Adaptation Narrative Analysis

A Learning-centered Appraisal Method for Ecosystem-based Adaptation

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Abstract
Ecosystem-based Adaptation (EbA) seeks to combine climate change adaptation, socio-economic development and climate change mitigation benefits through the use of ecosystem services and biodiversity. Embedded in socio-ecological-systems, EbA efforts need to overcome challenges posed by complexity, uncertainty, long time horizons and interdisciplinarity. A narrative-based appraisal method was developed aimed at addressing these challenges to support learning about the contributions of EbA efforts to climate resilience and adaptive capacity of the SES. The resulting Adaptation Narrative Analysis method is an argument and initial mean for the use of narratives in EbA appraisals.

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"Life shrinks and expands in proportion to one's courage."

Anaïs Nin, quoted in *French Writers of the Past* (2000) by C. A. Dingle, p. 126

To my husband, Farhad, and our daughter, Roya. Life with you is large and beautiful. You are my safe haven and give me the strength to be courageous. Thank you.

To my mother, Christiane, for being a role model to me all my life. You are the one that taught me to be courageous by example. To my grandmother, and uncle, for your love and support throughout my life and especially during my studies. My brother, Jan, you were the first to push me to be courageous as a little child and quietly and reliably looked out for me ever since. To my parents-in-law, Sharareh and Mohsen, for being a courageous couple that inspires. Thank you.

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To all the expert reviewers, for their criticalness and constructive feedback that shaped the method and their courage to be receptive to a new approach. The anonymous survey respondents, and reviewers, Thomas E Downing, Åse Johannessen, Tahia Dervisscher, and Ali Raza Rizvi. Thank you.

When I look back at the thesis process and what has led to it, I am reminded of the emergence and complexity that characterize the socio-ecological system. I could not have foreseen, nor explained the influences and relationships of the elements that led to this day. However, I can see that courage to try a new path and a different approach expanded my knowledge and horizon immensely. I am indebted to everyone who has built my courage.

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Abbreviations

ANA	Adaptation Narrative Analyis
BES	Biodiversity and Ecosystem Services
CA	Contribution Analysis
COR	Collaborative Outcomes Reporting
EbA	Ecosystem-based Adaptation
GHG	Greenhouse gas emission
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and Evaluation
MSC	Most Significant Change
NbS	Nature-based Solutions
OM	Outcome Mapping
SES	socio-ecological system
SEPL	Socio-Ecological Production Landscape
U-FE	Utilization-focused Evaluation
QIAP	Qualitative Impact Assessment Protocol

1. Introduction

Climate change impacts unfold across the globe in the form of extreme weather events, increased climate variability and environmental degradation. The IPCC (2018) has highlighted the drastic impacts expected with medium to high certainty of global warming on ecosystems, including species shifts, loss and extinction, habitat loss as well as damage to ecosystems at 1.5°C and 2°C warmer temperatures compared to pre-industrial times[1]. Impacts on ecosystems are higher where anthropogenic stress and pressure exists. Risks to food production and water resources, human health and economic activity is expected to increase with the global mean temperature (IPCC, 2018). Paired with the need for unprecedented reduction in greenhouse gas emission (GHG) to stall global warming to 1.5°C, the urgency to mitigate and adapt to climate change is evident.

In the past decade, the potential of Ecosystem-based Adaptation (EbA) for climate change adaptation has increasingly been recognized by the scientific community, national and international organizations, and governments (CBD, 2009; Chong, 2014; FEBA, 2017; Ikkala, 2011; Ojea, 2014). It has been especially acknowledged for its combination of mitigation, adaptation and resilience benefits, as well as potential cost-effectiveness compared to hard engineering measures (CBD, 2009; Chong, 2014; Lo, 2016; Ojea, 2014).

In this thesis, a commonly cited definition for EbA, coined by the United Nations Convention on Biological Diversity is adopted:

> "Ecosystem-based adaptation is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change." (CBD, 2009, p. 6)

To emphasize the multi-facetted benefits of EbA efforts, the approach has been further conceptualized based on the work of Ojea (2015, p.42) as "[the] promotion of socio-ecological resilience through the management and conservation of ecosystems […]." More concrete, "EbA explicitly includes both people and biodiversity, recognizing the potential

[1] "Pre-industrial" refers to the years of 1850-1900.

for well-managed, resilient ecosystems to provide services that enable people to adapt to the impacts of climate change and reduce their vulnerability." (Ojea, 2015, p. 42-43). Furthermore, next to adaptation, EbA is expected to contribute to climate change mitigation and sustainable development (Munang et al., 2013; Scarano, 2017).

The combined work of Munang et al. (2013);, Ojea, (2015), and Scarano (2017) leads to the following understanding of EbA, assumed in this thesis:

> EbA aims to strengthen socio-ecological resilience to climate change impacts through biodiversity and ecosystem services; generating co-benefits for climate change mitigation and sustainable development.

At the governance level, EbA has been described as a concerted policy mix that addresses environmental restoration and conservation, socio-economic development and GHG mitigation, thus, reducing societal vulnerability in a manner that is adaptive to climate change (Scarano, 2017). It is often understood as part of a broader adaptation strategy, and substantial efforts have been put into mainstreaming it into national adaptation policy, as well as to mobilize national and international funding for its implementation (FEBA, 2017; GIZ, 2017c; Ikkala, 2011; Ikkala et. al., 2015; Ojea, 2014; Terton & Daze, 2018).

However, in practice, it has proven difficult to make the case for EbA on the local and national level (GIZ, 2017b; Ojea, 2015). EbA requires the cooperation of different stakeholders, such as government ministries and agencies at the national, regional and local level, community members, technical experts, private sector and donors. Furthermore, its implementation is seen within the action space of both, conservation and development organizations. As a result, the management of agendas and needs of all stakeholders, as well as engaging for and incentivizing its uptake remains a challenge (GIZ, 2017a; Klein et.al., 2017). Even more so, when the multiple benefits of EbA are difficult to communicate. While cost-benefit analyses or poverty reduction are quantifiable, other benefits, such as learning and leadership development for climate change adaptation, are intangible in nature and thus tend to be overlooked in EbA implementation and evaluation (GIZ, 2017b; Klein et al., 2017).

A need for greater learning within adaptation, including EbA, was highlighted during the Adaptation Futures 2016 conference in Rotterdam, the Netherlands, and captured by Klein et al. (2017). This need includes among other things a better understanding of adaptation effectiveness, success, and their appraisal. Furthermore, better focus needs to lay on learning about progress, impacts and outcomes of adaptation efforts (Klein et al., 2017; UKCIP, 2011). It is this identified research need that the thesis seeks to address.

2. Research Aims, Question and Scope

The research aimed to develop a method for the appraisal of EbA processes and outcomes that accounts for the specific challenges of EbA. These include the long time horizons of nature-based activities, and uncertainty and complexity of activities within the socio-ecological system with non-linear processes. This process and outcome appraisal method (referred to as "the method") should allow its results to be used for climate change adaptation decision-making by a variety of stakeholders. The intended users of the method are EbA project stakeholders, especially local communities, project staff, and researchers interested in EbA.

To fulfil the research aim, the following research question was formulated:

> How can adaptation processes and outcomes of EbA projects be appraised based on their contribution to climate resilience and adaptive capacity[2] of the socio-ecological system?

To answer this question satisfactorily, a set of criteria were developed that the method would have to fulfill. These criteria were identified through a literature review and pertain to key challenges of the EbA implementation, monitoring, and evaluation process. As an overall criterium, the method is expected to be perceived as useful for implementation, monitoring and learning in EbA efforts. As the research question suggests, the context for the method use is an EbA effort, more specifically, an effort at the local level (such as community, municipality, city).

While the method is expected to address key challenges of EbA in the aforementioned contexts, it is important to point out that the method is not expected to solve these challenges, that is to eliminate them. The expectation for the method is to provide an approach that supports EbA stakeholders in dealing with EbA key challenges in order to facilitate learning about local EbA outcomes.

[2] See Appendix 1 for definitions of climate resilience and adaptive capacity.

Criteria for the method:

1. The method should allow EbA processes and outcomes to be appraised over long time horizons, thus allowing iterative and participatory monitoring, that is flexible to adapt to changes and new understanding.
2. The method should support a system perspective and the documentation and analysis of complexity and uncertainty in the socio-ecological system (SES).
3. The method should document EbA processes and outcomes.
4. The method should be usable by individuals with a variety of disciplinary backgrounds.
5. The method should allow the appraisal of non-linear development.
6. The method should support learning about trade-offs through enabling the documentation of various perspectives, scales, and related decisions-making.

The literature review in section 5.2. contains the background information to these criteria.

3. Methodology

The thesis methodology can be divided into two parts: (1) literature focus, and (2) method development. The second part builds largely upon the first, although some additional literature was reviewed during the later stages of the thesis.

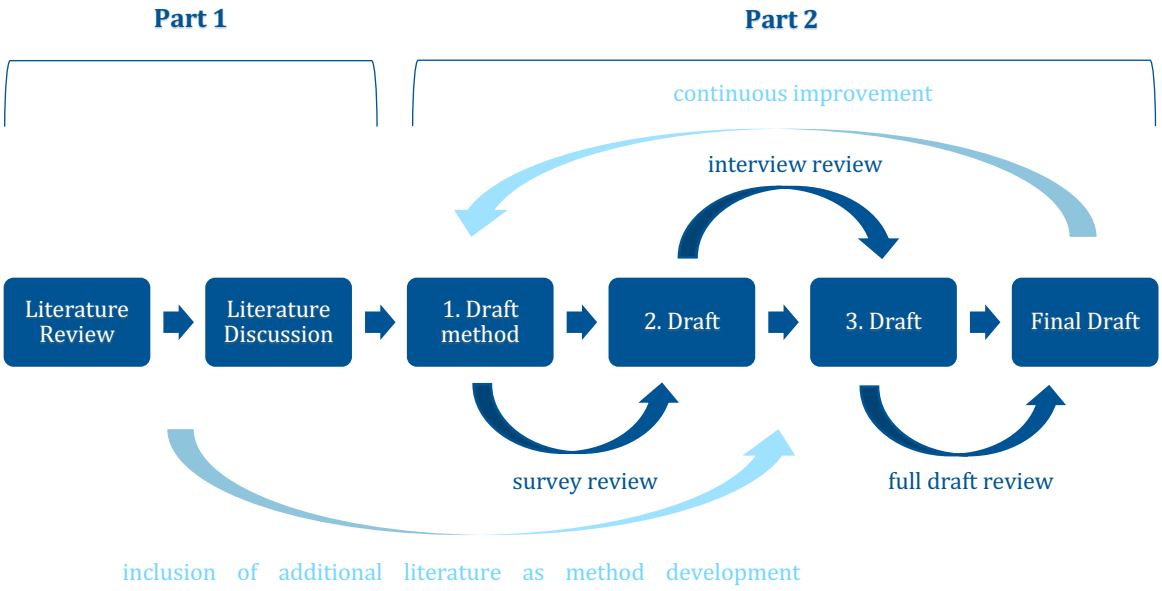

Figure 1: Thesis methodology

The first part consists of the literature review and discussion chapters. The literature review was used to further narrow down the problem that the thesis aims to address, that is key challenges in EbA, and to get an overview of the theoretical background of EbA, and evaluation and outcome appraisal approaches that can support the method development. The findings from the literature review were then discussed, in order to form the conceptual and methodological foundation of the method. Additional literature was included during the method development process, to support ideas and corresponding arguments as they surfaced.

The literature review is not thematically exhaustive but focused to address certain criteria. These criteria are elaborated on in the respective chapter and sections. Literature was mainly identified through key word searches in online search engines (Google Scholar, Web of Science, Lund University Library Catalogue) and cross-references from

literature. The main key-word search in these online search engines was "Ecosystem-based Adaptation". When an EbA key-challenge had been identified, key-words for that challenge, such as "complexity" or "trade-offs" were used find more literature. A very large amount of EbA literature has been published in the past 10 years (since 2009), including peer reviewed journal articles and books as well as grey literature published mainly by organisations working with EbA. Google Scholar alone yields approximately 23 000 results for the search "Ecosystem-based Adaptation". Key-word searches were complimented with literature suggestions from thematic experts (key-informants and author's professional network) and pertinent online knowledge sharing websites (www.betterevaluation.org; www.weadapt.de; www.adaptationcommunity.net). Cross-references were mainly found within publications, that is rather than looking only at the reference list, possibly relevant new literature was mostly found in paragraphs that related to the thesis. The literature review was concluded, when no more criteria for the method, that is more key challenges of EbA, could be found. Furthermore, key-informants of the method review process provided feedback on the method criteria, which supports the assumption that saturation had been achieved. Overall, this research process was deemed reasonable for the purpose of identifying literature that could support the development of the method and the overall thesis argument

The second part of the thesis consisted of the iterative development of the method. As a first step, the initial method was drafted, based largely on the discussion findings. The structured review process of the method consisted of three rounds, namely a survey, semi-structured interviews and a semi-structured full draft review, which were all targeted at key-informant EbA experts. Each review round had a specific aim and criteria for the method (see corresponding sections in Appendix 3). The results of each review were incorporated as much as possible into the following method draft. This process led to four drafts, of which the last draft represents the conclusion of this research (see chapter 7 for last draft).

For the method review rounds, it is important to note that the review survey was not an opinion poll but targeted to specialists in a niche area and a supplement to the key-informant interviews. Key-informant surveys were conducted to review the indicators

based on their applicability and relevance. The method methodology was reviewed through key-informant semi-structured interviews, which provided room for follow-up questions that were expected to arise due to the innovative approach of the developed method. Key-informants were selected based on their expertise and availability, thus their opinions may not represent the full spectrum of EbA experience and the methodology review is detailed in quality but limited in quantity. With responses from the key-informants, an updated full method draft was sent to two experienced EbA professionals, one each focusing on academics and practice. The aim was to get feedback on draft form, perceived usefulness and criteria fulfillment of the method. This review strategy ensured that the method has been thoroughly reviewed alongside its development; however there has not yet been a first project setting application.

Overall, the thesis methodology supported the development of an EbA process and outcome appraisal method that is rooted in scientific research and fulfils the self-imposed criteria satisfactorily, without claiming to be complete. As such, the method should be understood as an attempt to grasp and explain realities, without appropriating absoluteness or truthfulness.

4. Research Limitations

Some research limitations exist. Firstly, the literature review was not based on a scoping study; thus, it does not represent the full range of academic and grey literature publications on the topics. This affects the key EbA challenges and theoretical grounding of the method which were identified through the literature review and only with limitations subjected to expert review. Consequently, the self-imposed criteria for the method, which were derived from the literature review, suffer the same limitations. However, the depth of the literature review was believed to suffice its aim, that is supporting the method development. This applies especially to key challenges of EbA, which are well articulated in literature. Therefore, the selection of self-imposed method criteria was thought to be appropriate.

Secondly, the method reviewers may be biased towards a similar understanding of climate resilience, adaptive capacity, and EbA concepts to the author's. Respondents to the survey, semi-structured interviews and the semi-structured full draft review came mainly from the author's circle of professional network, recommendations and were then snowballed. To mitigate this bias, survey respondents from various organizational affiliations and geographical foci were approached and the survey was publicized online[3], aiming to recruit more participants.

Thirdly, the chosen review methods have inherent limitations. As the review did not include a practice application due to time and resource constraints, it is impossible to attest practical usefulness to the method resulting from this thesis. However, the thesis shows that there is potential in a narrative approach for learning-centered EbA appraisals. The method takes a step towards the application of such an approach in practice, thus, it is useful despite the limitations of only a theoretical assessment. Surveys' and questionnaires' relevance are limited by the choice of questions and possible

[3] The survey was publicized on LinkedIn (https://www.linkedin.com/feed/update/urn:li:activity:6506468795840757760), Global Climate Adaptation Partnership UK Ltd blog (https://www.climateadaptation.cc/news-blog/entry/survey-on-climate-resilience-adaptive-capacity-indicators-in-eba) and weadapt EbA discussion forum (https://www.weadapt.org/forum/survey-climate-resilience-adaptive-capacity-indicators-in-eba).

answers, and the resulting constraint of information depth that can be derived (Choy, 2014). However, survey questions were chosen with great care and surveys are one part of a three-stage review process. Semi-structured interviews are limited in their representativeness, given that sample sizes are usually small (Adams, 2015; Choy, 2014). As the review was not aimed to be representative, this limitation is less applicable to the thesis. Despite these limitations, the chosen methods were believed to be appropriate for the aim of each review round and the explorative approach taken in this thesis research.

Lastly, the three review rounds of the method included only a small number of reviewers (six survey respondents, two semi-structured interview participants, and two semi-structured full draft reviewers). This thesis did not undertake empirical research. Nor does it claim that the resulting method is complete, absolute, or more truthful than other methods, however, it does claim to be a first step towards the use of narrative-based EbA appraisals in practice. The sole aim of the review rounds was to support the method development process and to assess the method's self-imposed criteria fulfillment. Hence, the number of reviewers was deemed reasonable.

5. Literature Review

The literature review was aimed at providing the knowledge foundation for the method development process. Two main subjects were pursued: EbA and appraisal approaches. The conceptual background of EbA as well as its efforts' key challenges were reviewed in order to operationalize relevant theory and identify criteria that the method was expected to fulfill. Furthermore, a variety of evaluation and outcome appraisal methods that were broadly found to be useful in the EbA context were reviewed.

5.1. Concepts Applied in Ecosystem-based Adaptation and Their Operationalization

EbA is based upon the concepts of resilience and adaptive capacity. Strengthening SES resilience, often through increased adaptive capacity, commonly underpins adaptation and EbA change logics (Folke et al., 2010; Folke et. al., 2005; H. Reid & Shafiqul Alam, 2017), even though this relation is not generally agreed upon in the scientific community (Bahadur et al., 2013; Schipper & Langston, 2015). Adaptive capacity, also referred to as adaptability, has been described as a precondition for, or part of resilience (Engle, 2011; Folke et al., 2010). While these two concepts are rather well covered in academic literature, often pertaining to SES, climate change, or environmental issues, it is their operationalization that supports climate change adaptation and their development in practice. Frameworks and indicators to measure resilience and adaptive capacity are plentifully available, however, significant shortcomings have been identified in the robustness and accurate representation of change in M&E results (see for example on adaptation indicators GIZ & IISD, 2014; for M&E challenges see GIZ, 2017d; Christiansen et al., 2016). Despite these apparent issues in methodologies, some common notions about resilience measurement can be found. These include the acknowledgement that the resilience definition influences what is to be measured; the high context dependency, which bars the use of universal indicators (Bahadur et al., 2013; Schipper & Langston, 2015); and that resilience can be divided into characteristics or areas, even though it is not agreed upon which of these constitute resilience (Bahadur et al., (2013); such areas are for example society, economy, and health, see also Cutter et. al., 2010).

Resilience of SES has been defined by Folke et. al. (2005, p. 443) as "[…] the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks." For a SES to be resilient, it must be able to persist, adapt, and transform, as the authors describe. More precisely, to be resilient, a SES needs the ability to understand drivers inside and outside of itself and the leadership to respond to changes in these drivers, while remaining in a state of continuity of SES functions (referred to as "stability domain", Folke et al. (2010) p.3 of original scan). Additionally, the ability to transform to a new state of continuity with new function but essentially the same elements, either intended by the SES or forced by crisis, is the basis of SES persistency (Folke et al., 2010).

Similarly, Becker (2014) defines and operationalizes resilience as the capacity of a SES to develop towards a goal despite setbacks and adversity. To be able to do so, the SES needs the interconnected abilities to recognize, anticipate, learn, and adapt to undesired change or disruptions (Becker, 2014).

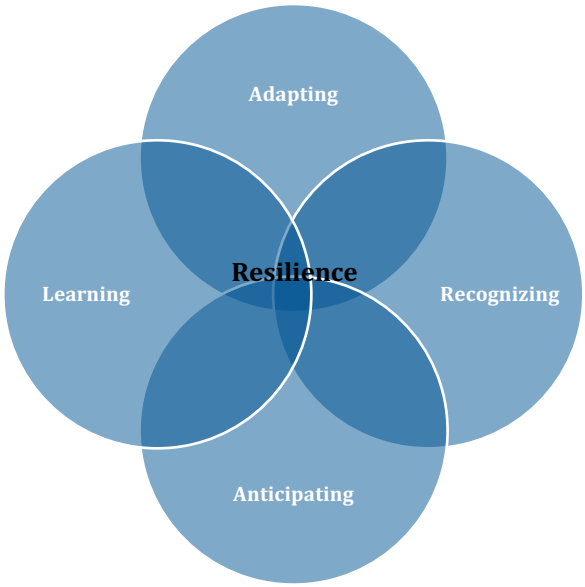

Figure 2: The interconnected abilities for resilience, adapted from Becker (2014)

In the development, disaster management and adaptation field, the concept of **equitable resilience** has been studied and made assessible for practice by Matin et. al. (2018). According to the authors, equitable resilience refers to resilience of the SES that "(…) takes into account issues of social vulnerability and differentiated access to power, knowledge, and resources" (Matin et al., 2018, p. 198). The equitable strengthening of resilience may never lead to enforced or increased vulnerability of others. Thus, one aims to increase the resilience of a SES in a morally just way, based on the perspective of the subjects belonging to the SES. These perspectives of SES subjects include their position within the SES, their realities, and identified needs for change to balance power more evenly. Addressing resilience across, and on, all geographical, temporal, social and political scales is argued to help prevent that activities to strengthen resilience on one scale increase vulnerability on another. When system failure prevents resilience, it may be necessary to transform the system from within, for which social learning processes are believed to be highly relevant (Matin et al., 2018).

The thesis adopts the climate resilience definition of Welle et. al. (2014, p.3), stating that climate resilience is "[…] the ability of social-ecological systems to absorb and recover from climatic shocks and stresses, whilst positively adapting and transforming their structures and means for living in the face of long-term change and uncertainty". This definition is believed to capture the essence of the previously introduced interpretations of (climate) resilience.

Mcleod et al. (2016) identified factors for **adaptive capacity** in a study with academic experts for climate change adaptation, and local stakeholders in Micronesia. Overall, 19 factors for adaptive capacity were pinpointed by academics and stakeholders, of which key factors pertain to learning, leadership and resources. Being able to recognize, understand and learn from climate or hazard occurrences in combination with the leadership to take appropriate action, were found to be important elements of local adaptive capacity. Social interaction and support through networks and groups in the community can strengthen adaptive capacity, if these are inclusive to all community members and address adaptation to and coping with climate change and disasters of its

members. Furthermore, equitable access to monetary and in-kind resources, such as credit and building material, can allow adaptation (Mcleod et al., 2016).

A framework to assess local adaptive capacity has been developed by Jones et al. (2010). Adaptive capacity is described as the interdependent result of five characteristics, namely asset base, flexible and forward-thinking decision-making and governance, innovation, knowledge and information, investments and entitlements. These characteristics can enable or hinder each other, for example, an underdeveloped characteristic of knowledge and information may inhibit innovation, while the opposite can be assumed to have an enabling effect. However, a better understanding of the interrelatedness and influences between the characteristics in practice is needed (Jones et al., 2010).

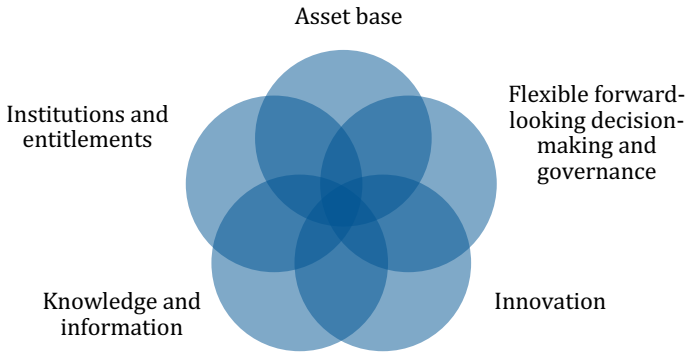

Figure 3: The relation of adaptive capacity characteristics (Jones et al., 2010)

Engle (2011) describes adaptive capacity as the ability of a system to moderate the pursuit of either maintained stability (resilience) or transformation to a new stable state (new system identity). The more adaptive capacity a system has, the higher the chance that the result of this pursuit will be desirable. Thus, adaptive capacity is a system attribute that is always positive, whereas resilience may be negative if an undesirable state is maintained. The author acknowledges that there is a dissonance in resilience research about the in- or exclusion of transformation in the concept (read more in the discussion chapter).

The thesis adopts the definition of Jones, Ludi, & Levine (2010, p.2) stating that adaptive capacity is "[…] the ability of a system to adjust, modify or change its characteristics or actions to moderate potential damage, take advantage of opportunities or cope with the consequences of shock or stress". This definition is found to combine the previously introduced adaptive capacity interpretations well.

It becomes clear that there is considerable disagreement over the definition of and contributing factors to resilience and adaptive capacity. In the case of resilience, the use of the term in a number of different disciplines, as well as its inflated application in recent years, may be two reasons for this dissonance (Hagelsteen & Becker, 2014; R. Reid & Botterill, 2013). Adaptive capacity appears to be overall less ambiguous than resilience and easier to grasp in practice (Nyamwanza, 2012). For EbA, the operationalization of resilience and adaptive capacity is a prerequisite for planning and implementation. Of similar importance is the ability to appraise these intended but also unintended processes and outcomes, to understand and shape local adaptation as well as to identify patterns of likely success.

5.2. Key Challenges in Ecosystem-based Adaptation

The implementation and M&E of EbA efforts faces some challenges. **Interdisciplinarity** due to its aim of addressing climate change adaptation needs of the SES through the combined use of biodiversity and ecosystem services (BES), and sustainable socio-economic development (FEBA, 2017; Lo, 2016; Scarano, 2017). To realize the potential of enhanced impact through the cooperation between conservation and community development organizations (H. Reid, 2016; H. Reid & Shafiqul Alam, 2017) and to enable stakeholder participation, EbA M&E methods need to be usable by individuals with various (professional) backgrounds.

EbA projects are situated in contexts that are best analyzed from a **SES** perspective (Folke et al., 2010; Garmestani, 2014; Lo, 2016; Matin et al., 2018). This perspective highlights

the interconnectivity of humans and the environment, more specifically, it accounts for the influences and dependencies that exist between the two. Such SES are characterized by **complexity** and **non-linearity**, which refers to the attributes of self-organization and emergent behavior. These characteristics lead to **uncertainty** over SES development (Folke et al., 2010; Garmestani, 2014; H. Reid & Shafiqul Alam, 2017).

Long time horizons of EbA measures are a result of multiple factors. First of all, multiple years are often needed to rehabilitate and restore ecosystems or parts of it, before impacts of these activities can be observed (Cunningham et al., 2015; Rizvi & Van Riel, 2014; UKCIP, 2011). Secondly, the non-linear processes and progress of EbA efforts and the context they are embedded in requires that time is available. Starting or furthering a local adaptation process requires considerable time. Social learning, leadership, governance, and management process for ecosystem management and continuous adaptation cannot be built quickly (H. Reid, 2016; Rizvi & Van Riel, 2014). Furthermore, EbA processes need flexibility to allow for experimentation, the review of objectives and project pathways as well as reorientation and realignment as new understanding and needs about uncertain climate change effects and SES develop (H. Reid & Shafiqul Alam, 2017; UKCIP, 2011). When projects are prematurely evaluated for their outcomes and impact, an opportunity to learn about their development and actual impacts (rather than expected impacts in the future) is missed (Dinshaw et. al., 2014; Rizvi & Van Riel, 2014).

Common challenges in adaptation, including EbA, are the management and evaluation of **trade-offs**, that is adaptation benefits that come at the cost of a missed opportunity for, or loss of, another benefit. Trade-offs can occur in a variety of forms, such as temporal, spatial, or social (Eriksen et al., 2011; Magnan et al., 2016; H. Reid & Shafiqul Alam, 2017; UKCIP, 2011). For example, the investment in adaptation today comes at the cost of reduced funds for other pressing needs. Being fully aware of possible trade-offs and determining their agreeableness between stakeholders is an important measure to ensure that adaptation processes are equitable and effective (H. Reid & Shafiqul Alam, 2017; UKCIP, 2011). Poorly managed trade-offs, on the contrary, can ultimately lead to

maladaptation, when measures result in situations worse than without them, in the SES or elsewhere (Magnan et al., 2016).

With all recognized benefits, EbA may prove insufficient when ecological tipping points are reached, which lead to fundamental changes in the ecosystem, including but not limited to biodiversity loss, reduction in ecosystem services and human well-being, and possibly global effects (CBD, 2010). Arguably, it is therefore even more important, to initiate and strengthen adaptation processes in EbA projects that facilitate adaptation decision-making in the face of possible rapid and extreme ecological changes.

5.3. Evaluation and Outcome Appraisal Approaches

To guide the development of the method, a selection of evaluation and outcome appraisal methods were reviewed. Approaches that were later directly used in the method are covered more in depth. Other approaches that inspired the method, but were not directly used, are included very briefly.

Outcome Mapping (OM) was developed by the Canadian International Development Research Centre in 2001 and has been applied and refined since (Smutylo, 2005). It is an approach to the planning and assessment of social change projects, based on the assumption that development outcomes are changes in behavior that can be logically contributed to interventions or actions, while recognizing that these changes occur in a non-linear process, often without direct cause and effect relations. The underlying thought of outcome mapping is that projects only bring in stimuli, such as resources and ideas, for a limited amount of time that can support the change process, while the actual change is driven by the local stakeholders, referred to as "boundary partners". It is thus, as the name suggests, an approach that focuses on outcomes, rather than outputs. Outputs are believed to be essential parts of behavioral change, because a change in state (output) is argued to correlate to changes in behavior, relations, activities or actions of the boundary partners. However, outputs are expected to be maintained or developed through outcomes. Planning for, measuring and evaluating outcomes is therefore thought to be a principal action for the successfulness of social change projects. Outcome Mapping is a three stages and twelve step process, requiring significant time commitment if applied

from project start to end, yet, it is possible to adapt it to compliment other project management approaches or later stages of a project (Earl et. al., 2001; Smutylo, 2005).

The **Most Significant Change (MSC)** technique is an outcome appraisal approach developed by Rick Davies in the mid 1990s that uses stakeholder stories to identify qualitative changes. Stakeholders, such as direct beneficiaries or participants and field staff of an organization, are asked to contribute stories they feel constitute significant change in their lives / lives of their project partners. These stories are bound by time, for example within the last month, and are often assigned to domains, such as health or shelter. Stories are usually sent up the hierarchy, from project participants to regional and the head office of the project donor, for example. Each higher level selects one story per domain that it sees as most significant. Whenever stories are chosen, the criteria for selection have to be enclosed and fed back to the previous level. The result at top hierarchy level is a selection of the most significant change per domain, as seen by the donor. The project level staff gains insight into what kind of outcomes the donor wishes to see, among those that have actually been achieved. It is then possible to verify stories, for example through location visits. As the MSC approach does not rely on predefined outcomes, baselines or specific monitoring skills, it is well suited for complex contexts with emergent change and limited monitoring resources. It encourages stakeholders directly and indirectly involved in the change process to take part in the monitoring work (Davies & Dart, 2005).

Utilization-focused evaluation (U-FE) is an approach that is foremost concerned with the intended use and users of an evaluation. It puts emphasis on the design of an evaluation to address the needs of its users for practical use of the evaluation findings. In order to do so, it is argued, that from the beginning of the design stage onwards it must be clear who the intended users of the evaluation are, and what they need to find out through the evaluation, that is the intended use of it. U-FE as an approach to evaluation can take a variety of forms in practice, depending on the intended users and intended use of the evaluation. However, all U-FE based evaluations have extensive stakeholder participation in common is, in order to identify primary intended users as well as what the evaluation shall be used for (Patton, 2008). A comprehensive checklist that includes

all steps as well as primary tasks and associated challenges is available by Patton (2008) and has been further elaborated on in terms of its application in a set of projects by Ramírez & Brodhead (2013).

Composite narrative is a technique used for example, to present interview findings. It is not generally considered an appraisal approach, but the possibility to combine voluminous qualitative data anonymized and in an informative format has led to its inclusion in this chapter. Through the technique, multiple interviews (or other qualitative data) are combined to form a single constructed narrative. This narrative is entirely based on interview transcripts, it is therefore not invented, but rather an essence of similar accounts (Willis, 2018).

Outcome Harvesting is a method to appraise project outcomes. Through a retrospective investigation, evaluators ("harvesters") identify contributions of the project to any sort of outcomes, that is intended and unintended, positive or negative. It is derived from the OM approach (Wilson-Grau & Britt, 2012).

Qualitative Impact Assessment Protocol (QIAP) was developed to understand causal links within a project, that is project interventions and outcomes. It is based on the assumption, that "[…] 'project' activities (X) are contributing causally to a set of impact indicators (Y) under conditions of organized (i.e. not fully chaotic) complexity arising from the presence of interconnected, uncertain and hard-to-measure confounding factors (Z)." (Bath Social & Development Research Ltd, n.d. p.1).

Collaborative Outcomes Reporting (COR) is a method for impact assessment. It is founded on a participatory evaluation approach, which includes technical experts and project stakeholders in the evaluation, and makes use of other appraisal approaches, such as MSC technique (Dart & Roberts, 2014).

Developmental Evaluation can be described as one form of U-FE. It is an evaluation for the specific use of generating understanding about innovation in complex contexts with high uncertainty. It aims to answer questions such as, what are the effects and possible results of the change initiative, and then test these (Patton, 2011).

Contribution Analysis (CA) is a method to explore assumed cause and effect relationships in a project. It seeks to answer questions related to the project's contribution to outcomes, other influencing factors and risks to the envisioned change, based on the Theory of Change methodology (Mayne, 2011).

Participatory Evaluation covers a multitude of evaluation approaches that share their focus on involving project beneficiaries or those affected by a project in the evaluation process (Guijt, 2014).

Overall, this literature review shows that a multitude of approaches are available for evaluations and outcome appraisals. Some of them make use of (parts of) other methods, such as COR using the MSC technique. Furthermore, while none of the methods was specifically designed for climate change adaptation, let alone EbA, many address, at least partially, the challenges that EbA projects have to overcome, such as complexity and uncertainty. It becomes clear, that to a large extent, evaluation and appraisal in climate change adaptation can borrow and use methods that were originally developed for other disciplines. This option is further discussed in chapter 6.

5.4. Narratives in Climate Change and Development Research

Once the decision[4] was made to use narratives as primary data in the method, the use of narratives in climate change adaptation research was reviewed in literature.

Narratives and narrative analysis are rarely used in climate change research, although it has become more common in recent years[5]. Two purposes for the use of narratives in literature surface: communication and sense-making. Narratives have been recognized for their potential to communicate complexity and uncertainty of climate change impacts, for example in scenario planning (Paschen & Ison, 2014; Swart et. al., 2004). Research on

[4] See section 6.1. for the considerations and process behind this decision.

[5] Web of Science has only 57 entries for key words "climate change" and "narrative" in titles, half of these were published 2015 and later. Scenario planning, which may include qualitative input has a longer history, see for example Swart et al. (2004) for more information.

climate change framing, regionally, nationally, and globally, in policy and media, and the associated implications for (in)action also uses a narrative approach (Köpsel et al., 2017; Lück et al., 2018; Moezzi et. al., 2017). For research on (local) climate change sense-making, narrative analysis has been applied to identify reasoning, preferences, and actions (or lack thereof), among others (Arnold, 2018; McQuaid et al., 2018; Scoville-Simonds, 2018). Such analysis findings can be used, for example, to bridge the gap between scientific knowledge and emotional reasoning in adaptation decision-making (Köpsel et al., 2017), or to appeal to the agency that people ascribe to themselves in mitigating and adapting to climate change (McQuaid et al., 2018). Yet, it appears that in the past and present, narratives are not used for appraisals of climate change adaptation, let alone of EbA.

Regardless of the use, narratives and their analysis have been praised for their ability to capture rich contextual data, provision of insight into individual problem framing, solution preferences, as well as values and beliefs that influence peoples' decisions and (non-)actions. (Köpsel et al., 2017; Moezzi et al., 2017; Paschen & Ison, 2014; Swart et al., 2004). At the same time, challenges to the scientific use of narratives, such as concerns over validity, have been pointed out (Moezzi et al., 2017; Paschen & Ison, 2014). Making use of narrative research experiences from other disciplines, such as folklore, may be one approach to overcoming these challenges (Moezzi et al., 2017). However, a need for further work on the use of narratives in climate change research persists (Moezzi et al., 2017; Paschen & Ison, 2014).

Given its very limited presence in climate change research, the use of narratives in development research[6] has been briefly reviewed. Narratives are used to point out the shortcomings of development practice in understanding and addressing local realities in the Global South. Carr (2010), for example, voices the need for researchers and practitioners to become aware of the hidden barriers to participation of local

[6] EbA is also concerned with socio-economic development, which led to the decision to review development research.

stakeholders in development initiatives, which are often concealed in casually shared stories by these stakeholders. As an outcome appraisal method, the MSC technique relies almost exclusively on narratives. Benefits that have been observed in its use include the ability to identify unexpected change, surface the value that is given by stakeholders and donors to particular change over other change, its usability without particular monitoring skills, and the comprehensive information it can capture (Davies & Dart, 2005). Other appraisal approaches make use of narratives, such as COR, CA, and QIAP, although these approaches employ combine (semi-)quantitative methods with narrative or story reporting (Bath Social & Development Research Ltd, n.d.; Dart & Roberts, 2014). Drawbacks and limitations of narratives for research and appraisals are elaborated on in chapter 7.

In summary, narratives are currently not used to their full potential in climate change research. Comparing the expected benefits of narrative use in the adaptation field with the experiences in the development sector shows that the expectations to the narrative approach are reasonable and a further pursuit is advisable.

5.6. Literature Discussion

Some commonalities and differences in the introduced resilience and adaptive capacity concepts and their operationalization for potential use in EbA process and outcome appraisals can be identified.

5.6.1. Operationalizing Resilience for Ecosystem-based Adaptation

With the works of Becker (2014), Folke et al. (2010), and Matin et al. (2018), three complementing strands of resilience thinking are represented in this thesis, namely a (disaster) risk, a SES, and a human-rights focused perspective (in the same order as referenced above). While there are other perspectives, such as health or development, these three have been chosen for their good representation of the challenges of climate change (see chapter one).

The three resilience interpretations are operationalized on a surface level, meaning that they have been each divided into broad abilities. For example, Becker (2014) divides resilience into four abilities of the SES: adapting, recognizing, anticipating, and learning.

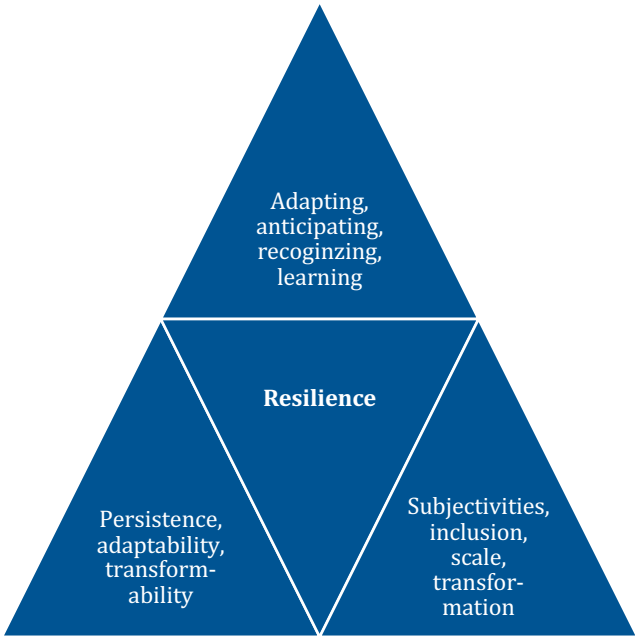

Figure 4: Three resilience interpretations and their operationalization, from top clockwise Becker (2014); Matin et al. (2018); Folke et al. (2010)

Just by comparing the terms used in their conceptualization shows that there is considerable overlap but also differences. One difference is that Becker (2014) and Folke et al. (2010) speak of SES capacities that make the system resilient. Matin et al. (2018) in contrast have identified aspects that make resilience more just, that is the equitable application of these capacities. As the authors write themselves, their aim was to provide through studying relevant literature "[…] ways of analyzing for engaging in resilience practice that […] increases the likelihood of equitable outcomes" (Matin et al., 2018, p. 203). Therefore, their work here is regarded as an analytical lens to the latter method development process (which is an engagement in resilience practice). This decision facilitated the consideration of equity in EbA as a cross-cutting issue, therefore not only limited to resilience and adaptive capacity outcomes, but also in regard to the method methodology.

A major difference in the conceptual understanding of resilience between the three presented works is whether transformation is part of resilience or not. Both, Folke et al. (2010) and Matin et al. (2018) describe transformation or transformability as an element of resilience, that is the ability to undergo major system change in order to overcome systemic failure. Becker (2014) does not include transformation in his resilience concept, however, he also does not exclude it specifically. For example, he recognizes that a crisis may provide a window of opportunity to undergo substantial change and the recovery from such an incident may be a chance to speed forward on the development trajectory of the SES, rather than merely "getting back on track". Furthermore, shifts in system values and development goals are considered by Becker (2014) as a part of the dynamic and emergent behavior of systems. The need for transformative change for sustainability purposes is well articulated in the author's publication, thus, while not included in his resilience concept, transformation appears possible when system values and development goals (or the activities to achieve these) are radically changed (Becker, 2014).

Becker (2014) and Folke et al. (2010) both argue for a system continuum or constant as an attribute of a resilient system, referred to as "development trajectory" (Becker, 2014) or "stability domain" (Folke et al., 2010). It encompasses the system's attempt to remain in a state of constant while undergoing change, adaptation and dealing with adverse events, which is termed as "persistence" by Folke et al. (2010). Becker's (2014) notion is different in a sense that he describes resilience as the prerequisite for stability, that is "development along (the) preferred expected development trajectory" (p.144), rather than stability being a part of resilience.

Adaptability is understood similarly both by Becker (2014) and Folke et al. (2010). It is the ability to remain on the chosen development path or –termed differently– in the current stability state. Becker (2014) distinguishes between five functions that make up adaptation: responding, recovering, preventing, mitigating, and preparing for events and adverse changes that may prevent the development along preferred paths. Folke et al. (2010) are less concrete about what adaptability means in terms of functions but refer to system abilities of learning as well as responding to sources of adverse change within and

outside of the system. On the first glance, this is a more reactive outlook than Becker (2014) argues for, however in their "general resilience" approach Folke et al. (2010, p.3) include the ability to deal with previously not experienced adversity which requires some level of anticipation and recognition.

In summary, there are some differences in the three resilience definitions, mainly concerning whether transformation is included as a part of resilience and how stability is treated, either as a prerequisite or constituent of resilience. However, with some lenience these differences can be regarded as variations in focal points within the respective researches. In this light, one can argue that stability is an important attribute of the SES, regardless of whether it contributes to, or is part of, resilience. Thus, SES stability can be expected to generally enhance resilience. The capacity to transform from one SES constant to another is not part of Becker's (2014) conceptualization. However, one can argue that shared ground of both works is that transformation may in some cases be the only option to remain within system boundaries. Therefore, transformation is in this thesis regarded as a part of resilience, even though it may often be a less prominent part.

Having compared these three resilience concepts, the question of their usefulness and relevance to address EbA challenges remains. Clearly, their rooting in systems theory allows for a good representation of SES complexity. Likewise, is the recognition of the dynamic of resilience conducive to a process-oriented adaptation approach in EbA. Understanding that neither climate change adaptation nor resilience are static, one-time solutions, highlights the need to develop processes over long-time horizons that support the continuous adjustment to changes in and outside of the SES. Applying an equity lens on resilience can help decision-makers to assess and manage trade-offs without perpetuating power-imbalance and discrimination across scales.

5.6.2. Operationalizing Adaptive Capacity for Ecosystem-based Adaptation

Jones et al. (2010) and Mcleod et al. (2016) have operationalized adaptive capacity quite similarly in their respective work. Using the categories as introduced by Jones et al. (2010), the findings from Mcleod et al. (2016) can be easily integrated.

Factor	Jones et al. (2010)	Mcleod et al. (2016)
Asset base	Availability of key assets that allow the system to respond to evolving circumstance	Access to financial (e.g., credit, loans, money) and material resources in community to support adaptation Resilience of key natural resources and ecosystems Perception of equity in accessing resources Presence of climate refugia Adaptation potential of ecosystem Level of biodiversity Level of current livelihood diversification Alternate livelihood opportunities (including subsistence and income-generating activities)
Institutions and entitlements	Existence of an appropriate and evolving institutional environment that allows fair access and entitlements to key assets and capitals	Effectiveness of and access to formal/informal social networks (e.g., women's groups, church groups, youth groups, Council of Chiefs), which may help people prepare for and respond to climatic events in community; social networks may either reinforce or limit adaptive capacity Effectiveness of and access to institutions supporting adaptation
Knowledge and information	The system has the ability to collect, analyse, and disseminate knowledge and information in support of adaptation activities	Local knowledge, practices, and mechanisms to cope with climate events and impacts Presence/effectiveness of conditions that support adaptation leaders (e.g., processes to pass learning from one person to another) Effectiveness of an access to warning mechanisms
Innovation	The system creates an enabling environment to foster innovation, experimentation, and the ability to explore niche solutions in order to take advantage of new opportunities	Presence and effectiveness of learning processes that support adaptation (e.g. extent to which community has processes/culture to stimulate learning through experimentation, to assess outcomes, and to use results to improve adaptation)

Flexible forward-looking decision-making and governance	The system is able to anticipate, incorporate and respond to changes with regards to its governance structures and future planning	Capacity to plan, learn and reorganize in response to hazards/climate events reflects capacity to anticipate the future; without it, any response to climate change will be reactive Effectiveness of leaders in community who can mobilize awareness and resources to better cope with climate change Community awareness of the causes and impacts of climate change How well natural resources are currently managed (informally/formally)

Table 1: Joining factors of Adaptive capacity as identified by Jones et al. (2010) and Mcleod et al. (2016). Direct quotes from the Authors. Factor titles as in Jones et. al. (2010)

Clearly, some abilities overlap or can fit two factors, for example, "innovation" and "knowledge and information" both encompass learning processes. The presence of social networks can also be filed under "asset base" and "institutions and entitlements". This highlights the need for clear terminology, and that the abilities in the complex SES do not (always) fit into set categories but may rather have permeable boundaries which could allow for a better understanding of relationships, influences and connections.

Having merged these two interpretations, it becomes visible that based on the joint experience[7] identified by Jones et al. (2010) and Mcleod et al. (2016), adaptive capacity can be grouped into five factors: asset base, institutions and entitlements, knowledge and information, innovation, flexible forward-looking decision-making and governance.

The application of this adaptive capacity understanding in an EbA context appears well suited. All identified EbA challenges are addressed in this operationalization. A SES perspective is applied, and adaptation is regarded as a long-term process. It incorporates anticipatory abilities to adapt to climate change impacts, while including capacities for reactive coping mechanisms. Furthermore, social trade-offs are considered in the form of

[7] Uganda, Mozambique, and Ethiopia in Jones et al., (2010); Micronesia and from experts with regional expertise around the world (Pohnpei Island; regional expertise of experts covered Asia, Pacific, Africa, Europe, North America, Latin America, Australia in Mcleod et al. (2016))

equitable access to resources and assets as well as equal participation in decision-making processes. Spatial and temporal trade-offs are not directly addressed but can be if one is to assume that "effectiveness" of management, leaders and institutions means that trade-offs are made consciously and fairly. However, this adaptive capacity concept would benefit from a more prominent inclusion of trade-offs.

5.6.3. Appraising Resilience and Adaptive Capacity

The use of indicators for baseline assessments and to measure progress, such as towards increased resilience or adaptive capacity[8], is widely common and presumably just as contested. The need to provide numbers and figures for the work that has been done is understandable from an accountability perspective – did the investment have the impact anticipated? Were funds used in an efficient way? However, the use of indicators for complex concepts that are very differently defined across academia and practice is not without challenges. Which indicators are considered useful and applicable depends not only on the context, but also on the interpretation of the concepts. This leads to a set of heterogeneous resilience measurement frameworks, each influenced by the authors' or publishers' thematic focus[9] (Schipper & Langston, 2015). Additionally, long time horizons pose difficulties for the analysis of changes in baseline data, as a static baseline in the absence of an adaptation project cannot be assumed. This means for example that the baseline of the area cultivated with a certain crop may have changed with or without a project's activities, which makes is difficult to attribute impact (Christiansen et al., 2016; Dinshaw et al., 2014). Christiansen et al. (2016) suggest that the use of monitoring and evaluation approaches from development and other sectors can be an option to address these obstacles. For example, they suggest the normalization of data to deal with shifting baselines. While this may be feasible in some cases, one can expect that other constraints

[8] Adaptive capacity is often regarded as a part of resilience, for example in Welle et al. (2014). Others, such as Engle (2011), point to the resilience (and vulnerability) frameworks to be use for adaptive capacity assessments. Thus, the findings about resilience appraisal partially overlaps with adaptive capacity in this section.

[9] (UN/ISDR for example has a disaster risk focus in resilience while other frameworks neglect this aspect. See Schipper & Langston (2015) comprehensive overview of resilience measuring frameworks.

such as a lack of data, resources and capacity will often prevent the use of statistical data-driven and time consuming techniques (Dinshaw et al., 2014).

To facilitate the assessment of resilience in SES, Welle et. al. (2014) developed a climate resilience matrix. The approach focuses on the interconnected abilities of the SES that are expected to enhance climate resilience. Resilience is divided into three capacities, namely absorption, adaptation and transformation, which are then subdivided into five dimensions each: social, ecological, economic, physical and institutional. The authors highlight the need for good performance in all capacities in order for a SES to be climate resilient, as lacking abilities in, for example, adaptive capacity will prevent system resilience despite presumably excellent abilities in the two other capacities. The matrix is complimented with a set of eight climate-resilient-system characteristics, which are seen as desired outcomes of resilience targeting initiatives. The approach foresees the use of indicators in the matrix to assess the resilience level of a system. Such indicators include, for example, GDP/capita. An online repository of indicators is available and provides guidance to user in indicator selection. Most of these indicators are quantitative (Welle et al., 2014). The climate-resilience-matrix approach is based on a resilience understanding similar to the views presented in this thesis (see section 5.1.). However, just as other resilience assessment approaches, it aims to measure a moment in time and falls short of the need to capture resilience as a continuous process (Schipper & Langston, 2015). Furthermore, a key difference in the conceptual understanding of climate resilience between Welle et al., (2014) and this thesis' author lies in the question whether overall climate resilience is measurable in percental resilience levels. It is the author's view, that such measurements would require knowledge of the absolute, that is a 100% resilient SES—which requires the ability to foresee future climate risks, hazards and SES states.

A different approach to assess resilience has been taken by the United Nations University's Satoyama Initiative (Bergamini et al., 2013). Following a socio-ecological production landscapes (SEPLs) approach, the landscape is regarded as the diverse and dynamic "mosaic" of different land-uses and -types influenced over centuries by the interplay of society and environment. The biodiverse landscape is seen as the basis for human well-being through the use of goods and services derived from it – in the past and

into the future. A resilience survey aids the assessment, understanding, and discussion of local SEPL resilience between local stakeholders, project staff and researchers. The survey comprises four categories with related indicators. The categories include: "ecosystem protection and the maintenance of biodiversity; agricultural biodiversity; knowledge, learning and innovation; social equity and infrastructure" (Bergamini et al., 2013). Rather than collecting quantitative data, respondents choose between five qualitative statements ranging from very poor to very high performance as well as adding a trend (five steps from decrease to improvement) to each answer (Bergamini et al., 2013). In a case study of the application of this method in practice, Morimoto et. al. (2015) identified strengths and shortcomings of the method. On the one hand, key strengths pertain to voicing perceptions of local resilience as well as risks and their mitigation, raising awareness for landscape resilience, and stimulating local efforts for innovative solutions to increase resilience. On the other hand, some shortcomings were identified, such as the language and phrasing of survey questions, which was not always understandable for stakeholders. Furthermore, while the better knowledge of local landscape resilience was noted positive, over the course of a project, it is seen necessary to get an understanding of the change processes and sustainability of keeping landscapes diverse and healthy, rather than a resilience state and (short-term) trend (Morimoto et al., 2015).

Jones et al. (2010) offer limited suggestions for the appraisal of the adaptive capacity characteristics they propose (see sections 5.1. and 5.6.2.). However, the authors point to analyses that concern the structures and quality of the system as means to assess adaptive capacity. This goes beyond the quantitative or semi-quantitative approach taken by Mcleod et al. (2016) and the reviewed resilience measurement frameworks.

In summary, there is little common ground on how to appraise resilience or adaptive capacity. The use of indicators is widely common and there is consensus that indicators need to be chosen for, and adapted to the local context, but little is agreed on how, when and for what purpose indicators need to be studied. This uncertainty applies to the choice of statistical methods and by whom they are to be applied (i.e. project staff, stakeholder participatory, or external evaluators), monitoring and evaluation frameworks, and the

use that is made of the generated data and insight (e.g. accountability, project goals, local adaptation processes). In this light, it may be worth considering other options that are less reliant on quantitative indicators and start asking how one can – rather than should – monitor and evaluate resilience and adaptive capacity.

5.6.4. Addressing Key Challenges of Ecosystem-based Adaptation in Monitoring and Evaluation

There are plenty of suggestions in literature in regard to how M&E can address issues as they are often experienced in EbA. A full list of challenges and how they may be addressed can be found in Appendix 2.

A common notion is the need to integrate M&E as an iterative part of the project from design to implementation, which is expected to facilitate the continuous observation and reflection on changes within and outside of the project, especially at times when project decisions are taken (Christiansen et al., 2016; Dinshaw et al., 2014; Patton, 2011; Terton & Daze, 2018; UKCIP, 2011). The use of participatory approaches in M&E may help address community needs and a better understanding of outcomes (Dinshaw et al., 2014). When assessing outcomes, it is advisable to include avoided and unexpected outcomes, as well as trade-offs that were knowingly or unknowingly made to reach these outcomes. This may require looking beyond the immediate project scope and timeframe (Dinshaw et al., 2014; UKCIP, 2011). Additionally, being able to capture learning about the SES and adaptation outcomes as well as feeding this back into project implementation is an important part of M&E in complex contexts such as EbA (Christiansen et al., 2016; Dinshaw et al., 2014; Patton, 2008, 2011; UKCIP, 2011). These feedback loops may also help to understand barriers to adaptation and how to overcome these (Moser & Ekstrom, 2010).

The MSC technique by Davies & Dart (2005) appears to address some of the key challenges of EbA by capturing and using change narratives. It is a participatory approach to M&E, able to document undesired and unexpected outcomes, as well as providing timely understanding for project decision-making. In the light of the apparent inability of quantitative indicators to capture resilience sufficiently, qualitative indicators may offer a solution.

Overall, approaches and ideas that can address individual or parts of EbA challenges are already existing. Some of the challenges are not unique to EbA and rather well covered in literature, even though the translation into practice may be limited. Other challenges, such as the need to foster adaptation processes or working at the interface of traditional social and environmental action spheres remain a puzzle in EbA M&E (GIZ, 2017d). The following method development process made use of these already existing approaches, while trying to overcome persistent M&E challenges in EbA.

6. Method Development Process

The method development process can be divided into steps aligned with the draft versions[10] that were developed and reviewed. When beginning the work on this thesis, the author did not have any preconceived idea of the later method methodology. Therefore, this chapter provides an overview of the method development process from first thoughts to the end result. Each draft was reviewed, with a summary of the review results included in this chapter, along with each draft description (see Appendix 3 for full reports of review criteria, key-informants and results). A brief overview of the review rounds is provided in table 2.

Review round	Number of reviewers	Review purpose
1. Survey	7	Confirm assumptions & indicators
2. Semi-structured interviews	2	Confirm narrative methodology
3. Full draft review	2	Confirm perceived usefulness

Table 2: Brief overview of review rounds. More information for each review round can be found in Appendix 3.

An initial draft of the method was written, which was largely based on the academic and grey literature identified in the literature review, and the discussion thereof. In a linear process, based on the three review rounds, this draft was further developed, refined and adapted to the feedback and input from EbA, climate resilience, and adaptive capacity key-informants. Each review lead to a new draft version, in order to document exactly which changes had been made to the previous. Reviewers' feedback was mainly in the form of broad suggestions, such as pointing out unclear passages or need for further theoretical founding of the draft. Furthermore, key-informants shared their own experience and observations related to EbA, without being specific about necessary changes in the method drafts (e.g. pointing out individual sentences in need of change). The

[10] All draft versions and other supporting documents are available by request from the author.

incorporation of reviewers' feedback was done to the best of the author's ability; however, it is not possible to be absolutely certain that reviewers' feedback was incorporated to their satisfaction. This is due to the choice that updated drafts would not be shared with the reviewers whose feedback had been incorporated. Time constraints disallowed circling back to reviewers (constrains of reviewers' time and the thesis' timeframe). However, as there were multiple review rounds that indirectly reviewed the incorporated feedback from the previous round, including the last draft (see chapter 7) which has been reviewed by the thesis' examiner.

6.1. Step 1: Initial Draft (1)

The literature discussion lead to some first ideas for the method. The use of narratives was found to be most appropriate for the appraisal of climate resilience and adaptive capacity contributions in the context of EbA, given the challenges that had been identified in section 5.6.3. Inspired and based on the MSC technique by Davies & Dart (2005), some initial plans for the method were made. Note that at this point in the thesis, the appraisal method was only focused on capturing EbA outcomes, which were expected to include the connected processes, but did not foresee that outcomes and processes would be captured separately. Furthermore, the method was expected to be used for end of project appraisals. Both presumptions changed during the drafting process.

First of all, expected benefits of narrative use were noted (see table 3), in order to identify aspects that would have to be included in the method methodology. For example, the expected benefit of retracing adaptation processes would require certain information to be included in the narrative (such as participating stakeholders and influences coming from outside of the EbA effort).

EbA key challenge / method criterium	Expected benefit of narrative collection
Long time horizons	Narratives can be added to over time, thus capturing every development of the long process.
System perspective and the complexity and uncertainty of the SES	Narratives are highly flexible in regard to what they focus on, how and when they are developed, and by whom, thus adaptable to changing circumstances, documenting experimentation, and progress towards new understanding. They can easily incorporate various developments and changes in the SES, most importantly the interaction between its parts.
Fostering adaptation processes	Being able to retrace the adaptation process can provide information on involved stakeholders and their roles, approaches and outside influences that have shaped the process. This can enable the identification of processes that may become standards or are worth reproducing.
Understanding and making trade-offs	Narratives are not bound by geographical, time or social grouping limitations, as they may encompass whatever the narrator wishes to include. They may also contain various perspectives (either as perceived by the narrator or as contributions from co-authors) on trade-offs and general equity questions.
Non-linear development	Narratives can capture any type of complex development that can be articulated.
Interface of the traditional social and environmental action spheres	Narratives are easy to develop and maintain, across disciplines and fields of study. They allow change to be captured by everyone for everyone.

Table 3: Use of narratives in EbA and expected benefits, adapted from Davies & Dart (2005)

Secondly, a set of questions for narrators was composed. These questions should ensure that the narrator addresses relevant aspects that would be required for the analysis and be of general guidance to narrators.

Thirdly, consideration was given to how narratives would be assigned to the indicators. The "domains" that narratives are categorized into in the MSC technique by Davies & Dart (2005), inspired this trial process. A first search explored how software programs categorize text through tagging, thus grouping texts together that are related based on

search words specifically for climate change topics, such as the Climate Tagger tool[11]. Even though a software-based method was not available for this thesis project, the first trial was influenced by automated categorization techniques. The aim was to prevent that narratives are randomly assigned based on the analyst's personal interpretation.

The categorization trials consisted of three rounds:

1. Manual key word trail
2. Software-based key word trial
3. Software-based thematic trial

A collection of EbA outcome reports was used as narratives to try the categorization into indicators. A report by Roberts et al. (2012) on EbA efforts in the eThekwini municipality, which includes smaller towns and the South African city of Durban. The report does not exclusively provide information about EbA outcomes, but also includes some outputs and planned activities. It was nevertheless chosen because of the documented variety of actions on the local government level to implement EbA measures, elaborate provision of outcome (or output) process accounts, municipality employee authorship and its publication in a respected journal.

The first two trial rounds categorized narratives based on key words and short descriptions for each indicator. These short descriptions to the set of indicators for climate resilience and adaptive capacity from section 5.1. are largely based and partially directly taken from the works of Jones et al. (2010), Mcleod et al. (2016), and Welle et al. (2014).

[11] See https://www.climatetagger.net for more information.

First climate resilience and adaptive capacity indicators with short descriptions and key words:

Category and description	Key words
Asset base and satisfied basic needs: Availability and access to, as well as state of key assets that support climate change adaptation. Basic needs in the SES are satisfied.	Ecosystem, biodiversity, livelihood, income, saving, investment, finance, fund, resource, climate refugia, asset, basic needs
Knowledge and learning: Local knowledge of and processes to recognize, anticipate and learn from climate occurrences and impacts.	Knowledge, learning, training, local knowledge, warning mechanisms, early warning, analysis, dissemination, dialogue, discussion, assessment, understanding
Flexible, forward-looking decision-making and governance: SES leadership has the capacity to anticipate, respond to and manage uncertainty and risk. Effective governance structures for flexible and cooperative future-oriented decision-making.	Options, flexibility, uncertainty, decision-making, governance, government, future, plan
Innovation: Experimentation, novelty and inquiry are fostered and supported in the SES through institutions and in society.	Innovation, experimentation, novelty, start-up, improvement, inquiry, trial-and-error, learning-by-doing, new approach
Stability: Ability of the system to cope and recover from climate occurrences and impacts.	Insurance, diversity, persistence, absorption,
Institutions, entitlements and trade-offs: Effectiveness and reach of formal and informal institutions to manage entitlements and trade-offs equitably in the SES across geographic, temporal and societal scales.	Networks, social networks, benefit, trade-off, institution, entitlement, management, partnership, vulnerability, cooperation
Transformability: Ability to recognize the need for, and lead change that transforms the system's structure in anticipation of climate change impacts.	Transformation, evolution, un-conventionalism, progressiveness,

Table 4: Short descriptions and key words for indicators

After trying different approaches to key words as a categorization determinant, it became clear that the initial assumption of key words as categorization methodology was incorrect. During the first round, key words were counted manually in three texts. They

were counted based on their absolute use (counting all key words per indicator) and their variety (counting each key word only once), which lead to the decision that key word variety was more meaningful. The result of counting the variety of key words was seen as less influenced by the style of writing (for example, use of synonyms). This counting approach was then repeated using NVivo software for qualitative research, with a much more elaborate and detailed set of key words and larger text sample (ten texts). However, key words proved to be inappropriate for this purpose. This was due to the variety of information that the text examples included, such as outputs, sub-outcomes, outcomes and generalized statements. Thus, a narrative analysis based on key words could not provide the necessary content analysis needed for meaningful categorization. At this point, the value of capturing EbA process narratives became apparent. Capturing the process towards outcomes is in line with the assumption that adaptation is a continuous process, rather than a result. It was therefore thought that dividing the analysis into four thematic parts was most useful to inform practice and would address some climate change adaptation research needs as identified during the Adaptation Futures conference 2016. These research needs pertain to enhanced understanding of and learning from adaptation effectiveness, progress, impacts and outcomes of adaptation efforts (Klein et al., 2017).

In the third trial round a thematic content analysis was tested. Ten texts were categorized in full or by paragraphs into four main categories: EbA outcome, EbA process, identified shortcomings and undesired outcomes. Narratives in the categories “EbA outcomes” and “EbA processes” were then assigned to the indicators, based on the indicator short descriptions and the narrative content. Working with the texts also lead to the realization that narratives have the large potential of providing information that is relevant during the implementation of the EbA effort. Thus, the expectation of the method application shifted from end-of-project to the full project lifecycle and beyond (if method use is continued).

Part of analysis	Expected analytical benefit
EbA process: any outputs of the EbA process or sub-outcomes, i.e. smaller outcomes that occurred as co-benefits or trade-offs. These can be anticipated or unanticipated.	Enables the recording early on, before outcomes are developed, which helps to document change pathways and progress as well as prevents the loss of knowledge and information. Texts would be categorized based on (expected) benefit or contribution to climate resilience and adaptive capacity factors.
EbA outcome: any main outcomes, that the EbA process has generated. These are substantial changes in behavior, activities or relations. These can be anticipated or unanticipated, however, they must be a desired change.	Documentation of outcomes enables learning about change and change processes. Updating stories can help generate understanding of how outcomes develop further over time. There is no clear cut in regard to when a change becomes an outcome, opposed to it just being a random event. Stakeholder discussion is advised to make this decision.
Identified shortcomings: anything that was identified to be missing, in need of change or a shortcoming in current (as of date the story was written) state to enhance EbA in the future. This could be within or outside of the project's sphere of influence.	This can be a repertoire of "next steps" for the project or issues to bring to public attention/direct it to appropriate decision-makers
Undesired outcomes: any outcomes that have lead or are expectantly leading to undesired change. For example, because it is unsustainable or inequitable.	Learn about maladaptation and other unsustainable and inequitable change. This may include unjust trade-offs. It is possible to move stories from the other EbA nodes here, if they later show to have negative effects

Table 5: Four-folded narrative analysis

It was expected that the four-folded narrative analysis would provide the user with a level of analytical depth conducive for answering the following questions:

a) How has an EbA effort progressed up to now? Which benefits are expected?

b) What sort of process (change pathway) has led to an outcome?

c) Which EbA outcomes have been accomplished and how are they continuing to develop over time?

d) Which undesired changes have occurred?

e) What are the barriers to a full or further development of EbA outcomes?

Narratives are regarded as "living", similar to a diary, which require updating, re-reading, and reorganizing. They are intended to document the "life" of the SES as it is touched by the EbA effort.

The fourth step in the first draft development process pertained to the identification of climate resilience and adaptive capacity limits. Such limits would largely determine the undesirableness of an outcome. Based on the work of Matin et al. (2018), an equity limit was set. Any change that is not equitable, cannot be included as a resilience and adaptive capacity outcome. The same applies to the need for sustainability, based on Becker (2014), which was similarly used as a fixed limit. Acknowledging that mistakes and failure are a part of experimentation and progress in complex settings, it was deemed important to capture outcomes "outside" of these limits, that is unsustainable or inequitable change. The method therefore captures such undesirable change to learn from it and correct it.

With this basic structure of the method in place, a first draft of the method was written. It included an introduction to the method, theoretical concepts and assumptions, limitations and the methodology. With this draft, the first key-informant review round was prepared (see Appendix 3 for details about the review rounds).

6.2. Summary of Survey Review Results

The survey largely confirmed the presumptions of the method. A difference between the method and survey responses was found in the use of quantitative data for the appraisal of climate resilience and adaptive capacity, which was regarded as useful in combination with qualitative data by survey respondents. However, the opinions on the need of precise (that is measurable) data was divided, with equal numbers of respondents agreeing and being indifferent and one respondent disagreeing.

Opinions of aspects that should be addressed through EbA partially conformed to the author's choice: the SES as a whole, and hazards and risk. The equity and human rights aspect included by the author was chosen by one survey respondent only, which might

have been due to the negligent considerations of equity and human rights in resilience building and climate change adaptation (Matin et al., 2018). Exactly for this reason, it was decided to keep this aspect in the method, despite the differing survey responses.

Indicators were mostly agreed to, however the need to clarify and refine the descriptions became obvious. A conceptual difference in the stability indicator, understood as either "bounce-back" or "bounce-forward" ability became obvious. It was kept as a "bounce-forward" ability, as it was seen as an integral aspect of climate resilience[12]. The indicator "innovation" received less support than others, however, as it was chosen by half of the respondents and highlighted in literature (Jones et al., 2010; Mcleod et al., 2016), it was decided to keep it as an indicator.

Overall, the survey results showed that the first method draft needed some refinement but was a good foundation for the method's further development.

6.3. Step 2: Post-Survey Draft (2)

Based on the feedback and input from key-experts through the review survey, two major changes to the initial draft were made: the inclusion of quantitative data and refining of climate resilience and adaptive capacity indicators.

The use of quantitative data was not addressed at all in the first draft, which exclusively focused on qualitative data (narratives). In the second draft, quantitative data was acknowledged to be useful whenever appropriate and meaningful, and decided to be included in narratives, an approach taken also by Davies & Dart, (2005) in the MSC technique.

The indicators were not changed; however, the descriptions were adjusted in order to improve their accurateness and clarity (see table 6). '

[12] A terminological ambiguity of "stability" as a bounce-forward ability and "adaptability" surfaced. However, this discussion is beyond the scope of this research. The terminologically, "stability" refers to an ability that is applied during stressors and adverse events, while adaptability refers to similar abilities that are continuously applied (slow-onset or long-term stressors).

Previous Indicator description	New indicator description
Asset base and satisfied basic needs: Availability and access to, as well as state of key assets that support climate change adaptation. Basic needs in the SES are satisfied.	**Asset base and satisfied basic needs:** Livelihoods in the SES are sustainable and support climate change adaptation.
Knowledge and learning: Local knowledge of and processes to recognize, anticipate and learn from climate occurrences and impacts.	**Knowledge and learning:** Ability to learn from change and making use of evolving knowledge about climate occurrences and impacts.
Flexible, forward-looking decision-making and governance: SES leadership has the capacity to anticipate, respond to and manage uncertainty and risk. Effective governance structures for flexible and cooperative future-oriented decision-making.	**Flexible, forward-looking decision-making and governance:** SES leadership has the capacity to anticipate, manage, and respond to change, including uncertainty and risk. Governance structures promote flexible and future-oriented decision-making.
Innovation: Experimentation, novelty and inquiry are fostered and supported in the SES through institutions and in society.	**Innovation:** Experimentation and the application of novel ideas is fostered in the SES.
Stability: Ability of the system to cope and recover from climate occurrences and impacts.	**Stability:** Ability of the system to cope and evolve from climate occurrences and impacts.
Institutions, entitlements and trade-offs: Effectiveness and reach of formal and informal institutions to manage entitlements and trade-offs equitably in the SES across geographic, temporal and societal scales.	**Institutions, entitlements and trade-offs:** Evolving institutions regulate equitable access and use of public assets and natural resources, as well as fair trade-off making across geographical, societal and societal scales.
Transformability: Ability to recognize the need for, and lead change that transforms the system's structure in anticipation of climate change impacts.	**Transformation:** Ability to recognize the need for, and lead change that shifts the system's purpose and objective in anticipation of climate change impacts.

Table 6: Changes to indicator descriptions, first and second draft

A new section was added to the draft, with basic instructions on how to make use of collected narratives. The principle of UfE by Patton (2008) to be intentional about use and

users of evaluation results was adopted. Some examples for analysis as well as potential use of analysis results were given, in addition to the analysis of EbA outcomes' contribution to climate resilience and adaptive capacity. These included the analysis of common traits of change, which may be used to adjust project assumptions or plans.

6.4. Summary of Semi-structured Interview Review Results

The two semi-structured interview respondents had positive opinions about the use of narratives in EbA. It was pointed out that capturing processes and outcomes through narratives can provide contextual insights, foster learning from sharing mistakes and failure accounts, and support adaptation communication. Overall, respondents expected narratives to address complexity and uncertainty challenges in climate change adaptation. However, challenges were foreseen in the ability to capture narratives, especially genuine narratives, that include mistakes, and the associated problem of narrative verification.

The updated indicators received divided feedback, with one interviewee regarding them as appropriate, and the other stating that their high level of generality and abstraction prohibited their usefulness. Furthermore, one interviewee stated the relationship and purpose of the indicators to be unclear and pointed out gaps in the theoretical founding of the method. This identified gap may have been partially due to the shortened method draft that interviewees received, which did not include the full theory section.

Including thresholds of the EbA process in the method was suggested by one interviewee; a notion supported indirectly by the second interviewee. Capturing turning points, when a critical mass for action or a decisive decision-making point has been reached was seen as beneficial for learning about adaptation processes, as it may provide insight into non-linear development and hidden influences. The non-linearity of adaptation processes was further commented on by both interviewees in regard to undesirability, which may be part of the process leading to improved resilience.

Some feedback was given to the guiding questions in regard to their precision and wording. The overall categorization methodology was commented on by one interviewee,

who approved it as a starting point, which may need refinement once narratives were present.

The review results showed that on the one hand, the method draft required changes in the indicators, given that the two respondents' feedback opposed each other. Including thresholds, elaborating the theoretical foundation, and refining the undesirability category was further needed. On the other hand, the feedback suggested that the overall methodology and especially the use of narratives were well chosen.

6.5. Step 3: Post- Interview Draft (3)

Substantial changes were made to the method draft based on the interview results. Furthermore, sections were filled in and edited for coherency, as the following review round required a full draft.

The climate resilience and adaptive capacity indicators were renamed to "characteristics" and minor changes were made to the descriptions. The change in name was made based on a shift in the theorization of how these characteristics were to be understood. As indicators, it was not possible to define and measure climate resilience and adaptive capacity to satisfying precision without compromising the expected benefits of narrative use. More precisely, it was feared that by narrowing down the indicators to enhance precision, the spectrum of narratives that could represent the indicator would be limited too much. For example, defining the knowledge and learning indicator to changes in the access to climate information (measured through stakeholder's perception of more or less access), would negatively influence the valuing of narratives pertaining to other aspects of knowledge and learning for climate resilience and adaptive capacity, that may be contextually more relevant than access (such as communication or passing-on of knowledge).

With this dilemma at hand, it was decided to rename the indicators to climate resilience and adaptive capacity characteristics, which avoids the need to fulfill clarity and other indicator requirements but maintains the broadness and equality of narratives. Therefore, the drawback of being unable to measure contributions to climate resilience and adaptive capacity was weighed less in comparison to the benefits of capturing

narratives pertaining to abstract characteristics. This resulted in the final transition from a pure appraisal to a learning-centered appraisal method, which had been building up. The transition did not affect the research question or aim, as the thesis remained focused on offering a mean to appraise EbA efforts' contribution to local climate resilience and adaptive capacity.

More room was given to the theoretical background of the method, in order to explain and locate the method within theory. This change was expected to allow readers to gain a better understanding of the presumptions that the design and methodology of the method are based upon, ultimately improving the acceptance and use of the method. A section on thresholds was added, explaining their meaning and applicability in EbA. Furthermore, the presumptions related to climate resilience and adaptive capacity processes and outcomes was elaborated on in more detail and supported with illustrations.

Fictional example boxes were further introduced to the method draft. The suggestion to add examples came directly from an interviewee, in order to improve the accessibility of the method and highlight the narrative format. Examples are mostly short and oversimplified narratives, no more than a few sentences. While these examples are loosely based on real cases, they were not conceived from specific sources, but from memory and imagination and are thus entirely fictional. These examples were mostly, but not exclusively, incorporated into the theoretical background of the method, as this section was seen in most need of additional illustration.

Lastly, undesirable outcomes were adjusted to interviewees' responses. Minor changes were necessary to acknowledge that a process or outcome may fulfill the criteria of undesirability for a short time before it transitions to exceed climate resilience and adaptive capacity compared to previous levels. Thus, short-term undesirability was included as a possibility in the desirable climate resilience and adaptive capacity process and outcome spectrum. To ensure that such processes and outcomes would be recognized as problematic and in need of close attention, it was decided to document them despite their desirability in the undesirability category, from which they can be moved once they have progressed to equity or sustainability.

6.6. Full-draft Review Results

The review results suggest that the post-interview full draft was well underway to fulfill the set criteria. Some structural changes were suggested to improve the flow of the text. For example, the section on trade-offs and maladaptation was stated to be better located in the theoretical background of the method. Furthermore, the accessibility of the method was found to be in need of improvement. Repackaging of information and the clarification of the relationship between theoretical background and methodology was proposed by the reviewers.

All of the objectives the method aimed to achieve, which were set as review criteria (see chapter 2 or Appendix 3) were assessed as at least "somewhat fulfilled". Three out of six criteria were assessed as "fulfilled" by both reviewers. One reviewer regards all, but one criteria as fulfilled. The other reviewer assessed half of the criteria as fulfilled. The reasons for only partial fulfillment concern the skills and capacity required in the narrative analysts, namely adaptation and resilience thinking and familiarity with terminology, as well as qualitative research skills for the systematic collection and analysis of narratives. One key shortcoming of the method's objectives that may not be possible to fulfill is the comparison of narratives over time, that is between past and contemporary narratives. It was stated by one reviewer that it might be impossible to identify patterns in narratives that are distant in time.

In summary, the last review round provided some valuable insight into how the draft form and method is perceived by first time readers. Gaps that are critical for its usability were pointed out, especially pertaining to the structure and language, and concrete suggestions that can strengthen the method were stated. The result of the assessment of the method criteria is promising, and shortcomings can be partially addressed with some adjustments.

6.7. Step 4: Post-Full Review Draft / Last Draft (4)

Based on the feedback received by the two reviewers, the main task was to make the text and information it contains more accessible und understandable. This included adding a graphic to illustrate the connections between climate resilience and adaptive capacity characteristics, as well as a guidance box summing up the narrative categorization

process. The new graphic was further accompanied by a paragraph explaining the choice of climate resilience and adaptive capacity characteristics. The section on trade-offs, maladaptation, and limits to adaptation was restructured and moved to the theoretical background, based on the suggestion from one reviewer.

The opening paragraphs were added to, in order to provide more background to climate change adaptation in general and EbA specifically. Where appropriate, references were added to the draft, to give due credit to other authors, and to strengthen its grounding in literature. Furthermore, additional sources were used to elaborate on what distinguished EbA efforts from other adaptation approaches.

The layout and coloring of the draft was changed to improve readability and appeal. A table of content was included, and the terminology section was moved to the appendix. Minor changes to wording and sentence structure were made throughout the document, based on highlights for clarification needs by the reviewers.

6.8. Review Conclusion

After three review rounds, using different methods (survey, semi-structured interviews, semi-structured full draft reviews), a last draft has been completed. Revisiting the six criteria set out for the method in the research aim section, it can be concluded that this research has largely fulfilled its objective. The two full draft expert reviewers have assessed that the method addresses all half of the identified key challenges of EbA fully, and half partially. Some gaps to the complete criteria fulfillment pertain, namely the skillset and capacity needed in the narrative analyst to deliver sound results. Furthermore, the goal of making process and outcome patterns comparable over time may be out of reach. Yet, the founding presumption of the benefits associated with narrative use in EbA appraisals has been asserted, and the method has been described as very useful. While this feedback constitutes the predefined end in the method development process within the realms of this thesis, it should not be regarded as the final method product. The method as it is now has not been applied, which would be a much needed practice test to further its refinement and assess its usefulness.

Areas of the method that are especially in need of input from a practical application is the narrative categorization structure and the conceptualization of climate resilience and adaptive capacity hierarchy and relations. The categorization structure of narratives may need to be adjusted, as one interviewee pointed out, once narratives are collected. The four categories may be too simple for practice, and different contexts may require slight adjustments to the categorization, depending on the intended use of the analysis. The relationship and influences between climate resilience and adaptive capacity, as well as their characteristics, functions, and measures are largely unknown in academia and practice. Applying the method in EbA efforts could provide some local insight into these connections and test the underlying concepts. Refinement of the climate resilience and adaptive capacity characteristics may thus be needed. While the draft suggests methods for the collection of narratives, practice tests may highlight which method is most applicable in different contexts.

Some further questions relating to the use of the method in practice pertain to the human capacities and skills of the narrative analyst, and the time and resource commitment that is needed, as well as the appropriateness of the narrative approach across societies. Some information, especially pertaining to the theoretical background, may need to be repackaged to make it more accessible and easier to grasp for non-experts. Unknown is the extent to which narratives need to be collected and the detailed handling of biases to ensure a minimum level of contextual representativeness in the analysis. The chapters on the preparation and use of the method findings are short. While these two aspects of the method were not part of the thesis aim, it would improve the method if more guidance was provided to the user. This concerns especially the missing strategies for wide engagement of stakeholder as narrators. However, it is hoped that the draft at least contributes to the argument for documenting and giving equal worth to all kinds of knowledge, observations and experiences. Lastly, it would be interesting to find out whether the use of the method influences overall communication between stakeholders, priority setting, planning, and other parts of the EbA effort.

Despite these further research and development needs, the method in its last draft form is a mean for practitioners to use narratives in EbA. With isolated but growing cases made

for the use of narratives in climate change research, the method is the first to offer an approach of how to do this for appraisals. Focusing on climate resilience and adaptive capacity characteristics is expected to provide an analytical perspective that enables long-term, cross-sectoral, and system-wide adaptation. Central limitations of EbA, that is equity and sustainability, are incorporated to ensure their consideration, and learning from breaching of limits. Just and inclusive trade-off management and the identification of maladaptation is promoted through the categorization structure. The method has an extensive theoretical background, and the potential to generate a better understanding and fill knowledge gaps concerning the local application of highly abstract concepts like climate resilience and adaptive capacity. It guides the user in the collection, documentation, and management of narratives, while leaving room for further development and context-specific adjustments that enhance the individual user's method application.

In summary, the Adaptation Narrative Analysis method in its last draft can function as the basis for discussion of narrative use in EbA. It invites academics and practitioners alike to reevaluate common monitoring and appraisal approaches, consider unconventional options, and most of all, engage in the further development, refinement, and testing of a narrative approach in EbA.

7. Adaptation Narrative Analysis

This section includes the full last draft method, thus, the result of the entire method development process. Its format has been purposely maintained for two reasons. One, the draft should be read as one coherent piece, as potential users would do. Second, the format supports the tone and language choice for the draft. Integrating the draft fully into the thesis body would have hurt its integrity. However, some changes were made to incorporate this method draft better into the thesis. Please note that the bibliography and terminology / definitions section of the draft are included in the respective section of the overall thesis. Thus, there is no separate bibliography or terminology section for the last method draft provided in this thesis. The draft's table of contents has been removed. This chapter's sections are not included in the thesis' table of content due to its own numbering.

Adaptation Narrative Analysis

Full method guide – version 24 April 2019

Adaptation to current and expected effects of climate change is a concern of global scale. Ecosystem-based Adaptation (EbA) is one approach to adaptation that seeks to combine adaptation, socio-economic development and climate change mitigation benefits through the use of ecosystem services and biodiversity. It is this potential, that has over the last ten years, resulted in the adoption of EbA by actors from the conversation and development professions alike[13].

To further climate change adaptation, the need for a better understanding of adaptation processes, outcomes and progresses was identified at the Adaptation Futures Conference in 2016 (Klein et al., 2017). Adaptation Narrative Analysis aims at addressing this need in the

[13] Organizations working with EbA are, for example, IUCN, Conservation International, UNEP, IFRC, GIZ. Also, see Friends of EbA network of conservation and development organizations.

context of EbA. It aims to provide the methodology for data gathering, and analytical perspective to support learning about how EbA processes and outcomes contribute to climate resilience and adaptive capacity development at the local level. Note that the method does not produce exact results or proof of contributions.

The method is inspired by and builds on existing evaluation and outcome appraisal methods[14], which have been combined, adapted and added to, in order to address challenges in the EbA context. Fictional examples are intended to increase accessibility of the method, although they are simplified for the sake of this research.

1. Introduction

Adaptation Narrative Analysis (referred to as "the method") was designed to support learning about how and why EbA processes and outcomes develop, as well as to appraise their contribution to local climate resilience and adaptive capacity. It makes use of narratives from stakeholders of the EbA effort to capture contexts, actors, influences and occurrences that impacted processes and outcomes. Quantitative data is embedded in these narratives whenever appropriate and possible. These narratives are categorized into seven characteristics (see p.8) of climate resilient and adaptive socio-ecological systems (SES).

The use of narratives provides insights into EbA processes and outcomes that remain usually hidden and are lost from collective memory. Through the method, these narratives can be meaningfully captured and prepared for analysis.

[14] These methods include: Utilization-focused Development Evaluation, Outcome Harvesting, Outcome Mapping, Most Significant Change Technique, Contribution Analysis, Collaborative Outcomes Reporting, Qualitative Impact Assessment Protocol and Participatory Evaluation Approaches.

a) Fictional Narrative Example:

"I work for the municipality, in the environmental department. My colleagues and I are working on eliminating invasive alien species from the area, because these plants need too much water, which leaves none to native species. It is a real problem here. In the past month, we invited some landowners to discuss how we could get rid of those trees on their land. A big question was, of course, who would pay for it – removing and then keeping regrowth at bay. The landowners aren't too interested, because they aren't using the land at the moment. It also seemed like they weren't aware of the threats from alien species. The municipality has a keen interest, but we can't fund the removal on private land due to regulations. So, it's either buying the land or changing the regulations, in my opinion." (this process narrative pertains to issues related to municipal institutions)

b) Fictional Narrative Example:

"In the past three months, 8 flat roofs and 3 facades were planted in the city, that's about 3 football fields. It's a real success! It took so much effort to get everyone on board. The private house owners, tenants, the city's public housing agency, and the city administration – everyone liked the idea from the start but the ideas on how we should do it were very different. I think what really made a difference was the excursion to Detnevni City. Seeing the green roofs and facades there and speaking to their respective counterparts gave the stakeholders the confidence that it was worth the compromises in planning, funding and the nitty gritty details, I would say. We are now working on a draft to change the city's construction regulations that would require all buildings with a suitable roof to be greened." (this process narrative pertains to institutional changes)

1.1. Why should this method be used?

Using this method can provide one with the analytical perspective needed to learn about contributions from EbA efforts to local climate resilience and adaptive capacity of the SES. It can help answer the following questions:

a) How has an EbA effort progressed up to now? What benefits are expected?
b) What sort of process has led to an outcome?
c) Which EbA outcomes have been accomplished and how are they continuing to develop over time?
d) Which undesired processes and outcomes have occurred?
e) What are the barriers to the full or further development of EbA outcomes?

Depending on research needs, further analysis of the data is possible.

The complexity, uncertainty and non-linearity that challenge EbA efforts lead to the assumption that learning about how and why EbA processes and outcomes developed is decisive for long-term climate resilience and adaptive capacity of the SES. Knowledge of the related how and why is expected to facilitate decision-making within EbA efforts to realize benefits and use opportunities. Such learning emphasizes the appraisal of processes and progress towards an objective, which requires understanding of contextual and hidden influences. Narratives can provide such insights. Due to the subjective experience of contexts, narratives are not poof, but evidence of processes, progress and outcomes that cannot be verified beyond all doubt.

1.2. Assumptions and theoretical foundation

This section covers the theoretical foundation and assumptions that the method is based on. It supports understanding of the method's design and the concepts it uses.

1.2.1. Ecosystem-based Adaptation

EbA has been defined as the strengthening of the socio-ecological system's resilience to climate change impacts through biodiversity and ecosystem services; generating co-benefits for climate change mitigation and sustainable development (adapted from Munang et al., 2013; Ojea, 2015; Scarano, 2017). Efforts are expected to fulfill certain criteria and quality standards, in order to be considered as EbA and to avoid maladaptation (see section 1.2.5. for more on maladaptation). These criteria include among others the need to reduce vulnerabilities, generate societal benefits, and strengthen ecosystem health. Furthermore, EbA efforts must be embedded in policy, and promote equitable governance and management of natural resources. Quality standards for these criteria require for example the application of appropriate scales, inclusiveness, community-centered, and gender-sensitive work (FEBA, 2017).

Key challenges in the design, implementation, monitoring and evaluation of EbA efforts pertain to its long-time horizons and non-linear development. Embedded in the SES, complexity and uncertainty of the system and climate change impacts pose obstacles. At the intersection of traditional conservation and socio-economic development disciplines, EbA seeks to realize benefits through a variety of strategies. The method aims to address these challenges.

1.2.2. Socio-ecological system

The method uses systems theory, more precisely, it uses the analytical perspective of SES (also "system" in this text). This means, that humans and the environment are regarded as elements of a system with dependencies, relations and influences. An analytical boundary is given to the system which differentiates between elements that are included and other that are not, however, this boundary does not (necessarily) exist in reality (Becker, 2014). SESs are characterized by complexity, emergent properties and non-linear development. Complexity means that the SES cannot be understood by examining its individual elements. Its properties are emergent because it is undergoing constant re-organizing which changes its properties unpredictably. This leads to uncertainty and non-linear development in the SES (Garmestani, 2014). Through the application of a SES perspective, this method acknowledges system characteristics (complexity, emergence, non-linearity) and the interconnectedness of humans and the environment. It also allows the drawing of analytical boundaries, for example based on geography or sphere of influence. However, drawing boundaries does not allow being blind or indifferent to the effects of EbA processes and outcomes outside of the chosen system.

1.2.3. Climate resilience and adaptive capacity

Due to disagreement in literature about the relationship and influence between adaptive capacity and climate resilience, the concepts are treated as equal with large conceptual overlap (see for example Engle, 2011,). Some characteristics of climate resilient and adaptive systems have been identified in literature (Jones et al., 2010; Mcleod et al., 2016; Welle et al.,

2014). While climate resilience and adaptive functions (e.g. preparedness plans, adaptive management – abilities specific to a purpose) and measures (e.g. rescue equipment, greening of roof – activities and tools for a purpose) will differ between systems, these characteristics (abilities relevant across functions/general abilities) are thought to be universally applicable, regardless of the kind of climate impacts the system experiences.

System function and measures may need to be adapted over time (e.g. preparedness plans need to be adapted to changes such as demographics and climate impacts), while the characteristics are expected to be relevant over long-time horizons.

c) Fictional Example:

The city council of the town Eno has recognized the need to become more resilient to climate change impacts. It has thus passed regulations that requires all city investments to be assessed based on their viability under expected climate change impacts (knowledge and governance ability). The city council commissioned the development of a software that supports the assessment of investments' climate resilience (function). All investments are screened for their climate resilience (measure).

All levels of climate resilience and adaptive capacity (characteristics, functions, measures, see Figure 1) are necessary for the system to sustain climate change impacts.

In practice, the connections and relationships between the levels may be less linear, for example, the presence of the characteristics may not be directly translated into resilience or adaptive measures; there may be some trial and error, time-lags, technical capacity or resource constraints. How the levels influence each other, such as whether the quality of measures influence the quality of functions or vice versa is not known from literature (Jones et al., 2010; Welle et al., 2014). For example, yielding good results from the implementation of flood mitigation measures might or might not influence the quality of flood management strategies. However, as a basic conceptual structure, characteristics of climate resilience and adaptive capacity are regarded as the enablers of adaptation action/activities (Jones et al.,

2010; Welle et al., 2014). Functions and measures are thought to build upon these characteristics. Pictured as a building, with characteristics as the foundation, functions as the walls and measures as the roof, it becomes clear that neither a good foundation nor strong walls and sturdy roof alone guarantee a safe house. It is their joint quality that determines whether the building will be a safe shelter.

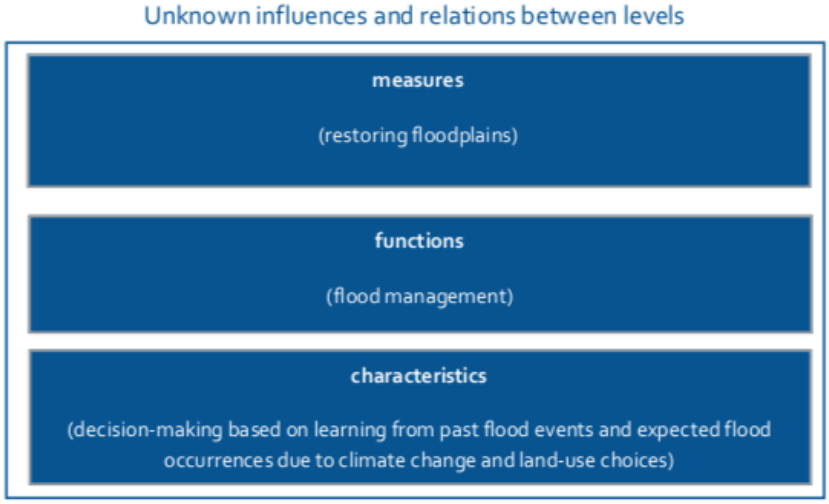

Figure 1: Conceptual hierarchy of climate resilience and adaptive capacity operationalization

There is no general agreement among the scientific and/or practitioners' communities on one set of climate resilience and/or adaptive capacity characteristics. However, there are some resilience characteristics that are more commonly included than others, namely learning, options, and flexibility (Schipper & Langston, 2015). Learning, options, and flexibility are mirrored in the characteristics chosen here, which are expected to provide a more nuanced and detailed operationalization. These resilience characteristics are largely similar to adaptive capacity characteristics (Jones et al., 2010; Mcleod et al., 2016). High adaptive capacity is expected to enable the system to maintain or transform itself, depending on which will likely result in a more desirable state (Engle, 2011).

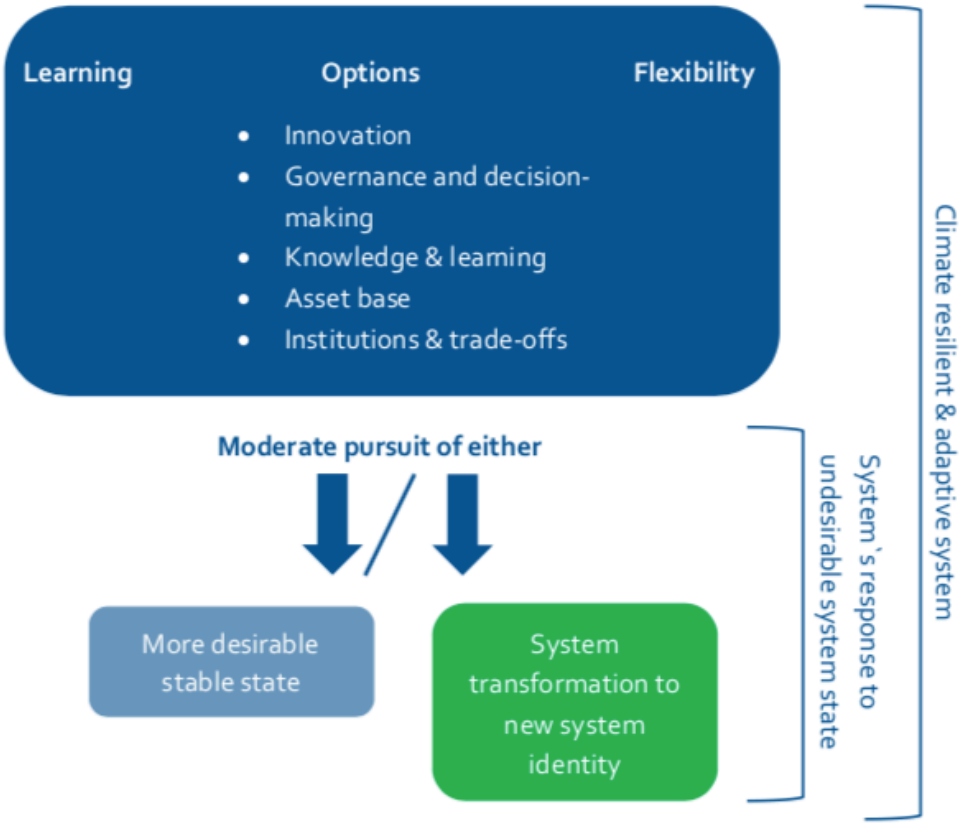

Figure 3: Climate resilience and adaptive capacity characteristics allowing the system to respond to an undesired state. High climate resilience and adaptive capacity is expected to increase the chance of the successful pursuit of a more desirable state. Note coloring significates a slight change in the stable state (state remains largely the same) and transformative change, with new system identity. Lower part of graphic adapted from Engle (2011).

As a result, seven characteristics of climate resilient and adaptive systems were identified (adapted from Jones et al., 2010; Mcleod et al., 2016; Welle et al., 2014). All seven characteristics are assumed to be equally important[15] and only in their combination can they characterize a resilient and adaptive system.

[15] Due to a research gap pertaining to the cross-influences and importance of climate resilience and adaptive capacity characteristics (Jones et al., 2010; Welle et al., 2014).

Characteristics of climate resilient and adaptive systems:

Figure 4: Characteristics of climate resilient and adaptive systems

- **Transformation:** Ability to recognize the need for, and lead change that shifts the system's identity in anticipation of climate change impacts.
- **Stability:** Ability of the system to cope and evolve from climate occurrences and impacts.
- **Innovation:** Experimentation and the application of novel ideas is fostered in the SES.
- **Governance and decision-making:** Ability to anticipate, incorporate, and respond to change, including uncertainty and risk, in regard to the SES's governance structures and future planning.
- **Knowledge and learning:** Ability to learn from change and to make use of evolving knowledge about climate change impacts to inform decision-making.
- **Asset base:** Livelihoods in the SES are sustainable across geographical, temporal and societal scales and support climate change adaptation.
- **Institutions and trade-offs:** Evolving and appropriate institutional context that regulates equitable access and use of public assets and natural resources. Trade-offs are made fairly across geographical, temporal and societal scales.

The characteristics are abstract and will thus need to be built through proxies. Proxies can be a combination of many targeted and harmonized actions within the functions and measures level of the concept. Most importantly, characteristics are not one-time check boxes, but require continuous and evolving development to be maintained and kept relevant in the long-term.

d) Fictional Example:

To increase the town's ability to understand and anticipate local climate change impacts, the municipality has formed a cooperation with a regional research institution. The aim of researchers and municipal administrators is to identify hazards and vulnerabilities under a changing climate in the town and develop mitigation and adaptation plans accordingly.

The process towards climate resilience and adaptive capacity is often non-linear and subjective, meaning that the quality of the system's state (that is the ability to fulfil core functions, such as the provision of livelihoods, ecosystem services) may decrease before it exceeds previous levels, or a sub- system may collapse before it is replaced (also see "Thresholds" below). The quality of the system's state is subjective because it depends on the perspective and scale that is applied. For example, some actors in the system may perceive its quality as poor, while others perceive it as high, when access to good agricultural land is unequal. Furthermore, one process can lead to multiple outcomes, split into multiple sub-processes, or discontinue without reaching any outcome.

e) Fictional Example:

The restoration of mangrove forests along the coast require that these areas are left to regrow naturally for some time. During this period, livelihood sources from the area are unavailable. However, once the mangrove forest has been restored, more sustainable and environmentally friendly livelihood sources can be taken up. (system quality decreases when livelihoods are lost, then exceeds previous livelihood provision once restored)

1.2.4. Thresholds

Thresholds refer in EbA often to the limitations of the ecosystem to function in its current state under climate change impacts and/or other stressors (see for example, Lo (2016); Rizvi & Van Riel (2014); for a literature review on thresholds in EbA, see Doswald et al. (2014)).

Thresholds in the EbA process have, for example, been indirectly identified as success factors or drivers for EbA effectiveness, such as a critical level of the recognition of EbA benefits, "champions" that advocate for EbA, and resources and capacities to implement the measures (Reid et al., 2018). These EbA thresholds correspond with findings from resilience and urban water management research. Johannessen & Wamsler (2017) identified two thresholds; the awareness threshold and action capacity threshold. With a critical level of risk awareness in combination with the ability to act upon resilience measures, a process towards change becomes possible. The nature and development of this change, however, is not foreseeable, that means that the action taken on a perceived risk does not necessarily lead to more resilience and may be non-linear. Overall, a better understanding of EbA thresholds in practice is necessary.

Thresholds are also relevant in the context of climate resilience and adaptive capacity levels (Welle et al., 2014). What amount or quality of climate resilience and adaptive capacity characteristics, functions and measures make the system climate resilient and adaptive? The answer will likely be contextual and subjective.

1.2.5. Limitations to adaptation, trade-offs, and maladaptation

Adaptation efforts, including EbA, have limitations. Any process or outcome of EbA efforts that is inequitable and / or unsustainable in the long-term, cannot contribute towards climate resilience and adaptive capacity (Eriksen et al., 2011; Matin et al., 2018). Both qualities are set as fixed limits to EbA processes and outcomes, which function as the border between adaptation and maladaptation.

Equity refers to freedom from bias or favoritism (Matin et al., 2018). The equity limit therefore excludes all outcomes that are biased against or favoring certain groups or individuals within and outside of the SES. Furthermore, outcomes that perpetuate or increase existing inequalities within or outside of the SES are inequitable. Furthermore, it includes the need for equitable fulfillment of EbA criteria pertaining to inclusiveness,

vulnerability reduction, needs addressing, and capacity development of SES members (FEBA, 2017).

Sustainable development has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations General Assembly, 1987, p.51, point 49). Thus, the sustainability limit excludes all outcomes that deplete or permanently damage resources within or outside of the SES.

Maladaptation refers to adaptation measures that lead to a worse situation than without the measure, for certain groups or in time (Magnan et al., 2016). Due to nonlinearity and existence of thresholds in resilience processes, unsustainable and inequitable processes and outcomes may be acceptable in the short-term, if they are expected to lead to a better state in the long-term or generate more options for future resilience and adaptation decisions. These decisions are trade-offs, which are adaptation benefits that come at the cost of a missed opportunity for, or loss of, another benefit elsewhere, in time or for certain groups. Compared to maladaptation, trade-offs are missed benefits, that is the opportunity for a "better" situation (Eriksen et al., 2011; Magnan et al., 2016; Reid). Trade-offs require case-by-case investigation and agreement by affected parties about their acceptableness and management. Acknowledging and balancing unequal power relations in trade-off management can be one factor in preventing undesired (maladaptive) outcomes (Matin et al., 2018). While trade-offs may be necessary, they require close monitoring to ensure that they are not inequitable or unsustainable in the long-term.

2. How to use this method[16]

Using this method requires considerable time commitment. This is due to the lengthiness of narrative collection, especially in large EbA efforts. While the method can be adopted at a later stage in the implementation of the effort, it is not a one-off application but relies on additions, updates and revisiting of narratives as processes and outcomes unfold.

2.1. Preparation

In preparation of the method use, some considerations and information are needed.

- **Use and users of the method:** Ensuring that the method is appropriate to the intended use and users of its findings (see section "Making use of narratives"; Patton (2008)).
- **Stakeholder analysis.** All stakeholders can be narrators and the more varied their connection to the EbA effort is, the more insights their narratives can provide.
- **Resources:** Ensuring that enough time is available for narrators and narrative analyst to work together. The time needed depends on how many stakeholders are involved and the complexity of the effort.
- **Context analysis:** Knowledge of the EbA effort to place narratives in its context. Includes, for example, vulnerabilities, hazards and present ecosystem services.

Tools are available for stakeholder and context analysis. Stakeholder support for application of the method is important in order to ensure their participation and contribution as narrators and the use of the method's findings.

[16] Note that references/citations in this part of the guide refer to particular aspect of the method that have been adopted from other evaluation methods or appraisal approaches.

2.2. Data choice

The method foresees EbA processes and outcomes to be documented as narratives, that is the documentation as qualitative and subjective accounts (see guidance box 1, Davies & Dart (2005)). The reason for this is to include contextual details and influences that would be lost in mostly quantitative data analysis. It can provide a very rich and complex data set that allows among other things the identification of barriers and drivers of processes and outcomes, as well as how they contribute to climate resilience and adaptive capacity in the SES (Moezzi et al., 2017; Paschen & Ison, 2014).

Guidance box 1:

In the past month, which experience, or observation related to the EbA effort stood out to you the most? Why?

While the method is clearly focused on qualitative methods, the combination with quantitative data can be beneficial for the analysis and learning where such data is appropriate and available. Quantitative data may, for example, pertain to ecosystem services and biodiversity changes, livelihoods, or finance/funding. Quantitative data is embedded within narratives, to ensure documentation of how figures were accomplished (Davies & Dart, 2005). A simple example are changes in the conservation estate, which would require documentation of the decision-making process and participation, as well as trade-off management. A beneficial addition to this narrative would be quantitative information of the size, location, and biodiversity levels, which could allow judgement of the estate's value for biodiversity and comparison over time.

It is up to the narrator and narrative analyst to decide which narratives will benefit from accompanying quantitative data. However, quantitative data may not stand by itself in this method, it must be embedded within a narrative about the process behind it. This is based

on the assumption that learning about EbA processes and outcomes requires information about their how and why.

2.3. Collecting narratives (largely adapted from Davies & Dart (2005))

Narratives are truthful (i.e. non-fictional) accounts of change as experienced or observed by the narrator. Each narrative represents one truth and reality among multiple. Narratives relate to the EbA effort, directly or indirectly.

The narrative analyst has to have an overview and contact with all relevant stakeholders. S/he will ask stakeholders for narratives in reoccurring time intervals, e.g. every month or two. The interval will depend on the context and may be adapted to the pace of project activities. Stakeholders should also be encouraged to share narratives whenever they have identified them.

This method suggests the collection of narratives through the use of two primary methods: interviews and written submissions. The choice of collection method depends on which method the narrator is more comfortable with. While interviews are less demanding in terms of time and documentation effort for the narrator; writing a narrative may assist the gathering of thoughts and self-reflection. In both methods, the narrative analyst will support the narrator through asking a set of broad questions to guide the narrator in the documentation of her/his observations or experience of the EbA effort. Apart from interviews and written submissions, any method for the gathering of information relevant to the intended use and users of the analysis is possible (see also "Making use of narratives"). Focus Group Discussions, writing workshops or other activities that support the production of narratives are just some examples.

To help narrators speak or write about EbA processes and outcomes, the narrative analyst can ask them to touch upon certain aspects in their narrative (see guidance box 2), resulting in subjective accounts. The narrative can also be a collaborative account of all stakeholders involved in the process/outcome, which functions as built-in verification. As perceptions

differ, however, it may be difficult to agree on one narrative per process/outcome. Formulating a narrative together may help the stakeholder team to review their collaboration, communication and address potential disagreement. In the case of very different narratives, these can be included as narrative variations, which can show processes and outcomes that are ambiguous or nontransparent.

Guidance box 2:

Can you describe the process and/or outcome that you experienced/observed?

Which actors were involved in the process /outcome and how were they involved?

Which factors influenced actors' interaction?

Did you experience challenges in the process/outcome and how did you address them?

Would you do something differently in retrospect?

Which factors influenced the process or outcome that were out of your control?

Over time, additions to narratives can be recorded. These could pertain to how the process has further developed, the long-term impact of the outcome or a new understanding of both, among other. This is especially relevant where processes and outcomes are ambiguous and the need for a better understanding is high. Collecting such information can also help stakeholders compare processes, monitor progress and generate more knowledge of how adaptation outcomes develop over time.

2.4. Narrative verification

An inherent challenge of narratives is the difficulty to verify them and the biases they may include. As perceptions differ, so will the observations and experiences of narrators. Narrators need to be encouraged to share genuine observations and experiences, so that

confirmation bias in regard to their work or other factors that influence their reporting can be minimized.

Strategies to increase reporting of genuine narratives:

- Promoting the need for learning. Learning in EbA efforts requires the honest documentation of change pathways and outcomes.
- Valuing mistakes as an opportunity to learn as a natural part of experimentation.
- Ensuring that as many narrators as possible share their observations and experiences from the EbA effort. If narratives are too similar or too different, there may be a need to look closer at them.
- Asking teams to narrate together. Reflecting on and speaking about shared experiences can produce consensus narratives that everyone agrees to. However, ensuring that the narrative is not "hijacked" by some strong voices is important.
- Asking stakeholders that were not directly involved in the process/outcome to narrate their observations.
- Documentation of the narrative analyst's work. Who has been spoken to and when? Transcribing interviews. Not all of these details must be public, however they are useful to follow-up and dive deeper into some narratives.

These strategies can help to build confidence in deciding whether a narrative is genuine or not, and whether it may be too biased or narrow to be representative of the process or outcome it pertains to. However, it is impossible to verify narratives[17] completely.

2.5. Excursion: Bias in narrative work

Qualitative research, which includes narratives, is double biased – from the participant (here the narrator) and the researcher (here the narrative analyst). Both are biased (i.e. knowingly

[17] Read up on narrative research for example in Etherington (2009) and Squire, Andrews, & Tamboukou (2008).

or unknowingly influenced in their thinking) about the research. In the method, the narrator's narrative is biased, for example by recounting events in a way that make herself/himself look better. The narrative analyst collects, interprets and presents the analysis and engages with the narrator in certain ways that are influenced by how s/he perceives the world (ontology) and how s/he thinks knowledge is created (epistemology; Etherington, 2009). Furthermore, the presence of sociocultural differences between narrator and narrative analyst can result in disingenuous narratives, for example, when questions or research methods are culturally inappropriate, or power imbalance between narrator and narrative analyst exist (Cortazzi & Jin, 2009). To address some of these biases, the narrative analyst needs to employ rigorous research practices, which includes self-reflection and documentation about one's position and relation in the narrative collection and analysis (Etherington, 2009).

Guidance box 3:

What is my role in the creation of knowledge as a narrative analyst?

What is my relationship with the narrator? How does it affect the way I respond to the narrative?

2.6. Storing narratives for analysis

Narratives are stored in the method in a structure that allows the narrative analyst to access narratives that are relevant to answer questions about the EbA effort (see p.3 for questions). When the narrative analyst has a narrative at hand, s/he will first have to get a good understanding of the text, which may require her/him to read it multiple times or contact the narrator for clarification. S/he will then need to go through the text and assign it in full or parts to one of the four main structural categories, depending on what the information in the narrative pertains to: the EbA processes, EbA outcomes, identified shortcomings, or undesired outcomes (Davies & Dart, 2005).

Narratives in the EbA process and the EbA outcome categories are further assigned to the seven climate resilience and adaptive capacity characteristics (see p. 8). It is expected that

some narratives will be difficult or impossible to be assigned to just one of the characteristics, which can highlight synergies and relationships between them. Thus, when narratives are assigned to multiple characteristics, a new potential analysis window has opened.

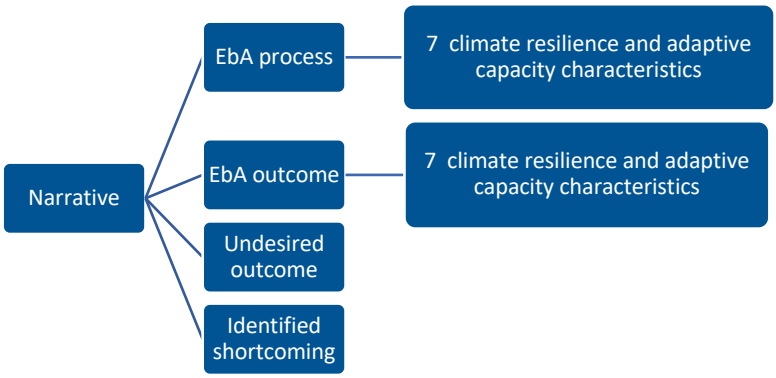

Figure 5: Categorization schema

Once the narrative analyst is able to identify individual processes and outcomes, all narratives pertaining to one process or outcome will be stored together. This can be done through assigning a unique key word / hashtag, or by creating digital folders where narratives are stored together. When using folders, the same process narrative may be included in multiple outcome folders, due to the non-linearity of processes and possibility of a process leading to multiple outcomes. Thus, multiple narratives can pertain to the same process or outcome. In the narrative categorization, it is these processes / outcomes that are moved with all narratives that pertain to them (see guidance box 4).

f) Fictional Example:

After collecting a dozen narratives, the narrative analyst recognized two emerging processes: process a) is concerned with raising awareness of local ecosystem services' importance to human well-being, and process b) is geared towards changes in the municipal land-use management practices. All narratives pertaining to process a) / b) will be stored with the same key word/hash tag, though possibly in different categories. Once one or more outcomes of either process have been identified, narratives pertaining to the outcomes' processes will be moved to their respective outcome (note that process narratives may be moved to multiple outcomes, i.e. one process narrative can be included in multiple outcome narratives). If the identified outcome is undesirable (at any point in time), the entire narrative is moved to the "undesired outcomes"-category.

The structural categories for narrative storage:

- **EbA processes** refers to information about the path towards outcomes (outcomes that have not yet been reached). Outputs of the process are included here, whether they were anticipated / intended or not. Also includes narratives of processes that stagnated without reaching outcomes.

  Examples: workshops, trainings, environment restoration activities, ecosystem service assessments

- **EbA outcomes** includes any outcomes, that EbA processes have generated. These are substantial changes in behavior, activities or relations. These can be anticipated or unanticipated, however, they must be desired changes. Outcomes would ideally want to be kept in this category, which would mean that a desirable change in behavior, activities or relations is maintained or positively developed over time (however, an outcome may become unsustainable and be moved to the undesirable processes and outcomes category).
  Includes narratives for the analysis of the EbA effort's progress, expected benefits, outcome accomplishments and their continuing development over time.

  Examples: application of a new farming practice, sustained collaboration strategy between municipal departments, use of natural resource management approaches
- **Identified shortcomings** refer to anything that was found to be missing, in need of change or a shortcoming in current (as of date the narrative was recorded) state to enhance EbA in the future. This could be within or outside of the project's sphere of influence.

  Example: National Adaptation Plans do not include EbA measures, limited scale of the EbA effort

- **Undesired processes and outcomes** have led to or are expectantly leading to maladaptation. For example, because they are long-term unsustainable or inequitable. Category includes short-term undesirable processes and outcomes that were willingly pursued or tolerated (see "equity and sustainability limit"). Such narratives would require corrective action.

  Example: access to natural resources, putting stress on ecosystems elsewhere.

Guidance box 4:

Storage and management of narratives

1. Narrative is screened and assigned to one of the four categories (EbA processes, EbA outcomes, identified shortcomings, undesired processes and outcomes)
2. If category EbA processes or EbA outcomes is chosen: assign narrative to one (or more) of seven climate resilience and adaptive capacity characteristics
3. Identify if narrative pertains to an individual process or outcome that has already been identified. If so, create or use appropriate hashtag/ store narrative in folder of the individual process/outcome.
4. If an individual process or outcome have changed (e.g. process has led to an outcome; outcome becomes undesirable), move all narratives to the new appropriate category.
5. Revisit narratives and repeat from point 4.

The boundaries between process and outcome categories can be blurred. When exactly does a process result in an outcome? When does a change in behavior, activities or relationships qualify as an outcome (after the first, second, third, etc. time it was applied)? At what point has a process ended without an outcome? These questions cannot be definitely answered but are well worth a discussion among stakeholders to clarify terminology, understanding and align expectations. When facing this challenge, the narrative analyst may consult the narrator and verify with other stakeholders, to make a category decision.

g) Fictional Example:

Some farmers are trying a new practice that is expected to improve soil quality in the long term. They want to see the effect it has on their crops. (this is a change in activity, however as a trial/pilot it does not qualify as an outcome – once the farmers adopt the new practice as a regular practice, it could become an outcome)

h) Fictional Example:

Efforts are being made to improve the resilience of locally grown subsistence crops. However, during this effort, cash crops become more interesting to local farmers, who wish to shift the focus of the effort to cash crop farming. (the process to subsistence crop resilience halts without an outcome, but experience from this process may be used for a new cash crop resilience effort)

The two EbA categories (process and outcomes) are each further divided into seven characteristics of climate resilience and adaptive capacity. The characteristics have a description to guide the narrative analyst in the identification of information in the narrative that pertains to this characteristic (see p. 5 for descriptions). Both, processes and outcomes, are thought to have potential for climate resilience and adaptive capacity building. Observations and experiences from processes may generate insights that can be used in other approaches. Thus, while not every process may lead to a (desired) outcome, its large potential for learning is regarded as valuable for climate resilience and adaptive capacity development, and thus captured in the method.

Categorizing narratives at the characteristics level, rather than, for example, at the functional level, has some advantages:

- Providing the "big picture" of climate resilience and adaptive capacity. Insight into how the characteristics are fulfilled.
- Avoids silo-thinking; promotes collaboration. Characteristics are not within the responsibility of specific actors, but usually require collaboration and contribution from a range of many.
- Long-term relevance. Future needs for functions and measures are uncertain, while characteristics are expected to have long-term relevance.

Assigning categories can be difficult and it makes sense to do this in a team of analysts[18] to benefit from different perspectives and interpretations. There is no absolute correctness in the assignment, however consistency is important. Similar narratives should be in the same category in order to document development in a characteristic. The characteristics are not to be understood as one-time goals, but rather as abilities and processes that need to be established, upheld and reviewed.

2.7. Dealing with maladaptation & trade-offs

With mistakes and failure as part of experimentation and progress in complex settings, it is important to capture processes and outcomes "outside" of the equity and sustainable development limit.

The method has specific room for identifying and documenting maladaptation to learn from it and correct it. Unsustainable and inequitable processes and outcomes that have been deemed acceptable in the short-term, should also be categorized under "undesirable processes and outcomes", to highlight risks and need for further development and attention (i.e. monitoring and (corrective) action to eventually move them to the "EbA process" or "EbA outcome" category).

i) Fictional Example:

The expansion of a nature reserve is expected to improve ecosystem services for local communities, however, it significantly increases the distance to regional trading markets for some communities as road infrastructure through the nature reserve is prohibited. (inequitable – some communities are worse off because access to livelihood sources (trading) are cut)

j) Fictional Example:

Grasslands have become degraded due to overgrazing. To restore the area, pastoralists agreed to refrain from letting their cattle feed there for some time. During this time, they are required to purchase more supplementary fodder and rotate feeding grounds more often, which puts a stress on the surrounding pastures. The cost for additional fodder and the adoption of more sustainable grazing patterns in the future is covered though a payment for ecosystem program. (short-term inequitable – pastoralists lose their grazing grounds and unsustainable – stress from short-term overgrazing on surrounding pastures; long-term equity through improved grazing grounds and more sustainable use of natural resources)

[18] In the absence of another narrative analyst, narrators and other stakeholders may substitute.

3. Making use of narratives

With a living (i.e. continuously updated) collection of categorized narratives, the narrative analyst can prepare the analysis and use of the data. When stakeholders decide on the intended user(s) and use of the analysis together, a good opportunity to discuss and align expectations of the analysis and the future of the EbA effort arises (Patton, 2008).

k) Fictional Example:

When project staff and local stakeholders of the EbA effort meet to decide on the intended use and user(s) of the narrative analysis, they discover that their expectations of the EbA project differ. Project staff would like to use the analysis to identify the progress the project made over the past four months, because they need to report to the donor soon. Some local stakeholders would like to use the analysis to identify best practice for collaboration. Other stakeholders want the project staff to use the analysis to make a case for EbA with the regional authorities, in order to receive additional funding. A small fraction of stakeholders would like to find out how the process has affected different groups in the community.

3.1. Analysis

The categorization is the first analysis step, which provides insight into how EbA processes and outcomes contribute to local climate resilience and adaptive capacity. All further analysis is dependent on the intended use and user(s) of the findings.

An example for analysis is the identification of common processes. Using composite narratives, the analyst may identify similarities in narratives in one context (i.e. one EbA effort). Such similarities can pertain to anything in the processes or outcomes, such as actors, policies, funding, or ecosystem characteristics. A composite narrative is a narrative that is based on information from multiple accounts, thus it is not invented but constructed exclusively from collected narratives (Willis, 2018). For example, the analyst may have recognized a pattern in how (certain) EbA outcomes are successfully funded. S/he can use the information provided in the relevant narratives to construct one composite narrative about successful EbA outcome funding, using selected details from various narratives. The

advantage of using composite narratives is that rather than displaying only one narrative, it is possible to combine a multitude of similar accounts from one context, thus highlighting not only important details from one narrative but multiple (Willis, 2018). The traits of change can of course also be neutral or negative, i.e. common processes or barriers to change. However, note that composite narratives may not be appropriate in contexts with a very high level of uncontrollable influences, as such contexts may not allow generalization.

3.2. Use of analysis

Having a better understanding of EbA outcome contribution to local climate resilience and adaptive capacity can enable a variety of uses. It may, for example, inform project planning (e.g. adjusting activities or assumptions) and reporting, identification of priority areas, replicable processes, and trade-off management. Being intentional and clear about the intended use and user(s) of analysis findings is pivotal to making full use of the method (Patton, 2008).

4. Limitations

The method is built on seven characteristics of climate resilient and adaptive SES. While these characteristics are well referenced in literature, empirical evidence of their validity is very limited. This also applies to other founding concepts, including the levels and hierarchy of climate resilience and adaptive capacity, their influences and relationships, climate resilience and adaptive capacity processes, as well as thresholds. The use of EbA narratives may provide much-needed understanding of the practical applicability and validity of these concepts. All concepts and the entire method should be regarded as approaches to grasp and explain realities, without the claim for absoluteness or truthfulness.

EbA is regarded as an approach with large potential for the strengthening of climate resilience and adaptive capacity through ecosystem services and biodiversity. However, EbA may not always be context appropriate, and is subjected to biophysical thresholds or tipping points, for example when an area becomes uninhabitable due to sea level rise. The method

does not aide the assessment or decision-making of whether EbA is context appropriate. It may, however, inform whether narrators perceive expected EbA benefits to be realized, thus, testing the appropriateness assumption.

An assessment of processes' and outcomes' effectiveness is not part of the method. However, with minor adjustments, narratives can provide the data needed for such assessments[19].

The method is not appropriate for financial accountability purposes, as narratives cannot provide the appropriate level of data confidence.

Lastly, narratives are documentations of experiences and observations that rely on and seek subjectivity. While the method includes strategies for narrative verification, the narratives are not objective and need to be treated accordingly. This disqualifies the understanding of narratives as single truth or reality, but rather one truth and reality among multiple. Thus, the method cannot provide absolute confidence in the findings. Narratives may be checked on their validity and quantitative and other supporting data may be used. However, the narratives are not to be seen as proof of change, but rather as evidence. Their main purpose is to support learning in EbA and its contribution to climate resilience and adaptive capacity. The method does not yield exact results.

End of last Adaptation Narrative Analysis draft.

[19] For example, see Reid et al. (2018) and FEBA (2017).

8. Conclusion

The explorative approach taken in this thesis lead the author to an unexpected result. A narrative approach to the appraisal of EbA processes' and outcomes' contribution to climate resilience and adaptive capacity was not foreseen, however once it was taken, possible advantages and potential benefits of it accumulated. The draft method, that is the result of this thesis, paves the way to a final method that can capture the contexts of options, decisions, and interaction in EbA. It opens up a potential to learn about processes and outcomes that is untapped into in current appraisal methods. The method may support the ongoing progression to understanding adaptation as a process, rather than a result, by documenting how and why a local EbA effort develops. Achieving inclusiveness of all types of knowledges and actors in EbA efforts may come closer through the adoption of a narrative learning and appraisal approach, as presented in the draft method. Shining a constructive, not an accusatory, light on maladaptation and trade-off management as it is perceived by stakeholders may not only lead to better understanding of both but could give value and leverage to the opinions of the ones affected. Adaptation Narrative Analysis could foster cooperation between stakeholders, as interaction and relationships are highlighted. While it is necessary to use modal verbs to describe these expected advantages and benefits, the prospect of achieving them is worth the endeavor of furthering the Adaptation Narrative Analysis method and thus, the development of a narrative approach to EbA appraisals. This view is supported by the consistently positive resonance from reviewers and other consulted experts on narrative use in EbA / climate change adaptation. At the same time, experts cautioned against the challenges and limitations of narratives, such as narrator inclusiveness, bias, verification, and capacity for analysis. This shows that there is a considerable need for further research and practice-testing of the draft method. Possibly even more so, it highlights that there is a need for debate about the kind of information that is deemed necessary for local climate resilience and adaptive capacity understanding, expectations on the results of such efforts' appraisals, and, especially, which and whose knowledge is included. Parting with the currently overriding paradigm of quantifying climate resilience and adaptive capacity, may stimulate this debate with new perspectives.

As a way forward in the development of Adaptation Narrative Analysis, a path that appears fruitful is the orientation towards disciplines that are well experienced with narratives, such as folkloristics, as suggested by Moezzi et. al. (2017). This could generate insights for targeted and effective use and handling of narratives. While one would expect actors in the field of climate change adaptation in general, and EbA specifically, to be accustomed and in favor of innovation and unconventional approaches to challenges, reluctance to the wide uptake of a narrative approach is anticipated[20]. This may be due to the many unanswered questions concerning this approach, and a preference for established practices that seems to be inherent to human nature. It is hoped and thought, that this thesis contributes to the use case of a narrative approach in EbA by offering initial means to do so in the form of the Adaptation Narrative Analysis method.

[20] Considering that a narrative approach was not widely adopted in the development field, despite available methods.

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Appendix 1: Definitions

Adaptive capacity refers to "[…] the ability of a system to adjust, modify or change its characteristics or actions to moderate potential damage, take advantage of opportunities or cope with the consequences of shock or stress" (Jones, Ludi, & Levine, 2010, p.2)

Appraisal is "the act of examining […] something in order to judge their qualities, success or needs" (Cambridge Dictionary online, n.d.)

Climate resilience is "[…] the ability of social-ecological systems to absorb and recover from climatic shocks and stresses, whilst positively adapting and transforming their structures and means for living in the face of long-term change and uncertainty" (Welle et. al., 2014, p.3).

"Ecosystem-based adaptation is the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change" (CBD, 2009, p.6)

EbA **effort** refers here to a project, strategy, approach or similar uptake of EbA at the local level.

Maladaptation are "[…] any changes in natural or human systems that inadvertently increase vulnerability to climatic stimuli; an adaptation that does not succeed in reducing vulnerability but increases it instead" (IPCC, 2001, p. 990).

Processes are continuous developments that result in one or more outcomes. Processes can be non- linear. They are driven by process stakeholders and influenced by contextual factors.

Outcomes are "[…] changes in the behavior, relationships, activities, or actions of the people, groups, and organizations with whom a program works directly" (Earl et. al.,, p.1)

Stakeholders are here individuals and organizations with an interest in the EbA effort. They may be directly or indirectly involved and / or affected by the effort.

Trade-offs are benefits that come at the cost of a missed opportunity for, or loss of, another benefit (adapted from H. Reid & Shafiqul Alam, 2017).

Appendix 2: Options to Overcoming Key Challenges of Ecosystem-based Adaptation

Understanding and making trade-offs - Thorough and continuous context analysis (Dinshaw et al., 2014) - Monitoring beyond the immediate project scope - Evaluating trade-offs and their decision making (UKCIP, 2011)	Long time horizons - Making monitoring and evaluation part of project design and implementation (Dinshaw et al., 2014) - Iterative monitoring of changing circumstances, new understanding and other new factors that support iterative review and adjustment of the project (Dinshaw et al., 2014) - Baseline assessments to analyze outcomes, review and adjust baselines during implementation (Christiansen et al., 2016; Terton & Daze, 2018; UKCIP, 2011)
Non-linear development - Making monitoring and evaluation part of project design and implementation (Dinshaw et al., 2014) - Iterative monitoring of changing circumstances, new understanding and other new factors that support iterative review and adjustment of the project (Dinshaw et al., 2014) - Outcome monitoring and evaluation, including outcomes that were avoided (Dinshaw et al., 2014; UKCIP, 2011) - Allocate time to the incorporation of learning into the project implementation (Dinshaw et al., 2014; Mack, Lu, Vaidyanathan, Gopal, & Lisak, 2016)	System perspective and the complexity and uncertainty of the SES - M&E on basis of system perspective - Capturing learning from flexibility and experimentation in the project (Dinshaw et al., 2014; UKCIP, 2011) - Appraising project contributions rather than attribution to outcomes (Dinshaw et al., 2014; UKCIP, 2011) - Doing evaluations synchronized with project decision making to inform decision making (Patton, 2011) - Participatory monitoring and evaluation to help address community needs and understand outcomes (Dinshaw et al., 2014) - Flexible M&E that can be adjusted to new understanding, changing contexts and other change in the project (Christiansen et al., 2016; Dinshaw et al., 2014)
Interface of the traditional social and environmental action spheres - Combining environmental and social indicators in M&E (Locatelli & Pramova, 2015) - Capturing learning about the relationships, influences and dependencies in the SES	Fostering adaptation processes - Monitoring and learning about common barriers of adaptation processes (Moser & Ekstrom, 2010) - Doing evaluations synchronized with project decision making to inform decision making (Patton, 2011)

Table 1: Key challenges of EbA and approaches to address these

Appendix 3: Method Review Rounds

Review 1: Key-Informant Survey

Prospective survey participants were approached via email. A short introduction was given in the email body, as well as a request to forward the email to individuals with at least one-year experience in EbA or NbS, and link to the survey. An invitation for participation with similar content was shared publicly on the author's LinkedIn profile (and once re-shared), Global Climate Adaptation Partnership's blog, and the discussion forum on EbA on the weadapt online knowledge sharing platform (see footnote 2 for hyperlinks). The survey was open from 1-20 March 2019. Seven individuals participated in the survey.

Criteria for Survey Review Round

To ensure that the method fulfills self-imposed standards, criteria for the review round were chosen:

a) Indicator assumptions used in the method are shared by EbA professionals (from academia and / or practice).

b) Indicators are perceived relevant for EbA contexts.

c) Indicators are judged to represent climate resilience and adaptive capacity adequately.

The threshold for the criteria fulfillment was set at 70%, that is this share of valid respondents agree to the assumptions and indicators used in the method. Some questions in the survey included sub-questions if the participant's response did not match the method's assumptions. Thus, if the 70% agreement threshold was not reached, open-ended follow-up questions were used for analysis.

Open-ended questions and improvement suggestions were not subjected to a threshold. These were analyzed for commonalities and across responses and incorporated into the method. Given that there were only very limited open-ended responses (no more than one paragraph and maximum four per question), the analysis was performed without coding.

Survey Guide

Key-informant survey with assumption-based answers and question purpose.

Questions about respondent's details: name; profession or job title; employer; EbA or NbS experience in years; country work experience; email address

Question	Assumption / expected answer	Purpose
1. EbA efforts need to develop local climate resilience and adaptive capacity.	Agree.	Feedback on assumption
2. How do you think climate resilience and adaptive capacity are best appraised	Through qualitative indicators.	Feedback on assumption
3. To assess climate resilience and adaptive capacity in a specific context, it is necessary to have precise (i.e. measurable) data, e.g. household income.	Disagree.	Feedback on assumption
4. To build climate resilience, it is more important to understand how change has occurred (change pathways), than the exact (i.e. measurable) outcome of the change.	Agree.	Feedback on assumption
5. Desirable EbA outcomes are peoples' and organizations' changes in behavior, activities or relations that lead to the maintenance or development of resilience and / or adaptive capacity.	Agree.	Feedback on assumption
6. In EbA, it is possible to attribute climate resilience and adaptive capacity outcomes to specific activities, following a linear development logic.	Disagree.	Feedback on assumption
7. To develop climate resilience through EbA, one should address…	hazards and risks, equity and human rights, the socio-ecological system as a whole	Feedback on assumption

8. Climate resilience and adaptive capacity should be appraised separately.	Disagree.	Feedback on assumption
9. Do you think the following indicators represent climate resilience and adaptive capacity?	N/A	Feedback on indicators
10. Please review and rate each indicator and its description. Does the short description clarify what the indicator means?	N/A	Ensure that descriptions are well worded, complete and understandable
11. What improvement would you suggest to the indicators and/or short descriptions? This can be related to wording, content or any other change you see necessary.	N/A	Commentary and improvement suggestions on shortcomings of indicator descriptions
12. Do you think there are other indicators for climate resilience and adaptive capacity in the socio-ecological system? If yes, what are they?	N/A	Identifying shortcomings in the list of indicators
13. Do you think the indicators adequately represent and address climate resilience and adaptive capacity in EbA efforts?	N/A	Feedback on completeness of the indicator list
14. Which aspects of climate resilience and adaptive capacity cannot be addressed through EbA?	N/A	Identifying aspects in the indicators that may not be addressed through EbA

Key-informant Survey Results

The survey was completed by seven individuals, currently working in climate change adaptation consultancy, academia and conservation. All but one respondent have at least one year experience in EbA or Nature-based Solutions (NbS), on average about 9 years[21]. One individual has not worked with EbA directly, but considerable knowledge and experience in climate resilience and adaptive capacity and good theoretical

[21] The average of 9 years included only the six respondents who have direct EbA or NbS experience.

understanding of EbA. The author thus decided to include the respondent's survey response in the study, because of its valuable commentary on the developed indicators. Location of EbA and NbS experience of the respondents includes countries in Africa, South-East Asia, South and Central America, as well as Europe.

The number of respondents is shown in parenthesis (X) in the following text. The 70% agreement threshold is equivalent to five respondents.

There is consensus among the respondents that EbA efforts need to develop local climate resilience and adaptive capacity. Desirable outcomes of EbA are thus seen as peoples' and organizations' changes in behavior, activities or relations that lead to the maintenance or development of climate resilience and / or adaptive capacity. Furthermore, survey respondents agreed that climate resilience and adaptive capacity are best appraised through a combination of qualitative and quantitative indicators. Respondents mostly (6) disagreed that both concepts, that is climate resilience and adaptive capacity, should be appraised separately, with one respondent neither agreeing nor disagreeing. These responses are in line with assumptions of this thesis.

Participants had different opinions on the appraisal of climate resilience and adaptive capacity. Some (3) stated that precise (that is measurable) data is necessary to assess climate resilience and adaptive capacity. An equal number of respondents (3) had no clear opinion and one respondent disagreed.

Understanding change pathways has been noted to be more important than exact outcomes of change by most respondents (5). One respondent has no clear opinion and one disagrees. This supports the methods focus on change pathways. Furthermore, respondents (6) mostly share the view that it is not possible to attribute outcomes to specific activities following a linear development in EbA, which was contested by only one respondent.

These survey responses show that the basic assumptions about EbA used in the method are shared by EbA and NbS and / or climate resilience and adaptive capacity experts. Qualitative data collection was not included explicitly in the first draft of the method (chapter 6), however, the survey had shown a need for it. The divided opinions on the

need for precise data to assess climate resilience and adaptive capacity was further investigated in the next review round.

Respondents were asked to choose the three most relevant aspects that should be addressed in the development of climate resilience through EbA. Since the respondents were asked to choose only three aspects, it is possible that respondents regard other aspects as relevant, however, less relevant than other aspects. The choice for the respondents was limited to three aspects, because it is assumed that EbA efforts will not be able to focus on all aspects for practical reasons (such as lack of resources, time, capacity). While the aspects' relevance may be context dependent in practice, the method aims to support the ones that were deemed most relevant (in any context).

Through EbA, addressing the SES as a whole was chosen by almost all respondents (6), followed by hazards and risks (5). Astride are livelihoods and well-being, and culture and traditional values; both chosen four times each. The environment as well as equity and human rights were chosen by only one respondent each. These results are somewhat expected and largely support the assumptions of the method. The need of using a systems perspective and addressing the SES in EbA is commonly agreed upon (FEBA, 2017; Lo, 2016; Scarano, 2017). Also, climate change adaptation is generally expected to address risks and hazards (as agreed upon, for example, in the Paris Agreement, COP, 2015), which applies to EbA as well. Furthermore, EbA distinguishes itself through its socio-economic development aim from other adaptation approaches (Munang et al., 2013; Scarano, 2017). The considerable influence of culture on climate change adaptation processes and outcomes has been studied by Leonard et al. (2013), a consideration that appears to be shared by more than half of the survey's respondents (4). Furthermore, the benefit of including traditional and indigenous knowledge in climate change adaptation and disaster risk management is supported in literature (case studies for example from Zimbabwe by Dube & Munsaka, 2018; and Australia by Leonard, Parsons, Olawsky, & Kofod, 2013), a recognition which appears to be mirrored in some of the respondents.

The low uptake of "equity and human rights" as a response may be explained by the mostly recent and under-researched[22] topic of equity and justice in climate change adaptation. In contrast, "the environment" may have been chosen only once because of its extremely broad meaning. Given that EbA is especially concerned with the ecosystem, it may have also been a too obvious choice for respondents to include "the environment" in this list, that is assuming the environment is the default concern of EbA. Despite that only one respondent included "equity and human rights" in the selection and because of the aforementioned reasoning for this, equity and human rights was decided to be kept as a limit for climate resilience and adaptive capacity outcomes. Thus, outcomes that perpetuate or increase power injustice and / or vulnerability of individuals or groups within or outside of the SES are considered inequitable.

The review yielded good input to the refinement and improvement of indicators. Responses suggested that most of the developed indicators represent climate resilience and adaptive capacity. Respondents were asked to select all indicators they think represent climate resilience and adaptive capacity. The stability indicator was least chosen (3) and criticism pertains to it being understood as a bouncing back to a previous (pre-disturbance) state, rather than evolving forward to deal with disturbances better in the future while remaining essentially the same system functions. Notably, the three respondents who chose the stability indicator were satisfied with its description and did not provide commentary, while all other respondents stated that the description "somewhat" clarifies the meaning. It appears that the conceptual divide in practice and academia of stability into either as a bounce-back or a bounce-forward ability may be found in the survey as well (Meerow & Stults, 2016). In the method, stability is not understood as the reestablishment of the previous state, thus, the survey responses highlighting a need for improvement in the indicator description. Given that only three respondents even stated that stability is an indicator for climate resilience and adaptive

[22] For example, the search for publications which contain the terms „equity, adaptation" in the title in the Web of Science database results in 17 articles, of which only 4 pertain to inequality and justice issues in climate change adaptation. The same search with the key terms "justice, adaptation" leads to 45 results of which 35 broadly pertain to justice in adaptation on any governance level.

capacity, the indicator could arguable be excluded from the method. However, given its conceptual representation in literature and its difference to transformation and adaptation, it was decided to keep stability as an indicator (see section 5.1. for stability in resilience concepts).

The indicator "innovation" was chosen by just over half (4) of the respondents as relevant and in need of description clarification, with three respondents stating it is "somewhat" clear. The indicator is not commonly used for climate resilience, but a part of adaptive capacity indicators (Jones et al., 2010; Mcleod et al., 2016). Given that adaptation efforts are embedded in a social context and that adaptation blueprints do not exist, the willingness and ability to experiment and be innovative is expected to impact climate resilience and adaptive capacity. However, some changes to the description are advisable, as it is not yet fully clear to reviewers.

All other indicators received high support in their relevance (6-7). Some commentary to the description of indicators were given, which shall be incorporated as much as possible. Some points were raised regarding other indicators for climate resilience and adaptive capacity in the SES that were not yet included. These include feedback processes in the SES and thresholds for system change, beyond which the usual feedback processes have been altered. Also, it was suggested to add sub-indicators that could capture important parts of the indicators. Furthermore, the access and ability to use climate service in decision-making was noted.

Lastly, some aspects of climate resilience and adaptive capacity that cannot be addressed through EbA were stated. These include, for example the relocation of coastal communities which may be an option but not part of EbA. Additionally, there may be some sectors or regions where EbA may not be feasible. External influences such as pollution or development pressure as well as larger scale political processes and the broader political environment could enable or obstruct resilience and adaptive capacity, which may not be addressed in EbA.

Criteria for survey review	Questions in the survey (Y- question responses fulfill criteria with ≥70% agree; N- unfulfilled criteria; - not applicable)								
Question Nr.	1	2	3	4	5	6	7	8	13
a) Indicator assumptions used in the method are shared by EbA professionals.	Y	Y	N	Y	Y	Y	Y	Y	-
b) Indicators represent climate resilience and adaptive capacity adequately	-	-	-	-	-	-	-	-	N

Table 2: Fulfillment of review criteria a) and b)

Overall, the survey result has shown that the self-imposed criteria of the review round on the method were partially fulfilled. The assumptions of the method are shared by the respondents except for one, which pertains to the question of whether precise data is needed to assess climate resilience and adaptive capacity. However, this question has received diverse responses. It will be included in the next review round for further clarification.

	c) Indicators are relevant for EbA contexts (only Yes / No answer possible)	Clarity of the indicator description (Y- >70% reply "yes")
Transformation	Y	Y
Stability	N	N
Knowledge & learning	Y	N
Institutions, entitlements, and trade-offs	Y	N
Innovation	N	N
Flexible, forward-looking decision-making and governance	Y	N
Asset-base and satisfied needs	Y	N

Table 3: Fulfillment of review criteria c) and clarity of indicator responses

There is an obvious need to improve the indicator descriptions, which were mostly ranked only "somewhat" clear in meaning (see Table 3). Two indicators, namely stability and innovation were not perceived as relevant by most respondents. Overall, indicators do not fulfill the criteria of relevance and adequacy yet. Using the respondents' comments

on the indicators, it is expected that indicator descriptions and relevance can be improved.

Review 2: Key-informant Semi-structured Interviews

The second review consisted of key-informant semi-structured interviews. Semi-structured interviews were chosen because of the novelty of the method methodology and to allow for the conversation to take individual turns based on the respondents' area of expertise. The aim of the review was to get feedback on the approach to use narratives for EbA outcome appraisal. Because of its unconventionality, it was expected that semi-structured interviews would provide richer responses than for example, a survey.

The prospect participants received a document[23] which contained an introduction to the method methodology. Based on this and further explanations of the interview purpose, they were asked to make their decision about participation. Furthermore, this document served as the input that interviewees would base their responses on. Before the interview, participants received the interview questions guide, in order to increase their comfort during the interview (through knowing what to expect), facilitate the interview (through having questions in front of them) and most importantly, to allow interviewees to prepare responses. This preparation of responses was expected to provide more focused and critical responses, because unprepared, interviewees would have to recapture the methodology, their own professional experience and connect both based on the question.

All in all, 15 prospective interviewees were contacted, which resulted in two conducted interviews. When the first few contacted individuals declined participation due to their inability to find time (high workload), a questionnaire with the same questions as the interview guide contained was sent out to the already contacted and all later contacted individuals, with the hope that a questionnaire might fit their schedule better than the interview. However, no one replied to the questionnaire. The interview and questionnaire timeframe was of originally 10 days was extended by three days, which was the maximum possible extension given that the following third review round needed to be prepared.

[23] This supporting document can be accessed through the thesis' author.

While this review round could have benefited from more reviewers, it was decided to adhere to the original review plan. This decision was based on the positive responses to narratives from informal exchanges with prospective participants and other experts in climate change adaptation, paired with the upcoming third review which would generate feedback on the overall method. Furthermore, postponing the third review would have jeopardized the commitment that these reviewers had already given.

After conducting two interviews, with one interviewee each from a more practical and an academic background, useful feedback for the overall method was received. The responses pertained to the methodology, theoretical foundation of the method and its indicators, as well as expected benefits and challenges of its application.

Criteria for the Key-Informant Semi-structured Interview Review Round

The method methodology is designed to enable a four-folded analysis to answer a set of questions:

a) How has an EbA effort progressed up to now? Which benefits are expected?

b) What sort of process (change pathway) has led to an outcome?

c) Which EbA outcomes have been accomplished and how are they continuing to develop over time?

d) Which undesired changes have occurred?

e) What are barriers to the full or further development of EbA outcomes?

These questions have been used as criteria for the review, that is whether the methodology will be able to provide such answers given that there is relevant information and stakeholder participation.

Furthermore, follow-up questions regarding insights from the preceding survey review round were included in the interviews.

The semi-structured interviews were used to receive feedback on the method methodology and to clarify questions from the survey. Note that this is the general

interview guide, which does not include interviewee-specific questions, that related to answers given in the survey.

Key-informant Semi-structured Interview Guide

General guide with question purpose underlined.

Semi-structured interview guide

Beginning of the interview - recording on

Do you wish to remain anonymous? This means that your interview responses will be included in the thesis without your name and information that could identify you as the interviewee. The privacy and data protection terms I sent you with the interview invitation apply.

1. Can you please state your name?

2. Please open the document "Interview guide" I sent you via email on (insert date). It contains the questions I may be using during this interview. Do you have the document in front of you?

3. In the survey you stated that you think it is/not (choose depending on answer given) necessary to have precise (i.e. measurable) data such as household income to assess climate resilience and adaptive capacity. Why do you think so?

Clarification on question from survey that got divided responses.

4. Have you read the updated indicator descriptions in the supporting document to the interview, which contained the methodology? (If not, would you mind reading them over?) Do you have a comment or suggestion for improvement for any of them?

Feedback on changes made after survey.

5. What do you think about the use of narratives for EbA outcome appraisal? Narratives are truthful accounts of change as experienced or observed by the narrator/story teller.

General opinion on the foundation of the method.

6. In the document in front of you, you can find six questions, labeled “Guiding questions for narrative writers”. These are intended to help stakeholders document their observation and / or experience in the EbA effort. Do you think answering these questions would lead to narratives that document the EbA outcomes and their change pathways? (change pathways = the process of occurring/occurred change)

Feedback on the methodology.

Guiding questions for narrative writers:

(1) What do you think is the most significant change that occurred in the past month? What do you think led to this change?

(2) Which actors were involved in the change and how were they involved?

(3) How did actors collaborate?

(4) Did you occur challenges in the process towards change and how did you address them?

(5) Would you do something differently in retrospect? Which factors influenced the change that were out of your control?

(6) How do you think will the change affect the socio-ecological system in the future?

7. In the document in front of you, point 7 has five questions a) to e). Providing that the information needed to answer these questions is available, do you think narratives can provide meaningful documentation of the EbA process and its outcomes to answer questions a) to e)? Why yes, why not? Please answer this question for a) to e) individually.

Feedback on the methodology.

a) How has an EbA effort progressed up to now? Which benefits are expected?

b) What sort of process (change pathway) has led to an outcome?

c) Which EbA outcomes have been accomplished and how are they continuing to develop over time?

d) Which undesired changes have occurred?

e) What are the barriers to a full or further development of EbA outcomes?

8. In the method, narratives are categorized first into one of four categories, with further categorization by climate resilience and adaptive capacity indicators for EbA process and outcome categories (see below, figure 1). Note that narratives can be further added to after their first documentation and moved between categories. Do you think this category division is useful for the appraisal of EbA outcome contribution to climate resilience and adaptive capacity?

<u>Feedback on the methodology.</u>

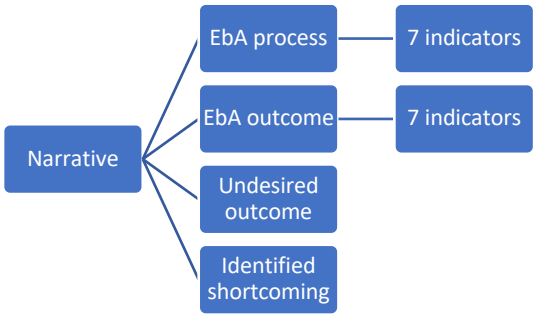

Figure 1: Narrative categorization

9. "Undesired outcomes" in the method are outcomes that are unsustainable or have unequitable impacts within or outside of the SES.

Do you agree that unsustainable and unequitable outcomes are undesirable in EbA? (Why not?)

Do you think there are other undesirable outcomes of EbA?

<u>Feedback on the methodology assumptions.</u>

10. Do you think there are other methods that could help answer questions a) to e) (under point 7) better than narratives? Why? Why not?

Feedback on appropriateness of narratives.

11. What do you think is a strength of the narrative methodology?

Feedback on methodology.

12. What do you think is a weakness of the narrative methodology?

Feedback on methodology.

13. Do you foresee challenges with the collection and use of narratives?

Feedback on methodology.

14. Is there anything you'd like to add or questions you think I might have missed?

Room for interviewee's comments.

15. Do you have any further advice for my research or anything I should be aware of?

Room for interviewee's comments.

End of the interview

Key-Informant Semi-structured Interview Results

Two interviews were conducted, which were transcribed, and responses were summarized for each question. The most important interview results are presented here, that is the results that were incorporated into the draft method.

Interviewee one is a postdoctoral researcher at Lund University, specializing in urban water services and resilience. Interviewee two is president and founding director at Global Climate Adaptation Partnership Ltd. UK, with over 40 years' experience in working in the field of environment, natural disasters and resilience.

The need for measurable data to appraise climate resilience and adaptive capacity remains further divided. While one interviewee stated that using quantitative data results

in a narrow perspective on resilience, which can perpetuate the power of those who define resilience, the other stated that quantitative data is useful to assess resource capacities for resilience.

Respondents agreed that the use of narratives for EbA process and outcome appraisals is appropriate and expected to address some of the key challenges of adaptation measures, namely complexity and uncertainty. Especially the documentation of contextual factors as well as mistakes and failure are believed to provide the information necessary to learn about and communicate adaptation. However, some challenges such as the willingness to share genuine narratives, including mistakes, as well as the verification of narratives were pointed out as weaknesses of the narrative approach.

The opinion between the interviewees regarding the indicators was divided. While one interviewee stated that the indicators were fine, the other critiqued them to be too generic and abstract to be useful. Furthermore, their purpose and their relationship to each other was pointed out to be missing. This interviewee also had substantial criticism for the lack of theoretical founding of the method. While there were aspects that had not yet been included in the method draft, other parts of the conceptual base had not been shared with the interviewees. This was due to the assumption that interviewee should not be burdened with too much material to read and prepare for. However, as it became clear, while well intended, this lack of provided theoretical background inhibited the interviewee's ability to place the method into its context. Another factor was that the interviewee prefers empirical research over abstraction, which, while being the opposite of the thesis, provided very useful comments from a perspective that focuses on the targeted applicability and clear problem statement.

Thresholds were mentioned by both interviewees, directly and indirectly. One interviewee said it would be useful to capture turning points in the adaptation process, that is moments in the process when one plan was pursued over another, and why this decision was made. Thresholds as critical mass for action on resilience was mentioned by the other interviewee. The non-linearity of adaptation processes was highlighted by both interviewees in the context of thresholds. Processes may lead to multiple outcomes, which could include a decrease in system resilience or system collapse before, possibly, system

resilience exceeds previous levels. Non-linearity is also relevant for undesirable outcomes of the EbA effort. It was pointed out by one interviewee that short-term unsustainability and inequity may be acceptable, if it improved the overall resilience in the long term and if such decisions leave more options for adaptation for the future, which relates to the notion of non-linearity in the resilience process.

The guiding questions for narrators were judged to be overall appropriate, however some suggestions to their precision and inclusion of processes were given. The categorization into EbA processes, EbA outcomes, identified shortcomings and undesired outcomes were only commented in by one interviewee, who agreed to them, but cautioned that they may need refinement once narratives were available for categorization.

Overall, both interviewees regard narratives as useful for EbA efforts. They expect that capturing expect contextual information, hidden influences and experimentation to support learning in adaptation. With the feedback on the method methodology, the method draft was updated.

Review 3: Semi-structured Full Draft Review

For the last review round, the full draft[24] was shared with two EbA experts. Reviewer one is a postdoctoral fellow at the University of British Columbia, with over 10 years of extensive research experience on topics such as socio-ecological systems, EbA, and adaptive governance. Reviewer two is the manager of the IUCN Global Ecosystem Management Programme, with over 20 years of professional experience in promoting environmental conservation and human well-being. The reviewers were chosen based on their longstanding experience in EbA, as well as their respective focus on academia and practice. At the same time, both reviewers possess knowledge of the other field to their focus, that is research or practice.

[24] Available upon request from the thesis' author.

The reviewers received the full draft along with a questionnaire and instruction on the review of the method (see review guide below). Thus, two semi-structured reviews were conducted.

Criteria for the Semi-structured Full Draft Review Round

The review criteria are the same as the criteria for the method stated in chapter 2, given that this was the last review round, aiming to assess whether the research aim of the thesis had been fulfilled.

Criteria for the method:

1. The method should allow EbA processes and outcomes to be appraised over long time horizons, thus allowing iterative and participatory monitoring, that is flexible to adapt to changes and new understanding.
2. The method should support a system perspective and the documentation and analysis of complexity and uncertainty in the socio-ecological system.
3. The method should document EbA processes and outcomes.
4. The method should be usable by individuals with a variety of disciplinary backgrounds.
5. The method should allow the appraisal of non-linear development.
6. The method should support learning about trade-offs through enabling the documentation of various perspectives, scales, and related decisions-making.

Additionally, the form of the draft was accessed, aiming to ensure that it is understandable and usable for readers.

Semi-structured Full Review Guide

Question purpose underlined.

Guide for full review draft method

Method for the appraisal of EbA outcomes' contribution to climate resilience and adaptive capacity

Dear reviewer,

Thank you for taking time out of your schedule to review this method draft that is part of my master's thesis in the MSc. Disaster Risk Management and Climate Change Adaptation program at Lund University, Sweden. My aim in the thesis was the development of a method for the appraisal of EbA outcomes' contribution to local climate resilience and adaptive capacity. Two previous review rounds included a survey about the assumptions and resilience and adaptive capacity characteristics, and semi-structured interviews about the methodology. Your review is the last step in this process. It is primarily aimed at receiving feedback on the overall composition of the method draft and whether the method can address a set of criteria. Furthermore, please feel free to include any other feedback you have.

Thank you again for your participation, it is very much appreciated.

All the best

Karen Pilgrim

Review Steps

The review of the full draft consists of two parts:

(1) Commentary to the draft document. Please use the comment-function to add any commentary you see fit within the document.

Please comment specifically on sections that…

- Are unclear in meaning to you

- Require additional explanation or examples
- Stand out as important
- Assumptions and concepts, you do not agree with

If you make changes to the document, please use track changes. Please save the document you worked on (docx) and send it back to me via email.

(2) Questionnaire to fill in. Please fill in the document, save and send it back to me via email.

Kindly send me your review by 15 April 2019.

If you have any questions during the review process, please contact me (karen.pilgrim.6460@student.lu.se).

Part 2 of full draft review: questionnaire

Section 1: Reviewer's details

1. Name:
2. Employer/Affiliation:
3. Employment position:
4. I wish to remain anonymous. My personal details are not to be included in the thesis publication. Indicate (X) for applicable answer. Please see privacy and data protection terms on last page.

   Yes () No ()

5. I would like to receive a digital copy/link to the published thesis. Indicate (X) for applicable answer.
   Yes() No ()

Section 2: Overall draft method guide impressions

This section's questions pertain to the presentation of the method draft.

1. What is your overall impression of the draft method guide? (free text)
Entry question. General feeling for the review.

2. What do you think about the draft method guide's structure (order of sections)? Do you suggest changes? (free text)
Ensure that sections build upon each other. Structure should be conducive for the understanding of the method.

3. Do you think the draft method guide is complete in regard to the descriptions, explanations and examples it provides for the user? If not, what do you think is missing? (free text)
Identify any missing parts that hinder the potential use of the method.

6. How would you rate the overall level of detail given in the theoretical foundation and explanations of the draft method guide? Indicate (X) for applicable answer.

Not enough details		Right amount of details		Too detailed
1 ()	2 ()	3 (X)	4 ()	5 ()

Free text comment:

Feedback on whether the draft method guide contains the right amount of information. Too little might leave reader with questions. Too much might hinder the method use.

4. How would you describe the readability of the draft method guide? (free text)
Ensure readability.

a. Language/wording: Should be clear and understandable.
b. Tone: Should be appropriate.
c. Text flow: Should be flowing well, conducive for reading and understanding.

Section 3: Fulfillment of method criteria

5. Please indicate to which extend you think the draft method fulfills the criteria. Please include the reason to your opinion, such as shortcomings or strengths of the draft method.
Identify shortcomings and strengths in the criteria fulfilment.

Criteria	Unfulfilled	Somewhat fulfilled	Fulfilled
The method should allow EbA outcomes to be appraised over long time horizons, thus allowing iterative and participatory monitoring, that is flexible to adapt to changes and new understanding.			X
The method should support a system perspective and the documentation and analysis of complexity and uncertainty in the socio-ecological system.			X
The method should document EbA processes and outcomes.			X
The method should be usable by individuals with a variety of disciplinary backgrounds.			X
The method should allow the appraisal of non-linear development.			X
The method should support learning about trade-offs through enabling the documentation of various perspectives, scales, and related decisions-making.			X

Section 4: Closing questions

6. What do you think about the use of narratives for EbA process and outcome appraisal? (free text)
General rejection or appreciation. Context to other questionnaire responses.

7. Would you consider using this draft method yourself if you worked in an EbA effort?
Please indicate (x).

Yes (x) Maybe () No ()

Feedback on practical applicability.

8. Is there anything else you would like to say, point out or comment on? (free text)
Leave room for other comments that are not covered in the questionnaire.

Section 5: Privacy and data protection terms

9. Do you consent to the data protection and privacy terms?
Please indicate (x) for applicable answer.

Yes () No ()

Need for consent. Note that the original document included the terms here.

End of questionnaire.

Semi-structured Full Draft Review Results

The overall notion of both reviewers is an appreciation for the potential of narrative use in EbA appraisals, and an identified need for further refinement and development of the method itself. These needs pertain to the presentation of information, clarifications, and structure of the draft. The reviewers gave mostly similar comments and responses to the draft and review questions.

The structure of the method was found to be in need of minor adjustments. These pertain to the section about trade-offs and maladaptation, which were suggested to be included in the section on the theoretical background. Some parts of the method limitations were further pointed out to be better placed in the beginning of the method in order to enable readers to judge the appropriateness of the method for their cause early on. More clarity of structure in regard to method application steps and instructions were requested.

It was suggested to add more references to the method, especially in regard to how it is inspired or adapted from other appraisal approaches. More clarity of the instructions (content), as well as the relationship between the different parts of the theoretical background and the methodology were requested. The level of detail was stated to be overall appropriate, with some suggestions of isolated unclear parts or redundancies.

The language and text flow require some adjustments. It was pointed out that the language used requires a degree of understanding of the theory that make it less accessible for individuals not part of the adaptation community. Furthermore, the text flow could be improved by eliminating some redundancies, clarification of vague statements, and polishing the overall layout of the draft.

In regard to the fulfillment of the method criteria that reviewers were asked to assess, opinions between the reviewers differed slightly. They agreed that none of the criteria is unfulfilled, however, differed in their assessment of some criteria that they found to be somewhat fulfilled or fulfilled.

Criteria	Somewhat fulfilled	Fulfilled
1. The method should allow EbA processes and outcomes to be appraised over long time horizons, thus allowing iterative and participatory monitoring, that is flexible to adapt to changes and new understanding.	X	X
2. The method should support a system perspective and the documentation and analysis of complexity and uncertainty in the socio-ecological system.		X X
3. The method should document EbA processes and outcomes.		X X

4. The method should be usable by individuals with a variety of disciplinary backgrounds.	X	X
5. The method should allow the appraisal of non-linear development.	X X	
6. The method should support learning about trade-offs through enabling the documentation of various perspectives, scales, and related decisions-making.		X X

Table 4: Review results of method criteria fulfillment. Each X represents one reviewer's assessment result.

Stated reasons for the gap to fulfillment in the criteria pertain to:

- Criteria 1: It may not be able to compare past and contemporary narratives.
- Criteria 4: The narrative analyst requires an understanding of adaptation and resilience thinking and terminology.
- Criteria 5: Depends on how narratives are collected and the level of systematic analysis and feedback the narrative analysts employ.

One reviewer commented on criteria 5, asking why maladaptation and limits to adaptation are not included in the criteria, given that these aspects are addressed in the draft method. This comment indicates that the criteria were at least to a very limited extend questioned by the reviewers. While the reviewer stated that the method has the potential to support learning about these aspects, it was too late to incorporate this remark in the overall criteria list.

These gaps can only be filled to some extent. Criteria one may be misconceived, thus, only a practice test can generate an answer of whether it is possible to compare past and contemporary narratives. In regard to criteria four and five, it could be possible to partially fill these gaps, by making the theoretical framework more accessible to non-experts and providing more detailed instructions and guidance for the method application. These two options have been applied in the last method draft, however, a

practice test would be more appropriate to assess the depth of theory that is actually needed, and to finalize the instruction for the method (see also section 6.8.).

The reviewers highlighted that narratives are very useful in the appraisal of EbA processes and outcomes. One reviewer points out the richness of information that narratives can provide, which can complement other data from quantitative or semi-quantitative approaches. To overcome bias in the subjective narratives, the need for systematic collection and analysis of narratives is stressed. This requires a certain skill set and capacity in the narrative analyst.

The reviewers stated, that if they were working in an EbA effort, one would consider and the other might consider using the method in its draft form.

Overall, the results of this review show that the draft method requires some editing and refinement to be more accessible for potential users and instructions to ensure that analysis results are sound. As in the previous review round, the proposition to use narratives for EbA process and outcome appraisals has been met with interest and appreciation.