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Asian Cities Climate Resilience

POLICY BRIEF 2015

Should we stay or should we go?

Understanding household decision making in climate change-affected areas of Indonesia

Low-income communities prone to flooding in Indonesia's urban areas are facing difficult choices regarding household safety and adaptation: to remain in at-risk areas or to relocate? Two studies have examined the economic, social and environmental factors that influence household decisions on where to live. The findings reveal a need for: increased community understanding of the climate risks to come; community-based risk assessments to understand their adaptation options; and government support of community adaptation both on-site and with relocation.

Policy pointers

- **Every effort must be made to raise awareness and educate vulnerable communities about climate change and future impacts, so that they can make informed adaptation decisions.**
- **Communities should be encouraged and supported to conduct a local risk assessment in order to understand the local risk context and the needed protective infrastructure.**
- **There is a role for governments to provide financial and technical resources that support these risk assessments and the adaptation initiatives that arise from them.**
- **Should the risk assessments identify the need to relocate, priority should be given to finding land that allows community social networks to be maintained for improved resilience and that preserves access to existing jobs and employment resources (ie coastlines and boats for fishermen).**

Indonesia's cities are facing a multitude of challenges relating to climate change, including higher temperatures, changing rainfall patterns, rising sea levels, and more frequent and severe extreme events. These changes pose a large threat to urban settlements along coasts and rivers. Two studies conducted in Indonesian cities used different metrics and models to examine household reasoning regarding whether to continue living in at-risk areas and adapt to changing conditions or whether to relocate to safer locations.

Costs of risk as a factor in location choice

In Semarang City, the capital of Central Java province, coastal communities are taking both protective and adaptive actions against flooding and inundation. Semarang is facing a multitude of coastal threats from sea level rise, flash and tidal floods, land subsidence, land movement and coastal erosion. Sea level rise estimates for the area ranged from 15 to 112 cm by 2100.

Protective actions taken by households include raising houses, constructing a second storey on homes, building embankments, raising roads and constructing drainage channels. Adaptive measures include raising furniture within the house, repairing damage experienced to homes and diversifying livelihoods. In some cases, residents opted to sell or leave their homes and relocate elsewhere.

But how safe are these actions making coastal communities, and are they worth investing in as climate change impacts intensify? The working paper 'Protect, adapt or relocate? Responding to climate change in coastal Indonesia'[1] examined household understanding of the costs of risks in Semarang, seeking to understand the patterns of adaptation vs relocation by coastal households at risk. In this research, four villages exposed to coastal climate change impacts were surveyed on their responses to threats and the reasoning for these

responses. The study used several methods of analysis to understand the costs, benefits and range of influences on households' adaptation decisions.

Reasons to stay

The research considered four case study coastal villages with different characteristics, specifically livelihoods, forms of vulnerability and types of adaptation attempts. Survey respondents were asked if they would choose to stay in their current villages and adapt to 'tackle the problems caused by climate change impacts', or migrate to lower-risk areas. The vast majority of each community sample chose to stay. Reasons to stay or go varied and households often had multiple reasons for their choices.

The most cited reason for choosing to stay in a community was financial assets. Most often, this related to the investments households had made into their coast-dependent livelihoods (fishing and related jobs). Respondents also appreciated the village location in relation to markets for selling their goods or to the city centre for other jobs. One community saw the potential for tourism in their location.

Social assets were another factor cited by some households in determining their decision to stay. It was stated that strong social bonds had been created as a result of the many problems the villagers had faced together. Family ties and kinship networks weaved into the community also tied households to their location. The farmers of one community had formed organizations relating to environmental protection for their village that created additional bonds in a community, which may motivate individual households to stay.

Coupled with social components were cultural assets. These assets can be physical, such as inherited land or homes, or less tangible, as in the generational tradition of working as fisher folk in the area. The desire to carry on these traditions 'out of respect for their ancestors' influenced a household's decision to remain.

Other cited reasons for a household deciding to remain in situ included human, physical and political assets, as well as environmental and technological motivators (ie engineered adaptation measures).

Another option for households is to migrate. Many villagers surveyed expressed an interest in this option but claimed they could not afford to move. Again, this is related to the heavy dependence on coastal livelihoods. Of those who had relocated (not surveyed, but described by villagers), these had either gone to government-built housing or were no longer involved in fishing and were able to afford rent elsewhere. Others expressed an interest in migrating temporarily, returning when the floodwaters receded.

Costs of remaining in exposed areas

Applying these findings to a Cost Benefit Analysis (CBA) model, which examines the financial risk to households that arise from various flooding and inundation response strategies, it was calculated that communities are spending between 9 and 45 per cent of their monthly household income on adapting to climate variability. This concludes that households choosing to stay must find ways to increase their income or reduce their exposure, for example through livelihood diversification away from fishing initiatives.

In the Socioeconomic Analysis (SEA) model, which compares the costs for climate response strategies with the average household income, it was revealed that there may be some misunderstanding around what climate change is. Residents believed the effects would be temporary and solvable with engineered solutions, suggesting the need for education or awareness raising on the topic.

Finally, the SWOT analysis, which looks at the strengths, weaknesses, opportunities and threats associated with a decision, showed that while all of the communities were currently capable of coping with climate-related risk, the majority of these strategies were unaffordable and unsustainable in the long term. Also, the embracing of technological adaptation solutions, such as the use of drainage pumps or constant investment in dyke repairs, may become a burden as climate change intensifies.

Social, physical and environmental influences on household location

In the Solo River district of Bojonegoro, households are threatened by intensive downstream flooding, which affects nearby villages five to seven times a year on average. There is a levee protecting settlements along the river but it blocks access to the city centre. To re-establish access, inhabitants chose to open up the levee, and now 1,300 families live outside of this protected area and are directly threatened by floods. The study 'Climate change and home location preferences in flood-prone areas of Bojonegoro Regency: Social networks approach'[3] took place in six of these unprotected communities, with surveys of 303 households in locations with various degrees of vulnerability (high, medium and low). It paid particular attention to social influences on household location, in comparison to economic or other factors.

For households living in areas classified as highly vulnerable to flooding, the built environment and public services were the two most influential indicators in deciding where to live. With regard to the built environment, access to markets and commercial services were mentioned most, suggesting people remained despite high flood risks because of livelihood opportunities. Cultural influences were not seen as a significant influence for this group, and social networks were understood to be weak.

In medium-risk areas, human resources, both collective and individual, were most influential. With collective resources, legal and administrative influences were discussed most, suggesting that legal conditions relating to land tenure influence people to remain where they are. With regard to individual resources, emotional perception, feelings, connections and moral values were most significant, indicating that social and cultural values held the most influence in location decisions.

Finally, for households in low-risk locations, public services and collective and independent human resources were most significant. Identifying public services as a key

motivation to remain in at-risk locations means that these areas have the most access to infrastructure and services, which makes the decision to remain easier. The high value placed on emotional needs and moral values suggests that social networks are important, as they allow for mutual support and shared resources during flooding.

The study used the Structural Equation Modelling (SEM) analysis, which aims to understand the relationship between variables, also the Social Network Analysis (SNA), which investigates social structures through network and graph analysis, to unveil the multiple layers of reasoning making a household remain where it does. These paired models revealed that proximity to markets proved important from a financial perspective, while the existence of a recreational facility is vital for social needs. They also identified that high-risk communities value intangible links to land (inheritance and cultural value) when determining where to live, medium-risk communities value social networks most, and low-risk ones value physical infrastructure most. Social networks allow communities to mobilise resources and therefore reduce their vulnerability to climate risks.

Common influences on household locations

Both studies clearly show that livelihoods and income protection are vital for poorer communities, more important than adapting for future climate change threats. In Semarang, access to the coast was critical for the many households that relied on fishing for an income. In Bojonegoro, proximity to markets and stalls was a critical indicator for remaining in situ, as the majority of the high-risk community are merchant traders.

The Semarang study noted the importance of social ties for these communities. In fact, some stated that staying together to face their common climate threats had strengthened social cohesion, and that these relationships would be difficult to recreate in a new location. This phenomenon was reflected in the medium- and low-risk communities in the Bojonegoro study.

In each case, households were attached to the generational or traditional value of their land. Remaining where they were was important in respecting and maintaining the legacy of the past, and adaptation options should focus on protecting these invaluable assets while improving household safety.

In both cases, respondents also dismissed the environmental hazards surrounding them. The Semarang case participants believed the climate impacts were temporary and that they could live with the ‘inconveniences’. They also believed that engineered solutions would be enough to address the hazards. Bojonegoro communities had similar sentiments, acknowledging the unsound levee as a reliable disaster evacuation path and ‘safe space’ during floods.

Conclusions and policy recommendations

A household’s decision to move or to remain on-site cannot be narrowed down to a single reason. The studies demonstrate that the decision to relocate or adapt is based on a complex group of interlinked factors, including social, cultural, natural, physical and financial, all tied to the particular location. These factors involved in the decision-making process point to several policy recommendations.

First, there is a need to raise awareness and provide publically accessible information about the possible climate change scenarios (ie sea level rise, flooding) for vulnerable communities. This ensures that households can take appropriate action and make informed decisions about adaptation spending and action. This can be done through regular circulars to every sub-district, with postings on public information boards in front of government offices, mosques or markets, as well as mainstream media such as radio, TV and newspapers.

With new education on climate change impacts, communities should be encouraged and supported in completing a needs assessment for their village. These assessments will determine the severity of climate change impacts and propose appropriate adaptation strategies and solutions. Where it is not possible for a community to complete their own assessment, each sub-district’s administrative office can be mandated to complete one.

The results of both studies show that most community residents prefer to stay in their current locations, and that some cannot afford to relocate. Thus, local adaptation efforts need to be financially supported. Governments can allocate a budget for each sub-district, for example each district receives an annual budget that is then redistributed equally to each sub-district. These budgets could be spent through proposals created by the communities themselves, which would address the real needs of the village and prioritise spending in these areas. However, this would require capacity building, as many people employed at sub-district level are inexperienced in budget proposal development.

Finally, if the needs assessment recommends relocating from the risk areas, or if households themselves choose to relocate, there is a role for government to evaluate potential locations for municipal housing. These locations should be situated close to people’s places of work and should aim to move communities as a group, in order to protect social networks and livelihoods as much as physical infrastructure and physical safety. In addition, efforts to understand community social structure will help further develop appropriate policy recommendations.

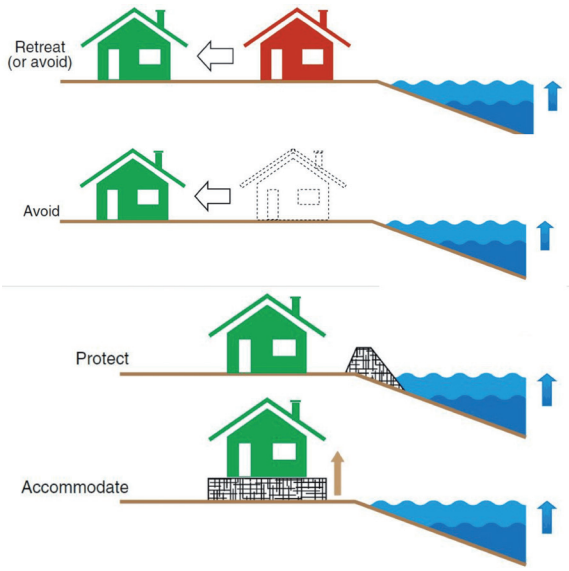
Adaptation and relocation

Adaptation is the adjustment in natural and human systems in response to actual or expected climatic stimuli or their effects, and moderates harm or exploits beneficial opportunities. It can be classified as:

1. **Anticipatory**: takes place before impacts of climate change are observed; also referred to as proactive adaptation.
2. **Autonomous**: not a conscious response to climatic stimuli, but is triggered by ecological or socioeconomic change; also referred to as spontaneous adaptation.
3. **Planned**: a deliberate policy decision, based on awareness that conditions have changed or are about to change and that action is required to return to, maintain or achieve a desired state (IPCC 2007 in [1]).

Relocation, the planned physical displacement of people to a new, permanent location, is one option of many on the adaptation spectrum.[2] The response to climate change impacts can be classified into four possible steps, using the example of sea level rise (see Figure 1 below). These categories are: avoiding the impact by retreating or relocating from coastal areas; avoiding coastal areas to begin with; adapting by protecting; or adapting by accommodating the sea-level rise.

Figure 1: Migration schema as a climate change solution



Source: Eichhorst, U *et al*. (2010) Climate-proof urban transport planning: Opportunities and challenges in developing cities. In: *Resilient Cities: Cities and Adaptation to Climate Change, Proceedings of Global Forum 2010, Bonn, May*. Springer.

Notes

1. Sofaniadi, S *et al*. (2015) Protect, adapt or relocate? Responding to climate change in coastal Indonesia. Asian Cities Climate Resilience Working Paper Series 14. IIED, London. Available for free download from http://pubs.iied.org/10723IIED.html
2. Arnall, A *et al*. (2013) Flooding, resettlement and change in livelihoods: Evidence from rural Mozambique. *Disasters* 37(3) 468–488.
3. Anggraeni, M *et al*. (2015 in press) Climate change and home location preferences in flood-prone areas of Bojonegoro Regency: Social networks approach. Asian Cities Climate Resilience Working Paper Series.

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