Community-based Adaptation to Climate Change – A Scoping Review of Success Factors, Challenges & Lessons Learnt

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Abstract
There has been growing recognition that local communities possess adequate knowledge, skills, experience and understandings of vulnerabilities and risks associated with their lives and livelihoods, and that this should be included in climate change adaptation (CCA). As a result, community-based adaptation (CBA) is being increasingly implemented as means to adapt to climate change (CC). However, despite the existence of a growing pool of literature on CBA, the overwhelming consensus is that further evidence is required for establishing its efficacy, best practices and lessons learnt. The purpose of this thesis is to contribute to the existing pool of literature by examining CBA's success factors, challenges and lessons learnt. To this end, a scoping review of scientific literature published between 2016-2022 was conducted, complemented by five semi-structured interviews with practitioners. Among others, factors such as local ownership, inclusive participation, enabling governance and institutional collaboration were identified as enhancing the success of CBA, whilst a lack of community cohesiveness, limited funding, and donor restrictions constitute few of the many challenges. The overall findings are in line with previous systematic reviews on CBA and emphasize a requirement for a holistic approach to CC adaptation, enabling and collaborative governance systems, as well as the need for integrated assessment of the roles of social capital.

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Summary

Climate change (CC) is affecting people and ecosystems around the world, frequently causing damages and losses. While some of the damages and losses are irreversible, others may be reversed, and emerging ones potentially prevented through adaptation. Since early 2000s, there has been growing recognition that local communities possess adequate knowledge, skills, experience and understandings of vulnerabilities and risks associated with their lives and livelihoods, and that this should be included in climate change adaptation (CCA). As a result, community-based adaptation (CBA) is being increasingly implemented. CBA refers to approaches to adaptation that are sensitive to local cultures and vulnerabilities, ideally created through participatory engagement, such as community-led risk assessment of CC impacts. Examples of adaptive measures include crop diversification, building walkways, seawalls, water harvesting facilities, reforestation, and awareness raising, among others. Some of the hazards frequently addressed by CBA include storms and floods, coastal erosion, droughts, crop management, and issues with water supply.

Despite the existence of a growing pool of literature on CBA, the overwhelming consensus among scholars is that further evidence is required for establishing CBA's efficacy, best practices and lessons learnt. The purpose of this thesis is to contribute to the existing pool of literature by examining CBA's success factors, challenges and lessons learnt. To this end, a scoping review of scientific literature published between 2016-2022 was conducted, complemented by five semi-structured interviews with practitioners.

The analysis of the thesis presents multiple factors affecting CBA. Many factors identified in the scoping review and interview results are overlapping. Among others, local ownership, inclusive participation, enabling governance and institutional collaboration were identified as factors enhancing the success of CBA, whilst a lack of community cohesiveness, limited funding, power dynamics and donor restrictions constitute some of the challenges. The overall findings are in line with previous systematic reviews on CBA (McNamara & Buggy, 2017; Piggot-McKellar et al., 2019), with a more recent emphasis on the requirement for a holistic approach to climate change adaptation, enabling and collaborative governance systems, as well as the need for integrated assessments of the roles of social capital. Like previous literature, the results of this paper indicate a need for further monitoring and evaluation data, to identify best practices and challenges of CBA. Considering the amount of research and implementation of CBA related projects, a potential question to explore in further research is what inhibits the existence of CBA related data. Another suggestion for further research is exploring community members' perspectives and thoughts about CBA, i.e., identifying success factors and challenges as reported by community members locally.

Abbreviations & Acronyms

CBA - Community-based Adaptation
CC - Climate Change
CCA - Climate Change Adaptation
DRM - Disaster Risk Management
DRR – Disaster Risk Reduction
EbA - Ecosystem-based Adaptation
EWS – Early Warning System
IPCC - The Intergovernmental Panel on Climate Change
M&E - Monitoring and Evaluation
NGO - Non-governmental Organization
IFRC – International Federation of Red Cross and Red Crescent Societies
INGO - International Non-governmental Organization
IPCC - Intergovernmental Panel on Climate Change
IUCN - International Union for Conservation of Nature
NbS – Nature-based Solutions
RQ – Research Question
SIDS – Small Island Developing States
SDG – Sustainable Development Goals
SRC – Swedish Red Cross
UN – United Nations
UNDRR – United Nations Office for Disaster Risk Reduction
UNFCCC - United Nations Framework Convention on Climate Change

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1. Introduction

1.1. Background and Rationale

Climate change (CC) is affecting people, livelihoods, and ecosystems around the world (IPCC, 2022; Scheffers et al., 2016 in Piggot-McKellar et al, 2019). Increasingly recurrent and unexpected weather events, as well as extreme events such as heatwaves, cold waves, and tropical cyclones, among others, are causing severe damage to nature as well as people's lives (IPCC, 2022). The damage and losses caused by CC are evident as transformations throughout all types of ecosystems; terrestrial, freshwater and ocean; species shifts, water scarcity, food production, cities, and infrastructure, as well as human health and wellbeing (ibid.). Some of these damages and losses are irreversible, while others may be reversed, and emerging ones potentially prevented through adaptation.

Adaptation refers to activities aimed at modifying, and regulating, the existing and predicted climate and its related effects (IPCC, 2022). The concept gained prominence when in addition to mitigation, adaptation to CC was recognized as crucial (Betzold, 2015). Adaptation is comprised of different processes and activities that transform behaviour, societal, and technological structures in an adjusting manner to damaging mechanisms of CC (UNFCCC, 2022). The aim of climate change adaptation (CCA) is to increase resilience and enhance adaptative capacities to endure damaging climate-related effects by decreasing vulnerabilities of a system (ibid.). In this light, adaptation is especially important for vulnerable communities which are most affected by the damaging effects of CC, including extreme weather events, sea level rise and others. Adaptation to CC is also a crucial element of sustainable development goals (SDGs), specifically Goal 13 which aims to enhance resilience and adaptive capacities to CC risks (UN, 2022).

There has been growing recognition that local communities possess adequate knowledge, experience and understanding of vulnerabilities and risks associated with their lives and livelihoods, and that this should be included in CCA (Forsyth, 2013). In the early 2000s, the term community-based adaptation (CBA) emerged, to encompass locally focused approaches as an alternative to historically dominant "top-down", i.e., donor-led initiatives to international development (Clissold & McNamara, 2020:456). The fundamental premise of CBA is that by engaging local communities, CCA initiatives become more relevant and suited to people's needs, thus attain more successful results. However, there is an ongoing debate in academia about the efficacies and implications of CBA initiatives (Westoby et al., 2020).

1.2. Research Aim and Research Questions

The underlying argument and motivation of this paper is that there is a need for more comprehensive analyses of the effectiveness of community-based approaches to CC, especially given the increasing implementation of such projects (Clissold & McNamara, 2020; McNamara et al., 2020). Despite the existence of a growing pool of literature on CBA since the early 2000s, the overwhelming consensus is that further evidence is required for establishing the efficacy, best practices and lessons learnt of CBA approaches (Hidalgo et al., 2021; Piggot-McKellar et

al., 2019; Sapkota et al., 2018). To fill this gap, scholars have provided systematic reviews of scientific and grey literature on the topic (McNamara & Buggy, 2017; Piggot-McKellar et al., 2019). Among others, their findings indicate that this is a dynamic, relatively new field of research, which constantly identifies emerging lessons, enabling factors and challenges.

Thus, this thesis aims to contribute to existing research with a scoping review of scientific literature about CBA to CC published between 2016-2022, as well as consultative interviews with practitioners about CBA's success factors, best practices, and challenges. Motivated by the work of McNamara & Buggy (2017) who conducted a systematic literature assessment of CBA from its onset until 2015, the main contribution of this paper is in providing a contemporary analysis of 51 articles published between 2016-2022.

The aim of the thesis was met by answering the following research questions:

RQ1: What is known in the existing scientific literature about community-based adaptation to climate change?
Sub-question: What are enabling factors, challenges, and lessons learnt about community-based adaptation to climate change within existing scientific literature?
RQ2: What are enabling factors, best practices, and opportunities of community-based adaptation to climate change, as identified by practitioners?
RQ3: What are challenges related to community-based adaptation to climate change, as identified by practitioners?

While a scoping study of scientific literature was conducted to provide answers to RQ1 and its sub-question, RQ2 and RQ3 were answered through five semi-structured interviews practitioners.

1.3. Conceptual clarifications

CBA refers to approaches to adaptation that are sensitive to local cultures and vulnerabilities, ideally created as a result of participatory engagement, such as community-led risk assessment of CC impacts (Forsyth, 2013). In line with previous literature, this paper applies the following definition of CBA:

"A community-led process, based on communities' priorities, needs, knowledge, and capacities, which should empower people to plan for and cope with the impacts of climate change" (Reid et al., 2009:13).

Reid et al.´s (2009) definition is one of the most frequently cited ones within the analyzed CBA literature, which was the author's reasoning behind its choice. It is also relevant to note that the current thesis does not engage in a comprehensive discussion on how CBA is defined, rather focuses on identifying its enabling factors, challenges, and lessons learnt.

CBA means that adaptation is local and place-based (Ayers & Forsyth, 2009). In practice, CBA entails building adaptative capacities through community-based initiatives involving many stakeholders, such as residents, risk-reduction practitioners, policymakers, and scientists. Projects are most often implemented through partnerships between external organizations, such

as international non-governmental organizations (INGOs) and other aid partners, and local organizations, such as non-governmental organizations (NGOs) (Ensor et al., 2016).

Climate change adaptation is defined as transformations and modifications of "ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts" (UNFCC, 2022).

For the purpose of this paper, CC is understood as identifiable changes in climate patterns that may "directly or indirectly" be ascribed to human behaviour, leading to changes in the atmosphere and alterations in climate variability throughout time (UN, 1992:7).

The thesis defines vulnerability as "the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards" (UNDRR, 2022).

Resilience refers to all acts that lead to current and future preservation of people's lives, livelihoods, and ecosystems (Becker, 2014).

The paper applies a broad understanding of the term "community", since the word could refer to groups of people with the same geographical place of residence, or for example groups with shared worldviews and values and other common aspects (IFRC, 2014).

1.4. Thesis Structure

The remainder of the paper is structured as follows:

Section 2: Methodology and Methods, outlines the methodologies and data collection tools of the scoping study and semi-structured interviews.

Section 3: Analysis and Results, presents the main findings of the scoping study, divided into overall analysis and in-depth analysis, followed by key findings from five semi-structured interviews with practitioners.

Section 4: Discussion, discusses and compares key findings of the scoping study and semi-structured interviews, outlines limitations of findings and concludes the research questions of the thesis.

Section 5: Conclusion, summarizes the main conclusions and identifies areas for further research.

2. Methodology and methods

The following section outlines the methodology of the thesis. It introduces two methods: scoping studies and semi-structured interviews, and outlines data collection, sources, analysis, and limitations of each.

2.1. Scoping Studies

Scoping studies, also known as scoping reviews, are a methodological approach for reviewing literature. They comprise a less systematic methodology than comprehensive systematic literature reviews, serving rather as a method to "map *rapidly* the key concepts underpinning a research area and the main sources and types of evidence available" (Mays et al., 2001 in Arksey & O'Malley, 2005:21). As such, scoping studies may be used as means to explore research topics, to provide an assessment of already available information and its sources, as well as to identify gaps in knowledge to motivate further research. While scoping studies may also provide a detailed review of existing literature, the extent of analysis is dependent on the purpose of the study (Arksey & O'Malley, 2005). Thus, scoping studies may be used either as a precursor for literature mapping and conducting a systematic review, or as a complete method of their own, whereby research findings are summarized, disseminated, and discussed (ibid.).

This thesis applies a scoping study as a stand-alone methodological approach that answers its research questions, without aiming to serve as a precursor for conducting a systematic literature review, nor to identify gaps in the existing literature. The main motivation for conducting a scoping study is to map key literature about CBA to CC, to summarize and disseminate crucial research findings discussed in the analysis part of this paper. Although scoping studies have been continuously advanced since 2005, it is important to note that their definition, methodological steps, and guidelines are not universally defined (O'Brien et al., 2016). This thesis applied Arksey's (2005) framework for conducting a scoping review. Arksey & O'Malley (2005:22) identify five stages which served as methodological steps in this paper:

1. Identifying the Research Question
2. Identifying Relevant Studies
3. Study Selection
4. Charting the Data
5. Collating, Summarizing and Reporting the Results

The overall application of the framework was a dynamic process, with each step complementing the others. For example, Step 3: Study Selection informed Step 2: Identifying Relevant Studies, and vice versa.

The remainder of this section presents the five methodological steps in greater detail. This detailed and transparent overview of the process enhances the reliability of the findings and the overall study, along with providing sufficient methodological detail to replicate the research (Mays et al., 2001 in Arksey & O'Malley, 2005).

2.1.1. Step 1: Identifying the Research Question

As proposed by Arksey & O'Malley (2005), the first step of the scoping study was to identify the research question. The primary research question of this scoping review was:

"*What is known in the existing scientific literature about community-based adaptation to climate change?"*

This primary question was followed by a closely related sub-question:

"What are enabling factors, challenges, and lessons learnt about community-based adaptation to climate change within existing scientific literature?"

The primary research question was designed to allow for a "wide approach in order to generate breadth of coverage" (Arksey & O'Malley, 2005:23). A wide initial approach enables the researcher to achieve an overall understanding of the volume and content of the literature, to set more specific search parameters later. This decreases the risk of missing relevant articles, whilst letting the researcher get more acquainted with the field.

2.1.2. Step 2: Identifying Relevant Studies

Identifying relevant studies is the second stage of Arksey's & O'Malley's (2005) scoping review framework. This stage may be divided into two steps, database selection and search query identification, as described below.

Database Selection

The entire search was conducted via "Scopus" (www.scopus.com), the biggest online database of peer-reviewed studies, owned by Elsevier. This choice was based on the fact that the scoping study was limited to scientific articles, and Scopus provides one of the most comprehensive databases for multi-disciplinary studies (Beerens & Tehler, 2016). Access to Scopus was enabled via Lund University's subscription.

Search Query Identification

The search query was based on the primary research question, as listed in Section 2.1.1. In other words, the query consisted of the key terms and concepts of the research question. The first part of the search field consisted of words "Community based adaptation", which were searched within "Title, Abstract and Keywords". The second half consisted of what was considered an essential keyword, "Climate Change".

Since CBA was the focus of the research, as well as a term of its own, synonyms were not considered in the query. This was due to the consideration of contributing to previously conducted reviews, which also searched explicitly for CBA and not its synonyms, thus enabling comparison of results (Piggot-McKellar et al., 2019). Climate change was chosen as an essential keyword due to its thematic focus of the thesis. This allowed for an automatic exclusion of articles relating CBA to another field, such as medical. Additionally, the query was limited to

Subject Area “Social Science” due to the author’s academic background and interest to study this specific area, rather than Medicine, Biochemistry or similar. An assumption was made that the subject area “Social Science” would also provide multi-disciplinary results.

Results were limited to the English language. Further, results were limited to document type “Article” so that only scientific, peer-reviewed studies were included in the analysis. Articles published before 2016 were excluded, to cover the most contemporary academic findings. This decision was also motivated by the fact that according to the author’s background readings, one systematic review about CBA prior to 2016 was identified (see McNamara & Buggy, 2017), so conducting a contemporary one avoided unnecessary duplication of findings.

To summarize, the search query consisted of:

1) “Community Based Adaptation” AND “Climate Change”
2) Document type “Article”
3) Articles published in English
4) Articles published between 2016-2022
5) Subject Area “Social Science”
6) Articles in “Final” stage of publication

The query presented a total of 53 results. The results were then generated into a Microsoft Excel file for further analysis.

2.1.3. Step 3: Study Selection

To guarantee methodological consistency in selecting articles (Arksey & O’Malley, 2005), all articles were assessed according to the following inclusion criteria:

- Articles focus on a climate change context
- Articles specifically address adaptation practices
- Articles focus on communities populated by humans, i.e., rural and/or urban societies

To be selected, each article had to fall into all three criteria. While criteria 1 and 2 were set to include only articles related to the research question, criterium 3 was set to exclude articles that focus on other entities, such as businesses. However, this does not mean that only articles which explicitly mention the word “community” were selected, since a broad understanding of community was adopted (see Section 1.3.). All articles which focused on some types of human populated environment were included, regardless of the type of environment, rural or urban.

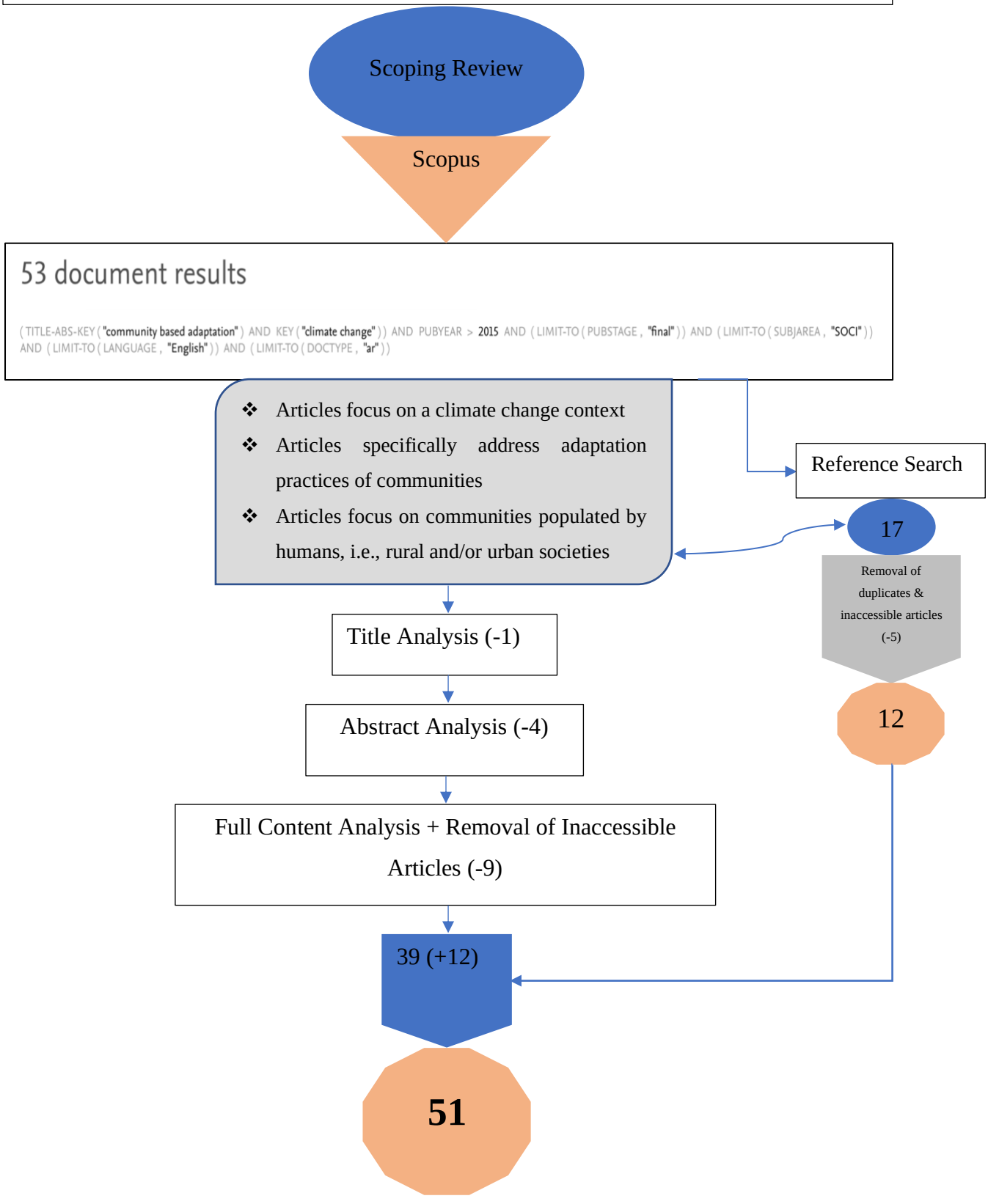
The next step of the study selection was to exclude obviously irrelevant titles that did not match the inclusion criteria, by assessing titles and keywords of the articles. This lowered the total number of articles to 51. Further, abstracts of all articles were assessed against the inclusion criteria. This step excluded 4 additional articles, resulting in 47 articles. Full contents of articles were then read and assessed against the inclusion criteria. 4 articles could not be accessed, whereas 3 articles did not match the criteria. The result was 39 articles.

References of the initial 53 articles were searched for relevance in Scopus to identify hits that might have been missed in the initial query. This step identified 17 additional articles that matched the inclusion criteria. After removing duplicates and articles that could not be accessed, the final number of articles included in this step was 12. This resulted in a total of 51 articles included in the review. Figure 1 presents a graphical overview of the scoping study methodology.

Figure 1: Methodological Overview of the Scoping Study.

What is known in the existing scientific literature about community-based adaptation to climate change?

What are some of the enabling factors, challenges and lessons learnt about community-based adaptation to climate change within existing scientific literature?



2.1.4. Step 4: Analysis

Following the final study selection, all articles were analyzed in a general way with charts and graphs, providing an overall analysis, as well as in-depth, whereby findings were collated, summarized, and presented, as suggested by Arksey & O'Malley (2005). Thus, steps 4 and 5 from Arksey's & O'Malley's (2005) scoping review framework were labelled as "Step 4: Analysis" in this paper, divided into overall and in-depth analysis.

Overall Analysis

The aim of the overall analysis was to chart data capturing some of the general information about articles. As suggested by Arksey & O'Malley (2005:27), this type of general analysis may provide numerical or qualitative data that shows the "extent, nature and distribution" of the assessed articles.

Data was charted in accordance with:

- Publication year
- Region of publication
- Region of focus
- Themes and hazards
- Adaptation measures

Findings were analyzed and presented in Section 3: Analysis and Results.

In-Depth Analysis

The purpose of the in-depth analysis was to present an overview of all included articles, their key findings and identified themes. It is important to note that it was not within the scope of the scoping study to provide a qualitative assessment of analyzed data (Arksey & O'Malley, 2005). In other words, findings were not assessed in regard to research reliability, result validity, or any other aspect. The mere aim was to present the reviewed data in a clear and logical manner. Thus, it was the researcher's task to identify key themes and develop a "narrative" which best suits the data presentation (Arksey & O'Malley, 2015:26). In this light, the in-depth analysis was conducted by identifying most prevalent themes in all reviewed articles and organizing information accordingly. This was done by reading several times through each article, highlighting text, and extracting information relevant to the research question, as well as cross-checking all articles after completion of the analysis to search for further information that might have been missed. Results and a summary of results are presented in Section 3.

2.2. Methodological Limitations of the Scoping Study

There are several general limitations of the scoping review methodology. First, as pointed by Arksey & O'Malley (2005), the reporting process conducted by the reviewer may be influenced by biases, sometimes referred to as "publication bias" (Sargeant & O'Connor, 2020). This could result in the researcher reporting certain studies and their findings to a greater extent than the rest. To address this limitation, transparency in reporting of results was a key priority in this paper. It was achieved by detailed reporting of the methodology and data presentation in the present thesis. Transparency in reporting and analysis of data allows for a recognition of potentially subjective decisions (Arksey & O'Malley, 2005). Second, the fact that scoping

studies do not allow for a qualitative assessment of analyzed data is another methodological limitation (Arksey & O'Malley 2005). However, the scoping review was an adequate method for this paper since the aim was not to conduct a qualitative assessment, rather to synthesize information about CBA to CC from existing scientific literature.

Another limitation of the methodology is the exclusion of grey literature from the scoping review. Proponents of scoping reviews recommend conducting a review of grey literature as part of the study methodology, to ensure a broad representation of results (Arksey & O'Malley, 2005; Levac et al., 2010). The author acknowledges the existence of a vast amount of such literature on the topic of CBA, such as project reports. However, the aim of this research was to investigate specifically academic literature. Moreover, an existing review of grey literature was identified during the initial phase of background reading (see Piggot-McKellar et al., 2019), which reinforced the decision to focus on academic literature.

Lastly, although synonymous terms were not included in the search query, it must be noted that this has possibly left out some relevant articles, such as those that indirectly discuss approaches related to, or similar to CBA. For example, the concept of nature-based solutions (NBS) may be similar. The International Union for Conservation of Nature (IUCN) defines NBS as "actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" (Cohen-Shacham et al., 2016 in Melanidis & Hagerman, 2022:273). A pilot Scopus search including NBS as a synonym in the original search query was conducted, and results were scanned. This resulted in a decision not to include NBS as a synonymous keyword, since the titles of most hits containing NBS focused mainly on ecosystem management, agricultural solutions, and biodiversity, rather than a community aspect. However, the limited scope of the thesis did not allow for an in-depth analysis of the results, possibly excluding relevant hits.

2.3. Semi-Structured Interviews

Five consultative, semi-structured interviews with practitioners formed the second part of the thesis methodology. The interviews were conducted to complement the scoping review with perspectives from practitioners, thus enabling a comparison between theoretical findings and practical viewpoints, strengthening the overall methodology (Arskey & O'Malley, 2005; Levac et al., 2010). They provided answers to research questions 2 and 3:

RQ2: What are enabling factors, best practices, and opportunities of community-based adaptation to climate change, as identified by practitioners?

RQ3: What are challenges related to community-based adaptation to climate change, as identified by practitioners?

Semi-structured interviews enabled in-depth conversations with participants, while still being guided by the main research questions (Creswell, 2013). As the main purpose was to identify enabling factors, opportunities, best practices and challenges of CBA, semi-structured interviews allowed the researcher to ask questions in a broad manner, with flexibility to ask follow-up questions depending on participants' answers. Thus, questions focused on

participants' experience with CBA related projects, opportunities, best practices, challenges, and obstacles that they could identify. Follow-up questions were created ad-hoc, however related to previously identified factors in the scoping review (see Appendix 2: Interview Script).

Interviewees were selected through personal connections, professional networks, as well as through recommendations from participants. Four interviewees were from the humanitarian sector, current or previous employees of the Swedish Red Cross; while one interviewee was from the private consulting sector, albeit with previous public sector experience. The full list of participants and their relevant roles can be found in Appendix 3: List of Interviewees.

All interviews were conducted on Skype, which was cost-efficient and enabled inclusion of participants from different countries. Calls were recorded on Skype and transcribed in the software "Otter".

2.3.1. Methodological Limitations of Semi-Structured Interviews

Several methodological limitations of semi-structured interviews were identified. First, the number of participants was low, making it impossible to draw generalizations of findings. Participants were not selected systematically nor in any way that is representational of a broader group of people (Creswell, 2013). Selection was primarily based on one factor – professional experience with projects related to CBA. The fact that most participants were employees of the Swedish Red Cross also limited representativeness of the sample. However, since the goal of the consultative interviews was to strengthen the scoping review with practitioners' inputs, these limitations were not considered detrimental.

Second, it was apparent throughout the interviews that interviewees were addressing community-focused projects not explicitly labelled as CBA. Interviewees were using terms such as community-engagement, community-led initiatives, community-level adaptive strategies, and community-based initiatives interchangeably. Participants from the humanitarian sector were referring to community-focused initiatives within the disaster risk management (DRM) sector, which encompassed CCA and other development issues. However, approaches matched the previously adapted definition of CBA which describes CCA as locally based and community-led (see Section 1.3.).

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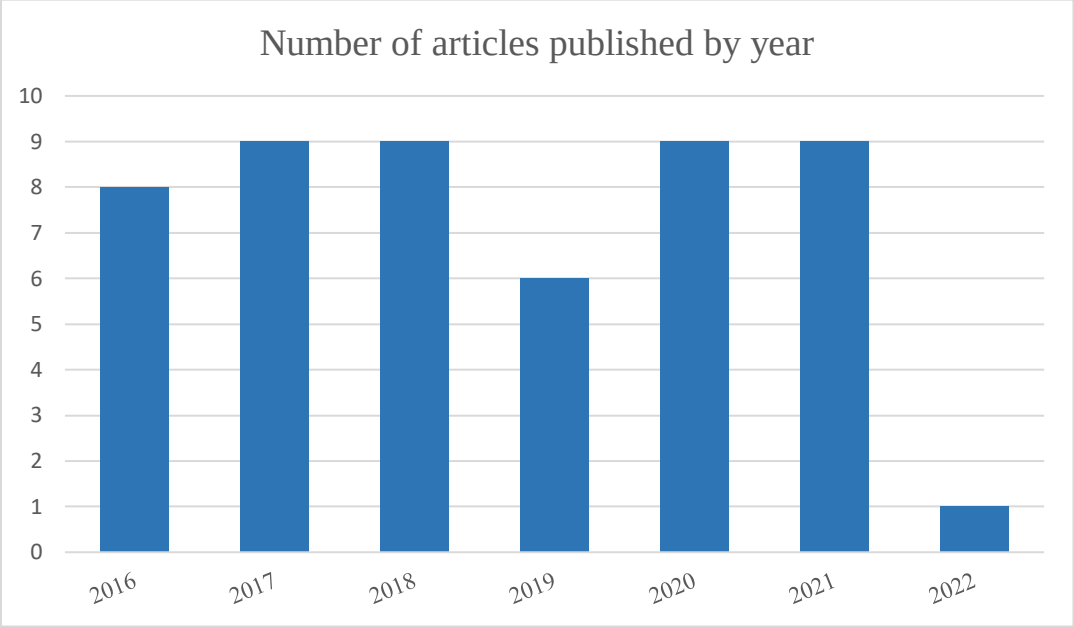
3. Analysis and Results

3.1. Scoping Study Results

The current section presents the findings of the scoping review. An analytical approach was adopted to collate and summarize results according to different categories and themes, to enhance readability and clarity as well as to allow for the creation of a narrative (Arksey & O'Malley, 2005). Sub-section 3.1.1. includes graphs and figures of the overall analysis, while sub-section 3.1.2. consists of an in-depth analysis of the results. The section is followed by a short summary.

3.1.1. Overall Analysis

Articles Published by Year



Graph 1: Number of articles published by year

The graph above shows the number of scientific articles published per year, on CBA to CC in line with the paper's inclusion criteria, for the period of 2016-2022. The overall distribution of articles by year of publishment is rather continuous, with a mean number of 8,3 articles per year between 2016-2021, while there is only 1 article published in 2022. This is unsurprising, given that the research was conducted during the first six months of 2022. Overall, the graph shows a consistent publishing trend.

Region of Publication

Articles were sorted by geographical region of publication, as shown in Figure 2 below. The region of publication was based on the location of the institutional affiliation of publication, as listed in Scopus. In cases of multiple affiliated institutions, location was determined from the first one listed. Three regions dominate the chart: North America (14 articles or 27%), Asia (10

articles or 20%), and Oceania (18 articles or 35%). This result might relate to the fact that the query was limited to articles published in English, the native language of North America and major countries in Oceania, such as Australia and New Zealand. A full list of the number of articles published by country can be found in Appendix 4: List of Articles by Country of Publication.

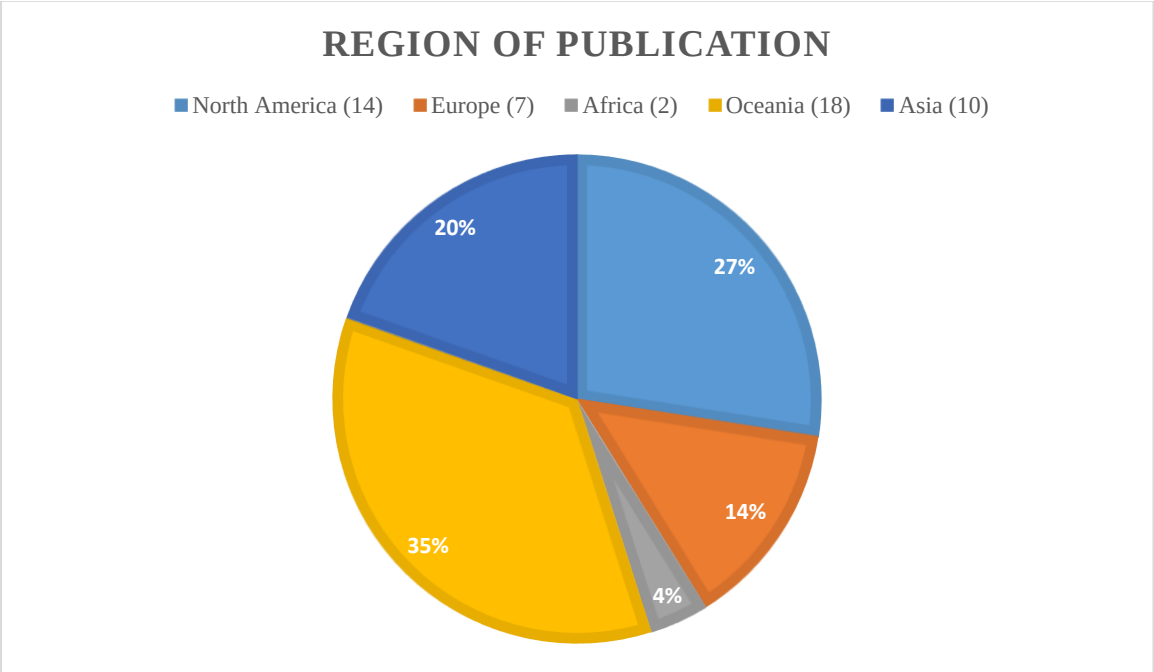


Figure 2: Number of articles published by region

Regional Focus of Research

Figure 3 below presents articles sorted by regional focus of research. The focus of research was chosen based on the geographical location of the conducted research, or the place that articles focus on in analyses. Articles which analyzed multiple locations are grouped under "Multiple".

Results indicate that the biggest proportion of articles focuses on Oceania (17 articles or 33%), and Asia (17 articles or 33%). North America, South America, and "Multiple" categories each have 5 articles, while 2 articles focus on South American countries. The results may be explained by the fact that a big proportion of the literature focuses on countries belonging to the Pacific Island States, which are commonly researched by institutions from Australia and New Zealand and published in English, thus identified by the Scopus query. Additionally, since the premise of CBA is that local communities possess relevant knowledge for CCA, many authors focus on examining traditional, Indigenous knowledge, found in more rural communities such as the Inuit in Alaska, rural communities in Asian countries and those in Pacific Island States. Moreover, it is recognized that communities most vulnerable to CC are those in less developed countries (IPCC, 2022), which could explain why Europe was not the focus of research in any article. A full list of the number of articles published by country can be found in Appendix 5: List of Articles by Country of Research Focus.

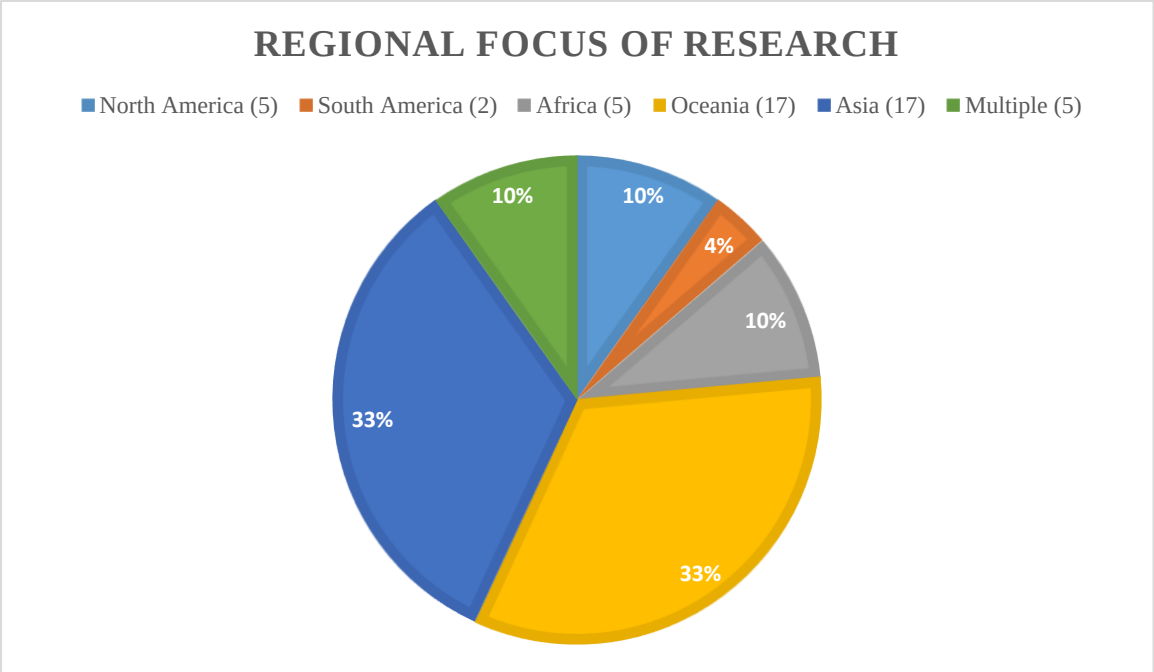


Figure 3: Number of articles by regional focus of research

Themes and Hazards

Articles were screened for general themes and hazards referred in them. These themes and hazards describe events related to climate change effects, which are targeted by adaptation measures discussed in the articles. As such, they provide an overview of the most targeted problems by CBA. Themes and hazards are often overlapping, one article refers to sea-level rise, erosion, and saltwater intrusion at the same time. Thus, the identified themes and hazards were not sorted by frequency, rather merged in a list. Figure 4 presents an overview of the identified themes and hazards. As shown in the figure, articles frequently address climatic hazards related to storms and floods, coastal erosion, droughts, crop management and issues with water supply.

storms, flooding, sea-level, rise water scarcity, coastal retreat, coastal erosion, extreme weather events, hail storms, crop losses, urban farming, water stress, saltwater intrusion, informal settlements, tidal flooding, dry spell, land subsistence, solid waste, river bank erosion, drought, urban flooding, poor sewer system, cyclones, high tides, storm surges, reduced fish diversity, deforestation, increased temperature patterns, inconsistent water supply, coastal fishery systems, food crisis, reduced aquatic plants availability

Figure 4: Themes and hazards addressed in articles

Adaptation Measures

The overall analysis also identified adaptation measures described in the articles. Adaptation measures refer to actions taken by communities to adapt to CC related effects. Like the hazards, adaptation measures were often overlapping, and most articles mention multiple. Thus, they were not screened for frequency, rather to provide an overview of existing CBA to CC measures discussed in the literature. For organizational clarity, identified measures were divided into four groups: societal, infrastructure, agricultural, ecosystem. A comprehensive overview can be found in Appendix 6, Figure 5: Adaptation Measures. However, some of the discussed measures include crop diversification, building walkways, seawalls, water harvesting facilities, reforestation, and awareness raising, among others.

3.1.2. In-depth Analysis

Results of the in-depth review are presented through main themes identified in the literature, in relation to answering the paper's primary research question and sub-question (see Section 2.1.1.). Thus, the in-depth analysis summarizes key findings about CBA to CC. Data is qualitatively synthesized into different categories that emerged during reading. The categorization was conducted through manual coding, whereby articles were read several times, with the aim of highlighting and extracting text discussing success factors, challenges, lessons learnt and opportunities. Afterwards, articles were grouped under further sub-categories, as presented in the forthcoming paragraphs. Each category provides examples from research to create a narrative, however the goal was not for this to be comprehensive, as that would require a systematic review beyond the scope of the present scoping study.

Enabling and Success Factors

Most articles discussed factors that enable effective CBA, interchangeably also referred to as success factors, as presented below. Where possible, findings were merged into sub-categories, followed by "Other Factors" which presents singular elements.

Inclusive Participation

Articles both explicitly and inexplicitly mention inclusion and inclusive participation in CBA projects as one of the key enabling factors (Aslany & Brincat, 2021; Clissold & McNamara, 2020; Ensor, 2018; Hagedoorn et al., 2019; Haque et al., 2016; He et al, 2021; Kim & Kang, 2018; McNamara & Buggy, 2017; McNamara et al., 2020; Masud-All-Kamal & Nursey-Bray, 2021; Remling &Veitayaki, 2016; Patnaik, 2021; Younus, 2017; Warrick et al., 2017; Westoby et al., 2020).

Inclusive participation refers to the point that all groups of a society are represented in CBA projects, including the most vulnerable and marginalized, as well as different genders. Inclusive participation may lead to a reduction of vulnerability, as it allows for an integration of a broader spectrum of knowledge in CBA projects (Clissold & McNamara. 2020). Results from a CBA project in Aniwa Island, Vanuatu, indicate an "equitable participation" perceived by participants of the project, meaning that the project was designed in a socially sensitive and

adequately adapted way that considered power relations and the overall socio-political setting (Clissold & McNamara, 2020:463).

Including community members in the process of a participatory risk assessment proved to be an effective way to develop climate sensitive adaptation planning to floods in New Taipei City, Taiwan (He et al., 2021). Participation in the risk assessment led to an increased awareness of risks as well as development of suggested adaptation methods in a bottom-up way. Further, participation has beneficial effects on the development of social capital and broadening of knowledge (ibid.). Haque et al. (2016) emphasize that the participation of community members in governmental adaptation planning must be integrated to build resilience and include those most vulnerable to CC in decision-making. Inclusive participation has been linked to higher levels of collaboration among community members, resulting in a shared sense of project ownership (Remling & Veitayaki, 2016). This enhanced sense of ownership results in increased project sustainability and longer lasting benefits (ibid.). However, authors also state that the "effectiveness of CBA is dependent on who within the community is able to participate in CBA strategies and how" (Aslany & Brincat 2021:580).

Knowledge Integration

Another widely recognized driving element of CBA to CC is the integration of traditional, local, and indigenous knowledge in CBA projects, as well as the combination of such knowledge with scientific expertise on climate change (Asugeni et al., 2019; Buggy & McNamara, 2016; Clissold & McNamara, 2020; Ford et al., 2016; Galappaththi et al., 2019; Haque et al., 2016; He et al., 2021; Hidalgo et al., 2021; Inamara & Thomas, 2017; Kangalawe et al., 2017; Kim & Kang, 2018; McNamara et al., 2020; Murtinho, 2016; Nunn et al., 2017; Nursey-Bray et al., 2019; Ojha et al, 2016; Piggot-McKellar et al., 2019; Remling & Veitayaki, 2016; Velempini et al., 2018; Warrick et al., 2017; Westoby et al., 2020; Younus, 2017). Recent literature particularly places emphasis on the need to merge traditional knowledge with expert knowledge, rather than to rely on just one.

In an analysis of 3 case studies in Timor-Leste and the Solomon Islands, Ensor et al. (2018) conclude that CBA's biggest strength is shifting decision-making to locals while integrating scientific data into local knowledge in a comprehensible way. Clissold & McNamara (2020) emphasize that integrating external knowledge with local knowledge resulted in reports of overall increased coping capacities. An example of such integration is when traditional agricultural practices like "mounding" are combined with more contemporary methods like "composting and mulching" for better harvest results (Clissold & McNamara, 2020:462). Knowledge integration is a key element of CBA as it results in increased understanding of CC and its impacts globally and locally, in turn motivating community members to participate in projects (ibid.).

Many examples of knowledge integration are found in the literature. For example, integrating external, i.e., expert knowledge, such as meteorological records may inform policymaking at local levels (Remling & Veitayaki, 2016). Asugeni et al. (2019) demonstrate how traditional, empirical lay knowledge of elderly residents about timber and building methods helped design

a bridge in the Solomon Islands. In another example, Inuit communities are complementing traditional knowledge with knowledge about technological advancements, by analyzing satellite imaging to increase adaptive capacities (Gallapaththi et al., 2019). CBA is generally recognized for increasing knowledge about CC. Community members in Fiji report that the Lomani Gau CBA initiative led to gaining knowledge of novel, sustainable ways to manage resources and adapt to CC (Hidalgo et al., 2021).

Integrating local knowledge into CBA also means discovering "historically rooted social knowledge" which uncovers not only adaptation strategies, but also people's attitudes about institutional contexts, which can also influence adaptation (Velempini et al., 2018:44). In the absence of access to scientific knowledge, local participants express needs for early information and forecasts, to increase adaptive capacities accordingly (Kangalawe et al., 2017).

Social Capital

Social Capital is another enabling factor found in literature. Studies relate social capital to levels of adaptive capacity, whereby higher levels of social capital correlate with higher levels of adaptive capacity (Hagedoorn et al., 2019; Haque et al., 2016; Johns et al., 2020; Kim & Kang, 2018; Patnaik, 2021; Saptiarani & Handayani, 2020; Vickers, 2018; Warrick et al., 2017). Haque et al. (2016:96) argue that social capital in the form of "multilevel social networks" are key to supporting socio-political factors that lead to adaptation. Hagedoorn et al. (2019) state that along other indicators, social capital is most crucial for predicting small island developing states' (SIDS) community member's intention to participate in adaptation activities. In this light, social capital should be a decisive element of CBA project design, while CBA may also lead to enhancement of social capital within communities (Hagedoorn et al., 2019; He et al., 2021). Authors also recognize the need to assess the different types of social capital within social groups (Johns et al., 2020). Strong social capital is found to enhance participation of women in CBA projects in Vanuatu (Patnaik, 2021).

Attachment to "Place"

Authors cite that community members' feelings and attachments to the physical space, "place", is complex, yet a crucial factor to consider when designing CBA to CC (Groulx, 2017; Narayan et al., 2020). Feelings and attachments related to place can influence motivation for engagement in adaptation practices, as well as community members' understanding of CC (Bronen et al., 2020). Citizens of Churchill demonstrate that their understanding of CC and its consequences to the physical surrounding are tightly connected to other socio-political and economic factors influencing their community, such as urbanisation (Groulx, 2017).

Local Leadership

Several authors point to the necessity of strong leadership skills among community members to achieve effective CBA (Asugeni et al., 2019; Younus, 2017). For example, "strong community leadership" is a crucial element of CBA, as it was a key enabling factor for building a bridge in East Kwaio, Solomon Islands (Asugeni et al., 2019:95). Community leadership exercised by locals, in this case hospital staff, replaced lacking governmental authorities to drive the project (ibid.). Local leadership can also be critical in arranging emergency

evacuations, as community leaders may have skills including knowledge and understanding of early warning systems (EWS) and resource mobilisation (Younus, 2017). The leadership of local academics in the Lomani Gau initiative in Fiji proved to have positive impacts on project sustainability (Hidalgo et al., 2021).

Funding, Resources & Capacities

Sufficient capacities, both in terms of soft skills and material resources including funding, often appear as an enabling factor in the literature (Jarillo & Barnett, 2021; Murtinho, 2016; Warrick et al., 2017). In this light, access to resources enables sustainable adaptative practices over longer periods of time. However, scholars state that material resources themselves are not sufficient without elements such as principles and worldviews which influence the use and accessibility of material resources (Warrick et al., 2017).

Local focus

Authors state that a focus on locally scaled adaptation measures is one of the essential success factors of CBA (Asugeni et al., 2019; Ford et al., 2016; Hidalgo et al. 2021; Masud-All-Kamal & Nursey-Bray, 2021; McNamara et al., 2020; Remling & Veitayaki, 2016; Westoby et al., 2020). CBA is effective if it is based on local initiative (Asugeni et al., 2019). This pool of literature emphasizes that the success of CBA depends on the extent of representations of local interests by the community.

Other Factors

- Attentive coordination and division of community work allows members to continue with their daily practices outside of the project, thus strengthens CBA participation rates (Asugeni et al., 2019).
- Addressing gender and religious differences within communities in project design enables successful implementation and increases inclusive participation (Clissold & McNamara, 2020).
- Communication adapted to knowledge backgrounds and experience of local participants is a key success factor (Hidalgo et al., 2021; Kim & Kang, 2019). For example, replacing the term “climate change” with meteorological descriptions such as “more rain” enhanced participant engagement and understanding (Kim & Kang, 2019).
- Integration of CBA with ecosystem-based adaptation (EbA) leads to enhanced sustainability of adaptation initiatives (McNamare et al., 2020)
- Perception of environmental changes and risks enhances participation in CBA initiatives, even if these are not explicitly labelled as CC (Hagedoorn et al., 2019; Nursey-Bray et al., 2019). Changes in perceptions of environmental conditions over time may lead to enhanced commitment to participation in CBA (Hidalgo et al., 2021).
- Activities that have a contributing effect on livelihoods and overall economy were preferred in CBA. Within a rural island community in Fiji, activities tend to be adopted only in situations when such benefits exist (Hidalgo et al., 2021).
- “Awareness raising” about environmental changes is identified as a best practice in the community based Lomani Gau initiative in Fiji (Hidalgo et al., 2021:915).

- Integration of adaptation practices into existing capacities of local institutions may increase project sustainability (Hidalgo et al., 2021).
- For CBA to be effective, an enabling environment must be ensured by the state, not only locally (Asugeni et al., 2019; Cash, 2021).
- Expatriate community members can be a driving factor in managing and financing CBA projects in their home communities, by providing resources in the shape of knowledge, funding and leadership that may be lacking locally (Jarillo & Barnett, 2021).
- CBA may lead to increased self-esteem, as reported among project benefits (Clissold & McNamara, 2020). At the same time, a strong sense of self-esteem and self-sufficiency positively impacts adaptation efforts (Warrick et al., 2017).
- "Moderation, prudence and self-immunity" are important factors for CBA, together with "local ecological knowledge with morality" in Thailand (Kansuntisukmongkol, 2017:56).

Challenges & Obstacles

Challenges and obstacles of CBA to CC were addressed in all reviewed articles. In the upcoming text they are synthesized in sub-categories, followed by "Other" where remaining findings were noted.

Social Dynamics, Power Dynamics, Wealth Status & Lack of Participation

Lack of participation in CBA initiatives is cited throughout a large proportion of literature. A frequently cited element inhibiting inclusive participation in projects as well as their effectiveness is the existence of significant levels of inequalities paired with power imbalances within communities (Karim & Thiel, 2017; Patnaik, 2021). In the context of Pacific Island States, gender inequalities emerge as a key issue affecting levels of participation as well as power over decision making (Asugeni et al, 2019; Buggy & McNamara, 2016; Patnaik, 2021; Wangui & Smucker, 2018; Westoby et al., 2020). However, this issue is not limited to the Pacific Island States. Most vulnerable and marginalized members of communities, as well as the poorest, sometimes face additional challenges to take part in adaptation practices and thus miss out on opportunities and decision-making (Aslany & Brincat, 2021; Karim & Thiel, 2017; Sapkota et al., 2018; Wangui & Smucker, 2018; Westoby et al., 2019). Their lack of participation may be grounded in limited resources, knowledge, or lack of social inclusion to partake in CBA projects. Moreover, people with greater power may possess a monopoly over decision making, affecting factors such as the distribution of resources and social inclusion. Thus, power dynamics may determine which community members benefit most of projects. Factors such as gender, status, and wealth may be detrimental in deciding whether people will take risks to try out new adaptation measures proposed by projects, as more stable prosperity is linked to greater experimentation with new measures (Wangui & Smucker, 2018).

At the same time, greater wealth might also mean that residents have less motivation to participate in CBA initiatives, as they could possess alternative resources and livelihood opportunities which make them less vulnerable to specific CC hazards (Aslany & Brincat, 2020). Indeed, factors such as homeownership have been cited to affect adaptive capacities,

with homeowners reporting higher emergency preparedness levels than renters, mainly due to access to insurance (Johns et al., 2020).

Just because a project is labelled as community-based, does not mean that all community-members are represented within it (Remling & Veitayaki, 2016). Additionally, not all opinions of community members are addressed in projects in the same way (Fischer, 2020; Haque et al., 2017; Karim & Thiel, 2017). Those with higher levels of social capital and social status are found to exercise control over decision-making and agenda-setting (ibid.). As a result, it may not always be beneficial for community members to take part in adaptation practices, and not adapting may even serve as a measure of risk aversion (Beckwith, 2022). Other findings reveal that community members with less resources benefit more from CBA initiatives than those with more (Fischer, 2020; Fischer, 2021).

Moreover, not all members of a community have equal access to resources (Aslany & Brincat, 2021; Fischer, 2020; Hagedoorn et al., 2019; Sapkota et al., 2018). Greater access to resources has been linked to higher adaptive capacities. Westoby et al. (2020) point out the inequitable benefits from CBA projects amongst community subsets, exacerbated by strict implementation guidelines of donor agencies. This had even resulted in segregation and conflict.

Unsupportive Institutional Governance

Issues related to institutions, governance and responsibilities are also cited as challenges to CBA. For example, Velempini et al. (2018) state that general limitations in capacities and lack of transparency of local governance are related to an inadequate management of water resources in Tanzania. A lack of functioning local governance may serve as capturing "elite interests" rather than adaptation priorities (Nagoda & Nightingale, 2017). Other scholars emphasize that CBA is not integrated into local governance systems, which inhibits its successful realization (Remling & Veitayaki, 2016).

A highly centralized, rather than decentralized nature of governance is found to inhibit locally led adaptation in Kyrgyzstan (Ashley et al., 2016). Even when there is an established narrative surrounding local participation, in practice community members are not actively engaged in CBA (Haque et al., 2017; Masud-All-Kamal & Nursey-Bray 2021). Instead, projects are mainly managed by experts and authorities from organizations, thus reinforcing a top-down approach to adaptation. Moreover, NGOs that implement CBA locally are characterized by multi-layered and sometimes complicated administrative structures, which may hinder timely project delivery as well as task understanding (ibid.). Such layered institutionalism hinders successful coordination of projects.

Funding and Project Sustainability

Short-term, or unsustainable funding is another key cited challenge of CBA initiatives (Ford et al., 2016; Jamero et al., 2018; McNamara et al., 2020; Piggot-McKellar et al, 2019; Wangui & Smucker, 2018; Westoby et al., 2020). Often, projects lack funds and resources to continue CBA initiatives after the exit of implementing partners. Project assessments show that strict donor limitations are a predictive factor of low CBA efficacy (Westoby et al., 2020). Masud-

All-Kamal & Nursey-Bray (2021) note that although local NGO implementors are aware that projects are unlikely to be sustainable, such concerns are not raised due to the beliefs that this might threaten partnerships with INGOs.

Closely related, poor sustainability of projects is another key challenge of CBA (Clissold & McNamara, 2020; Ford et al., 2016; McNamara et al., 2020; Remling & Veitayaki, 2016; Westoby et al., 2020).

Attitudes and Perceptions

Widely recognized barriers to CBA are the roles of perceptions and attitudes about climate change and its consequences, perceptions about risks, perceptions of project effectiveness, external actors' perception of local communities, as well as community members' perceptions of external actors (Ensor et al., 2018; Ford et al., 2016; Hidalgo et al., 2021; Inamara & Thomas, 2017; Kangalawe et al., 2017; Van der Piggot-McKellar, 2019; Ploeg et al., 2020; Westoby et al., 2020).

While perceptions of environmental changes may enhance motivation for adaptation, results demonstrate that these perceptions may also be skewed and lead to maladaptation (Ensor et al., 2018; Kangalawe et al., 2017). For instance, in a rural community in Solomon Island States residents have been more observant of environmental alterations of the marine ecosystem than the terrestrial systems, possibly due to fishing being a big livelihood element (Ensor et al., 2018). Such perceptions have a direct influence on types of CBA initiatives that are prioritized. Perceptions of CBA activities and their benefits may differ among community members, particularly between genders, and in turn affect motivation for participation (Ensor et al., 2018; Wangui & Smucker, 2018).

External implementing actors, such as members of development organizations and donors, may possess a "deficit mindset", perceiving community members in a victimized way, who are unable to manage themselves and lack essential skills to do so (Westoby et al., 2020:1470). Such discourse is likely to overlook existing capacities and inadequately design projects that are unsustainable for local communities. Additionally, it may negatively impact adaptive capacities of residents by creating a sense of victimization and lack of autonomy (ibid.). This leads to a further exacerbation of power inequalities (Ford et al., 2016).

Misunderstanding of the scale, structure and meaning of "community" and CBA related terms

Many articles address issues related to the meaning and understanding of the word community in CBA projects (Buggy & McNamara, 2016; Ford et al., 2016; Jarillo & Barnett, 2021; Johns et al., 2020; Ojha et al., 2016; Piggot-McKellar et al., 2019; Remling & Veitayaki, 2016; Westoby et al., 2020). This is not a new notion, rather seems to be well-established within literature. It centres around the point that "communities are not homogenous", rather consist of different groups with varying vulnerabilities, needs, physical and social capacities (Remling & Veitayaki, 2016:381).

There seems to be a growing recognition that communities are structurally and functionally more complex than simply comprised of a group of people who live at the same geographical place. For example, Jarillo & Barnett (2021:137) demonstrate how the Namdrik community in the Marshall Islands should be considered as a "spatially dynamic network of actors" that have varying degrees of readiness and motivation to take communal environmental action. They show that CBA projects may be unsustainable due to a lack of resources over time, and that such resources sometimes come from community residents who have emigrated abroad for better work options. It is noted that Namdrik's expatriate community plays an important role in leading, financing and sustaining projects on the island, from abroad. Communities are thus not stationary entities; they constantly evolve (ibid.). Similarly, Ojha et al. (2016) demonstrate that local communities do not exist in a vacuum, they are influenced by external actors and comprise cross-sectional entities.

As a response, some scholars advocate for a reconceptualization of CBA into "locally-led" adaptation, to highlight the geographically local aspect (Westoby et al, 2021). Others claim that such reconceptualization would not solve any of the existing issues surrounding the term, rather simply rebrand the concept (Masud-All-Kamal & Nursey-Bray, 2021).

Maladaptive practices

Articles refer to maladaptive practices both in terms of traditional adaptation approaches that are harmful for the environment (Inamara & Thomas, 2017; Jamero et al., 2018; Remling & Veitayaki, 2016), as well as organizationally implemented CBA initiatives which do not meet the needs and interests of communities (Beckwith, 2022; Ford et al., 2016). Examples of the former include the use of plastic as filling material, or floor elevation with coral stones (Jamero et al., 2018).

Limited Capacities and Limited Access to Resources

Limited capacities and limited access to resources have been recognized as inhibiting factors to CBA, since they negatively affect project sustainability as well as outcomes. Limited financial resources might lead to projects stopping before completion (McNamara et al., 2020; Warrick et al., 2017), Limited capacities may refer to lack of leadership skills, while limited resources, such as technological and technical are found to negatively affect the success of CBA (Jamero et al., 2018; Narayan et al., 2020; Velempini et al., 2018).

Lack of Monitoring & Evaluation Tools

Related to limited technical capacities, authors state that CBA projects are difficult to assess and lack established monitoring and evaluation (M&E) tools. Some state that the long-term nature of CBA is similar to development projects, which further complicates assessments (Jamero et al., 2018).

Other

- Structurally deep corruption in communities may be a key inhibitor to successful CBA (Younus 2017).
- Low motivation from community members, combined with projects that do not specifically target their requirements (Piggot McKellar et al., 2019).

- Encouraging participation in long-term CC adaptation initiatives is a frequently cited challenge for CBA, since participants do not always see immediate benefits of CC initiatives (Remling & Veitayaki, 2016).

Lessons Learnt & Opportunities

The following text outlines some of the lessons learnt and opportunities of CBA to CC as identified in the scoping review. Since some of the lessons learnt were inexplicitly described through enabling factors & challenges, the following text focuses on those elements that were discussed by scholars within key findings and recommendations in articles. However, several themes are overlapping. Findings are grouped thematically.

Gender Mainstreaming

There is a cited need for reinforcing institutional settings to address and account for gender differences (Clissold & McNamara, 2020; Patnaik, 2021). This could result in greater participation of women in projects, as well as strengthen women's rights. One suggestion is to kick-off projects with women's associations or similar representatives of women, rather than with everyone (Patnaik, 2021). This might lead to less inequality and greater participation in projects, as well as more democratic decision-making at the local level (Fischer, 2021). An initiative that successfully blends policies including "social protection, small-scale infrastructure development, and a community-based architecture", is the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), providing a successful CBA example in Bangladesh (Fisher, 2020:699).

Ownership, Leadership & Sustainability

Project sustainability may be increased by delegating more leadership responsibilities to members of communities, as well as engaging as many members as possible (Asugeni et al., 2019; Basel et al., 2021; Haque et al., 2016; McNamara et al., 2020; Westoby et al., 2020; Younus, 2017). In other words, there is a need to increase local ownership and adapt a "strengths-based" approach, which recognizes that communities have the knowledge and capacities needed to tackle challenges they face (Westoby et al, 2020).

Research shows that projects have the potential to increase community-members' sense of self-esteem, when conducted in a participatory way, and in turn strengthen ownership and participation incentives (Clissold & McNamara, 2020). Younus (2017) argues that local leadership should supervise and manage all parts of CBA projects. Overall, it is noted that a greater sense of ownership directly enhances project sustainability.

Understanding Local Contexts & Community Needs

There is a strong emphasis on the need for more comprehensive understanding and assessments of the meaning of "communities"; societal structures, needs, social dynamics, belief systems, vulnerabilities and marginalization within them (Aslany & Brincat, 2020; Beckwith, 2022; Buggy & McNamara, 2016; Clissold & McNamara, 2020; Galappaththi et al., 2019; Jamero et al., 2018; Jarillo & Barnett, 2021; Johns et al., 2020; Masud-All-Kamal & Nursey-Bray, 2021; Narayan et al., 2020; Nusey-Bray, 2019 et al., 2019; Ojha et al., 2016; Piggot-McKellar et al.,

2019; Remling & Veitayaki, 2018; Sapkota et al., 2018; Wangui & Smucker, 2018; Warrick et al., 2017; Westoby et al., 2020).

Communities should be assessed as heterogenous entities. A deeper understanding of communities and structural vulnerabilities should account for varying degrees of adaptive capacities, to address such differences in the design of projects. Projects should be targeted to the specific needs of communities, otherwise there might be a lack of motivation for participation (Piggot-McKellar et al., 2019), as well as implementation of potentially inadequate adaptation measures (Beckwith, 2022). Similarly, the example of Namdrik demonstrates that needs and interests of communities change over time, especially in areas with high levels of migration. Factors such as "sense of shared purpose and capacity" influence motivation to participate in CBA, but they also vary across time (Jarillo & Barnett, 2021:137). In this light, there is a cited need for further research about demographic trends.

Multiple CBA initiatives in Vanuatu demonstrate that sustainability is stronger when projects are explicitly driven by local needs, and in collaboration with local institutions (Westoby et al., 2020). These needs are often related to immediate livelihood improvements, rather than explicitly climate change related issues, even though in practice socioeconomic factors are intertwined with CCA (Ford et al., 2016; Jamero et al., 2019; Kim & Kang, 2018; Remling & Veitayaki, 2018; Van der Ploeg et al., 2020). To tackle this issue, some scholars advise for a provision of immediate incentives, such as monetary ones to motivate participation in CBA projects whose benefits may not be visible in the short-term (Reid, 2016).

Nexus of local, national, and international efforts

Authors recognize that due to capacity constraints, local communities may face overwhelming challenges to adapt to CC and require national and international support, both from different organizations and public administration (Asugeni et al, 2019; Cash, 2021; Fisher, 2020; Galappaththi, et al. 2019; Haque et al., 2016; Johns et al., 2020; McNamara & Buggy, 2017; McNamara et al., 2020; Velempini et al., 2018; Warrick et al., 2017). There is a persistent need to identify optimal cooperation procedures between local, national, and international organizations in the field of CC adaptation.

"Co-management" of resources between different partners, such as the government and local stakeholders, may strengthen a sense of shared responsibilities and power over resources and enhance adaptation (Galappaththi, et al., 2019:8). Cooperation among different levels of governance is also a beneficial learning mechanism that enhances informed decision making (Haque et al., 2016; Remling & Veitayaki, 2016; Warrick et al., 2017).

Evidence from Sitio Libis, Philippines, suggests that CC adaptation initiatives present entry points or enhancing partnerships between the public and private sector, and that such collaboration may lead to successful results (Cash, 2021). Others state that the role of external partners and project implementors should not be more than that of facilitators, enabling community members to have full leadership of projects yet ensuring resources, both in terms

of funding as well as required skills to achieve locally desired adaptation (McNamara et al., 2020).

Institutional Reform & Enabling Governance

Limited adaptive capacities and limited ways to enhance them are cited to be closely related to limited institutional capacities, and/or a limited amount of CBA strategies, as well as limited institutional support (Aslany & Brincat, 2020, Galappaththi, et al. 2019; Fischer, 2020; Fischer, 2021; Haque et al., 2016; Karim & Thiel, 2017; Masud-All-Kamal & Nursey-Bray 2021; McNamara & Buggy, 2017; McNamara et al., 2020; Narayan et al., 2020; Patnaik, 2021; Remling & Veitayaki, 2016; Velempini et al., 2018; Warrick et al., 2017; Westoby et al., 2020).

Thus, there is need for stronger institutional roles in CBA, both in terms of providing capacities and encouraging local initiatives. One way to approach this issue is through strengthening ownership, and self-dependence of local governments. Closely related is the cited prerequisite of an enabling governance system, that allows policies and systemic reforms which would allow CBA to be successfully implemented (Cash, 2021; Westoby et al., 2020). Masud-All-Kamal & Nursey-Bray (2021) found that there is a need for critical assessments of NGOs that implement local adaptation, since in practice they often resemble classical top-down approaches, hindering possibilities of socially just adaptation. Indeed, results from Bangladesh show that planned CBA initiatives are executed in a top-down manner (ibid.).

An example of a successful approach to integrate governance into local adaptation initiatives is MGNREGA (Fischer, 2020:699). This initiative combines three regulatory frameworks: "social protection, small-scale infrastructure development, and a community-based architecture" (ibid.). The success of this initiative is argued to be grounded in long-term, systematic political changes that enabled more inclusive participation in project implementation and stronger local institutionalism combined a redistribution of power from elites to community members. Another example, from South Africa, illustrates that establishing water committees that monitor water supply is successful for CBA targeting water scarcity through restrictions on use (Rankoana, 2020).

Scaling Up & Mainstreaming

Many scholars argue for the need of scaling up CBA projects into wider development agendas (Cash, 2021; Haque et al., 2016; McNamara & Buggy, 2017; Reid, 2016; Wangui & Smucker, 2018; Westoby et al., 2020). However, evidence on how to best approach this seems limited. These authors refer to the prerequisite of guidelines within institutional frameworks at all levels of governance for scaling up, as well as the need for greater analysis on factors which would enable this.

An important factor for scaling up is gaining more evidence through establishing stricter monitoring and evaluation mechanisms (Reid, 2016). One way to achieve this would be through the development of national guidelines about CBA initiatives and the collection of data about best practices, which could then be shared (Remling & Veitayaki, 2016). It is also noted that

CBA initiatives should be mainstreamed into poverty reduction initiatives, in addition to other development sectors (Wangui & Smucker, 2018).

Need for more data and M&E mechanisms

A large proportion of literature emphasizes the need for more evidence and more established M&E procedures of CBA projects, and their long-term effectiveness (Bronen et al., 2020; Clissold & McNamara, 2020; Hidalgo et al., 2021; Murtinho, 2016; Piggot-McKellar et al., 2019). There seems to be a lack of sharing of lessons learnt, best practices and enabling factors between scientific literature and practical implementation.

Funding Reform

As long as there are funding barriers, CBA initiatives lack the ability to be truly locally led and sustainable (McNamara et al., 2020; Murtinho, 2016; Remling & Veitayaki, 2016). Some authors emphasize the need for new funding systems, and most authors emphasize the need for more funds overall.

Communication

Examples indicate that the explicit wording of climate change is not a determinant factor for successful project implementation, and may even inhibit motivation for participation (Cash, 2021; Kim & Kang, 2018; Nursey-Bray et al., 2019). Thus, it is important to communicate CC effects and adaptation measures in manners adjusted to local understandings of environmental impacts and issues. For example, integrating culturally specific humour in climate communication is an important element to achieve participation and understanding of CCA within Indigenous communities in Australia (Nursey-Bray et al., 2019).

Perceptions of Environmental Variations and Risks

Risk evaluations and perceptions of variations in the environment by community members are subjective, and sometimes not in line with scientific observations (Ensor et al., 2018). Factors such as distance from town centres and gender significantly influence perceptions of risks. These factors should thus be accounted for in CBA, both to achieve fair adaptation as well as to target relevant environmental risks.

Livelihoods Relevance

Most examples of successful CBA initiatives cite the importance of implementing CCA relevant projects that are also providing direct benefits to livelihoods. These studies emphasize the high interdependence between basic livelihood provision and environmental adaptation, whereby each factor influences the other.

Other

- Conducting a cost-benefit analysis should be a prerequisite in decision making about CBA implementation, to reduce potential harm that initiatives may cause (Ford et al., 2016).
- Adaptation and development should not be separated, as in practice they are intertwined (Remling & Veitayaki, 2016).

- Contributing to the debate whether increased market participation decreases social capital, and thus makes community-members less resilient, Vickers (2018) found that more market participation did not lead to less social capital in Samoa. In other words, CC adaptation initiatives which involve higher market participation should not weaken existing levels of social capital.
- Social capital, and the types of social capital, should be assessed and addressed during project design, as communities with high levels of it provide favourable conditions for successful CBA (Basel et al., 2021; Hagedoorn et al., 2019; Johns et al., 2020). While social capital of wealthier community members may enable them to influence decision-making authorities, this may not be the case with poorer residents (Johns et al., 2020).
- Measures such as improved education may indirectly contribute to enhanced adaptive capacities, as higher levels of education are associated with decreased vulnerability and increased chances for economic migration, which for example, in the case of Kiribati, might help with planned relocation of communities from the country (Jamero et al., 2019).
- Provision of climate change related information is crucial for local adaptation and educated prioritization (Kangalawe et al., 2017). Thus, authors call for clearer analyses of CC effects.
- When knowledge and information about sustainable CCA methods are lacking, in addition to funds, communities might adapt in ways that may solve issues in the present but are maladaptive in the long run (Jamero et al., 2018). An example is using plastic as a filling agent. A key solution is to enhance planning strategies and technical support (ibid.).
- Authors advocate for more research on local adaptation preferences, to comprehend variations among different adaptation choices (Narayan et al., 2020).
- Traditional adaptation strategies, specifically in the context of Pacific Island states, should be given more recognition for their historical resilience when characterising communities as vulnerable to CC effects (McNamara et al., 2020; Nunn et al., 2017; Westoby et al., 2020). In other words, identification of communities as highly vulnerable may create a self-fulfilling narrative that undermines local capacities.
- Globalization plays a role in "delocalizing" communities, due to growing interplay between local communities with external actors, for example, through advanced economies. Thus, it is inadequate to address communal resource management only at local scales, when interests of multiple groups are existent (Ojha et al., 2016:274).

3.1.3. Summary of Key Results

This sub-section summarizes key findings of the scoping review.

Overall, factors such as inclusive participation, external and traditional knowledge integration, high levels of social capital, a strong attachment to the geographical place of residence, local leadership, sufficient resources, funds, and capacities, and locally scaled project designs are considered to enhance the effectiveness of CBA to CC. Collaboration among community members, as well as collaborations between different levels of governance, also increase

effectiveness. CBA initiatives that have direct implications on livelihoods, are perceived important by local populations and therefore more sustainable in the long run.

Key inhibitors of CBA include social dynamics, power structures, wealth status, and lack of inclusive participation. Additionally, unsupportive institutional governance, limited funding, poor sustainability, attitudes, perceptions, misunderstanding of the scales, structures and meaning of communities, maladaptive practices, and limited capacities are considered crucial challenges. If projects are not truly adopted to local needs, social dynamics, and interests, and supported by an enabling governance, effectiveness and sustainability are hindered.

Examples of successful CBA show that a strong sense of ownership combined with truly local leadership are key. On the other hand, CBA requires a supportive nexus between local, international, and national governance, because local resource management intertwines with national and international ones. It is recognized that factors such as social capital may be influential for CBA, and thus should be analyzed thoroughly during project design. There is a need for greater sharing of lessons learnt if CBA is to be scaled up and mainstreamed. It is also noted that CBA should be integrated within other development sectors, such as poverty reduction initiatives, because in practice projects target many of the same problems.

3.2. Semi-structured Interviews - Results

Consultative interviews were used to answer the following research questions:

> RQ2: What are enabling factors, best practices, and opportunities of community-based adaptation to climate change, as identified by practitioners?

> RQ3: What are challenges related to community-based adaptation to climate change, as identified by practitioners?

The present section presents and summarizes results from five semi-structured interviews with practitioners (see Appendix 3: List of Interviewees), while Section 4 (Discussion) compares them to results of the scoping review.

Enabling factors, Best Practices, and Opportunities of CBA to CC

All interviewees addressed enabling factors, best practices, and opportunities of CBA to CC.

Historical roots of organization

Interviewee 1 discussed the historical role of community-focused disaster risk management projects as providing enabling ground for community-led climate adaptation initiatives.

> *"They also began then [in the 1970s] to organise people in groups that were responsible for different tasks such as providing the early warning messages (…) the reason why I mentioned this is because I now just said that we were organizing people, it's a key word that I will get back to, and that I find highly important."* (Interviewee 1)

United & Cohesive

In an evaluation of a resilience and CCA program in Bangladesh, implemented by IFRC and run by local community members, community members reported that the greatest achievement was being "united" (Interviewee 1):

> *"Community members always answered more or less the same thing, to my great surprise, the answer they gave me was that we're organized, we are united, we are now as a family, as one family."* (Interviewee 1)

Similarly, referring to migration and people in the Pacific Islands as highly migrative communities, Interviewee 2 cited "cohesiveness" of a community as an enabling factor for CBA.

> *"The makeup of the local community, being natives or immigrants, for long term or short-term, the cohesiveness of those communities determined to some extent the successfulness of community engagement budgets"* (Interviewee 2)

Shared Interests

Closely related to cohesiveness, while describing an example of successful community engagement, one interviewee stated shared interests, in this case fighting poverty, as a crucial factor.

> *"This community agricultural project [in Martinique] was successful despite some of these challenges (…) what made it successful is that nobody is against fighting poverty, the people that fall into poverty or have the risk of falling into poverty are often the local population (..)"* (Interviewee 2)

Interviewee 5 also emphasized the need of shared interests among community members for project success.

Ownership & Participation

Two interviewees (Interviewee 1 & Interviewee 2) mentioned ownership and participation as key factors. Interviewee 1 described an example of building community ownership:

> *"Participation and ownership were key guiding words also for this program. (...) we met the community members and invited them to be part of a longer journey together with the Red Crescent, and we told them that we will serve as guides, and we will provide technical support with the aim to make you more resilient to the challenges that you would share with us and that you want to address. And we began with the mapping risks that they were seeing which were related to cyclones and floods. And we helped them also make plans for addressing these risks. (…) we helped them to be organised in micro groups, and these micro groups were responsible for different tasks."* (Interviewee 1)

Both interviewees stated that the role of implementing partners in CBA should be that of a facilitator, not leader.

Timely Consultation & Engagement

Another key factor cited by two interviewees was timely consultation with local communities in the project design phase, to capture community's needs and incorporate existing knowledge into the projects.

> *"The activities have to mostly be implemented by the community, getting that by and doing that consultation in time and early enough is super important. And if they don't agree, then it [the project] generally just can't happen."* (Interviewee 3)

> *"Making use of the local knowledge in projects requires being early and requires that you're still flexible."* (Interviewee 2)

Trust

Related to timely engagement, Interviewee 2 specifically emphasized the importance of building trust with community members and an ongoing collaboration among different layers of governance to achieve this trust.

"Community engagements require active communication and coordination, and trust between government layers, active communication, feeling... So, it's not like we're going into a community engagement project, and we never spoke to each other and now we can engage in a project, and we'll be successful. It should be part of an ongoing dialogue with communities (…) Trust is everything and there's little trust" (Interviewee 2)

"If an NGO or an international organization, wants to enable community engagement in adaptation, it requires to be in close and continuous in contact with the community and not every now and then, you need to build trust. And often it doesn't get to that stage because capacity just isn't there. It's done on the side." (Interviewee 2)

Incentives

Three interviewees stated the importance of incentives, in terms of livelihood improvements as drivers for participation in CBA.

"Incentive must have been that they had a better income, more variety of foods to serve to their families. They told me about their kids attending school and that they now even had some girls going into higher classes." (Interviewee 1)

"With things like fruit trees, or planting, you know, types of grasses that provide an economic incentive like vertebrate grasses. (…) And what we find [when] somebody can get a small livelihood out of that, those are the activities that will last for a few years. Whereas if we just plant whatever tree and leave it, those trees will be cut down, because people see a bigger value in having the wood or having whatever fuel that might come from that tree rather than keeping that tree in place." (Interviewee 3)

Understanding Social Dynamics

Understanding social structures, power dynamics and specific needs of local communities emerged as key factors, together with the notion that not all communities speak openly about challenges that they are facing.

"We try to understand as much as possible beforehand, which are the kind of stakeholders here, which are the important figures, and usually there is a community leader, that elderly person. Here you could easily actually engage the women in women groups without problems [in Bangladesh]." (Interviewee 1)

Guidance, Freedom & Flexibility

Interviewees 2, 3 and 5 highlighted the importance of implementing partners to provide the freedom and flexibility for local communities to run projects based on their own needs and agendas, while serving as facilitators that help with funding, training and knowledge sharing when required.

"If you really want local communities to do stuff, in terms of climate adaptation, and depending on the level of factors, the best thing is to give them a bag of money, and some guidance on how they should spend it." (Interviewee 2)

In the context of a community-led resilience program facilitated by IFRC and the Bangladesh RC National Society, Interviewee 1 noted that local communities do not necessarily show the initiative to lead projects, due to being accustomed to implementing partners to fill this role.

"It took a long time before they realized that we wouldn't start until they had fully understood what we were talking about, accepting it, delivering on the benchmarks that we had set up and so on." (Interviewee 1)

Self-esteem

Two interviewees from the humanitarian sector mentioned self-esteem as an enabling factor for community engagement. Interviewee 1 cited self-esteem in the context of previously mentioned successful self-organization as a result from a community-focused resilience program. Self-organization into micro-groups and participation together with ownership of responsibilities, resulted in the community members feeling like they were being heard.

"[Community members said] we have been given a voice and most importantly, we have self-esteem. So, this helped them realize that they are not just victims of circumstances."(Interviewee 1)

On the other hand, Interviewee 2 addressed that the lack of confidence when engaging with local communities through National Red Cross Societies might be a factor that hinders members to speak out, emphasizing the need for encouragement of local expertise knowledge by implementing partners.

"They don't feel that they should be taking that space. And so, we have real work to do to build that capacity within them to say, no, you are the experts. You need to be talking, not the Swedish Red Cross."(Interviewee 3)

Realistic Objectives

Community-led adaptation is not appropriate for all types of projects, according to Interviewee 2. As stated, it might not be the most optimal solution for bigger infrastructural projects, although even in such projects inputs of local knowledge should be accounted for.

Collaboration

Interviewee 1 addressed the need for CBA to be integrated and supported by different layers of governance.

"Always ensure support from top." (Interviewee 1)

Strong Facilitation

Skillful facilitation, as well as strong leadership skills within community members was mentioned as a key enabling factor by Interviewee 5.

Challenges and Obstacles of CBA to CC

Power, Social Inequalities & Wealth

Three interviewees mentioned power imbalances as a challenging factor, followed by wealth and status.

> *"The reigning political elite will have the tendency to provide services to the people they represent and not so much political colors. My general observation is community engagement is always important, but particularly in countries with weak governance. But there it also becomes more complicated because of political ties and family relations."* (Interviewee 2)

> *"Community dynamics probably play a bigger role (...) if there's digging and things like that involved, these tend to be jobs that might be slightly paid, or an incentive is given. And those jobs often tend to go to able bodied men, more than they will go to disabled or women."* (Interviewee 3)

Corruption

Closely related, Interviewee 1 mentioned corruption as an inhibiting factor, in the context of community-focused projects implemented through INGO and NGO collaboration.

> *"As most National Societies are, this is a National Society with a lot of challenges coming to nepotism and corruption and financial management."* (Interviewee 1)

Funding. Budget & Time Constraints

An obstacle addressed by all interviewees is limited project funding, combined with budget and time constraints, which restrict projects to be flexible and adapt to communities' needs. Interviewee 2 described how despite local communities sharing knowledge about drainage and sewage during an infrastructure project, this knowledge was not accommodated due to budget constraints and lack of flexibility.

> *"If community engagement and adaptation is done with a foreign donor (...), these donors come with all sorts of restrictions on what can be done and should be done, and should not be done. Accountability is delivered in terms of: we invest money, and now we need to know exactly what is done. Community engagement does not always benefit this accountability upfront."* (Interviewee 2)

Interviewee 4, from the humanitarian sector, emphasized limited time as a key inhibitor. This refers to limited time for project design, i.e., proposal phase and creation of concept notes, as well as a limited time to engage with communities, as an implementing partner.

"Engaging a community and making sure that they're on board with everything, making sure that you are not taking decision on behalf of them, that you're not prioritising what they need on their behalf, but more listening to them, (…), it requires quite a lot of time." (Interviewee 4)

Distrust

If donor funding does not allow for flexibility and a truly implement communities' needs, CBA projects may create distrust instead (Interviewee 2):

"Community engagement requires degrees of freedom. If you cannot do justice to what you hear in community engagement, because you're tied to a planning deadline, then don't engage the public because you create distrust." (Interviewee 2)

While also citing funding as a challenge for projects, Interviewee 3, from the humanitarian sector, stated that there is an ongoing dialogue in the sector about merging development work with humanitarian response and preparedness, with the aim of gaining more funds for humanitarian projects which also contribute to long-term adaptation.

Sustainability

Another obstacle addressed by all five interviewees was poor project sustainability, related both to the issue of limited funding, as well as to the lack of motivation from community-members to participate in projects that result in long-term benefits. Interviewee 1 from the humanitarian sector mentioned compartmented funding in the sector as an inhibiting factor for long-term project success, similarly to previously discussed need for sectorial mergence by Interviewee 3.

"A key challenge is the limited interest there is for long term community-resilience projects, compared to funds for disaster response. The Humanitarian world takes time to change from being reactive to proactive." (Interviewee 1)

"The compartmented funding for prevention, mitigation, response and development is a challenge." (Interviewee 1)

At the same time, sustainability of local CC adaptation initiatives was mentioned as a general opportunity that creates long-term benefits, and eventually decreases the needs for funding (Interviewee 3).

Lack of Monitoring & Evaluation and Lessons Learnt

Two interviewees from the humanitarian sector cited a lack of adequate monitoring and evaluation mechanisms and/or lack of data on lessons learnt, lack of case studies and lack of reflections on long-term project success. Interviewee 1 stated that M&E mechanisms are provided by National Societies, experts engaged in programs, as well as yearly reports and donor evaluations, albeit that evaluation could be improved by engaging independent research institutes.

"You will usually see [M&E], which is, of course, good. I wouldn't say it's good enough, it's not good enough. I think one should preferably have a research institute, like, Lund University, for example, an independent research Institute, be involved from the beginning." (Interviewee 1)

Interviewee 3 emphasized the lack of evidence base and lessons learnt, together with the reputational risks humanitarian organizations face when admitting project failure. Moreover, the interviewee stated that local knowledge is not always shared with implementing partners due to perceptions of local partners that nobody is interested in the knowledge.

"I think [sharing experiences and best practices] is still a really big challenge. That evidence base is not really there yet. So, it's not necessarily happening." (Interviewee 3)

Lack of Experience & Lack of Motivation to Change Existing Modes of Operating

Two interviewees (Interviewee 1 & Interviewee 2) brought up the overall lack of experience in working truly people centered, from an organizational viewpoint, although Interviewee 1 believes that there is a lot of experience to learn from. Interviewee 2 cited that engaging local communities in projects is often perceived as a "distraction", especially if it leads to criticism of established approaches to adaptation (Interviewee 2). In this light, implementing partners prefer to work under the traditionally established top-down approach.

"Community engagement will lead to criticism of a certain approach or to dialogue on how to best do things. This is something that governments don't easily deal with. It's a distraction. It's complicated and costs time. So, community engagement, particularly there where you expect discussion or criticism to an approach from a government, it requires time, and it requires sufficient efforts in terms of human beings dealing with communication." (Interviewee 2)

Governance VS. Community Needs

Clashing interests between governing authorities and those of the local communities has been cited as a challenge by three interviewees (Interviewee 2, Interviewee 3, and Interviewee 4). In situations of opposing interests between local authorities or the ruling elite and community members, it is challenging to implement projects that go against the interest of the ruling authorities.

"If governance is not secured, everything becomes unsecure, unsafe and protected. And everything is political, (….) the reigning political elite will have the tendency to provide services to the people they represent and not so much political colours." (Interviewee 2)

"The local authorities don't want to see value, for like trees and grasses in places that can add value to communities, because they don't want to see these communities establishing themselves and setting up livelihoods within these camps." (Interviewee 3)

Closely related, Interviewee 4 mentioned that local authorities are often already overwhelmed capacity-wise to be part of CBA.

Short Term Vs. Long Term Needs

Three interviewees from the humanitarian sector cited the challenge of working on adaptation and resilience related projects in environments where community members have more immediate livelihood needs (Interviewee 3, Interviewee 4, and Interviewee 5). According to them, communities lack motivation and capacities to participate in projects that result in long-term benefits due to pressing short-term needs, such as food. Interviewee 5 also mentioned that needs of households change over time, which creates additional challenges for sustainable project designs.

3.2.1. Summary of Key Interview Findings

Interviewees mentioned a variety of factors enabling and inhibiting CBA. Some notable success factors include historical roots of organization, unity, and cohesiveness, shared interests, ownership and participation, timely consultation and engagement, trust, incentives, understanding social dynamics, guidance, freedom, flexibility, self-esteem, realistic objectives, collaboration, and strong facilitation. On the other hand, power imbalances, social inequalities, wealth, corruption, funding, budget and time constraints, distrust, sustainability, lack of monitoring and evaluation and lessons learnt, lack of experience and initiative to change existing ways of operating, disbalance between needs of local authorities and community needs, as well as a mismatch between short-term and long-term needs were among the cited challenges.

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4. Discussion

This section discusses the results and implications of the scoping study and consultative interviews, as well as conclusions of the research questions:

- What is known in the existing scientific literature about community-based adaptation to climate change?
- What are enabling factors, challenges and lessons learnt about community-based adaptation to climate change within existing scientific literature?
- What are enabling factors, best practices, and opportunities of community-based adaptation to climate change, as identified by practitioners?
- What are challenges related to community-based adaptation to climate change, as identified by practitioners?

For clarity, results from the scoping study and interviews are merged and compared.

4.1. Enabling and Success Factors, Challenges and Obstacles of CBA

Many findings from the scoping review and consultative interviews are similar. For example, shared interests of community members, strong sense of project ownership and inclusive participation are crucial factors for effective CBA, addressed in both. Closely related is the importance of understanding social dynamics and local societal structures. It is noted that motivation for participation in projects is dependent on many factors, such as status of wealth and social capital (see Section 3.1.2.). Incentives are also found to be of great importance in both the scoping review and interview results. It is therefore fair to assume that CBA initiatives must generate some immediate livelihood benefits for community members if they are to be sustainable in the long run.

Both the scoping and interview results outline the need for truly locally led CBA, whereby external implementing partners take on roles of facilitators, along with the notion that in practice this is often not the case. Similar conclusions are well-established among scientific CBA literature. One element highlighted by interviewees, as opposed to results of the scoping review, is the importance of trust. This notion relates to trust being an influential element for collaborations between local communities and external implementing partners. While external partners require trusting communities to enable local leadership, short-term project funding and disregarding community members' inputs in project design phases may lead to skepticism within communities (see Section 3.2.). As suggested by Interviewee 2, if projects and funding are not designed flexibly enough to adjust to communities' needs, engagement of residents may lead to distrust instead.

Results from both methodologies confirm that self-esteem of community members is influential to CBA, with one interviewee emphasizing that due to historically established top-down approaches in aid and development, members of local communities might not consider local knowledge as an important factor to integrate in projects (Interviewee 3). This could impede knowledge sharing and integration between local and expert knowledge for CBA. It is perhaps a sign that additional encouragement from external partners is required to enhance local

leadership and knowledge sharing. In a wider sense, it implies a need for structural transformations of established top-down approaches characterized by a reliance of local communities on external decision-making.

Another factor identified in both methodologies is strong leadership skills among local community members. Empirical evidence points to the fact that individual leadership is a significant factor which enables project realization and is a key element of sustainability, especially when projects lack support from local governance. One factor identified by several authors, yet none of the interviewees, is residents' feelings and attachment to the geographical place of living, and their implications for participation in CCA. However, two interviewees stated that levels of cohesiveness and shared interests among community members influenced CBA engagement, which could also relate to a shared sense of attachment to place.

Power imbalances, social inequalities, corruption, funding, sustainability, lack of monitoring and evaluation mechanisms, lack of identified lessons learnt, unsupportive institutional governance, lack of capacities, imbalances between needs of local authorities and community needs, are among challenges identified in both the scoping review and interviews. These challenges seem to be widely established. One element highlighted in the scoping review but not by practitioners is the misunderstanding of the scale and meaning of "community". A potential explanation for this could be that most of the interviewees were from the humanitarian sector and showed confidence in community assessment tools applied by their organizations. Another element identified in the scoping review, but not cited as a challenge in interviews is the role of attitudes and perceptions about CC effects among communities. On the other hand, three out of five interviewees cited the challenge of lacking motivation for long term engagement in adaptation initiatives, an element that was also addressed in the literature (see Section 3.1.1). This finding links to the previously discussed need for short-term incentives to ensure participation in CBA.

4.2. Best Practices, Lessons Learnt and Opportunities

Best practices and lessons learnt identified in this paper show that a strong sense of ownership combined with truly local leadership supported by higher levels of governance are key for successful CBA. For example, as cited by Interviewee 1 referring to a case from Bangladesh, one way to strengthen local ownership is through the establishment of micro-leadership committees within communities, responsible for different tasks (see Section 3.2.). This way of organizing raised unity within the community, creating an enabling environment for CBA. However, as previously discussed, it is important to note that cultural and structural differences among communities must be considered when analysing best practices. Overall, the analysis showed that there is a need for greater sharing of lessons learnt if CBA is to be scaled up and mainstreamed.

Results from both methodologies indicate that CBA requires a supportive nexus between local, international, and national governance. It is also noted that CBA should be integrated within wider development agendas, such as poverty reduction initiatives. This notion has been increasingly emphasized in recent literature, as well as recognized by practitioners as an

existing trend, partly related to the "triple nexus" framework which advocates for a holistic transformation and integration of humanitarian, development, and peacebuilding sectors (Interviewee 5; WeWorld, 2020). It also relates to the previously discussed argument that CC adaptation is interlinked with livelihood needs and should not be tackled separately, along with livelihoods being a key element of wider development agenda. From this standpoint, CBA may indeed require conceptual redefining that encompasses the holistic approach argued for in scientific literature and by practitioners (Remling & Veitayaki, 2016).

Overall, results imply needs for greater analyses of community dynamics, levels of cohesiveness, interests, and ways to design projects sensitive to local power relations and gender imbalances. It is also recognized that social capital is influential for CBA, thus requiring a thorough assessment during project design.

5. Conclusion

The present study identified multiple enabling factors, challenges and lessons learnt about CBA to CC. The overall findings are in line with previous systematic reviews on CBA (McNamara & Buggy, 2017; Piggot-McKellar et al., 2019), with a more recent emphasis on the requirement for a holistic approach to CC adaptation, enabling and collaborative governance systems as well as the need for integrated assessment of the roles of social capital. A major source of limitation to generalization of these findings is the existence of an extensive amount of grey literature on CBA, followed by the limitation of a small sample size of interviewees. Similar to previous literature, the results of this paper indicate a need for further monitoring and evaluation data, to identify best practices and challenges about CBA. Considering the amount of research and implementation of CBA related projects, a potential question to consider in further research is what inhibits the existence of CBA related data. Another suggestion for further research is exploring community members' perspectives and thoughts about CBA, i.e., identifying success factors and challenges as reported by community members locally. Lastly, the present paper did not provide an in-depth analysis of reasons for the significant differences in regional focus of research, as identified and discussed in Section 3.1.1. However, further research could investigate reasons behind this finding to determine whether it is due to research bias, or solely because of the geographical distribution of CBA initiatives.

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Appendices

Appendix 1: Examples of the Scoping Study Data Management

Authors	Title
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Reid H., Shafiqul Alam S.	Ecosys
Zhang T., Bakar S.	The Imp

Authors
Ojha H.R., Ford R., Keenan R.J., Race D., Carias Vega D., Baral H., Sapkota P.
McNamara K.E., Clissold R., Westoby R., Piggott-McKellar A.E., Kumar R., Clarke T., Namoumou F., Areki F., Joseph E., Warrick O., Nunn P.D.
Nagoda S., Nightingale A.J.
Warrick O., Aalbersberg W., Dumaru P., McNaught R., Teperman K.
Buggy L., McNamara K.E.
Ravera F., Martín-López B., Pascual U., Drucker A.
Nunn P.D., Runman J., Falanruw M., Kumar R.
Mugambiwa S.S.
Karim M.R., Thiel A.
Galappaththi E.K., Ford J.D., Bennett E.M., Berkes F.
Nursey-Bray M., Palmer R., Smith T.F., Rist P.
Jamero M.L., Onuki M., Esteban M., Tan N.
Smucker T.A., Wangui E.E.
Ensor J.E., Abernethy K.E., Hoddy E.T., Aswani S., Albert S., Vaccaro I., Benedict J.J., Beare D.J.
Narayan S., Esteban M., Albert S., Jamero M.L., Crichton R., Heck N., Goby G., Jupiter S.
Asugeni R., Redman-MacLaren M., Asugeni J., Esau T., Timothy F., Massey P., MacLaren D.
Medina Hidalgo D., Nunn P.D., Beazley H., Sovinasalevu J.S., Veitayaki J.

Appendix 2: Interview Script

1) Could you tell me a little bit about your professional background, and experience with CBA related projects?

- Depending on the answer, ask for specification of project experience.

2) What are some of the challenges that you experienced, and/or are aware of about CBA and its implementing, both from an organizational as well as community aspect?

- Depending on the answer, ask about specifications and implications of mentioned factors.
- Based on scoping results, possible mention of factors such as: social dynamics, power structures, wealth status, and lack of inclusive participation, institutional governance, limited funding, poor sustainability, attitudes, perceptions, misunderstanding of the scales, structures and meaning of communities, maladaptive practices, limited capacities

3) What are some of the enabling factors, best practices, and opportunities of CBA?

- Depending on the answer, ask about specifications and implications of mentioned factors.
- Based on scoping results, possible mention of factors such as: inclusive participation, knowledge integration, social capital, attachment to the geographical place of residence, local leadership, resources, funds, capacities, and locally scaled project designs, collaboration among community members, collaborations between different levels of governance

Appendix 3: List of Interviewees

Interviewee 1: **Thomaz Carlzon**, Senior Disaster Management Advisor, Swedish Red Cross (retired).

- Relevant experience with community-resilience projects, incl. NBS; helped developed "The Framework for Community Resilience" and the linked "Roadmap to Community Resilience" which are instruments used by IFRC in community-resilience projects.

Interviewee 2: **Marc Arnold**, Head of Analyses, Prepared International.

- Relevant experience includes roles as Deputy to the Prime Minister of Sint Maarten: Territorial and Regional (Caribbean SIDS) Authorizing Officer for EU funded DRR, resilience and sustainable development projects; resilience building by reducing poverty through innovative agriculture.

Interviewee 3: **Kanika Groeneweg-Thakar**. Advisor, Environment and Green Response, Swedish Red Cross.

- Relevant experience: co-authored guidance for the European Commission related to the use of NBS; advocating for longer-term, climate responsive interventions within Green Response in the SRC.

Interviewee 4: Disaster Management Advisor from the Swedish Red Cross who preferred to stay anonymous.

- Relevant experience includes supporting DRR and CCA related projects, including community-resilience projects.

Interviewee 5: **An Vanderheyden,** Country Representative in South Sudan, Swedish Red Cross.

- Relevant experience comprised of various DRR & CCA projects with a community focus.

Appendix 4: List of Articles by Country of Publication

Canada: 5

Australia: 15

United States: 9

United Kingdom: 2

Sweden: 4

Taiwan: 1

South Africa: 1

Japan: 2

Solomon Islands: 1

Netherlands: 1

South Korea: 1

Bangladesh: 4

Tanzania: 1

Papua New Guinea: 1

Thailand: 1

Kyrgyzstan: 1

New Zealand: 1

Appendix 5: List of Articles by Country of Research Focus

Cambodia: 1

Marshall Islands: 1

Senegal:1

India: 3

Taiwan: 1

Philippines: 3

Bangladesh: 6

Mexico: 1

South Africa: 1

United States: 2

Solomon Islands: 4

Fiji: 1

Vanuatu: 3

Micronesia: 2

Korea: 1

Nepal: 1

Tanzania: 3

Pacific Island States: 5

Canada: 3

Kyrgyzstan: 1

Colombia: 1

Australia: 1

Multiple: 5

Appendix 6: Adaptation Measures

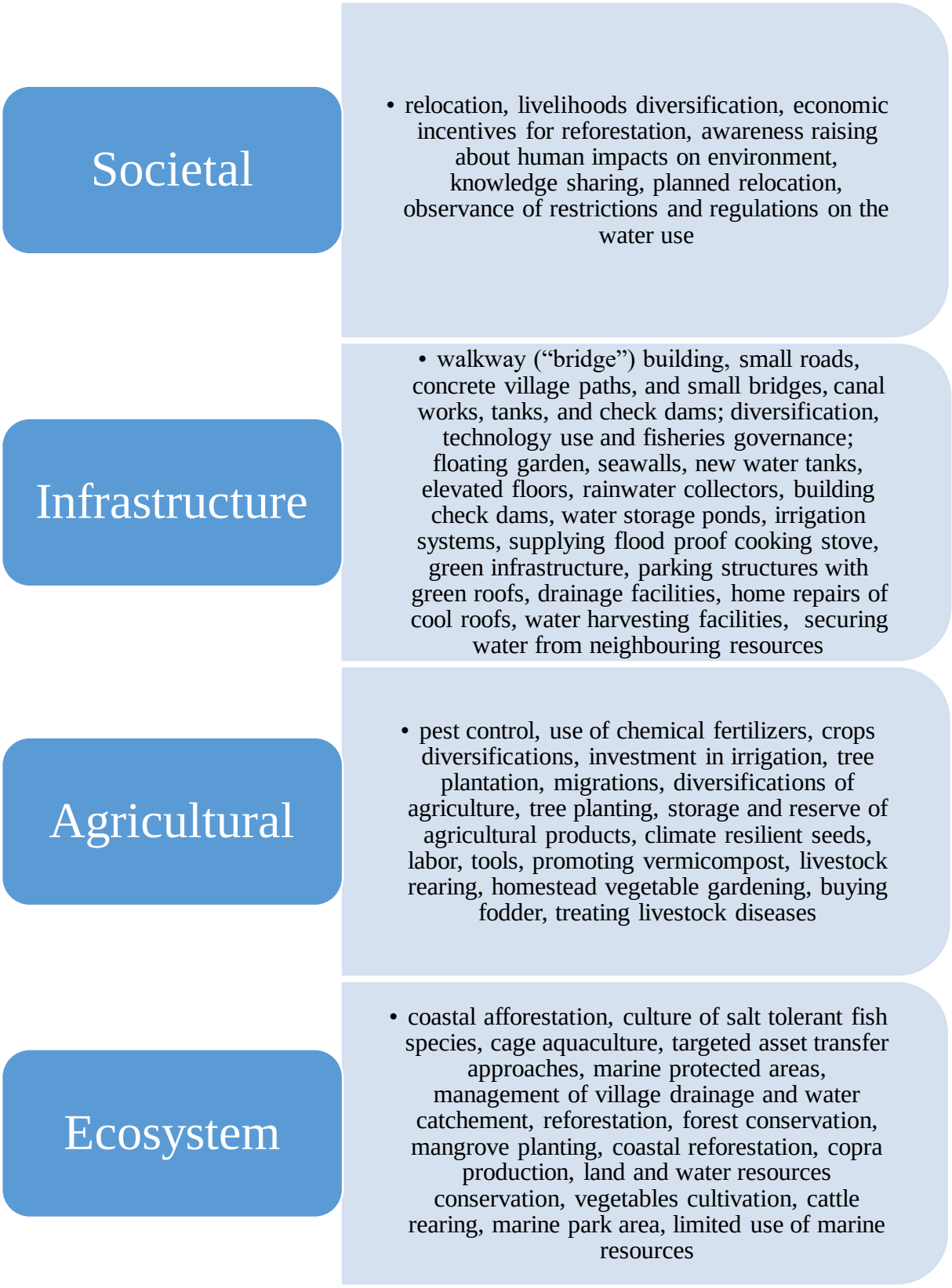

Figure 5: Adaptation Measures