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The effects of the local building culture approach on the local adaptive capacity to climate change:

The case of the implemented project in Haiti

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08th of September, 2016

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**NOTICE ANALYTIQUE
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Résumé en Français et dans une langue étrangère de votre choix:

Abstract:

Climate change is a certain truth. Adapting to climate change becomes a necessity. The 2015 Paris agreement on climate change sets the global adaptation goal, with the aim to increase adaptive capacity to climate change. Many development approaches are not designed as adaptation interventions, but they have an impact on adaptive capacity. The aim of this thesis is to evaluate the impact of the Local Building Culture (LBC) approach on the local adaptive capacity. The evaluation is based on the implemented project in Haiti, and it follows a descriptive framework. Evaluating this impact brings new understandings on the LBC approach in the context of climate change adaptation. It is expected that the LBC approach positively affects the local adaptive capacity, since it is based on a local know-how and expertise, actively involving local stakeholders in the development process. On a broad scale research illustrates a model of evaluating an impact of development approaches on adaptive capacity, which brings potential for its characterization and adjustments of development interventions in the context of climate change.

Keywords: climate change adaptation, local adaptive capacity, community-based adaptation, local building culture, and vulnerability;

Résumé:

Le changement climatique est une « est un fait avéré ». L'adaptation au changement climatique devient une nécessité. L'accord de Paris 2015 sur le changement climatique définit l'objectif global d'adaptation dans le but d'accroître la capacité d'adaptation au changement climatique. De nombreuses approches de développement ne sont pas conçues comme des interventions d'adaptation, mais elles ont pourtant un impact sur la capacité d'adaptation. L'objectif de ce mémoire est d'évaluer l'impact de l'approche des Cultures Constructives Locales (CCL) sur la capacité d'adaptation locale. L'évaluation est basée sur un projet mis en œuvre en Haïti et elle suit un cadre descriptif. L'évaluation de cet impact apporte de nouvelles connaissances sur l'approche CCL dans le contexte de l'adaptation au changement climatique. Il est pressenti que l'approche CCL impacte positivement la capacité d'adaptation locale, car elle est fondée sur des expertises et des savoir-faire locaux en impliquant activement les acteurs locaux dans le processus de développement. Dans une perspective plus générale cette recherche illustre un modèle d'évaluation d'impact d'approches de développement sur la capacité d'adaptation. Cela apporte un potentiel pour sa caractérisation et pour proposer des ajustements aux interventions de développement dans le contexte du changement climatique.

Mots-clés: adaptation au changement climatique, capacité locale d'adaptation, adaptation à base communautaire, cultures constructives locales, vulnérabilité;

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Chapter 1: Introduction

1.1. Background

Today, climate change is a certain truth. The fourth report of the Intergovernmental Panel on Climate Change (IPCC) shows that the climate is changing (IPCC 2007 a,b as quoted in Lemos, et al., 2007:1), which will bring higher frequency and intensity of natural disasters, the climate variability will be less predictable and there is an uncertainty about the impacts of the changes (Lemos, et al., 2007).

Impacts of climate change are experienced differently around the world. Developing countries are severely affected, which brings another layer of development challenges. The notion of uncertainty about climate change gives no possibility to predict the impacts. Development strategies need to respond to these challenges by targeting specific vulnerable groups, and enhancing their capacity to respond to the impacts.

Adapting to climate change, as the ability of a system (e.g. community) to respond to changes, is becoming an important part of development strategies. In 2015 the Paris agreement on climate change was signed during the Conference of Parties 21 (COP21). The agreement shows the importance of taking climate change adaptation into account in reaching sustainability and resilience, since the climate change mitigation is not enough (Heltberg et. al., 2009). According to the Article 7 of the Paris agreement, which is legally binding document to the UN member countries, the global goal of adaptation is “enhancing adaptive capacity, strengthening resilience and reducing vulnerability”, which will contribute to sustainable development in the context of climate change global goal, which is keeping the increase of the global temperature “well below 2 degrees Celsius” (UNFCCC, 2016).

In other words, climate change adaptation needs to be mainstreamed in the development strategies. According to the Saleemul Huq and Hannah Reid (2004) the adaptation to climate change is “fundamentally linked to development” (Huq & Reid, 2004:16). These linkages exist on different scales, levels (local, sectoral, national, regional, global).

Many development interventions are not designed as the adaptation to climate change. However, findings show that these approaches have an impact on adaptive capacity to climate change. Exploring this impact brings new perspectives in the context of climate change adaptation and adjustments of development activities to respond to climate impacts on a long-term.

In this sense, the aim of this thesis is to evaluate the impact of the Local Building Culture (LBC) development approach on the local adaptive capacity. The evaluation is based on the implemented project in Haiti. It is expected that the LBC approach positively affect local adaptive capacity, since it is based on a local know-how and expertise, including local stakeholders in the development process.

1.2. Definition of the terms and concepts

Climate change adaptation refers to the “adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts” (Smit and Pilifosova, 2003:879). The adjustment “refers to changes in processes, practices, or structures”, which will neutralize or take advantage of expected impacts of climate change (Smit and Pilifosova, 2003:879).

Adaptive capacity “refers to the potential, capability, or ability of a system to adapt to climate change stimuli or their effects or impacts” (Smit and Pilifosova, 2003:894).

Community-based adaptation (CBA) is defined “as a process focused on those communities that are most vulnerable to climate change” (Huq and Reid, 2007 as quoted in Ensor and Berger, 2009:231). The process is “is rooted in the local context and requires those working with communities to engage with indigenous capacities, knowledge and practices of coping with past and present climate-related hazards” (Ensor and Berger, 2009:231).

Local Building Culture (LBC) is the approach that focuses on improving local habitat and community resilience by identifying local knowledge and know-how related to traditional ways of building. The approach is based on the principle of active participation of a community, delivering the ownership of the project and meeting the needs of the people.

1.3. Statement of the problem

Many development approaches are not designed as adaptation interventions, but they have an impact on adaptive capacity. Mainstreaming climate change adaptation into development requires an understanding of these development practices and the ways they impact the local adaptive capacity. This will provide new opportunities for adjusting development activities in responding to climate change challenges.

1.4. Purpose of the research

The aim of the study is to evaluate LBC approach, through a chosen descriptive framework, and answer how does this approach support local adaptive capacity to climate change.

The hypothesis is that LBC positively impacts the local adaptive capacity. Based on the findings, adaptive capacity is 'intimately' connected with the climate change adaptation. The second research question derives from the first. The aim is to understand does objectives of the LBC approach correspond to the Community-based Adaptation, described in the literature review.

To reach the aim of the thesis, research questions are set to guide the research process, and they are state as follow:

1. How does the Local Building Culture approach support local adaptive capacity to climate change?
 - How these findings shape the Local Adaptive Capacity framework?
2. Does the Local Building Culture approach correspond to the objectives of Community-based Adaptation?

1.5. Significance of the research

Evaluating Local Building Culture provides an overview on how locally based development intervention shape the adaptive capacity. On a broad scale research illustrates a model of evaluating an impact of development approaches on adaptive capacity, which brings potential for its characterization and adjustments of development interventions in the context of climate change.

1.6. Scope and limitation

The research method is based on the analysis of the relevant documents, which provides the context of the research and base for evaluating the LBC approach. The approach is evaluated through chosen descriptive framework. The methodological paradigm of research is evaluative, and main qualitative method for data collection is document analysis.

The limitations of the research method are related to the inherent limitations of the document analysis, but due to the chosen framework for evaluation and collected data, this method is chosen as the appropriate one to answer the research question.

1.7. Description of the thesis chapters

The Chapter 1 describes the background, problem, purpose, significance, and scope and limitation of the research. This chapter is an introduction to the master thesis.

In the Chapter 2 the literature review examines the concepts of climate change adaptation, adaptive capacity and its different framings, Community-based Adaptation and Local Building Culture approach. The collected information is a base for the understanding of the context of research. Climate change adaptation and adaptive capacity literature are used to answer the first research question, while the analysis of the Community-based adaptation and Local Building Culture are used to answer to the second research question.

The Chapter 3 describes methodology of the research. Purpose of the study, research design, data collection and research limitations and strengths are highlighted. The document analysis is the main qualitative method for data collection. There are inherent limitations to this method, which are explained in the Chapter. Certain models from case study design are taken for the data analysis. This chapter ends with the limitations and strengths of the research.

The Chapter 4 starts with the analysis of the case project in Haiti. Results of the implemented projects are presented, with the philosophy and methodology of the approach in Haiti. The data on Haiti are used for the answer on the first research question. Collected data are presented in the Findings through descriptive framework in visual and textual form. This chapter continues with analysis and findings for the sub-question. The Chapter 4 ends with the second research question findings, which are based on the documents analysis from the literature review.

In the final Chapter 5, responses to the research questions are presented with the final remarks and conclusion.

Chapter 2: Literature review

2.1. What is climate change adaptation?

“In very simple terms, adaptation entails an adjustment to changing conditions” (Adger et. al., 2009:10)

Understanding the concept of adaptation

Smit and Wandel (2006) give an overview of the adaptation concept and its treatment in different fields. The term derives from the natural sciences and evolutionary biology, where it refers to the ability of organisms to adapt to the environment in order to survive and reproduce. Organisms have developed “genetic and behavioral characteristics”, which helps them to develop adaptive aspects necessary for survival. These are adaptive features of individual organisms (Smit and Wandel, 2006:283).

As the authors explain, by applying adaptation in human systems anthropologist Julian Steward used the term “cultural adaptation” to describe an adjustment of people to the natural environment with livelihood activities. The other authors dealing with adaptation in human systems define it as a “process of change in response to a change in physical environment or a change in internal stimuli, such as demography, economics and organization” (Denevan, 1983:401 as quoted in Smit and Wandel, 2006:283). This definition expresses different dimensions upon which human systems adapt, dimensions that go beyond physical environment. Also it describes adaptation as a process in time and space.

In social sciences, anthropologists and archeologists use adaptation in terms of an accomplishment of culture to survive. Being able to develop various cultural practices, as a result of a reaction on different abnormalities, group is able to overcome a stress. In terms of natural sciences, cultural practice has genetic character, meaning that the groups without appropriate cultural practices will not be able to benefit from the natural environment, and will not be able to endure. Cultural practices developed as an answer to a stress can be called adaptations. In this way the distinction is made between adaptations of a group and adaptive features of individual organism (O’Brien and Holland, 1992, as quoted in Smit and Wandel, 2006).

As Smit and Wandel (2006) continue, cultural practices, as used in more recent social sciences literature, enable societies to survive. Societies react to different

situations, not just to environmental stresses. Cultures which are capable to react and respond to a new conditions efficiently are considered as cultures with high “adaptability” or “capacity to adapt” (Denevan, 1983 as quoted in Smit and Wandel, 2006).

In the field of climate change, research on adaptation became important with the spreading awareness of the subject of climate change (Smit and Wandel, 2006).

Climate change adaptation

The concept of adaptation in the context of climate change refers to the “adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts” (Smit and Pilifosova, 2003:879). The adjustment “refers to changes in processes, practices, or structures”, which will neutralize or take advantage of expected impacts of climate change (Smit and Pilifosova, 2003:879).

“Adaptation refers both to the process of adapting and to the condition of being adapted” (Smit and Pilifosova, 2003:882). Process of adapting involves making a change in practices, which will at the end neutralize the adverse effects of climate change (Smit and Pilifosova, 2003).

Either as the process or condition, “adaptation is a relative term”, which “involves an alteration in something (the system of interest, activity, sector, community, or region) to something (the climate related stress or stimulus)” (Smit and Pilifosova, 2003:882).

Climate stimuli

Climate is defined as a pattern of weather for a long period of time (NASA, 2016), or in other words “long term averages and variations” (NOAA, 2016). Climate is associated with inherent variability and extremes of climatic conditions. Climate change on the other hand is defined as a “change in the state of the climate that can be identified (e.g. using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period” (IPCC, 2016). The climate change includes changes caused by climate variability or human activity.

In this sense, as the authors to Smit and Pilifosova (2003) claim, the climate stimuli of adaptation encompass not just changes of averages (annual conditions), referred

as climate change, but also climate variability and extremes of climatic conditions (Smit and Pilifosova, 2003). Why is this important? The systems (eg. community) are adapted to the variability and climate extremes. It is in the system's coping range to adapt to the long-term climate pattern. The problem with changes begins when the extreme events change their long-term frequency of occurrence. In those situations extremes are out of the established coping range of the community, which makes them more vulnerable (Smit and Pilifosova, 2003).

The ability to adapt to climate variability, or the yearly climatic conditions, is referred as coping range. In the Figure 2.1., the coping range is shaded, and it is noticeable that it is not static (Smit and Pilifosova, 2003). What the different fluctuations show are the new adaptations of the system. It illustrate that the coping ranges are "flexible and respond to changes in economic, social, political and institutional conditions over time" (Smit and Wandel, 2006:287).

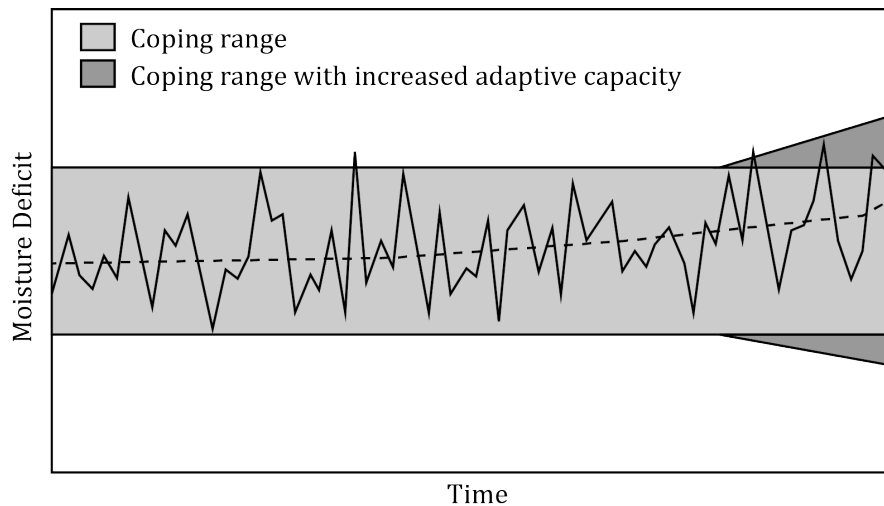


Figure 2.1. *Coping range and extreme events*
 Source: (Smit and Wandel, 2006:287).

The decrease and increase of the coping range is different over time. The reasons can be various. For example, economic stability can increase the adaptive capacity to changes, while the natural disasters or the external socio-political factors can decrease the coping range to react. Even the conditions, which are inside the coping range, can act in a decreasing way. If the floods or droughts are repetitive in years, even though their single effect is within coping range of the community, it can bring a negative decreasing trend to the community's ability to react. Also, one extreme event can be way out the coping range, without a chance for a community to recover, which can "permanently alter" the community's coping range (Smit and Wandel, 2006:287).

According to the Smit and Pilifosova, (2003) and Smit and Wandel, (2006), the coping range expressed in the Figure 2.1. can be referred as the adaptive capacity of the system, (e.g. community), to respond to changes. Coping range is one of the ways that adaptive capacity is being analyzed (Smit and Wandel, 2006). The issues with the adaptive capacity and its assessment will be explained later in the text.

To outline climate change adaptation process, specific attention is given to the to “who or what adapts, the stimulus for which the adaptation is undertaken, and the process and form it takes” (Smit and Pilifosova, 2003:882).

Climate Change Adaptation Types

Numerous attributes define variety of adaptation types. Most common ones are dividing adaptation based on the purpose, such as autonomous and planned. Also, adaptations can be based on time, such as short or long term adaptations or localized and widespread (Smit and Pilifosova, 2003). For the purpose of this master thesis, simple explanation of the autonomous and planned adaptation is used as a starting point for the second research question. The community-based adaptation, as a form of planned adaptation, will be explained later in the text, in the second part of the literature review.

The autonomous adaptation is usually occurring in unmanaged natural systems. It is referred as reactive adaptation, which means that the reaction on climate stimuli is after its impact. Smit and Pilifosova (2003) talk about adaptations implemented in the human systems, such as community, where private actors, without interference of public domain, lead autonomous adaptations. Opposite of autonomous is planned adaptation, which can be reactive or anticipated, meaning that the adaptation is started before the impact occurred. Planned adaptation is result of defined policy, where public institution is approving planned adaptation strategy based on expected climate changes (Smit and Pilifosova, 2003).

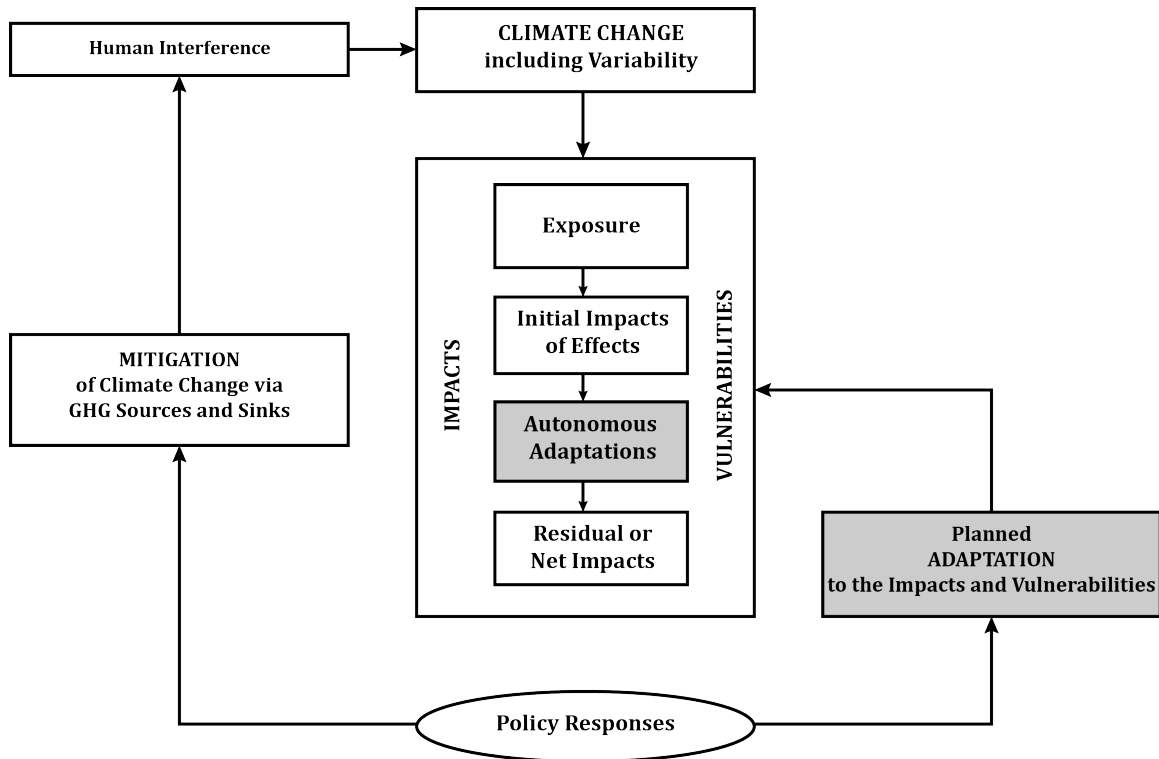


Figure 2.2. *Places of adaptation in the climate change issue*
 Source: (Smit and Pilifosova, 2003:881).

The Figure 2.2. illustrates where the autonomous and planned adaptation are occurring, in the process of climate change adaptation. The impacts and vulnerabilities of a system (e.g. community) depend on the exposure, initial effects, and the ability of the system to respond, which will be further elaborated. According to the Figure 2.2. planned adaptation options require analysis of the “likelihood of autonomous adaptation” (Smit and Pilifosova, 2003:881).

Purpose of the research of climate change adaptation

In their article, Smith and Wandel (2006) define four purposes of research of climate change adaptation. The common purpose is related to the modeled climate change scenarios. In this case, the adaptation is “assumed or hypothetical, and their effects on the system of interest is estimated relative to the estimated impacts (e.g. in terms of costs, savings, etc)” (Smit and Wandel, 2006:284). The purpose of this research is to assess the impact of climate change, based on a given scenario, without empirical research on adaptation or adaptive capacity. In this sense the “focus is on the effect of the assumed adaptations” (Smit and Wandel, 2006:284).

Second purpose tackles the specific adaptation measures and options, with purpose to define, which adaptation measure is better. The research takes a list of possible adaptations delivered by researchers through models, scenarios, and hypotheses and evaluates them based on similar criteria. The research does not explore the process of adaptations. It only ranks the different options by their efficiency (Smit and Wandel, 2006).

Third scholarship deals with the relative adaptive capacity of countries, communities, regions, and “involves comparative evaluation or rating based on criteria, indices and variables typically selected by the researcher (Smit and Wandel, 2006:285).

Fourth group of studies relates to the “practical adaptation initiatives” and their analysis. It focuses on the initiatives, which are not “labeled as adaptation”. The aim is to “investigate the adaptive capacity and adaptive needs in a particular region or community in order to identify means of implementing adaptation initiatives or enhancing adaptive capacity” (Smit and Wandel, 2006:285). The focus of this research is to identify the means with which communities already adapt to climate changes and to document decision-making process, with assumption that will bring perspectives on the types of adaption and ways of improving adaptive capacity (Smit and Pilifosova, 2003).

Based on the findings, Smit and Wandel (2006) define the features that characterize practical adaptation interventions: (1) The interventions are set to meet the needs of a community; (2) The proposals for interventions are not based on the external researchers data; (3) The interventions use local knowledge and experience; (4) The interventions are based on a local decision-making process, upon which, adaptations are integrated (Smit and Wandel, 2006).

The nature of the practical adaptation interventions is to identify “what can be done in a practical sense, in what way and by whom” (Smit and Wandel, 2006:285), in order to impact the vulnerability of a community.

This master thesis fits under the fourth group of studies, since it investigates how certain development approach, in this case Local Building Culture, supports local adaptive capacity to climate change. The research methodology is described in the Chapter 3.

2.2 Adaptive capacity to climate change.

“Adaptations are manifestations of adaptive capacity, and they represent ways of reducing vulnerability” (Smit and Wandel, 2006:286).

“Adaptive capacity is a vector of resources and assets that represent the asset base from which adaptation actions and investments can be made” (Adger and Vincent, 2005:400).

Adaptation is ‘intimately’ connected with the vulnerability and adaptive capacity. To explain the relations the Venn’s diagram (Figure 2.3.) is used from the article of Smit and Wandel (2006:286).

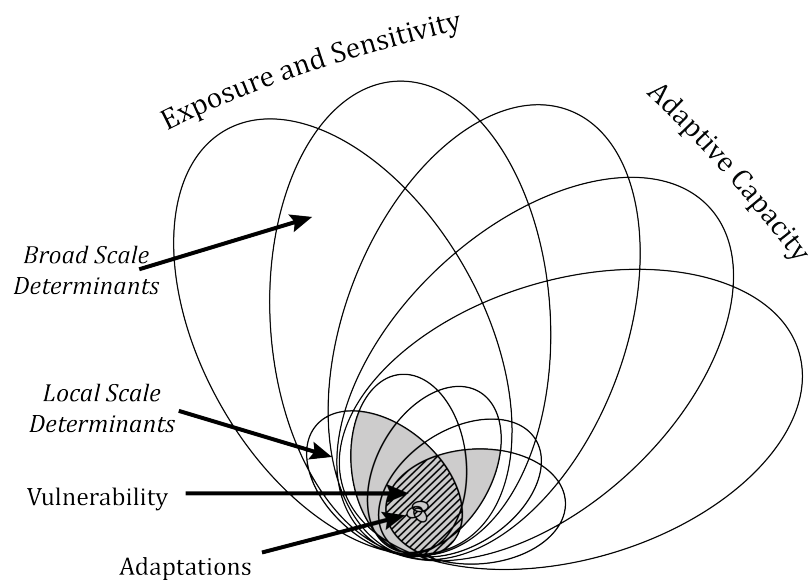


Figure 2.3. *Nested hierarchy model of vulnerability*
Source: (Smit and Wandel, 2006:286).

All determinants in the diagram overlap, which show their interdependence. Broader determinants, such as exposure and sensitivity are the result of “interaction of environmental and social forces”, while adaptive capacity is shaped by the “various social, cultural, political and economic forces” (Smit and Wandel, 2006:286).

Local scale determinants represent local vulnerability and adaptations, which are “particular expressions of the inherent adaptive capacity” (Smit and Wandel, 2006:286). As the authors explain, the system with low adaptive capacity is more vulnerable and consequently system with high adaptive capacity is less vulnerable.

Based on the extensive literature, Smit and Wandel (2006) state that the “vulnerability of any system (at any scale) is reflective of (or a function of) the exposure and sensitivity of that system to hazardous conditions and the ability or capacity or resilience of the system to cope, adapt or recover from the effects of those conditions” (Smit and Wandel, 2006:286).

The diagram (Figure 2.3.) is a conceptual representation of how community’s vulnerability is shaped. It shows two broad related determinants, exposure and sensitivity, and adaptive capacity that contribute to vulnerability. The diagram is based on the assumption that relationships among broad determinants exist, and they are diverse in time and place. Broad conditions, such as social, economic, political and ecological affect exposure, sensitivity and adaptive capacity. On a community level the elements of a broad determinants are experienced in various forms (Smit and Wandel, 2006).

Exposure and sensitivity depend on the characteristics of a system and on the aspects of climatic stimuli. As properties of a system (e.g. community), exposure and sensitivity portrays the possibility of a system to experience adverse impacts of a climatic stimuli (e.g. drought). If we consider community as a system, it has its characteristics, such as “occupance (e.g. settlement location and types, livelihoods, land uses etc.)” and livelihood. These characteristics influence the sensitivity of a community to an exposure. The occupance characteristics “reflect broader social, economic, cultural, political and environmental conditions, sometimes called “drivers” or “sources” or “determinants” of exposure and sensitivity” (Smit and Wandel, 2006:286).

Based on the extensive literature Smit and Wandel (2010) find that: (1) adaptive capacity is a similar concept to “adaptability, coping ability, management capacity, stability, robustness, flexibility and resilience”; (2) “the forces that influence the ability of the system to adapt are the drivers or determinants of adaptive capacity”; (3) “local adaptive capacity is reflective of broader conditions” and (4) “at the local level the ability to undertake adaptations can be influenced by such factors as managerial ability, access to financial, technological and information resources, infrastructure, the institutional environment within which adaptations occur, political influence, kinship networks, etc.” (Smit and Wandel, 2006:287).

Authors explain how the adaptive capacity is “context specific”, with variations in time across scales, among different states and social groups. For example, the nature and value of adaptive capacity varies from national and regional level of the state, to the community or household level. For a community this means that its adaptive

capacity is dependent on the local “enabling environment” to respond to crisis, and “reflective of the resources and processes of the region” (Smit and Pilifosova, 2003; Yohe and Tol, 2002, as quoted in Smit and Wandel, 2006:287).

Smit and Wandel (2006) here take community as “some definable aggregation of households, interconnected in some way, and with a limited spatial extent”, which is analogous to Combes et. al., (1988) use of term “locality” (as quoted in Smit and Wandel, 2006:283).

While some determinants of adaptive capacity are broad, such as social, economic, political and environmental factors, some determinants are only local. For example, as the national determinant can be availability of micro credits for investing in new crops, strong local social relationships are the local determinant, which can absorb the impact of a disaster (Smit and Wandel, 2006).

Strong local networks can provide better access to different goods, such as economic resources, which can foster development of a new technology in a system or improve skills of the people. What Smit and Wandel (2006) want to make clear here is that all determinants are interacting, and interaction varies in “space and time” (Smit and Wandel, 2006:288).

There is no common agreement among scholars about the models, which will define local processes and elements of adaptive capacity, exposure and sensitivity, “beyond broader categories”. It makes practical adaptation initiatives hard to implement, as the broader determinants are too general to be considered as guidelines for the process of adaptation. Based on the findings in practice, community-based analysis illustrate that the adaptive capacity, sensitivity and exposure are “community specific” (Smit and Wandel, 2006:288).

It implies that for a practical adaptation on a community level, practitioners should gather information on adaptive capacity elements and pertinent sensitivity and exposure from the community itself, through an active participatory approach. The approach should involve all stakeholders and decision-makers to identify processes relevant for the community (Smit and Wandel, 2006).

Different framings of adaptive capacity

Gathering information on adaptive capacity requires characterization of adaptive capacity in a “meaningful sense” and with “generic determinants...at various scales...”(Adger and Vincent, 2005:400). The challenge is in its latent condition,

where adaptive capacity is “important only when sectors or systems are exposed to the actual or expected climate stimuli” (Adger and Vincent, 2005:400) and “can only be observed when realized through some form of concrete adaptation”(Lemos et al., 2007:1).

In the article Berger et al. (2014), authors focus on the different framings of adaptive capacity, and what communities at the local scale need to have to be able to adapt. The starting point for the discussion on the adaptive capacity is the Ensor’s (2011, as quoted in Berger et al., 2014) position where adaptive capacity “is proposed in terms of the processes, which must be in place if communities are to be able to make changes to their lives and livelihoods in response to emerging environmental change” (Berger et al., 2014:22). In this regard adaptive capacity is the “the combination of skills, resources and information that a community can call on and use at a given point in time” (Berger et al., 2014:22).

Ensor (2011) claims that the assets, physical, natural, financial and human capital, are not the only important features of adaptive capacity. It is also “how networks of relationships define the distribution, access and control of the material and knowledge assets that determine the options that communities can select when looking to respond to environmental change” (Berger et al., 2014:22).

“These relationships are determined by characteristics such as power, culture and gender, and operate across scales, meaning that local communities may need to link or engage with actors and institutions located in different and sometimes distant locations” (Berger et al., 2014:22).

The article continues with “the focus of adaptive capacity, then, is on the processes of change, and the character of the formal and informal institutions and networks of relationships that determine the nature of achievable change. These processes must also enable communities to understand and prepare for an uncertain future where the limitations of climate projections are compounded by the complexity of human systems” (Berger et al., 2014:22,23).

Accepting this position on adaptive capacity, the adaptive interventions evolve from the processes of change. The challenge is in “identifying the mechanisms through which a better-informed image of future scenarios can be generated assessed and acted on by the poorest in their own best interest (Berger et al., 2014:23).

Authors give an overview of the three different frameworks, with explored case studies, which deal with the adaptive capacity at the local scale.

(1) The Climate Smart Disaster Risk Management (CSDRM), is an approach to adaptive capacity that made an impact on “operationalizing, monitoring and evaluating adaptive capacity” (Berger et al., 2014:23). The approach is based on a link among Disaster risk reduction (DRR), climate change and development policies. The approach “offers a set of action points, guidance and indicators that link together uncertainty, poverty, vulnerability and adaptive capacity” (Berger et al., 2014:23). In practice this approach is used to in projects aiming to achieve long-term disaster risk management (DRM), with special focus on poor people (Berger et al., 2014).

(2) The International NGO, Practical Action, developed an approach to adaptive capacity based on the complexity theory and resilience. The approach entails three dimensions, within which adaptive capacity can be supported: (1) power sharing, (2) knowledge and information, and (3) experiment and testing. This approach does not focus on determinants of adaptive capacity; it explores how certain development activities support adaptive capacity (Ensor, 2011 as quoted in Berger et al., 2014).

(3) *The Local Adaptive Capacity framework (LAC)* includes five interrelated dimensions of adaptive capacity (Figure 2.4). These dimensions, if supported through adaptations and development, contribute to the enhancement of local adaptive capacity (Jones et al., 2010 as quoted in Berger et al., 2014).

The LAC framework will be explored in detail, since it is used as a descriptive framework in getting a response to the research question.

The framework is developed by the African Climate Change Resilience Alliance (ACCRA), which is the Consortium made by Oxfam GB, the Overseas Development Institute (ODI), Save the Children International, Care International and World Vision International (Eldis communities, 2016).

The LAC framework is developed “with academics, policy-makers and practitioners”. The attempt was to blend “intangible and dynamic dimensions of adaptive capacity, as well as capitals and resource-based components, into an analysis of adaptive capacity at the local level” (Jones et al., 2010:2).

The framework is based on the notion that development entails continual adaptation to the uncertain future in a changing context. In this regard, the framework “starts with assessing what people and communities can do for

themselves to maintain or improve their well-being, and the context in which they make their living” (Ludi et. al, 2014:40-41).

The LAC framework focuses on the dimensions of the adaptive capacity of a system. The starting point was that the adaptive capacity is not measurable directly (Jones et al., 2010).

The developers of the framework focus on the characteristics of the adaptive capacity of the local systems, such as community and household level, recognizing that much more attention is given to the characteristics and dimensions on national and regional level (Jones et al., 2010).

The attention in LAC framework is given to the “processes, rather than snapshot pictures of a system at a single point in time” (Jones et al., 2010:1).

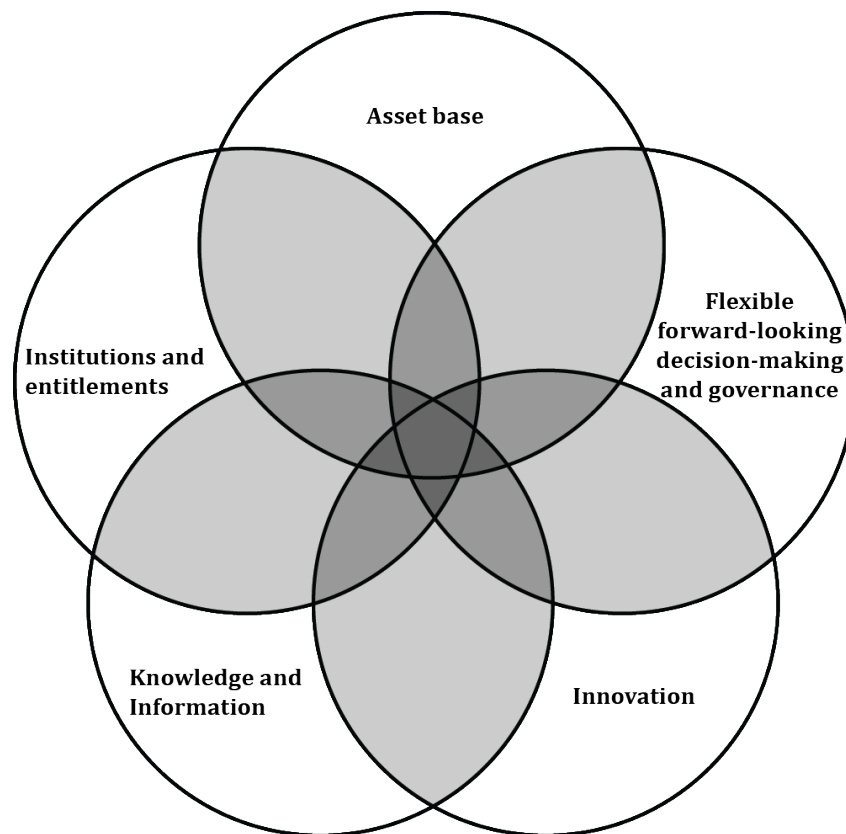


Figure 2.4. *The relationships among characteristics of adaptive capacity at the local level*

Source: (Jones et al., 2010:4).

Asset base

“The availability of a community to cope with and respond to change depends heavily on access to, and control over, key assets” (Daze et al., 2009 as quoted in Jones et al., 2010:5).

With assets here are included tangible and intangible ones. Tangible assets comprise natural, physical and financial, while intangible include human and social ones (Prowse and Scott, 2008 as quoted in Jones et al., 2010:5).

Not being able to access the assets can limit the availability of a community to respond to evolving climate changes. The interdependent relationship between asset base and adaptive capacity is “complex”. While the lack of assets limit the response to changes, “effective asset base depends on the extent to which components within the system are substitutable” in the case of disaster (Jones et al., 2010:5),

Poor people are usually considered most vulnerable. As the poverty is expressed in different dimensions, not purely financial, free access to assets and capitals, and assets diversity are crucial for a vulnerable group to respond to disruption (Jones et al., 2010). Having that in mind, “this category incorporates the importance of social networks” (Berger et al., 2014:24).

Institutions and entitlements

The contribution of institutions to adaptive capacity of a community can be measured or evaluated according to the asset distribution to people and participation of people in decision-making process. As the institutions provide “equitable access” to resources, they are “likely to promote adaptive capacity within a community” (Jones et al., 2010:5). On the other hand, looking at “how institutions empower or disempower people; and the extent to which individuals, groups and communities have the right to be heard” (Jones et al., 2010:5), demonstrates the ability of a system to adapt.

Here institutions not only mean to the established public institutions, rather “rules’ that govern belief systems, behavior and organizational structure” (Ostrom, 2005 as quoted in Jones et al., 2010:5).

Jones et al., (2010) talk about informal institutions, locally established rules at the community level, which can include “land tenure rules, such as claims to common

property resources; the ways in which farmers share knowledge; family, clan and church networks through which assets are shared; and 'rules' (unwritten) governing the rights of women" (Jones et al., 2010:5).

Within that frame of institutions, individual activity or reaction in moment of disturbance can impact and shape the local adaptive capacity of a community (Dulal et al., 2010 as quoted in Jones et al., 2010).

Knowledge and information

Possessing knowledge on the threats of the upcoming hazards and the ability to understand how to cope with them, improves communities' capacity to apply adequate response to a threat (Franhauser and Tol, 1997 as quoted in Jones et al., 2010).

In context of empowering local community and raising awareness, knowledge plays an important role (Ospina and Heeks, 2010 as quoted in Jones et al., 2010).

Based on this Jones et al., (2010) continue "the way in which a system generates, collects, analyses and disseminates knowledge is an important determinant of adaptive capacity – with obvious links with the institutional context and the governance of knowledge" (Jones et al., 2010:5).

The capability to access knowledge emphasizes links with intangible assets, where the system needs to provide and distribute relevant information and knowledge about the future changes to all stakeholders, on local, regional, and national level. This indicates the importance of having dialogue and discussion (Berger et al., 2014).

At the community level Jones et al., (2010) claim that the generation and sharing of knowledge and information is classified as 'informal'. This is in contrast to the 'formal' way of sharing, provided by the external experts or state actors. Having that in mind a community needs a system that will bring about local 'informal' knowledge and incorporate it with the 'formal' external or scientific knowledge. In this case adaptation measures on a community level would need external assistance to support the process (Jones et al., 2010).

Innovation

Innovation as the key characteristic of adaptive capacity expresses systems ability to foster innovation and take risk (Berger et al., 2014).

Willingness of a system cultivate innovation brings the acceptance of failure. There is a great variety on a local level about the innovation aspect. However, in contexts on uncertain change community, with ability to “alter existing practices, resources and behaviors, or in some cases adopt new ones” ...”as a part of learning process” will have greater chances in responding effectively to changes (Jones et al., 2010:6).

The innovation can be planned and ‘high-tec’, referred as high scale, but also it consists of local level initiatives, done autonomously or spontaneously, which improve local practices. Here Jones et. al. (2010) bring at caution “not to over romanticize’ traditional local practices” (Jones et al., 2010:6).

This dimension associated with the knowledge and information, because during process of innovation in the changing environment, people need information and adequate knowledge. It is also associated to the assets, as the innovation requires economic stability to be able to risk and invest in innovation (Jones et al., 2010).

Flexible forward-looking decision-making and governance

Having high adaptive capacity includes also having adaptive governance. The task of adaptive governance is to ensure that “local organizations are informed on future climate impacts and take appropriate measures to plan for the future” (Berger et al., 2014:25). The key characteristics of such governance are “informed decision-making, transparency and prioritization” (Jones et al., 2010:6).

Supporting local organizations to be able to “anticipate and incorporate relevant initiatives into future planning and governance” can help communities to respond more efficiently to changes, and disruptive shocks. According to Jones et al., (2010) it is important to choose forward-looking organizations, which can be able to recognize future vulnerabilities and create enabling environment for adaptive activities. This is also important to avoid maladaptive actions (Jones et al., 2010).

To be able to identify adequate response to changes, decision-making process needs to be analyzed. Decision-making process is dependent on the ‘technical’ capacity of institutions and power relations. Great attention needs to be on the power relations, as the class discrepancy is present in any contexts. These differences and

imbalances among certain groups manifest the capacity to respond to hazards (Jones et al., 2010).

2.3. Community-Based Adaptation

“The difference between a community-based adaptation project and a standard development project is not principally in the intervention, but in the way the intervention is developed: not what the community is doing, but why and with what knowledge” (Ensor and Berger, 2009:231).

After getting familiar with the climate change adaptation concept and research practice, the community-based approach to climate change adaptation will be presented.

Community-based adaptation (CBA) to climate change is developed during 2000s, as a response to a growing attention to the climate change adaptation, and the need to make adaptation more sensible toward poor people in developing countries (Forsyth, 2013). The approach focuses on the most vulnerable communities in developing countries, and it is “based on the premise that local communities have the skills, experience, local knowledge and networks to undertake locally appropriate activities that increase resilience and reduce vulnerability to a range of factors including climate change” (Dodman D, and Mitlin D. 2011 as quoted in (Forsyth, 2013).

CBA as approach is a “small-scale, place based and often grassroots driven”. It “engages development practitioners and development approaches, and most importantly is community-based” (Reid and Schipper, 2014:3).

The CBA has emerged as a result of three factors. First, the growing attention to the climate change adaptation as a complementary measure with mitigation to reduce adverse effects of the climate change. Second, the international development actors have recognized the need to understand “social vulnerability” and “local contexts of poverty” while applying adaptation in developing countries. Third, based on the practice of Community-based Natural Resource Management approach, findings showed that it had potential in empowering local stakeholders to implement adaptation. This was favorable for CBA to start as a practice (Forsyth, 2013).

The nature of CBA is to allow people to engage in the process of adaptation, and express their needs. Narrative that follows the practice is to focus on the most

vulnerable and poor groups, and “help them shape the responses to the risks posed by climate change” (Forsyth, 2013:2).

The methodology of the approach is based on the “culturally sensitive participatory research methods—comprising interviews, group discussions (sometimes gender specific), and observation of affected people—of either how current livelihoods might be affected by climate change; and/or how proposed forms of adaptation might be implemented more successfully” (Forsyth, 2013:2). The interventions tend to make adaptation closer to local communities, following their needs in reducing vulnerability, which will eventually make the process more successful (Forsyth, 2013).

Following that, CBA has “focus on the local social, economic, and political contexts of poverty and vulnerability as well as physical bases of climate risks such as floods and droughts (Forsyth, 2013).

The CBA works with the local identifying “existing social and economic practices that can built or protect livelihoods” (Forsyth, 2013:2).

Ensor and Berger (2009) in their article show how CBA is well situated in promoting understanding between culture and adaptation. Authors try to explain the complex relationships among well-being, community, culture and adaptation (Ensor and Berger, 2009). The article is a reflection of Practical Action’s, international NGO work on adaptation, which tackles these complex relationships.

Based on the Ensor and Berger (2009) findings CBA “is rooted in the local context and requires those working with communities to engage with indigenous capacities, knowledge and practices of coping with past and present climate-related hazards” (Ensor and Berger, 2009:231). The CBA interventions are developed to look why community is doing something and with what knowledge. “The aim is to enable the community to understand and integrate the concept of climate risk into their livelihood activities in order to increase their resilience to immediate climate variability and long-term climate change. Community-based adaptation is essentially an action research approach to the problem of climate change impacts on livelihoods” (Ensor and Berger, 2009:231).

Developing adaptation process with communities enables the “important communal practices and collectively held metaphors or sayings to be identified and used to facilitate change from within, rather than attempting to force change from without” (Ensor and Berger, 2009:231).

Having this in mind, the successful CBA initiative will be the one where adaptive practices become “a shared community value or attitude” (Ensor and Berger, 2009:231). The initiative that creates an “enabling environment” – “political, social and cultural environment that encourages freedom of thought and expression, and stimulates inquiry and debate’ (Twigg, 2007:26 as quoted in Ensor and Berger, 2009:232), will have greater chance to be successful.

The other definitions of CBA, such as the one from Reid et. al., (2009:13 as quoted in (Reid and Schipper, 2014:7), put the “emphasis on the process” of adaptation, meaning that the initiatives, which only provide certain material goods to combat climate change should not be considered as CBA (Reid and Schipper, 2014).

Reid and Schipper (2014) continue, the process of adaptation on a community level should be “centered around the priorities and processes chosen by the community” (Reid and Schipper, 2014:7). In this sense, successful CBA should avoid priorities of the external actors, rather build intervention on the priorities of a community, its knowledge and capacity, which would empower them to react by themselves (Reid and Schipper, 2014).

As the local and scientific knowledge can help in understanding the climate change risks and uncertainty of future events, these findings should be part of any CBA initiative. However, Reid and Schipper (2014) warn to be cautious on the simple repackaging of the projects as CBA, “when no observed climatic events can be objectively attributed to climate change and the project was not planned based on existing assessments of where climate change risks might significantly increase” (Reid and Schipper, 2014:7). According to the authors this practice would be “unwise” and “not well-intentioned” (Reid and Schipper, 2014:7). In the case of repackaging the projects, Ludi et al., (2014) claim that the risk of “climate change is not adequately taken into account”(Ludi et al., 2014:37).

Ludi et al., (2014) call for an overall integration of adaptation to a new circumstances as a part of development process. According to them, climate change is only one part of the problem, and focusing the initiatives only on climate change without tackling underlying vulnerabilities is missing the point of the adaptation process (Ludi et al., 2014).

Reid and Schipper (2014) also draw attention to what is not CBA. According to them development projects that help communities in dealing with changes, which are not a result of climate change, should not be called CBA. Based on findings certain

organizations label their projects as CBA, even though it is not connected with climate change. Authors note that this practice should be avoided as it makes confusion in defining what CBA really is and what are the successful practices (Reid and Schipper, 2014).

2.4. Local Building Culture approach

“A good knowledge and understanding of local building cultures forms a sound basis to help communities plan towards climate change mitigation and disaster preparedness. By strengthening self-confidence and dignity, it is further possible to re-launch an endogenous process for a long-term improvement of living conditions and resilience. A real way forward!” (Caimi, 2015:27).

The Local Building Culture Approach has been developed in the last thirty years and it is “dynamically linking analysis, research, experimentation and the implementation” (Moles and Caimi, 2012:2)

The LBC looks at the building culture as a result of the “adaptation of a community to the environmental conditions of territory in which it is established” (Caimi, 2015:5). The result of a community’s adaptation is “situated architecture and building systems respectful of their local environment” (Joffroy and Garnier, 2015:51). These building practices are result of people’s “customs, beliefs and capacities” (Caimi, 2015:13). There is a diversity of building practices and building systems evolved during history as a consequence of “available resources, local climate, social practices and cultural models” (Caimi, 2015:13). These form varied building cultures around the globe.

Traditional ways of building are part of the daily living practices in low developed remote areas, affected by the frequent natural hazards. People facing continual disasters modified and improved construction techniques and details to respond to the risks and vulnerability of the built environment. Along with the customization of local construction techniques, ways of living and response to the risks on household level also evolved. The approaches “vary from hazard to hazard, from region to region, and even among members of the same communities” (Caimi, 2015:13).

LBC is the approach, which recognizes the importance of a diverse “local know-how and local dynamics” in the process of reaching human habitat resilience and overall better living conditions, especially in the natural disasters context. Applying the LBC approach in post-disaster situations and in process of disaster risk reduction “can directly contribute” to the community resilience (Caimi, 2015:17).

Most of the CRAterre's practice in the last decade focuses on post-disaster and vulnerability reduction programs in developing countries, where institute is applying "efficient approach toward the mobilization of local knowledge and resources related to housing" (Hosta, J. et al., 2016:57). Its approach is based on the principle of active participation of a community, delivering the ownership of the project and meeting the needs of the people.

The Local Building Culture approach is developed on the "drawbacks" of the international development policies and activities in housing (re)construction programmes, post-disaster interventions and disaster reduction (Caimi, 2015:18).

The drawbacks are: (1) "Lack of adaptation to local climatic conditions, ways of living and cultural habits; (2) Technical solutions often not replicable by the local community as they are either too expensive or too sophisticated; (3) Low quality imitations and mix of technologies often result in poor quality and increased vulnerability; (4) Beneficiaries and local professionals not involved in the design and implementation process, even though this is essential for the local economy and the continuity of projects in the long term; (5) Use of imported or non-local materials and technologies limit the ability of the community to contribute their own resources and knowledge, and discourage local ownership of, and responsibility for, the resulting housing or construction solutions." (Caimi, 2015:18).

To overcome these drawbacks LBC approach is focusing on the improvement of local building practices, by analyzing their strengths and weaknesses. It is believed that development based on the "individual experience and community achievements, responsive actions can better reach the goals of enhancing and reactivating community resilience while reinforcing people's dignity and capacity, thereby ensuring the sustainability of the investments" (Caimi, 2015:19). This will bring coherence and improved coordination among various stakeholders and actors involved in the process of habitat improvement (Caimi, 2015).

In order to improve traditional way of building local formal and informal construction processes "needs to be analyzed in its dynamic dimension to: (1) strengthen technical, operational, organizational and managerial capacities; (2) foster a sustainable process; (2) establish more effective preparedness to manage future crises; (3) propose solutions that actually improve upon what currently exists; (2) ensure that even if they cannot be used directly, local strengths (tangible and intangible) are kept through adaptations to contemporary situations (Caimi, 2015:27).

This will create a base for communities to reach better disaster preparedness. Having people at the center of the intervention will bring higher self-confidence and dignity to local people, which can serve to improve livelihood and resilience on a long term (Caimi, 2015:27).

The Table 2.1. shows the key concepts behind LBC approach.

Participation	Actively involve local communities, artisans and stakeholders from different ages, settlements, socio-cultural backgrounds and income levels. Each of them holds particular knowledge and experience and can play a relevant role in future actions.
Observe, Ask, Verify	At each stage of the process, 3 main actions - to observe, to ask, to verify - need to be carried out on the basis of 5 key questions - What? Why? How? (By) who(m)? When? - to better understand specific behaviors, phenomena and practices that might be omitted by the tools or which could not be identified at the time of assessment.
Facilitation	Information gathering and relations with local communities need to be properly facilitated and managed to ensure data reliability and a fair involvement of all the stakeholders.
Adaptation	Activities, contents and tools are flexible and need to be adapted to the characteristics of the area and the situation (before or after a disaster) where the assessment takes place as well as to the conditions (available time, funds and skills) for its implementation. If needed, change sequence, add or adapt the activities to be carried out and develop new tools or adjust the existing ones, according to assessment objectives, local context and target audience (artisans, adults, children, etc.).

Cross-Checking	Ensure the reliability and completeness of information by crosschecking and triangulating different sources throughout the assessment.
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Table 2.1. Key concepts behind LBC approach

Source: Caimi, (2015:41-43)

LBC assessment as a process, not a single event

The participatory assessment of local building culture consists of four main steps: analysis, planning, implementation, and evaluation (Figure 2.5.). To keep the consistency with dynamics on the ground these four steps need to be carried out through whole project cycle. Having that in mind, assessment is not a “single event”, it is a “process” (Caimi, 2015:96).

The importance of assessment in post-disaster situations continuously addresses the weaknesses on the ground, and “introduces new adaptations” (Caimi, 2015:96).

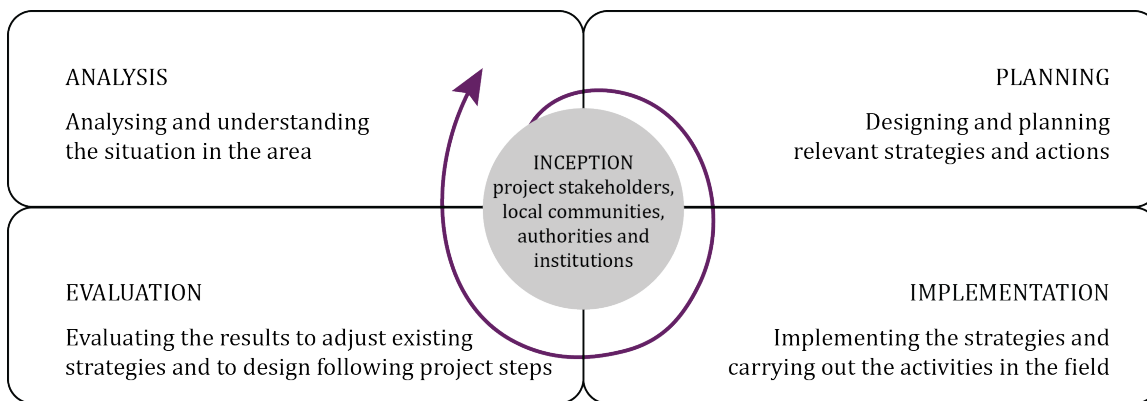


Figure 2.5. LBC assessment main steps

Source: Caimi, (2015:96).

The LBC methodology can be applied with initiatives that aim to support habitat improvement and local capacity of beneficiaries. The approach is not only aiming the people that directly benefit from the houses, rather to “contribute to a whole process improving practices at individual, professional and institutional level” (Caimi, 2015:39).

LBC approach can be applied in disaster relief, recovery and rehabilitation, preparedness and mitigation and development contexts, and it developed “primarily for rural and peri-urban contexts, especially where traditional knowledge about construction and risks is still transmitted and widely practiced” (Caimi, 2015:40).

2.5. Conclusion

Societies have inherent ability to adapt to their environment. Anthropologists use the term ‘cultural adaptation’ to express this ability. According to sociologists, developing diverse cultural practices enables society to survive. Having in mind that the climate today is human driven, it implies that society needs to adapt to the climate changes. With the raising awareness of the climate change problem, adaptation became important in the research and development field.

Adapting to climate change refers to the adjustments in the system (e.g. community) to the expected climate changes. Being able to adapt represents the capacity of a system to respond to change. Adaptive capacity to change is the ‘asset base’ (Adger and Vincent, 2005:400), which enables adaptive interventions.

As described above, broad and local determinants influence this ability, and shape local vulnerability. Adaptive capacity to change is context specific, and dependent on the existing ‘enabling environment’ and reflective of the ‘resources and regional processes’ (Smit and Wandel, 2006:287).

Among researchers there is no common agreement how to measure local adaptive capacity. Different international organization, with academics and researchers define their own approaches to the local adaptive capacity, which enables them to guide the local adaptive interventions. Local Adaptive Capacity framework defines five determinants of local adaptive capacity. The dimensions of adaptive capacity in this framework serve to draw attention to the development actors in getting understanding of crucial dimensions of adaptive capacity on a local level (Ludi et. al, 2014:41-42).

In this sense, LAC framework is used as a descriptive framework to evaluate Local Building Culture approach, and recognize does the activities implemented with this approach support local dimensions of adaptive capacity.

As the adaptation is ‘intimately’ related to adaptive capacity, second part of the literature review focuses on Community-based Adaptation and Local Building

Culture approach. The objectives of these two approaches are part of the analysis for the second research question. As the LBC impact on adaptive capacity is evaluated, the intention with CBA analysis is to recognize the analogue community-based practice, in the climate adaptation field. Based on the above literature review, the answer to the second research question is presented in the Findings of the Chapter 4.

Chapter 3: Research methodology

3.1. Introduction

In the previous chapter, a literature review provides an understanding of the term climate change adaptation and how it is related to the adaptive capacity, with different methods of its characterization on the local level. The Chapter 2 ends with an explanation of the Community-based Adaptation and Local Building Culture approach.

The following finding will be used for the investigation:

Local Adaptive Capacity Framework as a descriptive framework to evaluate Local Building Culture approach through document analysis, for the purpose of the first research question, and

Objectives of the Community-based Adaptation and Local Building Cultures, for the purpose of the second research question;

This chapter will explain the research methodology used for this master thesis.

3.2. Purpose of the study

As written in the introduction, the aim of the study is to evaluate LBC approach, through a chosen descriptive framework, and answer how does this approach support local adaptive capacity to climate change.

The hypothesis is that LBC positively impacts the local adaptive capacity. Based on the findings, adaptive capacity is 'intimately' connected with the climate change adaptation. The second research question derives from the first. The aim is to understand does objectives of the LBC approach correspond to the Community-based Adaptation, described in the literature review.

The research questions and sub questions that guided the study are Table 3.1.:

Research questions:	Form of data collection	Source of data
How does the Local Building Culture approach support local adaptive capacity to climate change?	Document analysis	Secondary data
How these findings shape the Local Adaptive Capacity framework?	Document analysis	Secondary data
Does the Local Building Culture approach correspond to the objectives of Community-based Adaptation?	Document analysis	Secondary data

Table 3.1. Research questions

Source: Author

3.3. Research design

Following the comprehensive guidelines of Jacques du Toit (2015), in the Routledge Handbook of Planning Research Methods, the research design has been defined. According to the author the research design is a “logical plan to maximize the validity of research findings” (du Toit, 2015:61). It can be referred as a research strategy that will guide you to an answer of the research question (du Toit, 2015).

The context and the aim of the research can be “basic” and “applied”. Basic research aims to “advance fundamental knowledge”, while applied research is “driven by practical aims” to give answers to practical problems (du Toit, 2015:62). This research is applied, since it is driven by the practical aim to evaluate how LBC approach contributes to LAC to climate change.

It implies that the purpose of this research is evaluative. Regarding the methodological paradigm, according to du Toit (2015) evaluative research falls under pragmatism, which “ought to solve problems in the real world and improve human condition” (du Toit, 2015:65).

The methodological approach that will be used in this research is qualitative descriptive. Document analysis is the primary method of qualitative data collection.

3.4. Data collection

“Document analysis is a systematic procedure for reviewing or evaluating documents” (Bowen, 2009:27). In this research method data is “examined and interpreted in order to elicit meaning, gain understanding, and develop empirical knowledge” (Corbin and Strauss, 2008 as quoted in Bowen, 2009:27). The document analysis is usually complemented with other qualitative research methods, in order to enhance the credibility of research (Bowen, 2009). However, “it has been also used as a stand-alone method” (Bowen, 2009:29).

There are five specific purposes of documents that Bowen (2009) describes in her article: (1) “documents can provide data on the context within which research participants operate”; (2) “information contained in documents can suggest some questions that need to be asked and situations that need to be observed as part of the research”; (3) “documents provide supplementary research data” ...which “can be valuable additions to a knowledge base”; (4) “documents provide a means of tracking change and development”; (5) “documents can be analyzed as a way to verify findings or corroborate evidence from other sources” (Bowen, 2009:30).

Advantages of document analysis as a method, compared to the other qualitative methods, are related with its (1) efficiency, since it less time consuming and “it requires data selection, instead of data collection”; (2) availability, due to the fact that many documents are now in “public domain”; (3) cost-effectiveness; (4) exactness, since the documents contain exact “names, references, and details of events”; and (5) coverage, since documents cover “a long span of time, many events and many settings” (Bowen, 2009:31).

Document analysis has “inherent” limitations, such as “insufficient detail”, since certain documents are produced for specific purpose, and since some document collections are not complete it suggests “biased selectivity” (Bowen, 2009:31-32).

To get an answer to the first research question “How does the Local Building Culture approach support local adaptive capacity to climate change?”, the following documents are analyzed Table 3.2.:

Documents selected	Data Analysed	Type of document
Joffroy, T. et al., (2014). Reconstruire Haïti après le séisme de janvier 2010: réduction des risques, cultures constructives et développement local. CRAterre.	Context of the project; Methodology of the project; Philosophy behind the approach; Objectives and results that are reached; Results of the on-site implemented projects;	Technical publication on the project – Publication is translated in English language
Caimi, A. et al.,(2013). Traditional and scientific knowledge for a sustainable vulnerability reduction of rural housing in Haiti. In P. J. S. Cruz (Ed.), Structures and architecture: concepts, applications and challenges.	Context of the project; Methodology of the project; Philosophy behind the approach; Objectives and results that are reached;	Academic article
Joffroy, T., and Garnier, P. (2015). Local building cultures valued to better contribute to housing reconstruction programs. In M. Correia, P. B. Lourenço, and H. Varum (Eds.), Seismic retrofitting: learning from vernacular architecture : Seismic-V : Vernacular Seismic Culture in Portugal	Context of the project; Methodology of the project; Philosophy behind the approach; Objectives and results that are reached;	Academic article

Table 3.2. Data analysed for the first research question on evaluating LBC approach

Source: Author

The documents that are analyzed, Table 3.2., represent the synthesis of the project results that is implemented in Haiti, after the heavy earthquake in 2010.

The analyzed project in Haiti is chosen as the biggest in scale and impact, which is implemented under the LBC approach methodology. The whole reconstruction

programme lasted from 2010 until 2014. The collected data are in detail presented in the Chapter 4.

Since the document analysis on LBC approach are dealing with the one specific single case study project in Haiti, certain method of data analysis from the case study research design are used to gather information from the documents.

The document analysis of a publication on a reconstruction of Haiti included description of eight implemented projects. The analogy of this analysis can be made with the Yin's, R. K., (2014) "embedded case study" research design, where "the same single-case study may involve units of analysis at more than one level" (Yin's, R. K., 2014:78). According to Yin, R. K., (2014) this method is used in an "evaluation study" (Yin's, R. K., 2014:79). The attention in this research method is on subunits (Figure 3.1.). The analysis of the eight implemented projects in Haiti provided general conclusion on LBC approach, which are organized within descriptive LAC framework.

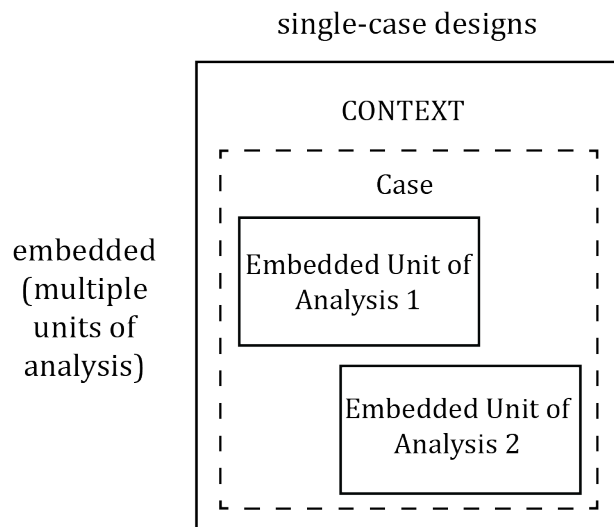


Figure 2.5. *Embedded case study*

Source: (Yin's, R. K., (2014:79).

The broad guiding questions, based on the LAC framework characteristics are defined in Table 3.3. These questions are used to organize the secondary data acquired from the documents in Table 3.2.:

LAC characteristic	Broad guiding questions
Asset base	Which tangible and intangible assets LBC approach provided during the reconstruction project in Haiti?
Institutions and entitlements	How did institutions provide access to the asset base?
Knowledge and Information	How knowledge and information were collected and disseminated?
Innovation	What was innovative in the LBC approach?
Flexible and forward looking decision-making and governance	How did LBC approach contribute to the flexibility of governance and decision-making?

Table 3.3. Broad guiding questions for data analysis, based on LAC framework
Source: Author

The secondary data that are collected through document analysis Table 3.2. are organized according to the descriptive LAC framework. The results are presented in the Findings of Chapter 4. This method of analyzing data corresponds with the Yin's, R. K., (2014) method of "developing a case description...according to some descriptive framework" as a part of case study research design (Yin's, R. K., 2014:158).

The sub-question of the first research question: "How these findings shape the Local Adaptive Capacity framework?" focus on the relations among adaptive capacity determinants that are defined based on the data collected in the first research question. The sub-research question derives from the research question, as the logical result of applying LAC framework.

The second research question: "Does the Local Building Culture approach correspond to the objectives of Community-based Adaptation?" is answered by analyzing the following documents in the Table 3.4. and Table 3.5.:

Documents selected	Data Analyzed	Type of document
Reid, H., and Schipper, L. (2014). Upscaling community - based adaptation - An introduction to the edited volume. In Community-based adaptation to climate change: scaling it up. London: Routledge.	Definition, aim, focus and objectives of CBA;	Academic article
Forsyth, T. (2013). Community-based adaptation: a review of past and future challenges: Community-based adaptation. Wiley Interdisciplinary Reviews: Climate Change, 4(5), 439-446.	Definition, aim, focus and objectives of CBA;	Academic article
Ensor, J., and Berger, R. (2009). Community-based adaptation and culture in theory and practice. In W. N. Adger, I. Lorenzoni, and K. L. O'Brien (Eds.), Adapting to climate change thresholds, values, governance, 227 - 239. Cambridge; New York: Cambridge University Press.	Definition, aim, focus and objectives of CBA; CBA as an action research approach; CBA promotes understanding among culture and adaptation;	Academic article

Table 3.4. Data analyzed to understand Community-based Adaptation objectives
Source: Author

Documents selected	Data Analyzed	Type of document
Caimi, A. (2015). Assessing local building cultures for resilience and development. CRAterre.	Definition, aim, focus and objectives of LBC;	Practical aidebook
Joffroy, T., and Garnier, P. (2015). Local building cultures valued to better contribute to housing reconstruction programs. In M. Correia, P. B. Lourenço, and H. Varum (Eds.), Seismic retrofitting: learning from vernacular architecture : Seismic-V : Vernacular Seismic Culture in Portugal	Definition, aim, focus and objectives of LBC;	Academic article
Moles, O., and Caimi, A. (n.d.). Disaster Risk Reduction Through Local Knowledge And Capacities Enhancement. Retrieved from https://www.researchgate.net/profile/Annalisa_Caimi/	Definition, aim, focus and objectives of LBC;	Academic article

Table 3.5. Data analyzed to understand Local Building Culture approach objectives

Source: Author

The collected data on CBA and LBC is evaluated in the Findings of Chapter 4.

3.5. Limitations and strengths of the research

Field research – During the internship of five months it was not possible to organize field trip and conduct the field research on the impact of the project in Haiti on community’s adaptive capacity. The fieldwork would provide primary data and influence the research viability.

The case project in Haiti – The case study of the reconstruction of Haiti is chosen due to its scale and impact. The project is not labeled as “adaptation to climate change”, it is implemented in the post-earthquake context, focusing on the long term

habitat resilience and vulnerability reduction. However, the comprehensive approach of Local Building Culture that is applied in Haiti, through multiple on-site projects, provides enough material to conduct document analysis and apply the described method of research, and get understanding on the impact of LBC to LAC.

Research methodology – As written above, document analysis as research method has inherent limitations, and it is usually complemented with the other qualitative methods. The research findings show that the collected data with the document analysis is suitable to get an answer to the research question. The descriptive LAC framework, according to which Findings are organized, required synthesized results of the project in Haiti, which analyzed documents provided. The authors such as Ludi et al., (2014) and Berger et al., (2014), conducted the similar research, applying LAC framework, with the aim to recognize how wider development approaches contribute to the adaptive capacity.

It implies that, due to the research time limitations, and the broad scope of adaptive capacity determinants in the LAC framework, documents analysis as qualitative method of research, is chosen over the case study research design. The collected data on the project results in Haiti served as data to evaluate LBC approach with the LAC framework.

Technical issues – during the internship there were certain technical delays in translating analyzed documents from French to English language. This delayed the work on the thesis, and reduced the time for more thorough analysis of the case study.

Time – the questions of climate change adaptation and adaptive capacity require observation on a long term. Five months of internship during which the thesis was done, are just a starting point for a discussion on the impact of LBC approach to the local adaptive capacity to climate change.

Strengths – The CRAterre institute applies the Local Building Culture approach in last two decades. This is the first time start that the approach is evaluated in the context of climate change adaptation and adaptive capacity. The research can be replicated on the numerous projects that CRAterre implemented, to enhance the results. Also, the results of this research can be used as a guideline for the future projects dealing with the climate change adaptation.

Chapter 4: Findings and Analysis

4.1. Part I - Document analysis: Reconstruction project in Haiti

The analyzed data provide an understanding of the context, methodology of the approach, objectives and results of the implemented projects in Haiti.

The answers to the research questions are presented in the Findings of Chapter 4. The qualitative description of the answers is followed by the visual schemes, which derive from the collected data analysis.

4.1.1. Analysis of the Context

In January 2010 the earthquake of magnitude 7.0 heavily hit Haiti's capital Port-au-Prince, as well as other towns (Leogane, Jacmel, Petit Goave) and peri-urban and rural areas. Three million people were rattled, out of which almost 1.5 million people became homeless or displaced, with over 300 000 casualties and almost equal number of injured (Caimi et al., 2013; Joffroy et al., 2014; Joffroy and Garnier, 2015).

The high impact is a result of a high earthquake magnitude and existing vulnerability in Haiti, deriving from the "high human density, fragile buildings, non-compliance to construction rules, poverty and a «deconstructed» society, etc" (Joffroy and Garnier, 2015:51).

Regular hurricane seasons in Haiti disrupt development processes and negate efforts toward reducing people's vulnerability. The country is ranked as one of the poorest in the world, and in this case being faced with heavy hazard it required an international assistance and support in rebuilding process (Joffroy et al., 2014; Joffroy and Garnier, 2015).

This was the background upon which CRAterre started to work on a reconstruction project in Haiti, with a different international and national organizations, conducting basic and applied research (Joffroy et al., 2014; Joffroy and Garnier, 2015).

The main project supporters in reconstruction were Misereor (German Catholic Development Assistance Organization) and Caritas France. Network of partners expanded, after an initial success in rural areas, with the NGO platforms PADED (Agro-ecological and Sustainable Development Platform) from Haiti. The French National Research Agency (ANR) supported research projects, which contributed to

the understanding of social and technical approaches of reconstruction and prevention practices in Haiti, acquiring larger picture on the context processes (Joffroy et al., 2014; Joffroy and Garnier, 2015).

4.1.2. Reconstruction projects in Haiti

The reconstruction programme consisted of the research project implemented in Haiti and France, and multiple on-site rebuilding projects, supported by the Misereor and Caritas France, through the local NGOs. Here is the brief description and results of the main projects.

'ReparH' research project

Research project "ReparH", supported by the French National Research Agency (ANR), started in July 2010, following the earthquake in January. The project developed in parallel with the filed projects of the PADED platform supported by the Misereor (Joffroy et al., 2014).

The research was based in France and in Haiti, gathering partners around CRATERE research laboratory, such as: AE&CC research unit of the National School of Architecture of Grenoble, 3S-R laboratory of Joseph Fourier University in Grenoble, and GADRU. Other partners, which implemented reconstruction programmes were also included in the research process (Joffroy et al., 2014).

General goal of the project was the reconstruction of 5000 houses in rural and peri-urban areas. Specific goal was to develop a methodology for the analysis of the local building cultures. This methodology would help to understand better the context and guide the process in defining operational and technical principles of the interventions. The interventions would help to reduce local vulnerability and strengthen local abilities and capacities (Joffroy et al., 2014).

Research in Haiti focused on the analyses of the local building cultures in rural and peri-urban areas. In these areas people are using geographically diverse traditional techniques of building. This is a result of the poorly developed road infrastructure, which makes hard to transport concrete and steel materials for the construction (Caimi et al., 2013).

Developing research in this context brought an idea, which is to "...reproduce the intelligent building methods identified during surveys..."(Caimi et al., 2013:1811), and improve their features. This idea resulted in multiple pilot houses being

developed, with low financial means and with the “respect of local cultures and seismic resistant performances”(Caimi et al., 2013:1811).

Apart from documenting local building cultures, project identified decision-making process in local contexts. The assessment included “technical aspects (hurricane and earthquake resistance) and social aspects (lifestyle, organization of production, existing know-how, etc.)” (Joffroy et al., 2014:18).

The research had iterative approach with several phases: “inventories and studies, hypotheses, modeling, experimentation, evaluation and validation, and finally valorization of results which included 2PhD thesis and media presentation of the project to the general public” (Joffroy et al., 2014:18). The research results were disseminated in Haiti through numerous seminars, workshops and trainings of trainers.

With this approach two objectives are achieved. First set of methods is developed to support the process of identification of the traditional building practices and expertise. Second, these practices were supported and promoted by the local organizations, which provided their sustainable integration in the reconstruction projects and enabled local stakeholders to develop the skills needed to conduct analysis by them selves (Joffroy et al., 2014).

Part of the “ReparH” research project was a seismic study of wood-frame construction elements, with the goal to provide scientific proof for the building structures that are proposed for the reconstruction projects. The proofs are provided from the technical, as well as the social perspective, focusing on the protective features of the structures. The study was conducted in France, on a vibrating table, which simulated the earthquake, and the results proved the high resistance of the proposed construction elements (Joffroy et al., 2014).

EPPMPH project

Supported by the PADED platform, local organization EPPMPH implemented a project on reconstruction and repair of rural housing in different places in Haiti. The project had two phases from 2010 to 2014 (Joffroy et al., 2014).

EPPMPH is the organization, which exists for 20 years in Haiti, encouraging ecological agriculture and gathering many farming associations and families from the mountain areas (Joffroy et al., 2014).

The project started with the analysis of local building cultures. Along with the analysis there was an on going process of strengthening local capacity and improving traditional construction systems. First pilot project house was finished in the April 2010, followed by the numerous campaigns on promoting the traditional way of building, in order to convince other local organizations to use the same practice (Joffroy et al., 2014).

By the end of the first phase of the project in 2012, 172 families repaired their houses, receiving low financial subsidy of \$2,580 per family. The families were organized in Kombits, traditional way of social organization, by the facilitators who were trusted by local population. Kombits out of six families were stockpiling the material for the houses (water, sand, stone, earth, palm battens and fibres) and transporting them through the trails of the mountains, since there was a lack of road infrastructure in remote areas (Joffroy et al., 2014).

During first phase of the project local people managed to build an earthquake resistant house. Five local artisans became supervisors on all construction sites, and they were able to pass the knowledge and train other locals, which resulted in total of 76 artisans trained on-site. The consultant and engineer from the supporting partners Misereor and EPPMPH validated their knowledge (Joffroy et al., 2014).

Second phase of the project focused on a more isolated and inaccessible areas. Project facilitators organized workshops and offered knowledge and expertise to the locals to rebuild their own homes with local resources. This resulted in less imported materials, but the project involved more skilled workers (Joffroy et al., 2014).

By the end of the second phase in 2014, 253 families improved their livelihood, where 183 families constructed new house, 36 families repaired the old one, while 12 families decided to invest subsidies in the water tanks and rainwater recovery systems. The resources that have been provided by the facilitators, like mules who were used for the transportation of the materials, were left in the community for a benefit of all (Joffroy et al., 2014).

Alongside the project there was an on going communication with other projects implemented by the Concert-Action, Gadru, and ENH-Presten, through the steering committee of the PADED platform, which provided technical and strategic exchange (Joffroy et al., 2014).

ENH-PRESTEN project

ENH-Presten is the community-based organization in Haiti, focusing on the support of local farming families in improving their living conditions. The organization works in the contexts where the protection and revitalization of soils is needed due to the erosion and water runoff. Misereor has been supporting ENH-Presten for over 20 years in the projects dealing with the anti erosion systems, replanting, reforestation and income generating activities. All these projects require daily activities and strong and trustful relation with the local communities (Joffroy et al., 2014).

Following the earthquake in Haiti in January 2010, ENH-Presten accepted to support 215 families in the rebuilding and rehabilitation project in Belle Fontaine, Haiti. Facilitators provided certain materials for the houses reconstruction and the families have been organized into Kombits, a traditional way of organization based on mutual assistance and solidarity. Each Family needed to plant hundred trees and contribute to the reforestation, due to the fact that traditional building practices require a lot of lumber (Joffroy et al., 2014).

Areas where ENH-Presten had interventions required different techniques of construction. All of them were based on local building cultures, and designed to adapt to a variety of locally available resources and environmental conditions. The aim was to enable reproducibility of the intervention, and with the coaching programmes to empower local people to reduce their vulnerability by themselves (Joffroy et al., 2014).

GADRU project

GADRU is the organization based in Haiti, operating in agro-ecology in Central and Northern regions. The organization has experience with local building cultures, since they participated in the project based on locally-sources adobe and wattle, in 2002. The CRAterre and Misereor supported the project (Joffroy et al., 2014).

After the earthquake in 2010, GADRU became more involved in the programmes of reconstruction. Their goal was to revive local building cultures and strengthen farmers' capacities in order to provide improved and sustainable rural housing (Joffroy et al., 2014).

Co-construction and rural housing rehabilitation project were part of the wider agro-forestry programme, integrating reforestation and cultivation of timber useful in carpentry and joinery (Joffroy et al., 2014).

GADRU's organization philosophy is to provide decent housing to the farmers' families, which would help them to combat poverty. Their approach is empowering people in solving their own problems, helping them to reduce vulnerability, respecting their dignity and local culture and expertise. Their support is also in improving traditional building techniques (Joffroy et al., 2014).

During the first phase of the project 175 house were rebuilt, sixty local masons and carpenters and 4 foremen were trained in wood, stone, lime and raw earth construction techniques. The project demonstrated the success of the Kombits. Promoting and awareness campaigns were part of the programme, which enabled the acceptance of the proposed intervention (Joffroy et al., 2014).

Challenges followed the implementation of the project. Access to water was the major issue, with lack of infrastructure for proper transport. Timber was transported on foot, which made it more difficult and time consuming for the whole community. Coaching of the locals who did not have experience in construction required daily supervision (Joffroy et al., 2014).

CONCERT-ACTION project

Concert-Action is another locally based organization, which had projects focusing on the agro-ecological reforestation and soil protection programmes before entering the reconstruction after the earthquake. The areas where Concert-Action intervened were affected the most (Joffroy et al., 2014).

During the first phase of the project Concert-Action organized four workshops where 44 local artisans, 2 foremen and 2 engineers were trained. They followed the families organized in Kombits for a reconstruction of 95 houses, planned in the first phase of the project. The context was specific due to exposure of tropical storms, and the reconstruction of the homes required roof protection from four sides, and reinforced timber structure. The access to the transport was difficult, due to the low quality infrastructure. The challenges were overcome as a result of a strong collaborative work with communities (Joffroy et al., 2014).

The second phase of the project in 2014 started with reflection on the lessons learned from the previous work. The phase aimed to assist the 100 families through

mutual-aid process. All the families got involved in building community spirit through the social organization and reforestation of plots. There was a special attention on enforcing the local economy based on the local timber industry. More than half of the beneficiaries decided to rebuild their homes, than building new ones (Joffroy et al., 2014).

VEDEK project

The VEDEK is the locally based organization focusing on delivering bright future to an area in Haiti called Cap – Rouge. The project included reconstruction of 100 houses and 20 water tanks. It was implemented in different stages. First stage delivered analysis of the local building cultures, their values, strengths and weaknesses. In the second stage technical and economic capacity of local people was analyzed. Also, some technical improvements were designed improve the existing structures in the face of the upcoming disasters. In the third stage of the project different implementation strategies were discussed with local population (Joffroy et al., 2014).

The families were supported by the \$700 per family of direct assistance, while the total cost of the house reconstruction per family was \$2000 Local people reinvested the subsidies in making their houses more resistant and safe (Joffroy et al., 2014).

EdM – ‘Entrepreneurs du Monde’ project

The ‘Entrepreneurs du Monde’ is the organization that focuses on improving living conditions of the vulnerable groups by setting up the development assistance and social micro-finance projects. In Haiti EdM established a programme with CRAterre in 2011, which reuses debris from the earthquake. The programme introduced recycling in a building process adapted to the urban context. The goal was to support local building culture and create sustainable techniques for a construction of the wood frame using debris (Joffroy et al., 2014).

In May 2012 the Ministry of Public Works, Transport and Communication (MTPTC) certified the EdM method of construction, after which the technology was widely accepted. All the houses that have been built by the EdM were resistant to the afterward hurricane and tropical storm in 2012 (Joffroy et al., 2014).

During the project EdM supported and trained the local artisans in construction. More than 50 artisans received their validated certificate for the skills that they

acquired. After the training process EdM backed artisans in creating their own companies and associations (Joffroy et al., 2014).

The EdM project was in line with the environmental protection and the promotion of local knowledge. It has been organized around several complementary components: environmental, technical, socio-cultural and economic (Joffroy et al., 2014).

UN Habitat training programme

UN Habitat in collaboration with the Atelier-école de Jacmel, with support of Spanish, Canadian, Netherlands and International Red Cross, and Red Crescent, implemented a training programme from 2013 to 2015.

The overall objective of the programme was to build the training capacity of the partner institutions in the field of local building cultures. The programme aimed to train large number of artisans and raise awareness of the public to the importance of traditional practices (Joffroy et al., 2014).

The specific objectives was to develop a teaching module in Atelier-école de Jacmel, based on local building cultures and traditional construction techniques and to strengthen technical capacity of Atelier-école de Jacmel to conduct the proposed teaching module (Joffroy et al., 2014).

The educational kit included context specific courses on building cultures, information sheets disseminated by the trainers and illustrative presentations of building techniques that supported courses (Joffroy et al., 2014).

4.1.3. Philosophy and approach of the reconstruction of Haiti

Starting point was to follow the sustainable development pillars, and include social, environmental, economic and cultural aspects into reconstruction process, with the main idea to enlarge the benefits of intervention among local population, by “allowing them to reach a better level of resilience (techniques within their means) and offer living conditions adapted to the diversity of environments, ways of life and their specificities, including artistic expression, which is omnipresent in Haiti” (Joffroy et al., 2014:12).

The philosophy behind the idea “was based on the valorisation of traditional Building Cultures and the principles of ownership, scalability and large-scale

reproducibility” (Joffroy et al., 2014:12). This resulted in diverse and varying site interventions and technical proposals depending on the characteristics of an area. Traditional social organization of Haiti people, called Kombits, based on solidarity and assistance among neighbors, was accepted as a model for gathering communities around the reconstruction programme (Joffroy et al., 2014).

4.1.4. Methodology of the analysis of the local building cultures

Starting point for the assessment of local building cultures in Haiti was the notion that traditional houses are effective against the natural disasters. However, the knowledge is not recognized and valued by the construction actors, as a result of inadequate scientific evidence. This brought together partners from France, CRAterre and 3SR, who started working with local organizations, which already applied projects based on the traditional construction practices (Caimi et al., 2013).

The qualitative method that has been developed for the analysis of local building cultures aims to understand the weaknesses and needs of technical and taught knowledge and operational field work. The method includes “the analysis of built structures, life-styles and resources present in situ” (Caimi et al., 2013:1807), while focusing on four main subjects, such as: natural and built environment, local know-how and local resources.

Natural environment involves the study on physical, climatic, morphological and geological characteristics of a territory. The built environment analysis focuses on the technologies and materials used in realization of the buildings, with its architectural aspects as a result of the “needs, aspirations and activities of their users” (Joffroy and Garnier, 2015:52). Local know-how and knowledge of a community is a collection of experiences, information and understandings on a specific life challenges. Local resources, tangible and intangible, comprise the ability of people to respond to disasters, “including materials, means and capacities for the implementation and development of built environments” (Caimi et al., 2013; Joffroy and Garnier, 2015:52).

Methodology is established on a participatory approach. Actively involved local communities and stakeholders contribute to the collection and verification of data. Also, the methodology is flexible and adaptable to different local contexts. The implementation process is organized in phases, which comprises “group meetings, individual interviews, the detailed analysis of constructions and direct observations...” (Caimi et al., 2013:1808). This improves validity of data, as they are collected from multiple sources (Caimi et al., 2013).

The analysis brought various results. Study of the built environment and architecture identified “specific architectural and building characteristics of dwellings and the lifestyles of their dwellers”. Individual interviews helped “to understand the factors influencing design, implementation and evolution processes of the built environment as well as the common practices and specific measures linked to vulnerability reduction and risk preparedness”(Caimi et al., 2013:1808).

4.2. Findings

The findings on the reconstruction project in Haiti are organized on the basis of five adaptive capacity determinants of LAC framework. The Figure 4.1. is a visual representation of the collected data.

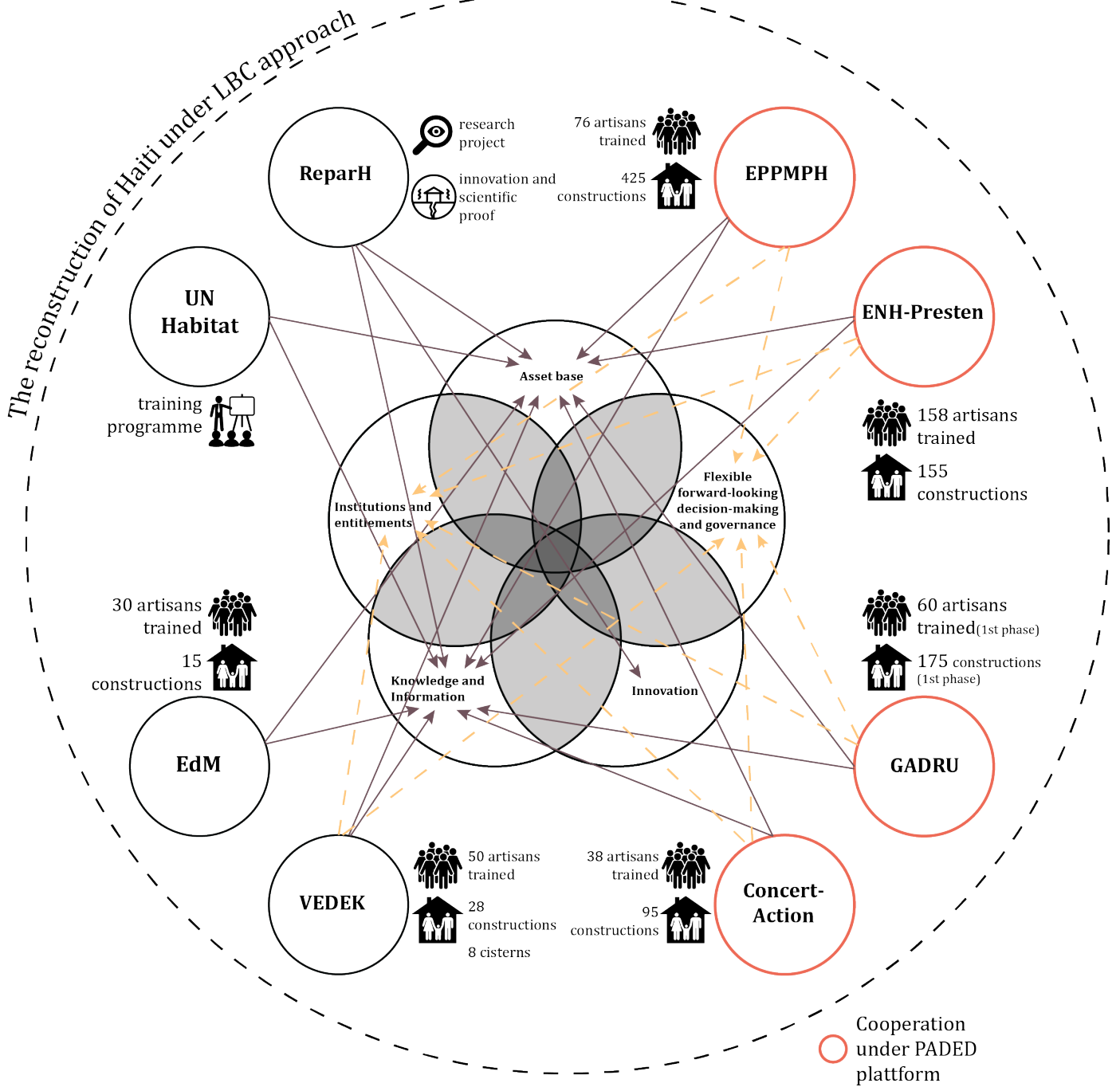


Figure 4.1. Visual presentation of collected data on the reconstruction project in Haiti
Source: Author

4.2.1. Asset base

The disrupted vulnerable context of Haiti after the earthquake required an immediate intervention. Access to the basic livelihood assets was rattled. Looking at the intangible assets, human and social, the reconstruction project in Haiti provided better access to the local knowledge and expertise, a communities' ownership over the whole project cycle, a dignity to the local people by respecting their culture, lifestyle, and social practices.

The results of the implemented projects in Haiti are tangible and measurable. Around 3000 houses were reconstructed or newly built. Also, the wide acceptance of the local building cultures approach brought an indirect effect of another 1000 basic housing models, expecting that the number will rise (Joffroy and Garnier, 2015).

As part of the research and investigative project "ReparH", assessing vernacular buildings and traditional skills in construction, contributed to the improvement of the technical and methodological solutions, implemented by the local partners. Also, it created an enabling environment for the local stakeholders, where they developed skills for conducting surveys and assessments on the existing structures, by themselves. These surveys can be applied for the future risk reduction interventions (Caimi et al., 2013, Joffroy and Garnier, 2015), which illustrates the long-term nature of the project.

In the center of the projects were people and their needs. Respecting traditional way of social organization, based on the solidarity and mutual assistance, the Kombits, eased the construction in remote areas and helped the reforestation projects, thus reaching social and environmental sustainability (Joffroy and Garnier, 2015).

The enabling environment created around the local building cultures improved economic situation. The building cost of the basic house unit was "very reasonable" (Joffroy and Garnier, 2015:55). Involving local population and experts enabled them to participate in income generating activities (Joffroy and Garnier, 2015).

The modular character of the house models enabled people to build additional rooms, according to their needs and capacities, which created opportunities for people to expand their houses and improve their livelihood.

Using traditional way of building houses maximized usage of local materials, such as stone, sand, wood and earth. This provided access to the tangible assets, which

enabled people to be deeply involved in the building process. Using local materials had several advantages: (1) affordability – as the local materials were collected near building sites, cheap, without heavy transport; (2) access to resources – the supply sites for materials were far away from the intervention sites; (3) accessibility and technical reproducibility – the usage of local materials often include use of local expertise in areas of intervention (Joffroy et al., 2014:55).

4.2.2. Institutions and entitlements

Necessary context analysis at the beginning of the reconstruction in Haiti made possible the pilot projects, with the experimental construction. This convinced local stakeholders in the quality of the construction, and identified the weaknesses and needs for the adjustments (Joffroy and Garnier, 2015).

Trainings and awareness campaigns helped to reduce initial skepticism about the LBC approach. Being able to acquire knowledge on the local intelligence of construction techniques and get certificate, made people proud for being part of the project. Also, it empowered them to build their own houses, and pass the knowledge. Training programme under the support of UN Habitat and Atelier-école de Jacmel, educated seven organizations, which are now able to conduct similar activities and train professionals. This raise the capacity of the local organizations in Haiti, where there is a need to mainstream sustainable practices (Joffroy et al., 2014).

Tangible results were thus achieved, not only in terms of reconstruction and rehabilitation and the social integration of projects, but also in terms of building standards and the reinforcement of technical and institutional capacities (Joffroy et al., 2014:14).

The on-site projects were implemented by the local organizations. These organizations were already established in the focusing areas for many years, with the strong local networks and trustful ties with the people. This eased the operational part of the projects, where community members were accepting traditional ways of building as the appropriate one.

Four local organizations were organized under the PADED platform (Figure 4.1.). Through steering committee the organization had regular communication, which provided technical and strategic exchange.

As written in the literature review, institutions enhance adaptive capacity by providing asset distribution, and fostering participation among local stakeholders in decision-making process. The local organizations through multiple workshops and seminars empowered local communities to take the ownership over the reconstruction process, and giving them chance to be heard. Using LBC approach local organizations provided equitable access to the local resources. These activities enhanced the local capacity within the communities.

Following the Jones et. al. (2010) description on institutions and entitlements, local organizations supported and integrated in the reconstruction process local “belief systems, behavior and organizational structure” (Jones et al., 2010:5).

4.2.3. Knowledge and Information

Scientific knowledge, based on the local know-how and expertise, represent crucial determinant that enabled efficient implementation of the LBC approach.

As written in the analysis, the research project in Haiti was based on the lack of awareness of the local construction stakeholders about the effective features of the traditional buildings for the prevention of natural disasters. This is a result of the absence of scientific data (Caimi et al., 2013).

For this purpose the qualitative methodology is developed, which aimed to give understanding of the weaknesses and needs of technical and taught knowledge and operational fieldwork.

The research and investigative project “ReparH” provided scientific knowledge, based on the local know-how and expertise. The research had iterative approach with several phases: “inventories and studies, hypotheses, modeling, experimentation, evaluation and validation” (Joffroy et al., 2014:18).

Methodology is established on a participatory approach, where actively involved local communities and stakeholders contribute to the collection and verification of data. Also, the methodology is flexible and adaptable to different local contexts. Through different workshops, seminars and training programmes the validity of data is improved. The initial success of pilot projects persuaded skeptical organizations to accept LBC methodology in a process of reconstruction.

Main training programmes implemented by the UN-Habitat and Atelier-école de Jacmel trained seven organizations, which are now able to continue disseminating sustainable practices and conduct similar actions (Joffroy and Garnier, 2015).

The assessment of the built environment in Haiti provided not only data on buildings and architecture, but also ways on how knowledge is collected and disseminated among people. Individual interviews helped “to understand the factors influencing design, implementation and evolution processes of the built environment as well as the common practices and specific measures linked to vulnerability reduction and risk preparedness”(Caimi et al., 2013:1808).

Through trainings, workshops and seminars relevant information about reconstruction is disseminated among people. This relates to the intangible assets that enable people to react in disaster contexts. The dialogue and discussion about traditional ways of building are crucial for the success of the approach. The network of local organization provided enhanced ‘informal’ way of gathering and sharing knowledge, and ‘ReparH’ research project improved ‘informal’ knowledge with a ‘formal’ scientific approach.

4.2.4. Innovation

The research and investigative project “ReparH” provided innovation in the methodology of approach and technical proofs on resistance of the proposed constructive elements.

Innovation and technical improvements of the constructive elements brought their better behavior in the face of: earthquake, cyclones and floods, and better aging performances (Joffroy et al., 2014:54).

The modular and flexible character of the proposed housing models enabled that every house is adequately situated to the geographical context respecting the identity of the place. Also, housing models could meet the needs and capacities of local people.

Research in Haiti included numerical modeling, a software calculation on a vibrating table. The behavior of constructive models was tested. The results of the test proved the resistance of the proposed construction elements on a simulated earthquake, with higher magnitude than the one happened in January 2010 (Joffroy et al., 2014).

In the Haiti project the innovation was at the micro scale, which corresponds with the Jones et al., (2010) argument that the innovation is not only about the “large scale” innovation, but also includes “micro-level initiatives”, since many adaptive

activities to the changing environment is done “spontaneously or autonomously at the local level” (Jones et al., 2010:6).

4.2.5. Flexible, forward-looking decision-making and governance

This determinant of adaptive capacity focus on the adaptive governance, and its ability to transparently lead the recovery process, with informed decision-making, thus provide efficient response for upcoming changes.

The international partners were supportive to the forward-looking local organizations to incorporate relevant knowledge, methods and tools of the LBC approach to the interventions.

As written above, part of the assessment of LBC is the analysis of local decision-making process, upon which intervention are developed. The local organizations that are established in the intervention areas supported existing trustful relations with local people, and created enabling environment to support adaptive capacity.

The major breakthrough for the LBC approach was the certification by the Ministry of Public Works of Haiti (MTPTC), which encouraged “local partners and actors on the capacity of the construction systems developed to withstand hazards” (Joffroy and Garnier, 2015:55). This illustrated the flexibility of an public institution toward sustainable approaches, based on local knowledge.

4.3. How these findings contribute to the LAC framework?

Based on the findings collected on the reconstruction project in Haiti, implementing the Local Building Culture approach provides supportive relations among determinants of adaptive capacity (Figure 4.2.).

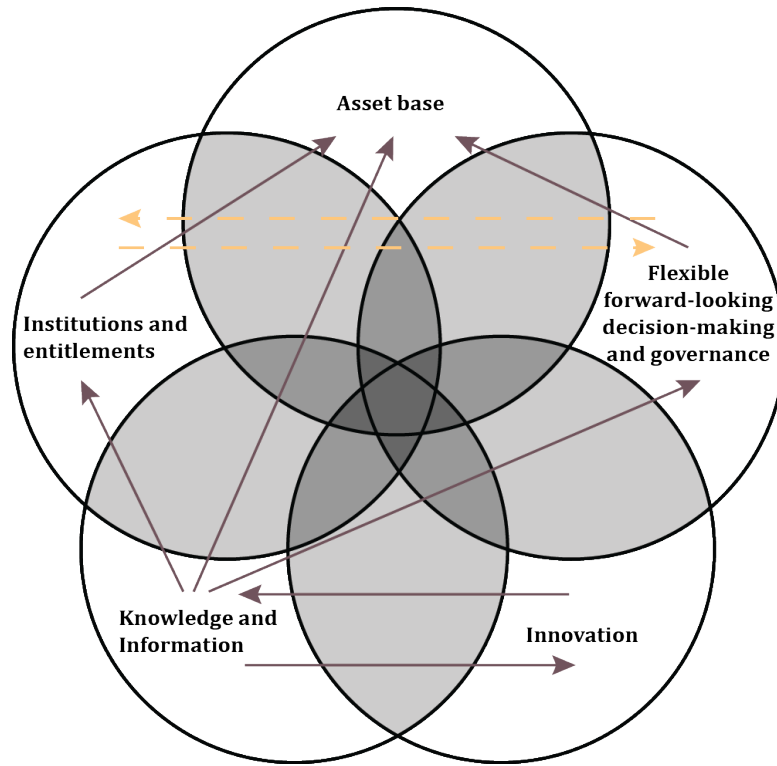


Figure 4.2. Visual presentation of established relations among adaptive capacity determinants
Source: Author

Assets base are strongly associated with the knowledge and information. For the LBC approach knowledge and information are crucial to reach the efficiency. Using scientific knowledge to provide methods and tools for assessing local know-how and expertise is essential to create enabling environment for the local stakeholders to apply this method. Assessing local know-how also recognizes its weaknesses and improves technical solutions.

In this sense, provision of intangible and tangible assets in the LBC approach strongly depends on the assessed knowledge and collected information.

The knowledge and information are linked with the innovation. As described, innovative solutions provided scientific proof, which improved existing knowledge on the traditional ways of building. This relation is mutual, as the 'micro-scale' innovation depends on the locally available knowledge and expertise.

The findings also show that the categories institutions and flexible decision-making and governance depended on the provided knowledge and information on the LBC

methodology. Institutions as a determinant of local adaptive capacity were supported by the knowledge and information. The scientific proofs and initial success of the LBC approach convinced the local organizations to accept this method in their interventions. Using their established social relations, local organizations involved communities in the reconstruction process, and created enabling environment to meet their needs. Local organizations were flexible, leading transparent decision-making process where communities' cultural practices were supported. Flexibility of the public institutions is recognized as the Ministry of Public Works of Haiti certified the LBC approach. The flexibility is a result of the provided scientific and practical proofs that LBC solutions are appropriate.

The institutions and flexible decision-making and governance as determinants have mutual relations, as in this case both rely on the knowledge and information in creating an supportive environment for the intangible and tangible asset base access.

4.4. Part II – Does the Local Building Culture approach correspond to the objectives of the Community-based Adaptation?

4.4.1. Analysis

The document analysis on the two community-based approaches, CBA and LBC is presented in the literature review. This data are used for the findings on the second research question.

4.4.2. Findings

Community-based Adaptation and Local Building Culture approach are both community-based approaches. These two approaches are based on the assumption that local communities have knowledge and skills and inherent capacity to reduce their vulnerability and increase resilience.

The local people are in the center of these approaches. The approaches aim to create an enabling environment, where local people create their own responses and processes to development challenges. The approaches are deeply rooted in the community practices and ways of living, thus respecting their beliefs and culture. Both approaches are strongly supporting changes within, asking the crucial questions why and with what knowledge is something done, thus empowering local communities and enhancing their capacity to change.

CBA and LBA are both action research approaches, CBA to the climate change impacts on the livelihood, while LBC to the habitat resilience and quality of living space.

Based on the findings, CBA gives an understanding between culture and adaptation. In this sense, since the Local Building Culture approach deals with the culture of traditional ways of building, it implies that LBC approach provides an understanding of the relationship of culture and adaptation in the context of habitat resilience and housing development.

It implies that the LBC approach can be appropriated as the Community-based Adaptation intervention.

However, researchers note that simple relabeling of the development intervention is not good for the practice of CBA. Findings show that many projects were labeled as CBA, even though they were not contributing to the climate change adaptation. According to Reid and Schipper (2014), this practice should be avoided as it makes hard to distinct the good and bad CBA practice, and what CBA is and what is not.

In the case of reconstruction project in Haiti, the intervention is in the post-earthquake context. Following the conducted activities in Haiti, the LBC approach corresponds to the objectives of CBA, but since it is not responding to climate stimuli, it cannot be called Community-based adaptation intervention.

Chapter 5: Discussion and conclusion

5.1. Conclusions on the research questions

The expected results of the research are to recognize the positive effects of the LBC approach to the local adaptive capacity to climate change. As the findings show, the initial hypothesis is confirmed. LBC as a community-based approach, that relies on local know-how and active community participation, in process of reaching habitat resilience, positively impacts the adaptive capacity to climate change.

The answer to the first research question is based on the relevant document analysis, presented in the Chapter 3, Table 3.2. The collected data on a reconstruction project in Haiti is presented in the analysis of Chapter 4. The data collection is based on the embedded case study model of a research design, where the context of the reconstruction project is in Haiti, but the focus of the analysis is on the implemented on-site projects. Collected data are organized through the descriptive LAC framework, described in the literature review,

Based on the findings, implemented projects in Haiti, support determinants of the local adaptive capacity. As the reconstruction project in Haiti is implemented under the methodology of LBC, it implies that this approach supports local adaptive capacity, by providing equal access to the asset base, relevant knowledge and information on local building cultures, innovation in traditional construction techniques, and flow and flexibility in decision-making process among local and public institutions.

The answer to the sub-question is based on the findings of the first research question. Findings show that in the case of applying LBC approach, certain relations among adaptive capacity determinants emerge. In order to provide access to the key assets, knowledge and information are crucial for the LBC approach. By introducing a comprehensive assessment methodology that relies on scientific and local knowledge, LBC approach provides crucial scientific knowledge and information that persuades skeptical local institutions to accept LBC as a method, and brings recognition in construction field. Knowledge and information are related to the innovation, as LBC approach strongly supports innovation on a local level.

The answer to the second research question is based on the findings from the document analysis presented in Chapter 3, Table 3.4., Table 3.5. Findings show that two community-based approaches, CBA and LBC, put people in the center of their interventions, trying to meet their needs. The goal is to create an enabling

environment where people are able to create an adequate response to their challenges. These findings are important, as the LBC can be associated with the climate change adaptation practice. However, as it is presented in the literature review on the CBA, the development approach that does not respond to climate stimuli should not be labeled as a Community-based Adaptation. In the case of reconstruction project in Haiti, LBC approach was implemented in the post-earthquake context, and even though the objectives of the intervention correspond to the CBA approach, it can no be labeled as such.

The findings of this master thesis are starting point for the research on the effects of the Local Building Culture approach to the local adaptive capacity to climate change. The findings serve as a base for further research inside CRAterre institute. Findings related to the Community-based Adaptation serve as a base for the understanding between LBC and CBA as community-based approaches, and position of the LBC in climate change adaptation practice.

5.2. The importance of research and future recommendations

The literature review shows that the practice of analyzing the impact of development approaches to adaptive capacity to climate change is active. International organizations, which are strongly involved in international development, create their own approaches and frameworks to characterize and measure adaptive capacity to climate change. In this master thesis LAC framework is used as the appropriate one, to analyze the results of LBC project. As the findings show, the importance of this analysis is to guide development approach in creating interventions that support adaptive capacity, which is essential for reaching climate change adaptation global goal.

Future research in the context of LBC approach can focus on defining clear indicators that support local adaptive capacity. This will help the research on characterization of adaptive capacity, since there is no common ground among scholars on this issue. Further research on the impact of climate change to Local Building Cultures, would improve the approach in defining adequate response to climate changes.

5.3. Conclusion

Climate change adaptation will require efforts to be mainstreamed in development. The ongoing practices already have an impact in the field of adaptation, even though interventions are not designed as adaptation. Evaluating how wider development

contribute to adaptive capacity, raises awareness on the climate change problem. Reaching global adaptation goal will require many efforts from the ongoing development practices to respond to challenges on a long term.

Bibliography:

- Adger, W. N., Lorenzoni, I., & O'Brien, K. L. (2009). Adaptation now. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien (Eds.), *Adapting to climate change thresholds, values, governance* (pp. 1 – 22). Cambridge; New York: Cambridge University Press.
- Adger, W. N., & Vincent, K. (2005). Uncertainty in adaptive capacity. *Comptes Rendus Geoscience*, 337(4), 399–410.
- Berger, R., Ensor, J., Wilson, K., Phukan, I., & Dasgupta, S. (2014). Adaptive capacity. In E. L. F. Schipper (Ed.), *Community-based adaptation to climate change: scaling it up* (pp. 22 – 35). London [u.,a.]: Routledge.
- Bowen, G. A. (2009). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*, 9(2), 27–40.
- Caimi, A. (2015). *Assessing local building cultures for resilience & development*. CRAterre.
- Caimi, A., Guillaud, H., Moles, O., Vieux-Champagne, F., Garnier, P., Grange, S., ... Daudeville. (2013). Traditional and scientific knowledge for a sustainable vulnerability reduction of rural housing in Haiti. In P. J. S. Cruz (Ed.), *Structures and architecture: concepts, applications and challenges*.
- du Toit, J. D. (2015). Research design. In E. A. Silva (Ed.), *The Routledge handbook of planning research methods* (pp. 61 – 73). New York: Routledge.
- Ensor, J., & Berger, R. (2009). Community-based adaptation and culture in theory and practice. In W. N. Adger, I. Lorenzoni, & K. L. O'Brien (Eds.), *Adapting to climate change thresholds, values, governance* (pp. 227 – 239). Cambridge; New York: Cambridge University Press.
- Eldis communities. (2016). What is ACCRA?. Retrieved 14 August, 2016, from <http://community.eldis.org/.59d669a8/about.html>
- Forsyth, T. (2013). Community-based adaptation: a review of past and future challenges: Community-based adaptation. *Wiley Interdisciplinary Reviews: Climate Change*, 4(5), 439–446.
- Heltberg, R., Siegel, P. B., & Jorgensen, S. L. (2009). Addressing human vulnerability to climate change: Toward a “no-regrets” approach. *Global Environmental Change*, 19(1), 89–99.

- Huq, S., & Reid, H. (2004). Mainstreaming adaptation in development. *IDS Bulletin*, 35(3), 15–21.
- Joffroy, T., & Garnier, P. (2015). Local building cultures valued to better contribute to housing reconstruction programs. In M. Correia, P. B. Lourenço, & H. Varum (Eds.), *Seismic retrofitting: learning from vernacular architecture : Seismic-V : Vernacular Seismic Culture in Portugal research project funded under the National Research Agency FCT*.
- Joffroy, T., Garnier, P., Douline, A., & Moles, O. (2014). *Reconstruire Haïti après le séisme de janvier 2010: réduction des risques, cultures constructives et développement local*. CRAterre.
- Jones, L. et. al., (2010). Towards a characterization of adaptive capacity: a framework for analyzing adaptive capacity at the local level, Overseas Development Institute.
- IPCC. (2016). Observed changes in climate and their effects. Retrieved 15 August, 2016, from https://www.ipcc.ch/publications_and_data/ar4/syr/en/mains1.html
- Lemos, M. C., Boyd, E., Tompkins, E. L., Osbahr, H., & Liverman, D. (2007). Developing adaptation and adapting development. *Ecology and Society*, 12(2), 26.
- Ludi, E., Wiggins, S., Jones, L., Lofthouse, J., & Levine, S. (2014). Adapting development: how wider development interventions can support adaptive capacity at the community level. In E. L. F. Schipper (Ed.), *Community-based adaptation to climate change: scaling it up* (pp. 36 – 51). London [u.a.]: Routledge.
- Moles, O., & Caimi, A. (2012). DISASTER RISK REDUCTION THROUGH LOCAL KNOWLEDGE AND CAPACITIES ENHANCEMENT. Retrieved from https://www.researchgate.net/profile/Annalisa_Caimi/publication/224953546_Disaster_risk_reduction_through_local_knowledge_and_capacities_enhancement_Local_resources_and_multilevel_cooperation_towards_long-term_prevention_strategies/links/02e7e51a784d27b50f000000.pdf
- NASA. (2016). What's the Difference Between Weather and Climate?. Retrieved 14 August, 2016, from http://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html

- NOAA. (2016). Climate Change and Variability. Retrieved 14 August, 2016, from <https://www.ncdc.noaa.gov/climate-information/climate-change-and-variability>
- Reid, H., & Schipper, L. (2014). Upscaling community - based adaptation - An introduction to the edited volume. In *Community-based adaptation to climate change: scaling it up*. London: Routledge.
- Smit, B., & Pilifosova, O. (2003). Adaptation to climate change in the context of sustainable development and equity. *Sustainable Development*, 8(9), 9.
- Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16(3), 282–292.
- UNFCCC. (2016). Adoption of the Paris agreement. Retrieved 30 June, 2016, from <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- Yin, R. K. (2014). Case study research: Design and methods. Sage publications.