Project: CPIS – DANIDA_VNU

SYSTEMATICAL DESIGN FOR WP2 AND WP5

(Report on 19.6.2013)

The impact assessment of water disaster (WD) on aquaculture and/or agriculture production system in the context of climate change should be based on the following hypothesis and scopes:

1) Climate Change (CC) might increase the extreme weather and climate events, that result in increaseing WD, such as flood and flooding due to heavy rainfall, landslide along rivers and coastal, drought causes the deficit of water for irrigation and drinking, depleting the rivers, and the increase of saline intrusion, etc.

2) The increase of WD might negatively impacts on aquaculture and/or agriculture production, such as lost of land, depression, and/or change of land use due to salinazation, desertification, lost-crop due to flood, drought, etc. In this project, the impacts of flood/flooding will be focused on.

3) Inhabitants in NHQ, generation to generation, adapted to their living environmental conditions. The accumulated experiences in coping with natural disasters helped them to overcome all difficulties for survival, and to create a sustainable livelihood system. As introduced in the studies of Robert Chambers in the mid-80s, and further developed by Chambers and Conway in the early 1990s, livelihood consists of capacities, resources (including material and social resources), and necessary activities such as ways to survive. Household livelihood now will be measured by four factors, including mode of production, livestock and plant structure, income structure, and employment status. Livelihood change takes place when at least one of the four factors changes.

4) The impact of WD caused by CC could disrupt the inherent balance of livelihood system, upset the life activities of the inhabitants, even lose some traditional livelihoods, and cause them any harm. These impacts will be looked inside in term of changing livelihoods and the resources creating livelihoods including natural resources such as land, natural resources, etc; financial resources (capital) and social resources (social network, etc). In addition, in each community, the types of livelihood and their fundamental resources contain themselves the vulnerabilities under the impacts from the outside (both natural and social aspects), of which, it includes CC.

5) As a result, in order to survive, inhabitants must know how to adapt with new life conditions, thanks to use their accumulated experiences to change from one type of livelihood to more appropriate type or to mobilize the resources more effectively to deal with and maintain the current type of livelihood in a sustainable manner. Self-adaptive process of inhabitants will accumulate many new and good experiences for them.

Figure 1 illuminates a logistic schema of the relationship between Indegenous Knowledge (IK), Impacts of CC-induced WD and Vulnerabilities (Vul) caused by these impacts. Where:

1) LH11, LH21, LH31 and LHn1 are indicators of livelihood (including the mode of production, the structure of livestock and plants, the structure of income, and the employment status) at the time of t_1 without the impact of WD on the activities of agriculture and/or aquaculture production (Aqua/Agri). IK-1 is the indigenous knowledge accumulated up to the time of t_1

Figure 1: Logic diagram link WP2 and WP5

2) Under the influence of WD, some types of livelihood will might be suffered any loss (L1, …, Ln). The inhabitants will be vulnerable when they meet the loss in that type of the livelihood.

3) In order to survive, inhabitants have applied their inherent life experiences (IK-1), adapt themselves (A) to change livelihood types from LH11, LH12,…, LH1n at the time of t_1 to LH21, LH22,…, LH2n at the time of t_2.

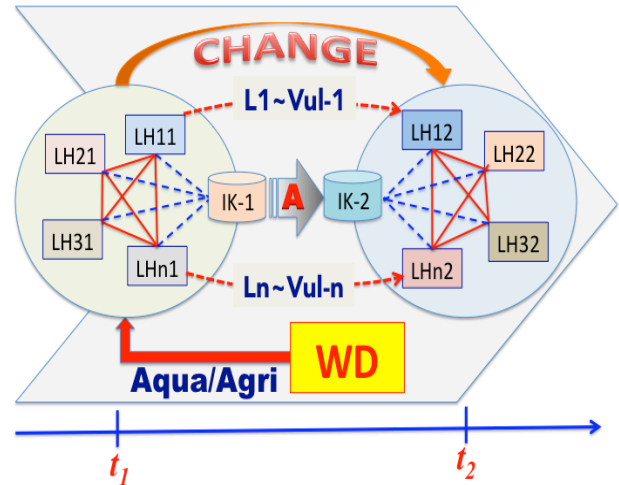4) That adaptive process has helped the inhabitants to get new knowledge and new experiences (IK-2).

Logically, it might understand that in order to assess the impacts and vulnerabilities caused by WD due to CC in taking into account the role of indigenous knowledge in the process of inhabitants' adaptation need to follow the sequence below:

1) *Step 1:* Assessing the nature and the extent of the impacts of WD. In order to perform this task requires input data from the assessment of CC (WP3) and the assessment of the change in WD (WP4). Based on this information, the evaluation will be conducted through a set of reasonable indicators developed and selected.

2) *Step 2:* Assessing the changes in livelihood system. At this step, it is necessary to determine the changes in livelihood system at least two times: before (t_1) and after (t_2) the impact of WD. This issue is conducted by a household survey.

3) *Step 3:* Assessing the extent of vulnerabilities. From the results of step 2, the impacts of livelihood chnages on living standards and resistant capacities of inhabitants will be indicated, which helps to determine the extent of vulnerabilities. This assessment will also need to build a set of realiable indicators.

4) *Step 4:* Assessing the resistant capacities, adaptive methods, and indigenous knowledge of inhabitants. Actually, this step will be implemented in parallel

with step 2 and 3. That means the information on inhabitants' experiences to cope with and adapt for WD will be collected in the survey process (*Step 2*). Basing on the information on the changes of livelihood system and the resistant capacities, this study will be identified the methods of adaptation and the accumulated experiences of inhabitants.

With this approach, two groups of WP2 and WP5 need to design a questionnaire that covers the content of both indigenous knowledge and livelihood changes under the impact of WD on Aqua/Agri.

In principle, the survey for **a study site** can be described as follows:

1) Step 1: Choosing 01 hamlet/village in each study commune (Based on the findings of WP3 and WP4).

2) Step 2: Choosing the entire households in the hamlet/village as a research unit to survey by questionnaire.

3) Step 3: Building the questionnaire which consist of two main parts as follows: Part 1 will collect the information about the livelihood changes (**Change** in the Figure 1) at two times of t_1 and t_2; Part 2 will gather the information relating to indigenous knowledge.

The requirements of questionnaire are generalization (representative of the study areas), specificity (the differences in living standard, geographical position, etc), and meeting the purpose of checking the logic of question system (the exclusion, combination,… to crosscheck and discover the errors and to evaluate the reliability).

Another requirement is how to quantify (even being very relatively) the answers beside descriptive statements.

If it is quantitative data, the findings would come from classification analysis, or discrimination analysis, or factor analysis.