrattanapong, B.D. The, L. Peñalba, N.P. Tuyen, T.H. Tuan, D. Elazegui, Y. Shen, and Z. Zhu.
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