



*Strengthening local capacity
in the economic analysis
of environmental issues*

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 10 member countries (i.e., Cambodia, China, Indonesia, Lao PDR, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, and Vietnam.) It aims to strengthen local capacity for the economic analysis of environmental issues so that researchers can provide sound advice to policy makers.

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What Factors Make People Act to Protect Themselves from Floods? A Study from Vietnam

Vietnam is one of many developing countries in Southeast Asia that are facing an increasing level of flooding and other extreme weather events. This is a challenge that is getting steadily worse due to effects of global warming. Given the lack of resources for the construction of large-scale flood defenses, Vietnamese policymakers are investigating how to implement an integrated flood-risk management approach that leverages action at the household level. However, up until now, there has been little information available on the factors that encourage people to take steps to reduce the impact of floods on their households.

A new EEPSEA study has looked into this issue in selected flood-prone areas in Vietnam's Mekong Delta.

The study is the work of a team led by Phung Thanh Binh, from Ho Chi Minh City's University of Economics. Their results indicate that people are more likely to take action to mitigate the flood risks they face if it is easy for them to act and if they know that the chosen action will be effective. The study therefore recommends that, in order to shift towards more integrated flood-risk management, future flood protection policies in Vietnam (and other developing countries) should focus on the feasibility and effectiveness of proposed mitigation measures rather than on just raising flood-risk awareness. Specifically, the study suggests that households that are at risk of flooding should be provided with more practical instructions on how to implement cost-effective mitigation measures and with more detailed advice on which measures are effective at reducing potential damage.



A summary of EEPSEA Research Report No. 2015-RR2: 'Mediation Analysis of Factors that Influence Household Flood Mitigation Behavior in Developing Countries: Evidence from the Mekong Delta, Vietnam', by Phung Thanh Binh, Xueqin Zhu, Rolf Groeneveld, and Ekko van Ierland. Comments should be sent to: Mr. Phung Thanh Binh, University of Economics, Ho Chi Minh City, 1A Hoang Dieu Street, Phu Nhuan District, Ho Chi Minh City, Vietnam. Tel: +84 8 38448222. Email: ptbinh@ueh.edu.vn

The flood challenge

Floods are one of the most frequent and destructive water-related natural disasters in Southeast Asia. The combined effects of increasing populations and property values, land use changes, the concentration of assets in flood-prone regions, and climate change will, most likely, increase the frequency and impact of catastrophic flood events across the region. This mounting challenge has motivated the search for solutions. However, traditional flood management policies, which have primarily depended on the construction of large-scale flood defenses, have had mixed success and have, in many instances, proved to be too expensive.

As a result, in recent years, there has been a gradual shift in the region towards a more integrated flood-risk management approach that concentrates not only on public structural measures and relief but also on private protective measures such as mitigation, preparedness and recovery. This shift requires the involvement of individual households. However, most people who are in areas at risk of flooding do not automatically take mitigation measures. This means that it is important to understand the factors that will encourage such people to act, as this will provide insights into how to design

effective flood management and communication policies.

Previous studies in this area have mostly been conducted in developed countries and have not taken into account various critical issues such as the impact of existing mitigation measures on people's perceptions of flood risk. Binh and his team therefore set out to fill this information gap and to provide a 'developing country perspective'. They did this using a flood-risk communication experiment and a face-to-face survey with 480 households living in flood-prone areas of Vietnam's Mekong Delta.

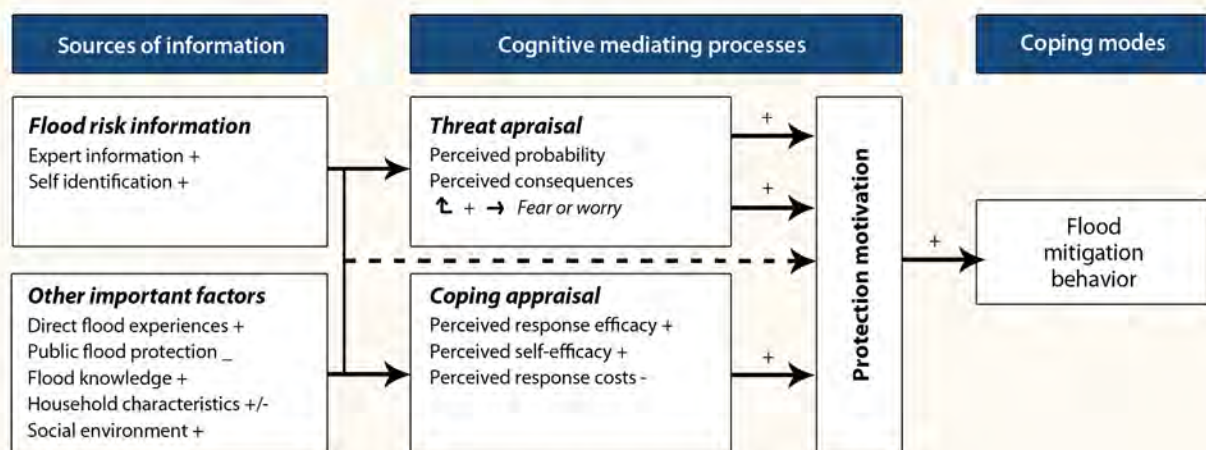
Protection Motivation Theory

The study was based on the Protection Motivation Theory (PMT). This is founded on the rationale that people consider two things when they think about flood risks: they evaluate the threat (referred to as threat or risk appraisal) and they then select the most appropriate coping response (referred to as coping appraisal). It is thought that the impetus provided by the risk and coping appraisals motivates people to take mitigation measures. The study therefore investigated the role that risk appraisal and coping appraisal play in motivating people to act to mitigate the impact of

floods. It also examined the indirect effects of the flood experiences that people have had and tested whether the actions that people had taken in the past to cope with flooding has had a feedback effect on their risk and coping appraisals.

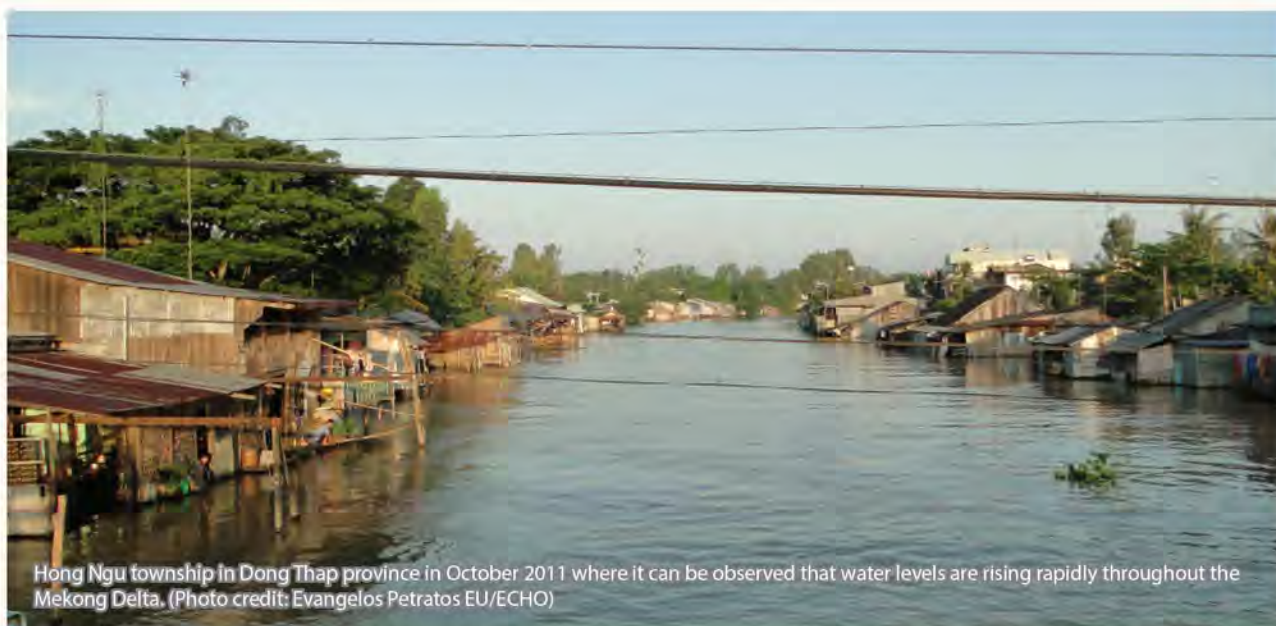
Study sites for this research were selected according to their flood-risk characteristics and on the basis of suggestions made by experts. The three selected districts were Tan Hong (high risk), Thanh Binh (low risk) and Chau Phu (low risk). The two low-risk districts were selected because they were different in terms of their flood-protection systems. Chau Phu (An Giang Province) had a full-dike system while Thanh Binh (Dong Thap Province) had a semi-full dike system. With a full-dike system, farmers can produce three crops per year and people may be reluctant to take precautionary actions. Experts said that flood probability was the same between Dong Thap Province and An Giang Province so only one representative district was chosen for high risk areas.

In each district, the two most representative communes in terms of their locations were selected. Then, the two most representative villages in terms of their economic development levels were selected from each commune. In each village, six groups of random households were selected (two



Extended framework of Protection Motivation Theory

Source: Adapted from Poussin et al. (2014), Bubeck et al. (2012a), and Grothmann and Reusswig (2006)



Hong Ngu township in Dong Thap province in October 2011 where it can be observed that water levels are rising rapidly throughout the Mekong Delta. (Photo credit: Evangelos Petratos EU/ECHO)

of which were used as 'control' groups: with and without wife's participation). Each group was given an extensive baseline survey to establish their knowledge of flood risks and to assess the actions they had taken to mitigate flood damage.

Flood-risk communication and training

The flood-risk communication experiment was carried out from March to April 2013. First of all, the research team talked with university professors and provincial government officers from Vietnam's Mekong Delta to select the most appropriate ways to communicate with the communities in the study areas. The selected communication channels were flood-risk training (i.e., sharing expert information on flood-risks) and flood-risk focus group discussions (FGDs). The training sessions were held at either the secondary school or the public hall of the respective communes, and the FGDs took place at the cultural house of each village. Each training session and FGD lasted for an average of two hours. Households from the survey villages were randomly allocated to FGD groups (with and without wife's participation), training groups (with and without wife's participation), or to control groups.

The training was given by a senior water management expert (a professor of Can Tho University's School of Environmental Management). Interactive discussions between the professor and participants were highly encouraged during the training sessions. The training program covered five main issues: the causes of flooding, past flood experiences, public flood protection investments, private mitigation measures, and the impact of floods on vulnerable groups such as the poor, women and children. The trainer used various visual aids such as a thirty-minute video about a catastrophic flood in 2011, a PowerPoint presentation, a flood map, and a description of the current dike systems in the Mekong Delta.

The FGDs were led by a facilitator from the Can Tho University's Institute of Climate Change. The facilitator's role was to initiate and encourage discussions, raise questions and keep up a free exchange of ideas amongst the participants. The FGDs focused on small group presentations, discussions and games. Participants were encouraged to recommend initiatives that would protect their communities and families against future flood hazards. Prizes were awarded to the groups that performed best.

Face-to-face household survey

The face-to-face surveys were used to assess household mitigation behaviour. The study team highlighted 15 individual mitigation measures that people in flood-prone areas are likely to undertake before the rainy season. Households were asked to evaluate each of these measures in terms of the likelihood that they would adopt them, the measure's potential effectiveness, their ability to undertake the measure, and their ability to cover the set-up costs. Households were also asked about the likelihood and impact of future flooding and about their concerns and worries concerning this potential threat.

The households' direct and vicarious experiences of flooding were also assessed, as were their thoughts on the level of support they had received during previous catastrophic flood events. Their knowledge about flood hazards was measured, as were their views on who should be responsible for flood risk reduction. The respondents were also asked to give their judgement on the quality and availability of flood control facilities and support services. In addition, they were asked about their communities' flood mitigation

efforts, about their ability to get loans to finance flood protection measures, and about the number of social groups that they belonged to. Information on socio-economic and geographical characteristics, and gender issues (such as the role of women in household decision-making) was also collected.

What factors make households act?

The information obtained from the training sessions, FGDs and surveys was assessed using mediating regression method and statistical tests to see how all of the various factors that had been discussed and recorded affected each other. First, no statistically significant relationship was found between risk perception and mitigation behavior. However, the study did find that self-efficacy (a person's ability to take actions that will reduce flood risks) and response efficacy (the effectiveness of the actions that are undertaken) were important predictors for mitigation behavior. In other words, it was found that people would be more likely to take action to mitigate flood risks if it would be easy for them to act and if they knew that their actions would be effective.

It was found that mitigation measures that had already been adopted had a significant effect on a household's coping appraisal but not on its risk perception. It was also found that past experiences of flooding could directly motivate people to adopt flood mitigation measures. The ways in which households had coped with flood risks in the past was also found to have both direct and indirect effects on their mitigation behavior. In addition, the study found that subjective flood experiences indirectly increased the likelihood that households would act (this was due to the positive effects such



experiences had on self-efficacy and response efficacy).

Vicarious experiences gained from participation in the flood-risk training programs and the FGDs also increased a household's motivation to undertake protective action. In addition, the role of women in household decision-making had a positive total effect on mitigation behavior. Finally, the results showed that public flood protection and support services can stimulate mitigation behavior through the positive indirect effects they have on coping appraisal and fear of flooding.

What should be done?

In light of its findings, the study recommends that future flood protection policies in developing countries should focus on the feasibility and effectiveness of proposed mitigation measures rather than on just raising flood-risk awareness. Specifically, it suggests that households at risk of flooding should be provided with more practical instructions on how to implement cost-effective mitigation measures and with more detailed advice on which measures will be effective at reducing potential damage. This should help to encourage a shift towards more integrated flood-risk management.

The study also suggests that, as flood insurance is still not easily available in Vietnam, an effective flood risk reduction strategy should be based on small FGDs involving village household heads. Furthermore, since fear of flooding was found to be a mediating variable, the study suggests that this should be taken into account when flood-risk communication policies are designed. For example, flood-risk communications should emphasize not only the risk of future flooding, but should also focus on subjective fears and should make households aware of the potential catastrophic effects of a flood.

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