

CHAPTER 8 - ADAPTIVE CAPACITY IN CLIMATE CHANGE VULNERABILITY ASSESSMENTS: QUANG BINH

8.1. INTRODUCTION

The present chapter discusses an important element in the vulnerability to climate change equation - adaptive capacity - and presents an overview of it, at the provincial level, in Quang Binh. A detailed study of provincial adaptive capacity was beyond the scope of the EbA assignment, so this exploration has involved a brief overview of policy and related literature, and semi-structured interviews with a small number of key informants, principally in DARD and DONRE, but also in other key departments as well as observations by members of the current study team. The findings presented here should be considered provisional, and provincial partners are encouraged to provide additional information and make corrections where needed. The impressions gained here have been used to inform the SES vulnerability assessments presented in Chapter 9.

The chapter begins with a brief review of key concepts relating to adaptive capacity. Since these concepts are complex and in some cases disputed, a fuller treatment is provided in the annex to this chapter. The next section outlines the approach to adaptive capacity taken in the provincial- and local-level studies of this vulnerability assessment. The indicative findings of provincial-level assessment of adaptive capacity follow - first examining relevant national level structures and policies and then looking in as much detail as was possible at the level and nature of the present adaptive capacity in Quang Binh. The chapter ends with a brief discussion, conclusions and recommendations.

8.1.1. Key concepts

To understand adaptive capacity and assess it for the EbA vulnerability study and, ultimately, to enhance it, it is useful to consider: i) what we mean by adaptation; ii) what is adaptive capacity; iii) what constitutes “successful adaptation” or a well-adapted community, or system; and iv) how do we build adaptive capacity?

The following definitions are used in this study:

8.1.1.1. ADAPTATION

Adaptation may be defined as:

“The adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Adaptation is a process and not an outcome” (GiZ/WRI 2011).

Adaptation is a process because climate change is on-going and thus the need to adjust to it is also continuing; therefore, no outcome is likely to be final. Though individual adaptation interventions might have an end-state in mind, this is likely only to

be an interim state, and further change is likely to be needed in the future. Uncertainty is inherent in adaptation, as it is in climate change, and it is thus the “capacity to adapt”, or keep adjusting that is the most important.

The questions of “who adapts” or “whose adaptive capacity” are important ones. Basically, everyone needs to adapt and develop their adaptive capacity, but different stakeholders have different roles in making adaptation work. In the context of this EbA study, adaptive capacity of government stakeholders at the provincial level is considered here, and that of local level stakeholders in case studies.

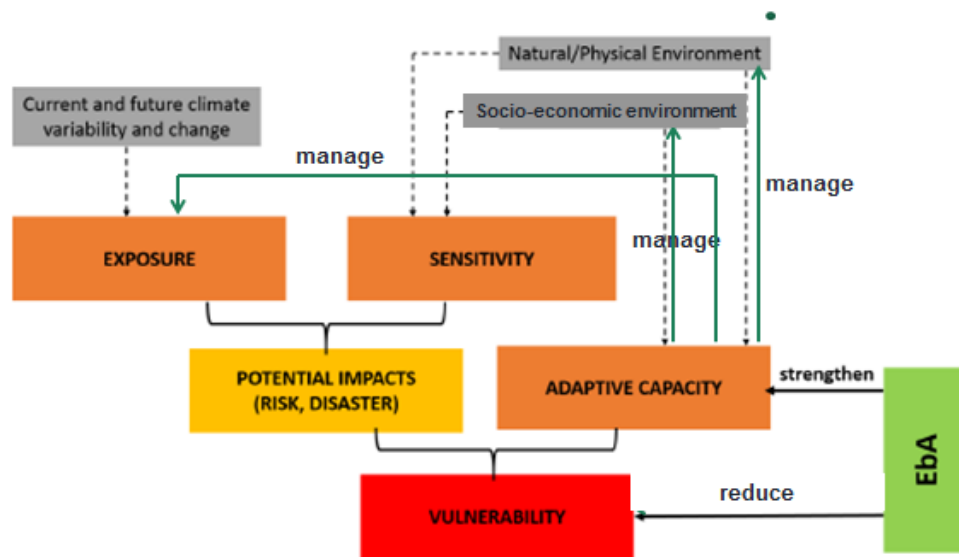
8.1.1.2. ADAPTIVE CAPACITY

Adaptive Capacity is defined in different ways depending on the context. In the context of climate change, it has been defined as:

“The potential or capability of a system to adapt to (to alter to better suit) climatic stimuli or their effects or impacts” (from Smit et al., 1999)¹.

For the EbA vulnerability assessments the “system” in question, and unit of analysis, is the socio-ecological system (SES), as shown in Figure 8.1. The socio-ecological system concept puts people front and centre in the analysis. It reflects the understanding that climate change is a human issue: people are the cause of climate change, the victims of it, and human capacity to adapt is key to successful approaches to it.

Figure 0.1: Capacity in Climate Change Vulnerability Assessment for EbA



Source: adapted from GIZ, Adelphi and EURAC 2013, based on IPCC 2007

Adaptive Capacity of Species and Ecosystems

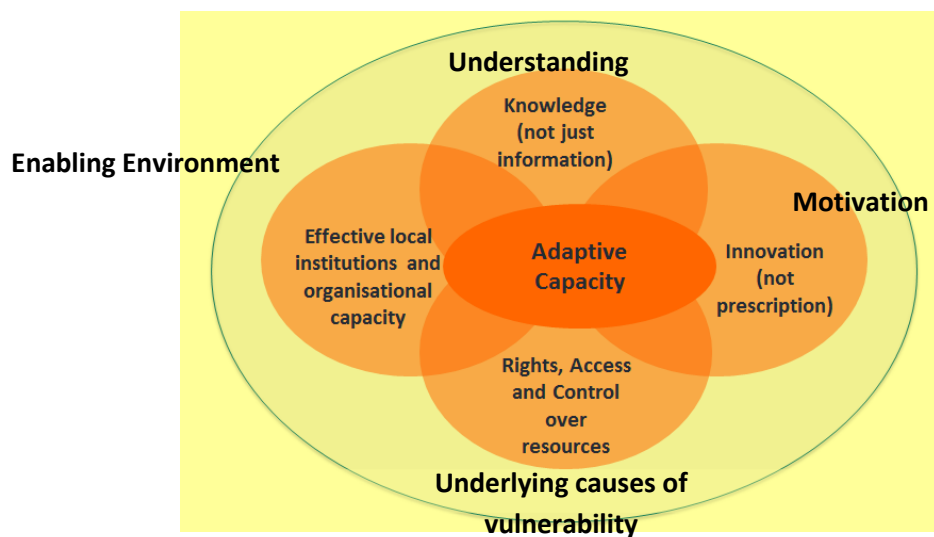
¹ <http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=650>

Some EbA assessments include an analysis of the “adaptive capacity” of species and ecosystems (Tuan et al (eds) 2012). In the ecological literature (Gunderson and Holling 2002) adaptive capacity is the ability of a living system to adjust responses to changing internal demands and external drivers in the short term; in the longer term, it is the system’s “evolutionary potential”. Three different levels are identified. For **species**, potential is determined by genetic diversity; for **ecosystems**, it is their biodiversity or complement of species; and at landscape or biome level, it is the mosaic of different **ecosystems present**, their connectivity and patch size.

While the concepts of adaptive capacity of species and ecosystems are relatively straightforward, in practical terms, they are very difficult to assess, particularly in a short study such as this. Simply too little is known about the ecosystems and species concerned, and even if such knowledge existed, the modelling required to predict changes would be impossibly complex. Further, in this EbA assessment, we are dealing with socio-ecological systems - in which the natural ecosystems have been radically transformed as a result of the decisions, technologies and actions of human beings.

In the present analysis, then, “adaptive capacity” is explicitly understood as a human/social phenomenon. While an inherent characteristic of ecosystems is that they can change fundamentally in response to shocks and trends, and reach new stable points, in terms of identifying EbA actions, we are more interested in peoples’ capacity to manage the ecosystem and direct the change (e.g. through application of human, technological, and financial capital) and the capacity and political will of governance entities to deploy those resources. Notwithstanding these practical constraints, some useful principles do emerge, which can be usefully applied when considering adaptation to climate change. These include the idea of maintaining and **promoting diversity** at all levels and the need for **flexibility**, to maximise and capitalise on the options open in socio-ecological systems, in the face of an uncertain future.

Figure 0.2: Elements of Adaptive Capacity



Source: CARE (2009) CVCA Handbook

For the purposes of this study, adaptive capacity is essentially:

“the broad set of enabling traits, possessed by people, to manage the exposure and sensitivity of their socio-ecological system, either for the increased resilience of the system to changing climatic circumstances, or for its transformation to a new regime that is better suited to new climatic circumstances”.

Having understood adaptive capacity as it relates to exposure, sensitivity and vulnerability it is useful to consider what it actually consists of. CARE, in its approach to community-based adaptation identifies four main elements of adaptive capacity, as shown in Figure 8.2.

Perhaps the most important element shaping the adaptive capacity of individuals, households and communities is their **access to and control over livelihood resources** or “assets”: natural, human, social, physical and financial². Simply put, the greater the access and control of these assets, the wider the potential options available and greater the potential adaptive capacity. Further, it is in the lack of these assets or capitals that we see the links between adaptive capacity, vulnerability to climate change and poverty, and the disadvantages suffered by women and other vulnerable groups.

From the EbA perspective, “natural capital” is of central importance. EbA seeks to promote adaptive capacity by enhancing peoples’ ability to manage and care for the natural ecosystems and the environmental services they provide.

² See DFID Sustainable Livelihoods Guidance Sheets for more details on livelihood assets. <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>

Access to resources is clearly not enough on its own. People must understand the climate challenge facing them, and have ideas about what to do. These are “**knowledge**” and “**innovation**” respectively. Knowledge is more than getting the information and knowing the facts about climate change. It must be accompanied by understanding the importance of ecosystems to livelihoods, the need for action, and the motivation to act. Innovation implies ability to devise new solutions. Communities in Vietnam have been coping with various extreme climate events for centuries, providing good preparation for climate change. However, climate change demands new solutions - looking further into an uncertain future.

Finally, there must be an “**enabling environment**” for adaptation: the policies and programmes of government that open up what people are able or encouraged to do; the organisations at all levels that support peoples’ adaptation and or manage wider adaptive interventions.

Drawing on all these definitions, building Adaptive Capacity is arguably the key element and ultimate objective of climate change adaptation work. It is thus an important factor in the present provincial-level EbA vulnerability assessment and the efforts to identify the socio-ecological systems most in need of adaptation action and select particular local-level sites for more detailed assessment.

8.1.1.3. WHAT IS “SUCCESSFUL ADAPTATION”?

At a very basic level, a successful adaptation is one that has established goals over a range of future climate scenarios and is effective in meeting them, producing benefits that outweigh costs - financial, physical, human, or otherwise (Smit et al., 2001). At higher levels, a successful adaptation would be one that has addressed cost-effectiveness, efficiency, the distribution of benefits, the legitimacy of the adaptation, sustainability, global and intergeneration equity and the resonance of adaptation with cultural norms and collectively held community values. With such a complex concept, inevitably, finding a workable definition of successful adaptation is always going to be contested (Adger and Vincent, 2005).

8.1.1.4. BUILDING ADAPTIVE CAPACITY

As discussed above, the question of “who adapts” is important, and so equally important is the question “whose adaptive capacity”. In the face of climate change, to a very large extent, everyone, civil society, private sector and government needs adaptive capacity, but the nature of the adaptive capacity in each group will be configured somewhat differently.

The CARE schema also helps us to understand what building adaptive capacity entails:

- Actions to **address the underlying causes of vulnerability**, which are largely the same as those underlying poverty: enhancing access to essential livelihood assets, and increasing livelihood diversification.

- Actions to **promote knowledge and understanding of climate change challenges**, including the inherent uncertainty climate change entails, the need to maintain diversity and remain flexible, and the motivation of key stakeholders to take action.
- Actions to **promote, encourage, and support stakeholders to devise innovative, locally appropriate and integrated solutions** to anticipate the threats of climate change, moving on from mere reactive coping to immediate hazards, or top-down prescriptions.
- Actions to **improve the institutional and organisational environment**: enabling policy for climate change adaptation, at local as well as national level, particularly relating the three points above, including actions on fundamental issues such as gender and then need for participatory engagement with all stakeholders

These points can guide the adaptation work of a wide range of stakeholders, from communities, through CBOs, NGOs, government agencies at all levels, and international donors. The focus of CCA must not just be on the practical adaptation “interventions” (like SRI, improved watershed management, diversification of livelihoods) but on the processes of reducing vulnerability and building adaptive capacity that underpin the interventions and promote the sustainability of adaptation, in the long term.

8.1.2. Adaptive Capacity in the EbA Vulnerability Assessment

For the EbA Vulnerability Assessment, adaptive capacity needs to be considered at both stages of the study: first at the provincial level stage, and then again at the local level. We use the CARE graphic to structure the analysis. Although it was developed to help understand community-based adaptation, with slight modifications it can equally be employed to inform adaptation interventions at any level. The approach at each level is outlined below.

8.1.2.1. ADAPTIVE CAPACITY IN THE PROVINCIAL-LEVEL VULNERABILITY ASSESSMENT

The objectives of the provincial-level VA are to identify the province’s socio-ecological systems (SES) and assess the vulnerability of each, to provide a basis for prioritising sites for further work and for making provincial-level EbA recommendations. The unit of analysis for considering adaptive capacity thus should also be the SES. While it has been suggested that, like ecosystems, SES will exhibit the tendency to change to their function and structure, when certain thresholds are exceeded and system feedbacks change, our understanding of what would be highly complex shifts is currently only rudimentary or speculative. Further, given that adaptive capacity is essentially a human characteristic, and that the provincial-level VA relies entirely on secondary data

and limited engagement with provincial level government stakeholders - this adaptive capacity assessment is focused on the provincial government. The capacity of government at the national and district levels are undoubtedly of importance, but beyond the scope of this study. Time permitting, commune government capacity can be picked up on during the local-level VA (see below).

CARE's four "elements" are used to structure the provincial-level adaptive capacity assessment:

Effective Institutions and Organisations: The government agencies that are responsible for climate change policy and action, their main policies, strategies, plans and programmes, and how effective they are individually, and how well they coordinate with each other.

Knowledge and Innovation: For most government actions, a collective understanding is expressed in its policies, strategies, plans and programmes. Vietnam's policy framework for climate change is thus given some consideration. However, concrete climate change related knowledge is a different thing, and much less widespread. It is important to identify the extent to which it exists, where this actually lies (who knows and understands what) and how this understanding is used. It must also include awareness of key climate change concepts - such as uncertainty and risk. For government, "knowledge" must also include the ability to generate relevant knowledge - that is research - and turn it into new and locally-appropriate action - that is "**innovation**". Which sectors and climate change related threats attract the most research, interest and application. EbA is an innovation - how well do government institutions embrace, explore and tailor new ideas.

Resources: How the government allocates funds for climate change related actions.

8.1.2.2. ADAPTIVE CAPACITY IN THE LOCAL-LEVEL VA

The objectives of the local-level vulnerability assessment are to identify and propose solutions to specific climate adaptation problems, in priority SES identified in the provincial-level assessment. An equally important objective of this initiative at both the provincial and local-levels is to demonstrate workable, replicable methodologies that can be applied in the demonstration provinces and elsewhere in Vietnam and perhaps the region. At the local-level, a key part of this methodology is engaging with local level stakeholders. Participatory exercises are employed to understand peoples' present adaptive capacity, and at the same time to raise their awareness of climate change and begin strengthening their capacity to work together to adapt to the challenges ahead.

The same four "elements" of adaptive capacity are assessed at the local level amongst the commune government and the villagers, and other key stakeholders, depending on the SES (eg Forest Protection Management Board (FPMB), Vietnam Border Defence Force, commercial companies, etc.).

8.2. CURRENT ADAPTIVE CAPACITY AT THE PROVINCIAL LEVEL

As mentioned above, the focus on this section is on provincial adaptive capacity, but to provide context, it begins with a brief review of the national organisational structures and policies for CCA to which provincial actions respond, and to the closely linked programmes in Disaster Risk Reduction.

8.2.1. National Organisational Structures and Policies for Climate Change Adaptation and Disaster Risk Reduction

Adaptive capacity for climate change adaptation in Quang Binh is strongly shaped by institutions and policies at the national level. Figure 8.3 shows how Vietnam's response to climate issues is structured, and Figure 8.4 presents the national policy framework for climate change.

8.2.1.1. NATIONAL ORGANISATIONAL STRUCTURES

The Prime Minister has ultimate responsibility for Climate Change and is advised by a National Committee on Climate Change (NCCC), established in 2011 and comprised of members from all key ministries³. The NCCC itself, has its own Advisory Team. The Ministry for Natural Resources and the Environment (MONRE) is the government's focal point and lead technical agency for climate change issues, both internationally and nationally. Internationally, MONRE coordinates Vietnam's participation in multi-lateral

³ MARD, MONRE and National Defence, public security, Information and communication, Transport, Industry and Trade, Planning and investment, Finance, Education and Training, Health, MOLISA

environmental agreements, such as the United Nations Framework Convention on Climate Change (UNFCCC) and its related Protocols. Nationally, MONRE hosts the Standing Committee of the NCCC and both the Standing Committee and the Project Management Unit of Vietnam's key climate change programme - the National Target Programme to Respond to Climate Change (NTPRCC). It includes key technical agencies related to climate change, notably the Institute of Meteorology, Hydrology and Environment (IMHEN) and the Institute for Strategy and Policy on Natural Resources and the Environment (ISPONRE). MONRE has a role to guide and coordinate the climate change work of other line ministries at national and provincial levels. However, there are also lines of communication between the Line ministries upward with the NCCC and downward with their own provincial departments. This creates some coordination issues that will be discussed below.

MARD, given its mandate for agriculture and rural development, also has a major role to play in climate change adaptation and mitigation. The other key Ministries are Construction, Industry and Trade, Transport, as well as Planning and Investment and Finance.

8.2.1.2. NATIONAL POLICY FRAMEWORK FOR CLIMATE CHANGE

The expression of Vietnam's highest political will relating to climate change is found in Resolution No 24 (2013) of the Communist Party Central Committee on "Proactively responding to climate change, boosting resource management and environmental protection".

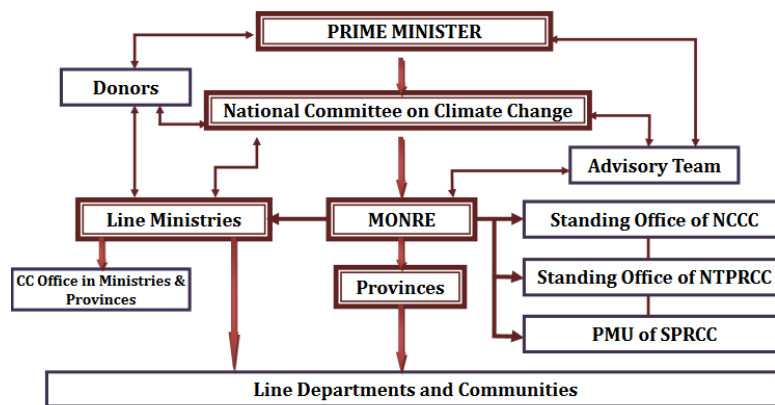
Vietnam's key policy, the National Climate Change Strategy, was set out by MONRE in 2008 and approved in 2011. This was followed by the key national programme, the National Target Programme for Responding to Climate Change, with a budget of USD 93.5 million up to 2015. The Support Program to Respond to Climate Change (SP-RCC) was set up at the same time to mobilise and coordinate resources from international donors for the NTP-RCC. USD 620 million was provided in the first three years, from a number of bilateral and multilateral donors including WB, UNEP, FAO, JICA, AFD, AUSAID, Korea and BMU. Its funds are allocated through a process guided by managed by MONRE. Ministries and localities submit projects and requests for funding, and following inter-ministerial consultations, these are compiled into a prioritized list and submitted to the Ministry of Planning and Investment (MPI) and the Ministry of Finance (MOF). The NTP-RCC and its Support Program were renewed in 2011 and again in March 2016.

The NTP-RCC has 8 sub-programmes:

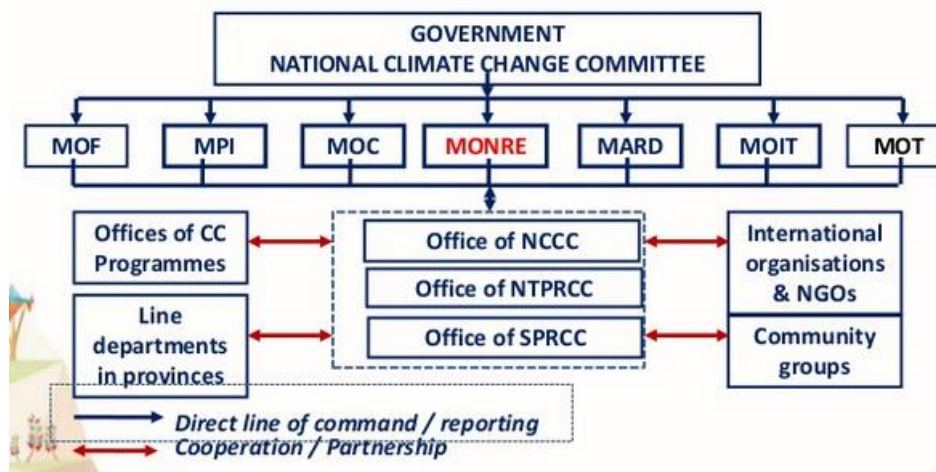
1. Assessing the impacts of climate change
2. Identifying appropriate responses

3. Developing a scientific-technical programme
4. Strengthening capacity and the policy framework in the relevant organisations and institutions
5. Raising awareness across the country
6. Enhancing international cooperation
7. Mainstreaming the NTP across all sectors
8. Developing Specific action plans to respond to climate change (all ministries, sectors, localities).

Figure 0.3: Vietnam’s Institutional Structures relating to Climate Change



Source: Nhat 2015



Source: Nhat (2016)

As such, the NTP is often referred to as a “strategy to develop a strategy”. In the first period, many important policies and plans were developed: National Strategy on Climate Change (2011), National Action Plan on Climate Change (2012), National

Strategy on Green Growth (2012), Party Central Committee Resolution on responding to climate change (2013), protection of natural resources and environment (2013).

The breakdown of expenditure for the NTP-RCC is:

- (i) about 72% goes to environmental research and governance, as well as training and education activities;
- (ii) 20% goes to specific sectors, including agriculture, social affairs and industry; and
- (iii) 8% is given directly to the 64 Peoples' Committees at provincial and municipal levels, to address local priorities.

In 2008, MARD was one of the first ministries to issue its specific action plan, in the Action Plan Framework for Adaptation to Climate Change in the Agriculture and Rural Development sector, period 2008 - 2020. It has five main objectives:

- Ensure the safety of all residents, particularly in the Northern Delta, Mekong River Delta and Central Coastal Zone.
- Ensure stable production of agriculture, forestry, fisheries and salt, with an emphasis on low emissions and sustainability
- Ensure food security through maintaining 3.8m ha of paddy (3.2m with at least 2 crops per year)
- Ensure the safety of the dyke system and other civil works for disaster prevention and mitigation
- Maintain economic growth rate and poverty reduction and GHG emissions reduction rates of 20% in each 10 year period.

Many of its proposed actions relate to infrastructure development.

MARD is also responsible for Disaster Risk Reduction work (see below).

Between 2010 and 2013 all 63 provinces and centrally-run cities issued their own climate change response action plans (CCRAP). Quang Binh prepared its CCRAP in 2011 and it was being renewed in 2015-16.

8.2.1.3. NATIONAL DISASTER RISK REDUCTION STRUCTURES AND PROGRAMMES

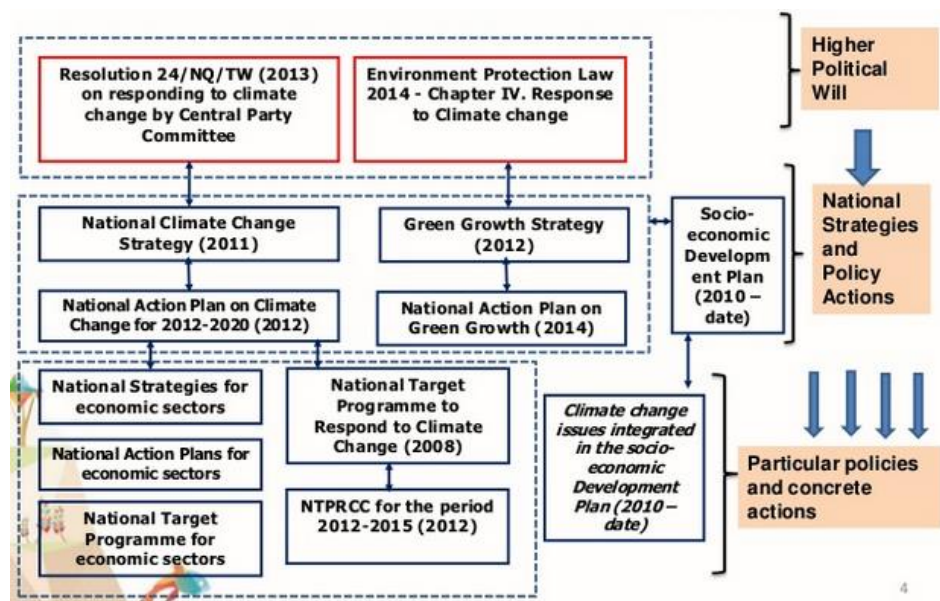
The National Strategy for Natural Disaster Response, Prevention and Mitigation to 2020 was developed by MARD, in collaboration with the Ministry of Defense and other agencies and approved by the PM in 2007. It broadly responds to requirements under the UNFCCC, Kyoto Protocol, Hyogo Framework for Action⁴ and the ASEAN Agreement on Disaster Management and Emergency Response. It is managed by MARD's Disaster

⁴ The Hyogo Framework for Action is a 10-year plan of the UN Office for Disaster Risk Reduction to make the world safer from natural hazards. HFA II was recently agreed in 2015

Management Center of the Directorate for Water Resources, established in 2010. MARD hosts the Standing Office for the Central Committee for Flood and Storm Control (CCFSC). Natural disaster prevention and control plans are elaborated at local, ministerial and national levels every 5 years corresponding to socio-economic development plans, and adjusted annually. Much of the practical work focuses on the construction and maintenance of reservoirs, irrigation systems and dykes.

The Central Steering Committee for Natural Disaster Prevention and Flood Control is responsible for disaster response, in coordination with the National Committee for Search and Rescue. Implementation of the response is handled locally, through provincial Disaster Management Departments (DMD).

Figure 0.4: Vietnam’s National Policy Framework Responding to Climate Change



Source: Nhat (2015)

8.2.2. Adaptive Capacity at Provincial Level in Quang Binh

8.2.2.1. ORGANISATIONAL STRUCTURES, POLICIES AND PLANS FOR CCA AND DRR

Provincial institutions engaged on climate change include Departments, Standing Agencies and Steering Committees, as at national level, and more specifically commanding committees, carrying out implementation. Together with policies and plans (and resources) - these configure the “enabling environment” for climate change adaptation.

8.2.2.1.1. Department of Natural Resources and the Environment (DONRE)

In Quang Binh, DONRE is the Standing Agency for the implementation of the NTP-RCC in the province. However, the province does not yet have Provincial Steering Committee for Climate Change related to the NTP5, and only in 2016 did DONRE establish a dedicated unit to manage climate change issues. This unit, Climate Change and Hydrometeorology, currently has 3 staff members.

DONRE's primary role is to prepare and manage the Provincial Climate Change Responding Action Plan (CCRAP), under the NTP-RCC. The CCRAP, which covers all economic sectors, was prepared in 2011 for the period to 2015 with VND 1 billion central government funding and is currently (June 2016) being updated. Consultants are hired to do the work, under the supervision of DONRE, and the process includes consultations with other departments. The plan incorporates 36 separate projects and programmes. Projects are implemented by the relevant departments, and DONRE supervises and monitors implementation, with the collaboration of MPI and MoF. However, as of December 2015, none of the projects included in the CCRAP had been funded.

DONRE sub-departments manage some climate-related data collection. Sea and Islands collects some seawater chemistry data from a limited number of inshore sites, but it is not clear whether this contributes to climate change analyses. Seawater temperature is not monitored. The division of Climate Change and Hydro-meteorology manages three weather stations, in Dong Hoi, Tuyen Hoa and Ba Don, and several hydrological stations on the main rivers.

8.2.2.1.2. Department of Agriculture and Rural Development (DARD)

The provincial Department for Agriculture and Rural Development (DARD) has been one of the first to establish its own Climate Change Action Plan, in response to the MARD. It also hosts the provincial Steering Committee for Storms and Flood Prevention and a Steering Committee for Search and Rescue, both located in the Irrigation and Flood Control sub-department of DARD.

DARD does not have a dedicated climate change unit, but "mainstreams" climate change in all its divisions. Forestry Division has 5 staff dedicated to climate change (including REDD+).

In 2015, with support from JICA, DARD embarked on the programme "Building Disaster Resilient Societies in Vietnam 2016-2020 and vision to 2030", which aims to strengthen the resilience of society against water-related natural disasters through integrated flood management (IFM) systems. The project covers all sectors, so an inter-departmental

⁵ NB. There are 46 different steering committees overseen by the Quang Binh PPC. So – a Steering Committee does not necessarily produce real focus on critical issues.

steering committee and working group were established to draw up a plan, which has now been approved by the PPC.

Despite these moves, climate change adaptation does not appear well integrated into DARD's annual plans (DARD 2016). Mention is made of El-Nino, and expected drought - but these short-term phenomena are not contextualised in terms of climate change. Plans do include introduction of fast-maturing rice varieties, the scaling-up of SRI rice techniques, or switching from rice to less water demanding crops - but medium-longer term trends and measures are not suggested. The focus of planning remains on increasing production, modernising techniques and general sectoral restructuring, although this latter task does call for greater attention to climate change.

Agricultural development and extension services.

The extension system in Vietnam is vertically organised - there is a National Agricultural Extension Centre (under MARD), a provincial centre (under DARD) and extension stations at district (also under DARD). Typically, one extension agent is responsible for two or three communes, but in the mountains, it may be one for one.

MARD has a Crop Production Department, and Science Technology and Environment Department, both contributing to developing adaptation solutions. At the provincial level the Economy and Technology sub-department handles technical issues. Most decisions on adaptation measures are made at national level. Provinces develop their own CAPs, depending on the principal threats of drought and salinization. MARD has a dedicated office of Climate Change Adaptation, as well as staff in all the relevant divisions and units, but as discussed above, adaptation is mainstreamed at the provincial level, and staff are less specialised. Extension agents work with local farmers' unions and the system is able to deliver tailored technical advice, for instance, on crop calendars, as well as inputs, such as improved seeds, and subsidised fertilisers and pesticides, which enable farmers to make the changes recommended by government. Government officers thus have a lot of power to get policies implemented. This is usually positive, but can also be damaging if recommendations are not fully evidence-based.

8.2.2.1.3. Coordination

Coordination amongst the provincial departments, and particularly between DONRE and DARD, is not strong. This is understandable, given the history of "vertical approaches" in Vietnam's economic development, and the proliferation of different sectoral and thematic plans. Central government is now insisting on the "One Plan" approach, which should simplify the process of coordination and enable CCA objectives to be fully integrated in the SEDP.

The Department of Planning and Investment is tasked with coordinating all NTPs, including that for Responding to Climate Change. On their recommendation, the provincial steering committee on climate change has not yet been formed.

Finally, an element of coordination and the “enabling environment for adaptation” that remains weak in Quang Binh, and indeed most of Vietnam, is engagement with local communities. The government remains very “top down” and in charge of economic development. However, for climate change - it is essential that individuals, households, and communities develop the capacity to understand their situation and challenges of climate change and themselves become able to adapt - because climate change adaptation is a long-term enterprise.

8.2.2.2. KNOWLEDGE AND UNDERSTANDING

8.2.2.2.1. Of Climate Change and Adaptation Issues

Quang Binh’s long experience of climate-related disasters (typhoons, floods, droughts) has given many government officials a solid foundation of knowledge and understanding for climate change and considerable capacity and will to act. However, as with the general approach to development, efforts are largely sectorally and even sub-sectorally driven and there has been a strong emphasis on “hard” infrastructure-based solutions, such as dykes, sea walls, reservoirs and irrigation systems. A notable exception to this is the Agriculture Division of DARD, which implements a lot of softer solutions involving substitution of different varieties and crops with better tolerances to various climate challenges, shifting of crop calendars, Sustainable Rice Intensification (SRI), removing salinised land from paddy rice cultivation, and the like.

The National Climate Change Action Plan was only produced in 2008, so climate Change remains a relatively new area of government concern. As discussed above, most provincial departments still do not have staff who are fully trained in or dedicated full-time to climate change issues. DONRE has a climate change unit staffed by three people. DARD states that climate change is “mainstreamed”, meaning there are few dedicated staff. But since all their activities relate to climate and weather, there is a lot of “learning by doing”.

Some projects, including JICA Integrated Flood Management Project and the present EbA Mainstreaming Project, provide some training courses on CC and CCA, but these are often very short and narrowly focused, and follow-up is limited. Generally speaking, training on climate change issues is the purview of donor projects. So, for the most part, knowledge and understanding of climate change issues are partial, and more importantly, under-utilised. Consultants are often employed to carry out technical work, such as the preparation of the CCRAP. Although government (DONRE) has a role in supervising the work, opportunities for real learning by provincial staff are reduced. It has been said (ref) that this implies that CCA capacity building should focus on consulting companies - but this neglects the vital role that government staff play in supervision and above all, decision-making - both of which require considerable capacity.

Knowledge and understanding problems include finding problems where they do not really exist, or blaming particular events and impacts on climate change, when they are caused by other factors. For instance the declining capture fishery is more a product of over-fishing and habitat destruction than it is about climate change.

Another important problem affecting understanding of climate change issues is Vietnam's vertical system of governance within line agencies and the resultant tendency for "silo thinking" and action. Awareness of climate change as an overarching issue on which all departments need to collaborate and coordinate is growing slowly. Even within a sector, it is not clear that the different objectives of sectoral plans are mutually compatible or compatible with climate change adaptation and mitigation. The central importance of sound land-use planning for climate change adaptation and mitigation does not appear to be understood.

8.2.2.2.2. Of EbA

EbA is a relatively new approach to climate change adaptation, so if local government is not fully aware of it, that is understandable. Under the present "EbA Mainstreaming" project, GiZ has conducted a two-week Training of Trainers in EbA for training organisations. These trainers will be responsible for the majority of the training under the project. Meanwhile, in 2012 GiZ also held a 3.5-day training focused on how to integrate adaptation, and particularly EbA, into development planning, for provincial staff from Quang Binh and Ha Tinh.

From the experience of the present assignment, it is difficult to gauge provincial capacity relating to EbA. It is a challenging topic that requires "learning by doing". Staff of various departments participated in project workshops and received reports, but no written comments have been forthcoming. It is notable that in early 2016, the updating of the CCRAP for Quang Binh was initially proceeding without reference to EbA. A special consultant had to be recruited to provide the needed integration. Quang Binh's SEDP 2011-2015 made only one reference to climate change and no reference to the need for adaptation. The updated SEDP is not yet available for review.

The National Climate Change Strategy policies talk about securing food, water and livelihoods and protecting natural resources, but treat these like a list of independent elements. EbA recognises that they are linked, and livelihoods cannot be secured unless natural ecosystems and SES are managed consciously and effectively in the context of climate change

8.2.2.3. ACTIONS AND INNOVATIONS

Vietnam's vertical system of governance means that most of the interventions and innovations for climate change come from the centre, notably MONRE and MARD. A province's role is largely to echo those initiatives at the local level, or to implement instructions and there is a tendency to wait for those instructions. The greatest provincial

role is in the preparation of the CCRAP, but the projects developed tend to follow priorities and formats introduced from the centre. There is some tendency to relabel routine actions as climate change adaptation, sometimes inappropriately. For instance, Sub-Committee on Ethnic Minority Affairs (SCEMA) cited promoting paddy rice cultivation amongst ethnic minorities as an adaptation action, but these efforts have been going on for over a decade, with little success, in attempt to reduce swidden cultivation and assimilate ethnic minorities into the cultural mainstream. Many other such routine interventions are appropriate for climate change adaptation, but cannot be considered innovative. As mentioned above, the vast majority of climate change adaptation projects involve hard infrastructure.

The sections below provide an overview of what the EbA team was able to learn of Quang Binh's climate change adaptation actions to date. Further collaboration with provincial departments is required to complete this analysis.

8.2.2.3.1. DARD

DARD is probably the most active of all provincial line agencies in climate change adaptation, due to its mandates in the key productive sectors of crop production, forestry, aquaculture and fisheries and in water management. Table 8.1 summarises the climate change adaptation work of DARD's divisions.

Table 8.1: Climate Change related work and staff of DARD's Divisions

Division of DARD	CCA work	Staff
Forestry	<p>Role of forest is crucial – not only provisioning, but for environmental protection. Provides direct support to forest management.</p> <p>Big programmes including REDD+ and JICA coastal forest protection programme. National government coastal forest programme. 35-37 billion VND /year for sustainable forest protection and development programme from national budget. Two companies in VN (one is Long Dai in QB) who have FSC certification.</p>	5-7 staff specifically on CC
Agriculture	<p>Many phenomena – storm intensity and frequency, drought related to ENSO have severe impacts to agriculture production. Cold spells still happen, killing many livestock. Saline intrusion caused loss of 40ha pf paddy rice.</p> <p>No specific or separate adaptation programmes but integrate into other options: 1) adjust crops and seasonal calendar Winter-Spring and Summer-Autumn can be affected by cold spells and floods respectively; 2) Shift to maize or other crops with lower water demand and higher tolerance – programme introduced by MARD; 3) new techniques – integrated pest management, SRI supported by SNV – pay special attention 40% reduction of pesticide and water but yield higher, and emissions reduced. Near future will apply drip irrigation (Israel style) and greenhouse planting for more controlled environment. Study on finding drought and cold tolerant species. Will develop agriculture plan to reduce CC impacts because many activities such as fertilisers use, paddy rice, etc contribute to GHG emissions. Green and clean to reduce use of natural resources and address CC</p>	7 staff; all contribute to planning all of the work
Aquaculture	<p>Severely impacted sector. Some solutions: Policy – 1) restructuring aquaculture sector including CCA Options; 2) production plan by ecosystems – e.g. freshwater fish; shrimp on sandy areas; sustainable brackish water fish;</p> <p>Annual plan to implement restructuring, Some pilots to enhance ecosystem services – fish and rice working really well. In areas showing some environmental degradations, shift from intensive shrimp to one shrimp and one fish crop. Or one shrimp and algae for gelatine (agar) production</p>	5 staff trained in aquaculture, none assigned specifically to CC adaptation
Irrigation and flood control	<p>Restructure programme to include CCA but outputs not yet as clear as expected, because only developed recently. Focus on engineering works like dykes and irrigation reservoirs. Targeted to repair or upgrade many reservoirs for irrigation purposes but budget is very limited. Also have goal to put monitoring equipment in all</p>	No specialised staff

Division of DARD	CCA work	Staff
	reservoirs for flood forecast and prevention. No separate packages, all integrated to other programmes. No provincial budget allocated to CCA for them. All supported by other donors.	
Livestock?	<i>Please provide information</i>	

8.2.2.3.2. Other Departments

Some information on the climate change adaptation actions taken by other departments in Quang Binh are presented in Table 8.2.

Table 8.2: Climate Change Adaptation Actions and Capacity Building of Different Provincial Departments

Department	Climate Change Adaptation Actions	Climate Change Adaptation Capacity Building
Standing Committee on Ethnic Minority Affairs (SCEMA)	No specific CCA analysis or actions in EM villages. Besides some effort to introduce paddy rice as substitute for hill rice.	No training yet, due to lack of funds. Staff participated in a DONRE consultation on climate change training in 2009, but nothing has happened since.
PNKB	Actions only related to projects, since no provincial funding. No unit exists in PNKB management structure. CC not explicitly integrated in Buffer Zone or National Park management plans – but implicitly. No stand-alone lens. No climate stations within the park, but some GIS related CC research.	

Department	Climate Change Adaptation Actions	Climate Change Adaptation Capacity Building
Department of Planning and Investment	Theoretically DPI is responsible for integrating climate change into provincial development, linked to its important role in preparing the SEDP. Climate change is not yet integrated into SEDP, but will be for the 2016-2020. DPI cannot drive implementation. It has a role in reviewing CC related projects, but does not do the appraisal.	MPI has issued a circular for integrating CC into planning for consultation. Also, Guidelines and handbook for green growth. 2013. DPI has not had specific training in CC issues.
Department of Transport	Impact of CC on Transport sector is complicated and Central Region most severely affected. QB has an annual workplan for spot checks on damage and to anticipate problems, and has financial support from higher level to address problems.	DoT receives guidelines from MoT, but has to apply to local context. Sometimes initiatives and innovation come from the local level.
Department of Labour, Invalids and Social Affairs	The needs to integrate CCA in poverty reduction support programme and to stop doing poverty reduction in an environmentally destructive way are recognized, but nothing comprehensive is done, due to lack of funds.	n/a
Department of Industry and Trade	DoIT operates under PPC as an advisory body on industrial and trade management. It supports the PPC in development of strategies and manages the electricity system and industrial and	DoIT receives CCA information through many channels, including MOIT, DONRE and the PPC.

Department	Climate Change Adaptation Actions	Climate Change Adaptation Capacity Building
Department of Construction	trade-related infrastructure. Construction Law does not integrate climate change. Project related actions only, including flood-resilient housing – floating on plastic barrels or elevated on posts. Conducts resettlement planning for flood prone areas – but lacks funding	n/a

8.2.2.4. RESOURCES

Quang Binh is a budget deficit province which receives most of its funds (65%) from central government. Resources for climate change related work are said to be quite limited, but it was not possible to get even rough estimates of the funds provided by central or provincial government, donors and NGOs, or to establish a framework for understanding the adequacy of those funds. The main sources of funding are the SPRCC and Ministerial budgets. A lot of the funds are apparently released in relation to specific projects, which go the national level for approval. A lot of climate related work gets integrated in other packages.

The Quang Binh CCRAP 2011-15 requested a budget of USD 210 million for 55 different projects, but apparently none was implemented. The updated CCRAP 2016-2020 has a budget of around VND USD 193 million, 95% of which is earmarked for “hard” infrastructure based projects.

For the purposes of this study, it is accepted that funding is a serious constraint on climate change adaptation actions, and thus on provincial “adaptive capacity”.

8.3. DISCUSSION

The original TOR and input schedule for the present study did not provide scope for a focused examination of adaptive capacity. The importance of the issue emerged as the study progressed, and has now been explored as far as was possible. Rather than employing a systematic methodology, this exploration has involved a brief overview of policy and related literature, semi-structured interviews with a small number of key informants, principally in DARD and DONRE, but also in other key departments, and team experience and observations. Thus, the findings here should be considered provisional and a more in-depth study should be undertaken, followed by a specific programme of capacity building.

Based on the above analysis, a number of strengths and weaknesses of Quang Binh's provincial government "adaptive capacity" can be seen. Appropriate knowledge and understanding of climate change and EbA exist, but there are few staff dedicated to climate change, and training is quite ad hoc and focused on specific issues, so for most staff, knowledge and understanding are only partial. Further, with the outsourcing of technical tasks and limited funding for projects, knowledge is not put into practice often enough to develop into real understanding and to provide opportunities for innovation. As a result, there remains an over-emphasis on hard infrastructure solutions to problems.

The agriculture sector, in particular, is well-organised and the provincial extension services are able to stimulate change amongst farmers quite rapidly, adjusting crop calendars, crop varieties and even crop types, season by season. It is unclear how well these messages are linked to regional or provincial weather forecasts. Further, many adaptation decisions are taken at the national level, and this powerful vertical system can lead to less appropriate recommendations being pursued, or the development whims of senior provincial or national PPC officials holding sway. There is still an impulse in rural development for the "one village one product" approach. In the era of climate change and the imperative to diversify livelihoods, this approach needs serious rethinking.

Although there are various plans and initiatives in climate change adaptation in Quang Binh, a Provincial Committee for Climate Change is still lacking and climate change is not yet integrated into the SEDP. Thus coordination is lacking and a degree of "silo thinking" can be detected. As a result, actions in one sector can produce problems for adaptation in other sectors, and potential synergies can be missed. Forestry and water supply, two key activities of the lower hills of Quang Binh provide a good example. Current short-rotation forest crops in the catchments of important reservoirs cause soil erosion which leads to sedimentation of the reservoirs. Similarly, regulation of river flows for irrigation and flood control leads to drastic reductions in river flows, which increases saline intrusion and degrades the mangroves that act as nurseries for various important fisheries species.

Against this generalised provincial background, adaptive capacity also varies from SES to SES. This largely reflects the priority given by the national and provincial governments to the particular commodity produced in an SES. Thus, SES 6a - lowland floodplain paddy rice cultivation probably exhibits the best "provincial" adaptive capacity because rice is the national staple food, the basis of livelihoods for a large proportion of the population, and an important export crop and so has received a lot investment over the years. The agricultural extension system is closely geared to the needs of this crop and the impacts of climate change related phenomena such as drought and salinization have received a lot of attention from government, donors and NGOs, alike.

At the other extreme, is SES 5 a, ethnic minority upland swidden cultivation and forest product collection. There is almost no research on the hill rice varieties that ethnic minorities cultivate. What little agricultural extension is offered is focused on converting minorities to paddy rice cultivation - however culturally inappropriate and problematic it is in upland environments. However, from the local-assessments of this study, it appears that their traditional system of intercropping varieties with different ripening periods and phasing the sowing of different plots across the growing season, is wonderfully intricate and accommodates a lot of variability in the weather. Forest product collection is largely discouraged by government agencies.

Relative poverty also affects the “adaptive capacity” related to different SES. Poverty is correlated with geography and population. So, SES associated with the more prosperous lowland communes have a suite of capacity-related advantages, from transport, communication, services, to better education and health. Thus, key elements of adaptive capacity - such as knowledge, resources, ability to innovate, local organisation are all likely to be stronger

8.4. CONCLUSION AND RECOMMENDATIONS

The provincial government of Quang Binh has the foundations of “adaptive capacity” for dealing with climate change.

Following the development of the policy framework at the national level from 2008 onwards, the institutions and policies that help configure an “**enabling environment**” for climate change are now in place at provincial level in Quang Binh. An important exception is the Provincial Steering Committee for Climate Change, and its absence is probably one main reason why coordination amongst institutions is not as good as it should be.

Recommendation: Establish the Provincial Steering Committee for Climate Change as soon as possible. Task them with implementing the recommendations below.

The tendency for “silo thinking” and the proliferation of plans by different governments departments promotes the attitude that “someone else is doing climate change” thereby intensifying the already considerable challenges of sharing knowledge and integrating action for effective climate change adaptation.

Recommendation: There is an urgent need increase government awareness of the centrality of climate change issues and the need to re-orientate development strategies accordingly. An important step is to integrate climate change actions, including donor projects, into the provincial SEDP. Another important step is to develop consensus land-use plans among the different economic sectors which comprehensively addresses climate change vulnerabilities, and then ensure the plans are properly enforced.

Vietnam's vertical system of governance means that most of the **interventions** for climate change come from the centre, notably MONRE and MARD. Some are innovative - emerging from research and development, but most are "business as usual" hard infrastructure solutions. A province's role is largely to echo those initiatives at the local level, or to implement instructions and there is a tendency to wait for those instructions and funds, reducing the province's scope for innovation and autonomous action. One of a province's main tasks is the preparation of CCRAP - but this is outsourced to consultants and there is an element of "box ticking" about the exercise. In the first CCRAP, IHMEN climate data is used, along with the provincial SEDP and DRR related information, but real analysis is lacking and so the proposed projects did not really reflect the background evidence and many projects are conventional development, relabelled as CCA. Innovation is limited and the province is thinking primarily about hard infrastructure solutions. It will be interesting to read the updated CCRAP, and see whether analysis has progressed and the links between evidence and action are now stronger.

Adaptation **knowledge** certainly exists in Quang Binh - however, training on climate change has tended to be *ad hoc* and donor project-related. Further, because funding at provincial levels is very limited, and technical tasks get outsourced to consultants, provincial staff get little opportunity for the all-important "learning by doing". There is an emphasis on tasks and projects but not on building the real capacity at local levels (provincial down to communities) needed to develop innovations and sustain adaptation efforts.

Recommendation: All climate change projects engaging consultants should include provincial government staff as active team members.

Recommendation: All departments need a small cadre of well-trained staff dedicated full-time to climate change issues, as well as well-informed general staff, to ensure effective coordination of climate change actions. In collaboration with main donors, develop a comprehensive training programme on climate change mitigation and adaptation including, EbA for wide range of provincial officials. As part of this process, conduct a KAP (Knowledge, Attitudes, Perceptions) study with government officials, as a basis for designing an intensive climate change training programme including the practical exercises in vulnerability assessment, identification of adaptation options and detailed project design, followed by project implement. (If an external consultant team is used, ensure inclusion of provincial staff on the team.)

Recommendation: For EbA and for CCA more generally, adaptive capacity represents a set of vital competencies - and needs to be built at all levels. The focus must be on **adaptive capacity** rather than simply on adaptation actions and, at the provincial level, work is needed in all four areas: building real knowledge, innovation, and effective institutions, supported by sufficient resourcing.

The objective of this chapter has been to focus attention on the issue of adaptive capacity. This review has been very preliminary and much of the information needed for designing an appropriate response has been lacking. It is hoped that more detailed studies will be conducted as a result and greater efforts made to raise adaptive capacity in Quang Binh.

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ANNEX 8.I: BACKGROUND ON CONCEPTS OF ADAPTION AND ADAPTIVE CAPACITY

1. ADAPTATION

Adaptation may be defined as:

“The adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Adaptation is a process and not an outcome” (GIZ/WRI 2011).

Adaptation is a process because climate change is on-going and thus the need to adjust to it is also continuing; therefore, no outcome is likely to be final. Though individual adaptation interventions might have an end-state in mind, this is likely only to be an interim state, and further change is likely to be needed in the future. Uncertainty is inherent in adaptation, as it is in climate change, and it is thus the “capacity to adapt”, or keep adjusting that is the most important.

Adaptation is often conflated with “resilience”, but whereas adaptation is a **process of change**, resilience is a **characteristic or condition** of a system. Resilience implies the ability to better withstand impacts and to more quickly re-establish an original state after a disturbance. Resilience is determined by a combination of exposure and sensitivity. As one approach to adaptation to climate change, we can seek to increase or build resilience of systems by managing some aspects of exposure and sensitivity. But each system will have its own resilience thresholds, after which further adjustments to climate impacts are not effective (this is one kind of limit to adaptation). The other part of the adaptation process is better understood as the transformative change to a new regime. In many cases appropriate adaptation planning will involve a strategic combination of both building resilience, and of fostering transformative change.

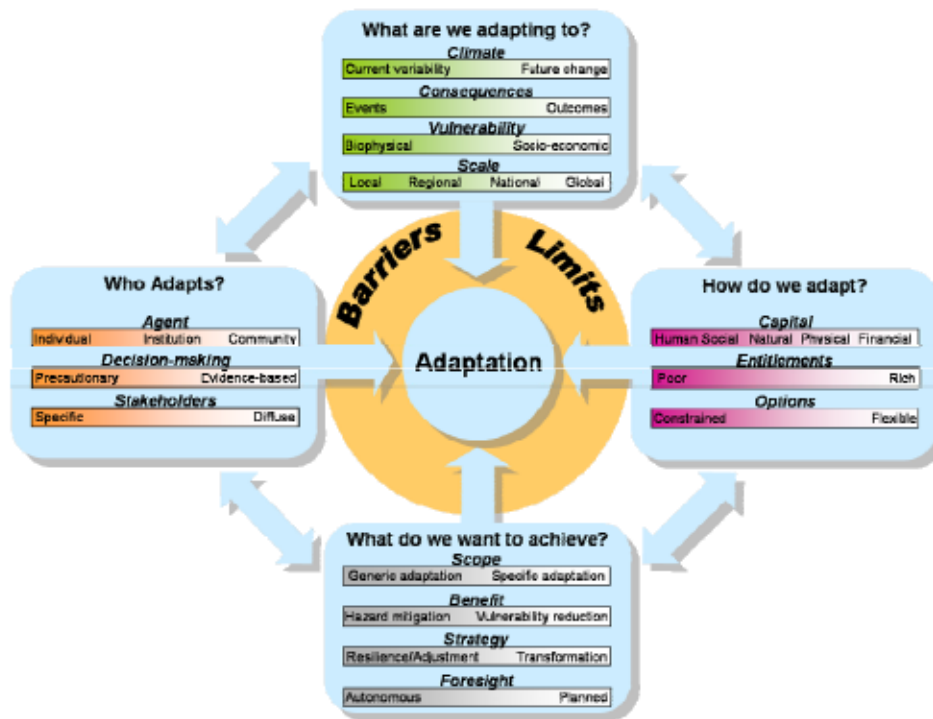
In developing economies, there is typically a significant degree of overlap between adaptation measures and development activities. Many adaptation measures have a development component, implicitly or explicitly, and sometimes the development component provides the incentive necessary for people to adopt the adaptation measure. More importantly, to promote effective adaptation, it will often be necessary to address non-climate stressors that are already having significant negative impacts on development. These are the “underlying causes of vulnerability”, such as discussed below (see Figure 8.7). An example would be attempting long-term adaptation measures in the fisheries sector while the resource is being degraded by overfishing and pollution. Better, is for adaptation measures to be integrated (mainstreamed) in development: this represents true “adaptive capacity”.

Adaptation efforts are often dogged by the inherent uncertainty in climate change projection models. In response, often promoted are “no-regrets” climate adaptation strategies: practices that are beneficial even in the absence of climate change, and

where the costs of adaptation are relatively low when compared to the results of the adaptations. In many locations, the implementation of “no-regrets” options constitutes an efficient first step in a long-term adaptation strategy. Examples would include scaling back groundwater use to sustainable levels, or switching from one crop to another equally productive but less sensitive crop.

Adaptation is complex. Figure 8.5 sets out four sets of key determinants of adaptation processes, essentially the “who, what, how and why” of adaptation, each with multiple dimensions that need to be considered when assessing adaptive capacity and designing a particular adaptation intervention.

Figure 0.5: Dimensions and Determinants of Adaptation



This helps explain why adaptation interventions take so many different forms: conventional climate change adaptation typically focuses on larger scale infrastructure that ultimately reduces sensitivity or exposure to climate impacts; community-based adaptation focusing comprehensively on specific local climate challenges and largely mobilising local solutions, and with the present project ecosystem-based adaptation, aimed at harnessing natural ecosystems and their services to address specific climate change vulnerability issues.

The questions of “who adapts” or “whose adaptive capacity” are important ones. Basically, everyone needs to adapt and develop their adaptive capacity, but different stakeholders have different roles in making adaptation work.

1.1. Adaptive Capacity

Adaptive Capacity is defined in various ways. In generic definitions, it refers to:

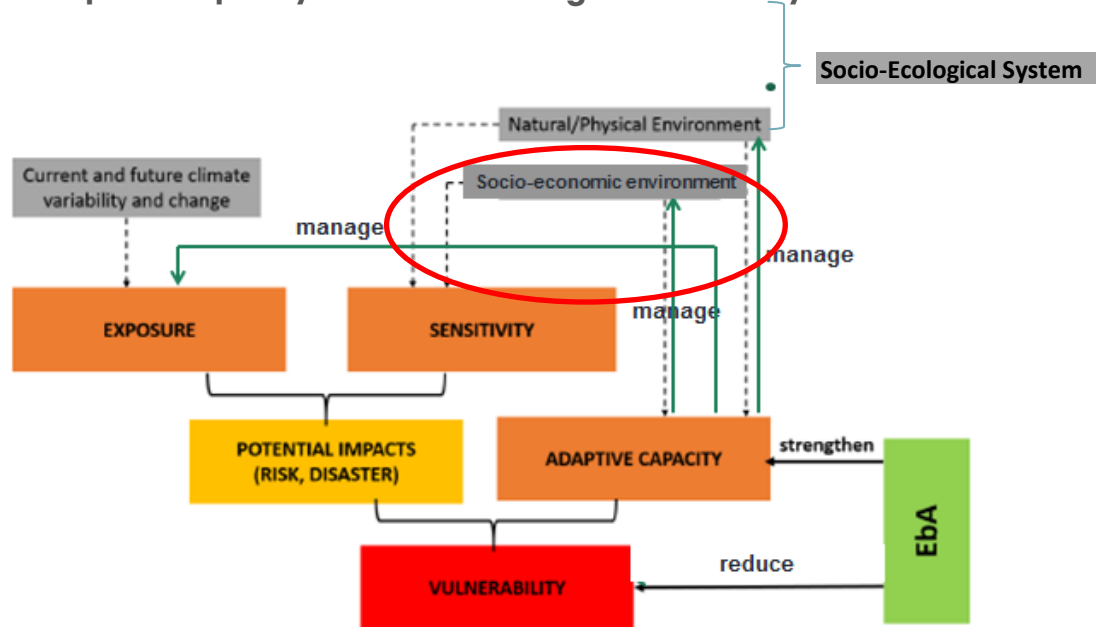
“The capacity of a system to adapt if the environment where the system exists is changing”.

In the context of climate change, it has been defined as:

“The potential or capability of a system to adapt to (to alter to better suit) climatic stimuli or their effects or impacts” (from Smit et al., 1999)⁶.

The suitability of these different definitions of adaptive capacity to a particular context depends largely on the object of the adaptation; thus the generic definitions use the term “systems”. For the EbA vulnerability assessments the unit of analysis is the socio-ecological system (SES), as shown in Figure 8.6. The socio-ecological system concept puts people front and centre in the analysis. It reflects the understanding that climate change is a human issue: people are the cause of climate change, the victims of it, and human capacity to adapt is a big part of the solution to it.

Figure 0.6: Adaptive Capacity in Climate Change Vulnerability Assessment for EbA



Source: adapted from GIZ, Adelphi and EURAC 2013, based on IPCC 2007

Figure 8.6 also illustrates that our understanding of adaptive capacity for climate change is closely related to our understanding of other key terms exposure, sensitivity

⁶ <http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=650>

and vulnerability. As set out in Chapter 1, exposure is defined as the extent to which an entity (e.g. region, resource or community) experiences changes in climate. It is characterised by the magnitude, frequency, duration and/or spatial extent of a weather event or pattern. Due to geographic location, some places are more exposed to climate changes and extremes than others. Sensitivity is the degree to which the entity is affected by, or responsive to, climate changes. Although most organisms operate within tolerance limits, those of some species are broader than others. Since exposure is mediated by sensitivity, the term impact is used to express actual effect. Vulnerability is the extent to which the entity suffers damage as a result of the impact, but it too is mediated, this time by adaptive capacity. Simply put, the greater the adaptive capacity, the lower the vulnerability. Adaptation is often expressed simply in terms of “decreasing sensitivity or reducing exposure” to climate threats (see Figure 8.6), or as mentioned above, it can also be about a managed transformation of the system. However, either of these types of adaptation can only be achieved through peoples’ ability to understand particular climate change problems and their ability and willingness to manage strategically their biophysical and socio-economic environments (SES) to address those problems and reduce vulnerability - i.e. their adaptive capacity.

Adaptive Capacity of Species and Ecosystems

Some EbA assessments include an analysis of the “adaptive capacity” of species and ecosystems (Tuan et al (eds) 2012)⁷. In the ecological literature (Gunderson and Holling, 2002; Carpenter and Brock 2008) adaptive capacity is the ability of a living system to adjust responses to changing internal demands and external drivers in the short term; in the longer term, it is the system’s “evolutionary potential”. Three different levels are identified. For **species**, potential is determined by genetic diversity; for **ecosystems**, it is their biodiversity or complement of species; and at **landscape or biome** level, it is the mosaic of different ecosystems present, their connectivity and patch size.

Different species, and different genotypes within species, have different “comfort zones” with respect to different climate and other biophysical variables; they have different “tolerances” and different “thresholds” beyond which they cannot survive in a certain place under certain conditions for an extended period. Typically, the greater the genetic diversity within the species, the wider are the tolerances and higher the thresholds, and the greater the likelihood the species will survive. However, in terms of

⁷ In contrast to “adaptive capacity”, socio-ecological systems can also exhibit “adaptive traps” (Carpenter and Brock 2008). *“In a social-ecological rigidity trap, strong self-reinforcing controls prevent the flexibility needed for adaptation. In the model, too much control erodes adaptive capacity and thereby increases the risk of catastrophic breakdown. In a social-ecological poverty trap, loose connections prevent the mobilization of ideas and resources to solve problems. In the model, too little control impedes the focus needed for adaptation. Fluctuations of internal demand or external shocks generate pulses of adaptive capacity, which may gain traction and pull the system out of the poverty trap”.*

the analytical framework presented in Figure 8.6, all these things (comfort zones, tolerances, thresholds) are more aspects of species' "sensitivity", than adaptive capacity. Ultimately, a new species may be formed, distinct from its parent, and better suited to the new conditions, but this will be highly unpredictable and typically take place on a time-scale beyond that useful for addressing our current climate change challenges.

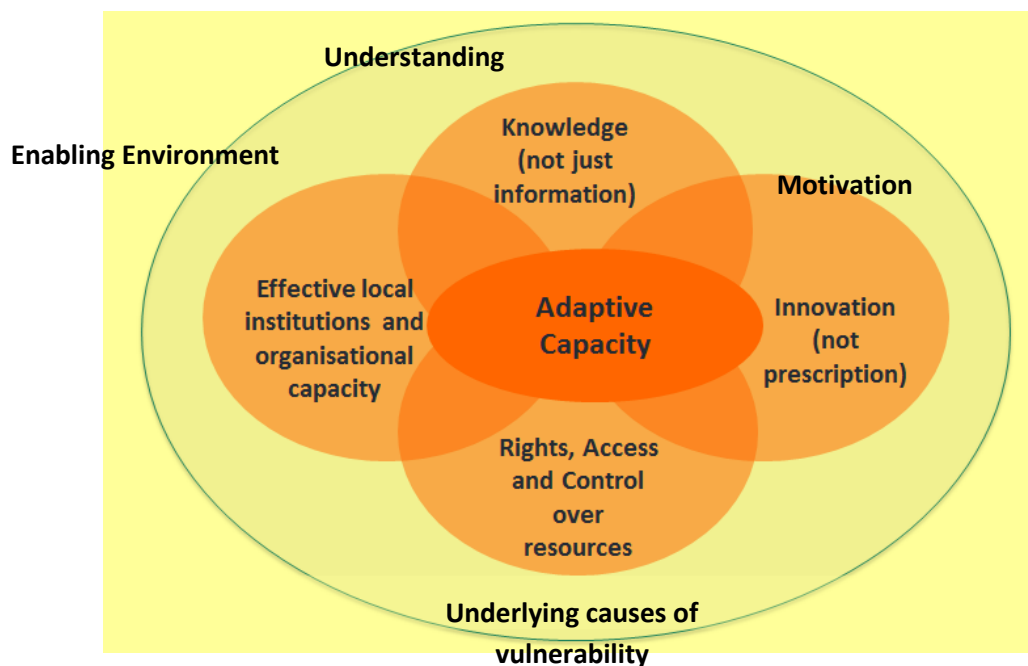
Ecosystems are characterised, biologically, by their assemblage of species, and by their configuration within wider landscapes. Ecosystems adjust to the loss of species. As climate change is a continuing and cumulative process, over time additional species will continue to be locally extirpated. The most sensitive species are lost first, followed by the less sensitive species. The ecosystem will continue to adjust to the loss of more species as it gradually becomes a simpler, less diverse system. At some point presumably so many species, or certain keystone or umbrella species, will be lost from the ecosystem that it will collapse or undergo some fundamental transformation to another type of system. As with species evolution, this will be highly unpredictable and taken place in the much longer term.

Ecosystems that originally had higher species and genetic diversity, larger patch size, greater connectivity between patches in the landscape, more functional redundancy in the system, etc) will presumably take longer and will be able to tolerate greater loss of species, before they reach the point of collapse/transformation. This equates to "resilience", discussed above.

While the concepts of adaptive capacity of species and ecosystems are relatively straightforward, in practical terms, they are very difficult to assess, particularly in a short study such as this. Simply too little is known about the ecosystems and species concerned, and even if such knowledge existed, the modelling required to predict changes would be impossibly complex. Further, in this EbA assessment, we are dealing with socio-ecological systems - in which the natural ecosystems have been radically transformed

In the present analysis, then, "adaptive capacity" is explicitly understood as a human/social phenomenon. While an inherent characteristic of ecosystems is that they can change fundamentally in response to shocks and trends, and reach new stable points, in terms of identifying EbA actions, we are more interested in peoples' capacity to manage the ecosystem and direct the change (e.g. through application of human, technological, and financial capital) and the capacity and political will of governance entities to deploy those resources. Notwithstanding these practical constraints, some useful principles do emerge, which can be usefully applied when considering adaptation to climate change. These include the idea of maintaining and **promoting diversity** at all levels and the need for **flexibility**, to maximise and capitalise on the options open in socio-ecological systems, in the face of an uncertain future.

Figure 0.7: Elements of Adaptive Capacity



Source: CARE (2009) CVCA Handbook

For the purposes of this study, adaptive capacity is essentially:

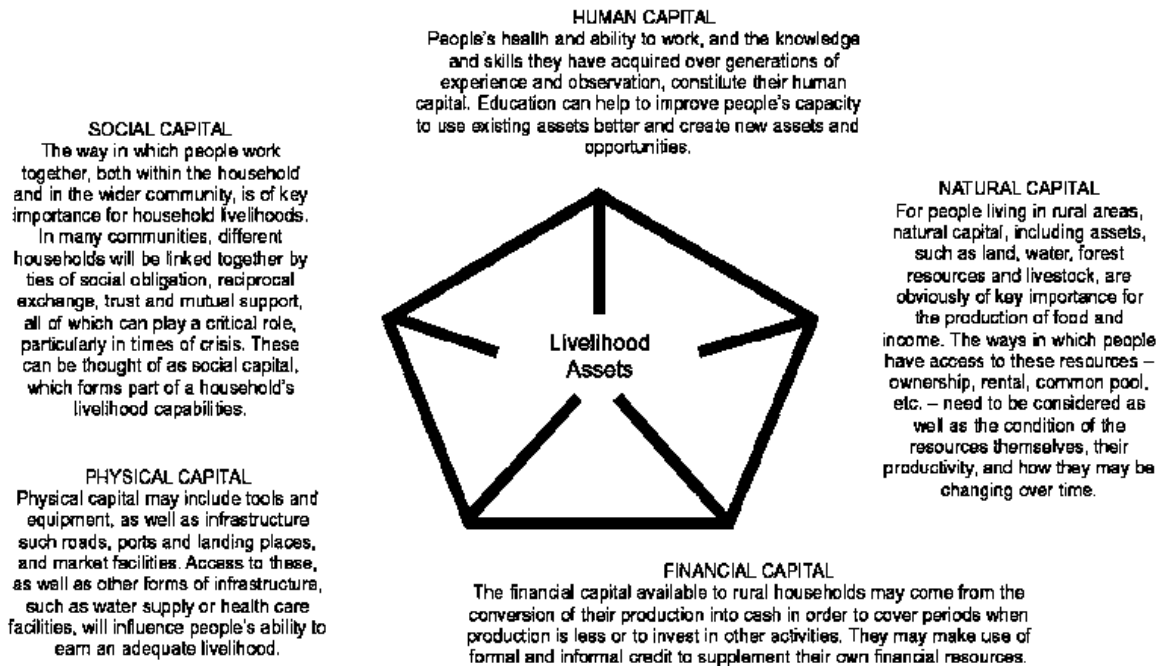
“the broad set of enabling traits, possessed by people, to manage the exposure and sensitivity of their socio-ecological system, either for the increased resilience of the system to changing climatic circumstances, or for its transformation to a new regime that is better suited to new climatic circumstances”.

Having understood adaptive capacity as it relates to exposure, sensitivity and vulnerability it is useful to consider what it consists of. CARE, in its approach to community based adaptation identifies four main elements of adaptive capacity, as shown in Figure 8.7.

Perhaps the most important element shaping the adaptive capacity of individuals, households and communities is their access to and control over livelihood resources or “assets”: natural, human, social, physical and financial⁸. These are described in Figure 8.8, below. Simply put, the greater the access and control of these assets, the wider the potential options available and greater the potential adaptive capacity. Further, it is in the lack of these assets or capitals that we see the links between adaptive capacity, vulnerability to climate change and poverty, and the disadvantages suffered by women and other vulnerable groups.

⁸ See DFID Sustainable Livelihoods Guidance Sheets for more details on livelihood assets. <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>

Figure 0.8: Livelihood Assets or Capitals



Source: <http://www.fao.org/docrep/006/y5084e/y5084e04.htm>

From the EbA perspective, “natural capital” is of central importance. EbA seeks to promote adaptive capacity by enhancing peoples’ ability to manage and care for the natural ecosystems and the environmental services they provide.

Access to resources is clearly not enough on its own. People must understand the climate challenge facing them, and have ideas about what to do. These are “knowledge” and “innovation” respectively. Knowledge is more than getting the information and knowing the facts about climate change. It must be accompanied by understanding the importance of ecosystems to livelihoods, the need for action, and the motivation to act. Innovation implies ability to devise new solutions. Communities in Vietnam have been coping with various extreme climate events for centuries, providing good preparation for climate change. However, climate change demands new solutions - looking further into an uncertain future.

Finally, there must be an “enabling environment” for adaptation: the policies and programmes of government that open up what people are able or encouraged to do; the organisations at all levels that support peoples’ adaptation and or manage wider adaptive interventions.

Drawing on all these definitions, building Adaptive Capacity is arguably the key element and ultimate objective of climate change adaptation work. It is thus an important factor in the present provincial-level EbA vulnerability assessment and the

efforts to identify the socio-ecological systems most in need of adaptation action and select particular local-level sites for more detailed assessment.

1.2. What is “successful adaptation”?

At a very basic level, a successful adaptation is one that has established goals over a range of future climate scenarios and is effective in meeting them, producing benefits that outweigh costs - financial, physical, human, or otherwise (Smit et al., 2001). At higher levels, a successful adaptation would be one that has addressed cost-effectiveness, efficiency, the distribution of benefits, the legitimacy of the adaptation, sustainability, global and intergeneration equity and the resonance of adaptation with cultural norms and collectively held community values. With such a complex concept, inevitably, finding a workable definition of successful adaptation is always going to be contested (Adger and Vincent, 2005).

1.3. Building Adaptive Capacity

As discussed above, the question of “who adapts” is important, and so equally important is the question “whose adaptive capacity”. In the face of climate change, to a very large extent, everyone, civil society, private sector and government needs adaptive capacity, but the nature of the adaptive capacity in each group will be configured somewhat differently.

The CARE schema also helps us to understand what building adaptive capacity entails:

- Actions to address the underlying causes of vulnerability, which are largely the same as those underlying poverty: enhancing access to essential livelihood assets, and increasing livelihood diversification.
- Actions to promote knowledge and understanding of climate change challenges, including the inherent uncertainty climate change entails, the need to maintain diversity and remain flexible, and the motivation of key stakeholders to take action.
- Actions to promote, encourage, and support stakeholders to devise innovative, locally appropriate and integrated solutions to anticipate the threats of climate change, moving on from mere reactive coping to immediate hazards, or top-down prescriptions.
- Actions to improve the institutional and organisational environment: enabling policy for climate change adaptation, at local as well as national level, particularly relating the three points above, including actions on fundamental issues such as gender and then need for participatory engagement with all stakeholders.

These points can guide the adaptation work of a wide range of stakeholders, from communities, through CBOs, NGOs, government agencies at all levels and international donors. The focus of CCA must not just be on the practical adaptation

“interventions” (like SRI, improved watershed management, diversification of livelihoods) but on the processes of reducing vulnerability and building adaptive capacity that underpin the interventions and promote the sustainability of adaptation, in the long term.