Appendix 3b

Policy Brief

Climate Change-Induced Water Disaster and Participatory Information System for Vulnerability Reduction in North Central Vietnam (CPIS)

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Executive summary

Extreme climate events relating to climate change are identified as a major current and future threat to Vietnam's socio-economic development, with a potential heavy impact on particularly the livelihood security of the poorest rural population segments depending on income from agriculture and aquaculture. Studying the North-Central Vietnamese provinces of Nghe An, Ha Tinh and Quang Binh (NHQ) with a joint population of 5.2 million and a total 350 km of coastal line towards the East Sea, the project has highlighted the occurrence, scope and impacts of disasters such as typhoons, floods, droughts, inundation and salinity intrusion.

By combining natural and social sciences, and bringing together a wide range of approaches across conventional disciplinary boundaries to analyzing the vulnerability of local communities in the studied provinces, the project aimed at building new and trustworthy data material. A detailed picture of observed and projected changes in temperature, rainfall and extreme climate events and related water disasters was established for short-, mid- and long-term periods. In addition to meteorological and hydrological data modeling water disasters were also closely studied in a complex real life context, where impacts from increased climate variability interact with ongoing industrialization, land use change and infrastructure construction works including dams and dikes on the one hand, and general socio-economic change associated with economic development, marketization and globalization on the other hand.

Based on a wide variety of local data collection and on-the-ground fieldwork in the three provinces, the project has shown that despite climate-related hazards appearing with increased occurrences in coastal areas they rarely affect all equally and do not seem to upset general income growth. Existing differences in key socio-economic variables across provinces and communities and among households appear to matter greatly for vulnerability. Vietnam's transformation process towards market-driven forms of production has provided many new opportunities and generated impressive growth rates, but has also produced new stresses in the form of insufficient land, water and capital, and a range of new inequalities relating to income, land and labour. Thus vulnerability varies not only according to differences in exposure to climate related hazards, which currently receives the greater attention from the Vietnamese government, but to a much broader scope of disparities. Vulnerabilities clearly showed to have multiple facets, since communities and individual households are subject to a wide range of stresses, which in addition to those stemming from climate variability and natural hazards may relate to the general economic transformation process, various branches of policy-making and state interventions.

Consequently, the projects identified a need for broad-based and disaggregated policies in reducing vulnerability to climate-induced disasters. The concern for future vulnerability to climate-induced disasters should extend beyond a focus on natural

hazards from climate change (or environmental degradation) to encompass changes in Vietnam's socio-economic fabric.

Apart from its independent scientific and academic achievements, the project has developed advanced data material and tools for local authority and policy makers. It has further set up a Participatory Information System enabling local communities to access a wide variety of data as well as to contribute to policy and planning with the local knowledge, weather sensibility and enduring adaptation potential inherent to farming communities.

Introduction

The research design operated with four main hypotheses/assumptions in mind and with clear objectives formulated for each.

1) Water related extreme events will be intensified by climate change and have critical negative impacts on the production systems of agriculture and aquaculture in NHQ. A solid understanding of these impacts will, if effectively communicated, contribute to minimizing the vulnerability and increasing the resilience capacity of the coastal and lowland communities in NHQ.

- The research objective was to assess the impacts of climate change on water disasters and consequently on aquaculture and agriculture in the NHQ region;

2) The impact of water related extreme events maybe born disproportionally by vulnerable groups in terms of loss of livelihoods, assets and employment. Such groups may be identified both socially and spatially.

- The research objective was to carry out local research into the potential of indigenous knowledge for vulnerability reduction and develop an integrative working model of scientists, policy/decision makers and local community representatives for indigenous and scientific knowledge integration.

3) There is a local demand for a Participatory Information System (PIS) that integrates the multi- and inter-disciplinary scientific and technological knowledge with indigenous experiences. Such integration can provide an effective tool for increasing community resilience towards climate change impacts, and facilitating local sustainable development practices by means of mass participation.

- The research objective was to establish a functioning Participatory Information System for scientific research, decision-making processes and local community needs in Vulnerability Reduction and to support the capacity of local authorities and communities in applying the technology.

4) The impacts of climate change should be analyzed in a broader, interacting relationship with other socio-economic and environmental factors. Thus climate change adaptation efforts need to be holistic in orientation, including evaluation of conventional resource management practices, and support to sound environmental management.

- The objective was to conduct on-the-ground socio-economic and interdisciplinary research in the NHQ region as well as to develop human resources in the field of local climate change adaptation and policy making.

Background

Climate change, especially extreme climate events, are currently a major threat to Vietnam's socio-economic development, with potentially heavy impact on particularly

the livelihood security of the poorest rural population segments. Nghe An, Ha Tinh and Quang Binh provinces (NHQ) have a population of about 5.2 million inhabitants of which 70% are living in the coastal and lowland areas. Most of these inhabitants depend more or less on revenues from the agriculture and aquaculture sectors. With about 350 km of coastal line open to the East Sea, the coastal and lowland areas of these provinces are inherently affected by severe disasters such as typhoons, floods, droughts, inundation and salinity intrusion.

Results

After running for three years, the project has carried out a huge amount of work and has fulfilled all expected outputs. Key results are:

- Based on data and materials collected, terrain missions and using numerical modeling approach, the project has drawn out a detailed and adequate picture of observed and projected changes in temperature, rainfall and extreme climate events and related water disasters as well as their impacts on agriculture and aquaculture production systems in NHQ during the last decades and during the near (2011-2030), mid (2031-2050) and far (2080-2099) future periods.
- A principal finding of the project is that, while the observed rainfall in NHQ decreased slightly, the projected rainfall trend in the middle and end of 21th century is a significant increase in the months of rainy season (summer and fall). On the other hand, the decline of river water level during dry season in combination with a future the sea level rise might cause an increase in saline intrusion. Although salinization thus affects agricultural production due to shrinking cultivated land, local people as an adaptive response have already begun to turn these challenges into opportunities for increased income by means of transforming conventional farming into aquaculture, animal husbandry and worm breeding.
- Six coastal villages (two in each province) were thoroughly surveyed and subsequently studied by means of qualitative fieldwork. In addition, all relevant local actors and authorities were interviewed and consulted. Using this broad data material, a range of socio-economic aspects of vulnerability to disaster were researched, described and analyzed. A comprehensive picture of the stresses that play a part in vulnerability at local level was established, and preconditions were outlined for communities and households to uphold their resilience. A fieldwork component specifically addressed the extent and significance of local and indigenous knowledge in coastal communities.
- A PIS has been built, in which multi-disciplinary knowledge, indigenous knowledge were integrated with computational and GIS tools. This PIS was transferred to local stakeholders, including training workshops and can be used as an efficient tool for vulnerability reduction to climate change at the different levels and for reinforcing the resilience of local community in project areas. The PIS has been highly appreciated by the local people in NHQ (video at http://danida.vnu.edu.vn/cpis).
- The project has been successful in establishing a teamwork model with win-win mechanisms, in which stakeholders-beneficiaries including scientists, decision makers and local communities cooperated to cover all stakeholder's needs and requirements.
- Among the noteworthy results of the project is the high number of academic articles and papers, 21 in total, including 10 articles published in ISI international journals, 1

article published in non ISI journal and 10 proceeding papers in international workshops and conferences.

Conclusions

Despite ongoing industrialization, agriculture and aquaculture will remain key production systems in the studied provinces, with significant contributions to the livelihood of their rural populations. Since both systems rest on water resources, climate change induced water disasters are likely to exacerbate the vulnerability of rural people. At the same time, previous experiences accumulated in coping with disasters and the indigenous knowledge of the coastal and lowland communities continue to play a role in securing livelihoods. However, a range of naturally and socially produced stresses combines in diverse patterns across communities and between households, calling for a higher degree of disaggregated disaster prevention models and sensitivity to the needs of weaker population segments.

Due to their complex and interdisciplinary nature, both climate change research and adaptation programs in Vietnam are still facing serious challenges. These include the lack of a scientifically well-argued background for understanding the complex interaction between nature and society in the context of climate change, qualified human resources, inter-sector collaboration, and especially the lack of efficient tools for local policy-making processes such as the Participatory Geographical Information System. The project has made significant inputs to meeting these challenges and has provided models for the effective exchange of information, knowledge and perspectives between researchers, provincial and local authority, and local people, which potentially is applicable to a wide range of contexts.

Implications & Recommendations

- Firstly, the project advocates an increased emphasis on disaggregated adaptation policies because natural hazards impact different parts of Vietnam unequally, and because differences in provinces' and communities' socio-economic profiles lead to different vulnerability outcomes.
- Secondly, the project has contributed to increase resilience capacity of policy/decision makers and local communities to climate change impacts in Vietnam, and has reinforced the international collaboration between Vietnamese and Danish scientists which in turn opens more opportunities with the researchers from others countries working in climate change impacts and vulnerability. Yet, the project outcomes have contributed to validate the models worldwide used.
- Thirdly, the project recommends even stronger emphasis on multi-dimensional approaches in any aspect of future climate change adaptation and disaster mitigation research.
- Fourthly, the project recommends government to pursue policies that not only address the physical exposure to natural hazards, but simultaneously address those more deep-rooted development issues such as poverty, inequality, household composition and access to quality housing, which are highly likely to impact vulnerability to climate-induced disasters – irrespectively of the type and variation of natural hazards.