INTERDISCIPLINARITY OF VIETNAM DENMARK COLLABORATION IN CLIMATE CHANGE IMPACT RESEARCH PROJECT THE CASE OF RED RIVER DELTA, VIETNAM.

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ABSTRACT: In a context where Vietnam is considered as one of the most potentially affected by climate change Denmark is supporting Vietnam to set up and to conduct research projects in various aspects of socio-economic development of the country and of technology transfer as well. These projects are focusing to enhancement of the adaptive capacity of Vietnam to cope the climate change impact. The International Center for Advanced Research on Global Change ICARGC from Vietnam National University VNU is one among the Vietnamese establishments qualified by Danida for project implementation. The Red River Delta is chosen as pilot site of a project *"Impacts of Climate Change on Land Use Change in the Red River Delta and its Community Livelihood Change"* in which the relationship between climate change, land use change and community livelihood change will be examined. The National Environment Research Institute from Aarhus University Denmark is Danish partner of the project and involving the researchers from both physic and socio-economic sciences. The project is designed for three years beginning form 2010 and the research aims to indicate to Decision Makers how to mainstream climate change issues into development planning to make sure that climate change should be integrated into existing policies of the Government and in awareness of the community. In parallel, the project will strengthen the human resources development of VNU via the exchanges and short term internship and academic education as well.

INTRODUCTION

In a context where Vietnam is considered as one of the most potentially affected by climate change, our project aims to understand the relation between climate change and its impacts to livelihood change of rural community in the Red River Delta (RRD) in Vietnam.

The Red River Delta (RRD) is situated in the North of Vietnam and characterized by its landscape diversity with hilly zone in upstream, flat topography in central part and strongly artificialized mangroves in its coastal zone. Its rapid population growth makes it the most densely populated in Vietnam. After Doi Moi, RRD has become an area of intensive land use transformation and of successful poverty reduction (Chaudhry and Ruysschaert 2007). A huge space of agriculture land is transformed into urban land by industrial and urbanization projects creating both environmental and social concerns in rural areas of RDD; in the coastal zone the land transformation is characterized by intensive conversion of agriculture land and mangrove forest into aquaculture land. In reality, all these transformations have created a risky economic situation where the livelihood of rural community is facing the fragility of their own agriculture and aquaculture activities. It is important to examine:

1. How the land use has been changed in the RRD though out the period before and after Doi Moi,
2. How important the impacts of climate change are on land use changes and
3. How these two factors have caused the changes in the livelihood of the rural community in the whole RRD.

The research should finally indicate to Decision Makers how to mainstream climate change issues into development planning to make sure that climate change should be integrated into existing policies of the Government and in awareness of the community.

MULTIDISCIPLINARITY OF PARTNERSHIP

The project is managed by the International Centre for Advanced research on Global Change (ICARGC), Vietnam National University in Hanoi which is the lead partner throughout the project. ICARGC's responsibility is to coordinate the whole project in involving the Vietnamese specialists coming from disciplines directly related to climate change, land use change and community livelihood change issues. ICARGC will assure all kinds of data collection, land use change analysis using remotely sensed and cartographic and/or

and statistic data. ICARGC is responsible for organization of field trips for conduction of interviews, collection of economic data and validation of image processing results. Danish partners from Aarhus University participate in some of these field trips.

The Danish partner is NERI, Aarhus University including two teams: one specialized in physical and multi-criteria modelling from NERI FEVO, another in socio-economic (welfare economic and sociological) analysis of livelihood from NERY SYS.

The Danish partner from NERI FEVO will help ICARGC evaluate the climate change impacts on hydrology, erosion, sediment yield and crop production at the river basin scale in using different models including the Soil and Water Assessment Tool (SWAT) model. The Danish team from NERI SYS will help ICARGC establish the foundation for design of the socio-economic analysis of livelihood changes imposed by the Doi Moi political reform process and climate changes in the RRD. Activities to build the foundation for this work package include training in research methods, assistance with data collection and with the overall design of studies, supervision on field work, and supervision and refereeing of analysis and of policy recommendations.

Both teams from Aarhus University will supervise the data base designing, data processing and modelling as well as the internships of Vietnamese junior researchers at Aarhus University.

PILOT SITES

The project is divided into 4 sub-projects: one overall RRD and three others for three pilot sites in the RRD. The specific pilot sites are located in three quite different contexts both in terms of socio-economic and biophysical conditions generating different land use practices, livelihoods and environmental impacts as shown in Figure 1. The climate change analysis of the whole RRD will be used for downscaling climate change impact on three pilot sites. These pilot sites are considered as zoom windows and in their turns, will be used for up-scaling synthesis at RDD level.

Description of Pilot Sites and Research Hypothesis

Ba Vi Pilot

Located in 60 km NW of Hanoi, Ba Vi is characterized by a complex landscape including the highest peak of the Ba Vi mountain and the hilly sector of the Red River Delta. Due to its geomorphology and demographic ethnographic structures the land use practice in this area is very diversified; some primary forests occupying the top of Ba Vi are mixed with swidden cultivation of the local ethnic group (mainly Dao); lower upland crop is intercalated with plantation of tea and paddy fields occupy the lowest valleys. Soil erosion and flash flooding and soil degradation are considered as consequences of conflict between land use practice and livelihood sustainability in this area. The forest is still an important source of livelihood for local communities not only because of forestry products they can gather but also by the tourism resources; with a relatively favorable climate, good infrastructure and close proximity to Hanoi, Ba Vi already attracts large numbers of tourists. In 1999 Vietnamese National University has installed its Experimental Station here, at the piedmont of Ba Vi, to carry out and maintain educational activities for the researchers and students of VNU. The tourism development in Ba Vi is strongly linked to the existence of the National Park in particular and to its wonderful landscape in general.

For the project team, it is important to verify the hypothesis that: 1) the land use change observed here is closely related to natural resource based livelihood of the local community, especially the minority groups, 2) the land degradation caused by soil erosion is linked to land use change pattern and 3) the extreme weather phenomena like heavy rainfall may produce a special impact both on livelihood of the local community, the economic conditions (e.g. for agriculture) and the environment.

Dong Anh Pilot

Dong Anh is located in the North of the Red River and characterized by specific geomorphologic conditions where soil and topography are favorable for upland crop. Dong Anh participates in the network of vegetable producers and providers for the capital of Hanoi. Just after the Doi Moi policy has been launched Dong Anh become a territory of intensive industrialization and where the rural-urban linkages are strongly reflected in land use changes. The undergoing land use change in Dong Anh since Doi Moi has shown that the peri-urbanization is leading to a situation of conflict where traditional livelihood based on vegetable and upland crop production systems is threatened by the construction of new residential areas and of the associated infrastructures. Even so, the main livelihood types of Dong Anh in rural sector are still typically agriculture based ones and depend much on natural conditions and the extreme weather events can cause a double impact on the fragility of the product systems here. For the project team is important to verify the hypothesis that: i) the land use change in Dong Anh is strongly influenced by urbanization directly linked to expansion of Hanoi and is causing the livelihood change of the local rural

community, ii) the vegetable and upland crop production systems in Dong Anh are the most vulnerable in case of extreme weather events such as unseasonable cold-snap, long drought and/or heavy rain.

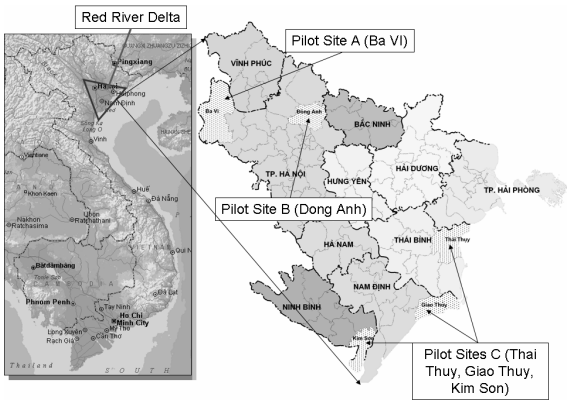

Figure 1 Pilot Sites and their location in the Red River Delta

Coastal Zone Pilot

The pilot site is situated on the coastal zone in this project consists of three provinces Thai Binh, Nam Dinh and Ninh Binh and belonging to the Biosphere Reserve of RRD. In this zone the land use practice is closely related to mangroves resources and aquaculture plays an important role in land conversion and land use change process. Aquaculture began about a century ago in the coastal areas of Vietnam and caused considerable environmental damage, both in the immediate term through mangrove habitat destruction and in the longer term through pollution and depletion of shrimp, crab and fish larval stocks. Beside the impact of land use activities, the mangroves forest in the coastal districts of Thai Binh, Nam Dinh and Ninh Binh provinces are facing the potential impacts of climate change in coming years. It is well known that the coastal zone of RRD is one of the most vulnerable areas in case of sea level raise and other climate change related processes. The coastal zone within RRD spreads over a distance of about 200km and is characterized by a diversity of landscape and it is important to select the most representative sites in terms of bio-physic and socio-economic characteristics for the pilots. The three districts chosen are Thai Thuy (Thai Binh province), National Park Xuan Thuy (Nam Dinh province) and Kim Son (Ninh Binh province).

The project team aims to verify the hypothesis that: *i*) the land use change in the coastal zone is characterized mainly by the transition of wetland mangroves into aquaculture land, ii) this transition has caused a risky situation for coastal community livelihood, the economic conditions and the environment, iii) the extreme weather phenomena and typhoon patterns can cause changes in land use practices and consequently, lead to economic, environmental and community livelihood changes.

INTERDISCIPLINARITY OF APPROACH

The research questions of the project are formulated to understand the impact of climate change on the land use practice on the Red river Delta and consequently on the community livelihood. In this research we are dealing with three components: climate, land use and livelihood which belong to three different branches of science and technology: Climate Science, Sociology and Economy, Earth Observation and Geomatics. However, half of the questions we have to answer to are situated in between these branches (see Figure 2). The relationship between climate change and land use practice is mentioned and analyzed in various publications (FAO, Fakhri Bazzaz et al. 1996; Garnaut Review 2007; Secretariat 2007). Land use and livelihood are also well researched in terms of mutual interacting in literature (L M van den Berg and Hoi 2003; Katherine Homewood, Patti Kristjanson et al. 2009). How to model all these relations in order to clarify the impact of climate change on the two remains components is the main research objective of the project.

The project concept is summarized as presented in Figure 2 bellow.

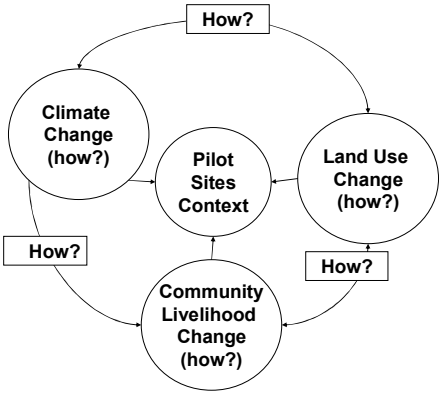

Figure 2 Interdisciplinary concept of project

It is important to mention the spatial dimension of the interdisciplinary approach used in this research which allow us to integrate the data of different nature in a multi-criteria and/or multi agent spatial analysis.

Finally but not less important, the project aims to enhance the academic research capacities of the Vietnamese young scientist through the short term internship in Aarhus University and through the Master Program at AIT, Bangkok. This activity creates promising opportunities for establishment and

enlargement the professional network for the young Vietnamese researchers in their future carrier.

CONCLUSION

The 3 year project funded by Danida is really a challenging initiative for which both donor and implementing institutions have been closely collaborating for project proposal development. The interdisciplinary character of the research questions and hypothesis requires the specialists coming from different disciplines to contribute and to share their knowledge in very complex analysis to understand the impact of climate change to land use and livelihood change on RRD. The Vietnamese side will learn through doing this exercise along with highly qualified researchers from Danish partner institution.

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