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Understandings, Practices and Human-Environment Relationships—A Meta-Ethnographic Analysis of Local and Indigenous Climate Change Adaptation and Mitigation Strategies in Selected Pacific Island States

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Abstract: Local and Indigenous knowledge systems worldwide indicate adaptation and mitigation strategies to climate change. Particularly in regions that are massively affected by climatic changes, such as the Pacific Island States, there is a need for increased and combined research on the role which these knowledge systems can play internationally. For this reason, this article provides a synthesis of empirical results and approaches to local and Indigenous climate change adaptation and mitigation strategies in selected South Pacific Island States by using a meta-ethnographic approach. The reviewed literature is associated with the sub-disciplinary perspective of the Anthropology of Climate Change. The results of the meta-ethnographic analysis are discussed based on three thematic focal points: First, the empirical ground of local understandings of climate change and its theoretical conceptualization(s) are constituted. Second, the results of practices for adaptation to climate change are synthesized and presented in detail throughout one example. Third, the synthesis of climate change mitigation practices is outlined with a specific focus on human-environment relationships.

Keywords: climate change adaptation and mitigation; local and Indigenous knowledge systems; South Pacific Island States; anthropology of climate change; meta-ethnography

1. Introduction

In the cyclone season between 2014 and 2015 Fiji had been hit by several strong storms. Two of them were categorized as tropical cyclones—Pam and Reuben. (For an explanation and assessment of the storm categorization, see the 2015 annual climate summary for Fiji: https://www.met.gov.fj/index.php?page=climatedataold#2015annualSum2018.09.25%2000.41.33.pdf). As I could encounter in Fiji in 2015, local people understood the unusual frequency and intensity as caused by climate change. (In 2014 and 2015, I visited Southern Fiji on two occasions while partaking in a voluntary service, each for a period of four to six weeks between July and September. For anonymization, the persons on whose statements these introductory sentenced are based on, are not further identified.) Due to increased flooding as a result of the severe storms, local communities considered relocating to higher-lying areas. Also, the meaning and potential loss of local knowledge came into focus: Semi-modern houses, which were built with corrugated iron roofs were, in a local area of Southern Fiji, understood to withstood the storms much worse than the traditionally built "Bures" which showed a higher permeability of wind currents [1].

These local points of discussion are in line with what scientific research has found: Based on scientific, technological, and socio-economic information from 2014, the Intergovernmental Panel on Climate Change (IPCC) points out that low-lying regions are most vulnerable to the consequences of climatic changes [2]. Amongst these, the Pacific Island States are most affected by natural disasters worldwide, the consequences being economic loss, diminishing water resources, and destruction of local ecosystems amongst others. [2–4]. On a further note, most recent evidence based on satellite data from August

2020 suggests that the ice sheet losses in Antarctica are currently close to the worst-case scenario depicted by the IPCC [5]. The published research results were compared with forecasts of climate models directly related to a predicted rise in sea level and the associated vulnerability [6,7] (Hereby, scientists of different disciplines discussed vulnerability within a societal/governmental context: especially in the field of governance the concept of vulnerability seems to obscure how political actions create or reinforce structural inequalities and vulnerability of marginalized groups [6,7]. Under the scientific perspective of modern risk societies, the extent of social vulnerability is essentially determined by the means and opportunities available to individuals and societies to deal with and manage risk situations [6] p. 169. Applied to a Pacific perspective on climate change adaptation this is the point of departure for a critique or expansion of how to grasp vulnerability, since practical possibilities for Pacific societies are also influenced by global power inequalities that possibly enhance vulnerability.) of coastal regions worldwide [8].

The 22 Pacific Island Countries and Territories [9] are experiencing multiple consequences of climate change, while at the same time being comparatively dependent on the maritime ecosystem for a nutritional basis and infrastructure [9,10]. The states differ based on a variety of factors such as (colonial) history, ethnic groups, ecological environment, and geology, with the consequences of climate change for each region being shaped in particular by their classification as high- or low-lying regions. Because of their immense regional variation, natural disasters, droughts, sea-level rise, and fish depletion are counted in varying degrees among the local impacts of climate change [9]. These local impacts in turn involve different following consequences and (ecological) interactions as exemplified by Kumar and colleagues concerning sea-level rise:

> "Accelerated sea-level rise will result in higher inundation levels, rising water tables, higher and more extreme flood frequency and levels, greater erosion, increased salt water intrusion, and ecological changes in coastal flora and fauna". [10], p. 5

These changes further affect socio-economic factors, which is reflected in scientific assessments predicting enormous economic losses for Pacific Island States [3]. At the same time, the consequences for different states cannot be equated: While Papua New Guinea, Solomon Islands, Tonga, and Vanuatu are among the most disaster-prone nations worldwide, low-lying states, including Kiribati and Tuvalu, are particularly at risk from sea-level rise [9]. Nonetheless, recent findings conclude that all Pacific Island Countries have exceptionally high vulnerability to the impacts of climate change [9]. In order to tackle these consequences, knowledge about strategies for climate change adaptation and mitigation are essential. But since the impacts of human-made climate change affect particularly young and future generations, the question of how this knowledge is generated and passed on becomes necessary as well [11].

Still, inhabitants of Pacific Island States already realize and experience the consequences of climate change firsthand. Moreover, research has shown that local, traditional, and Indigenous ways of living can contain strategies on how to adapt to climate change and are therefore crucial [12–14]. With this in mind, the research questions of this article are the following:

What are local and Indigenous understandings of climate change in selected Pacific Island States and how can they be conceptualized? Which adaptation practices to climate change already exist? How are these practices transferred to younger generations and how do they relate to international efforts to mitigate climate change? In order to answer these questions, I conducted a meta-ethnography that synthesizes previous empirical findings based on scientific literature. The article is thus intended to provide a literature-based overview of previous research results and to reinterpret them in terms of further research potential with a specific focus on the entanglement of local strategies and international ambitions.

Due to the number of different states and the high dispersion of their regional location, not all 22 Pacific Island Countries and Territories were regionally focused in this study.

Historical and regional aspects as well as the degree of affectedness were used as selection criteria. Thus, data collected in the politically independent, smaller Pacific Island States were included, which is why data collected in New Zealand and Papua New Guinea was excluded from the regional focus of the analysis. For reasons of more precise regional situatedness of the results, the regional focus was further placed on the southern Pacific Island States. Additionally, the low-lying, as well as disaster-prone regions of Kiribati, Solomon Islands, Tonga, Tuvalu, and Vanuatu [9], represented the center of interest. Since a large body of literature was based on research conducted in Fiji and Samoa, these were also focused on due to their regional fit. The nature of the environments of the states included in this research nonetheless exhibits a high degree of diversity, which is why this study primarily depicts local diversity rather than comparing a presumed homogeneity.

The synthesized data was assigned to the theoretical sub-discipline of the Anthropology of Climate Change, which has emerged over the last two decades under the umbrella of Environmental Anthropology. The Anthropology of Climate Change aims at analyzing the phenomenon of climate change in a multifaceted way [15–17]. For this reason, it discusses how people conceptualize climate change and adaptation to climate change in different contexts [18–20] with a specific focus on Indigenous realities and an engaged rather than only descriptive approach [19,21]. Epistemological approaches of Social and Cultural Anthropology are especially required because they enable us to not only understand knowledges on practical adaptation to climate change but also to culturally translate different understandings, ideas, and knowledge [22]. This article is part of my broader Ph.D. project that wants to contribute to this sub-discipline. The project examines local and Indigenous climate change negotiations and adaptation practices in the South Pacific and how they relate to international educational policies, such as Education for Sustainable Development (ESD) and Climate Change Education (CCE). The scientific results described so far show the relevance of the topic for exactly the southern Pacific region and let an urgency of the discussion of this article and its empirical basis appear in a new light.

2. Methods and Materials

In order to answer the research questions, the method of meta-ethnography was chosen. Meta-ethnography is characterized on the one hand by the synthesized presentation of empirical qualitative data [23,24]. On the other hand, it enables a new, interpretative compilation of the results to create a meta-level of ethnographic description that allows for new insights [23–25], as constituted in the following:

> "Meta-ethnography is a method that allows synthesizing qualitative studies in order to achieve a new conceptual understanding of a particular phenomenon. [. . .] Such a method can lead to more concise findings as well as to new conceptual frameworks, thus shedding light on gaps in literature". [24], p. 2

For these stated reasons, meta-ethnography was preferred to other methods of systematic literature reviews. Meta-ethnography, as developed by Noblit and Hare [23] summarizes, compares, and interprets different qualitative studies not only in order to shed light on gaps in research, but also to create added value to conceptual frameworks concerning the given topic [24,25]. In line with the approach, a seven-step procedure was carried out: (1) getting started—record identification, (2) deciding on what is relevant to the initial interest, (3) narrowly reading the studies, (4) determining how the studies are related, (5) translating the studies into one another, (6) synthesizing translations, and (7) expressing synthesis [23]. At its core, meta-ethnography is a synthesis of interpreting the interpretations of ethnographic results and "guides the researcher in translating results from one study to another to form a new conceptual understanding of a particular phenomenon" [24], p. 3 The explicit quality of the method lies not only in aggregating scientific results but also in expressing the results within a new set of relations in the next step, resulting in a kind of ethnography that achieves new insights for a meta-level [23,24].

The following flow diagram in Figure 1 [26] illustrates my methodical approach in the implementation of the 7-step procedure according to Noblit and Hare [23].
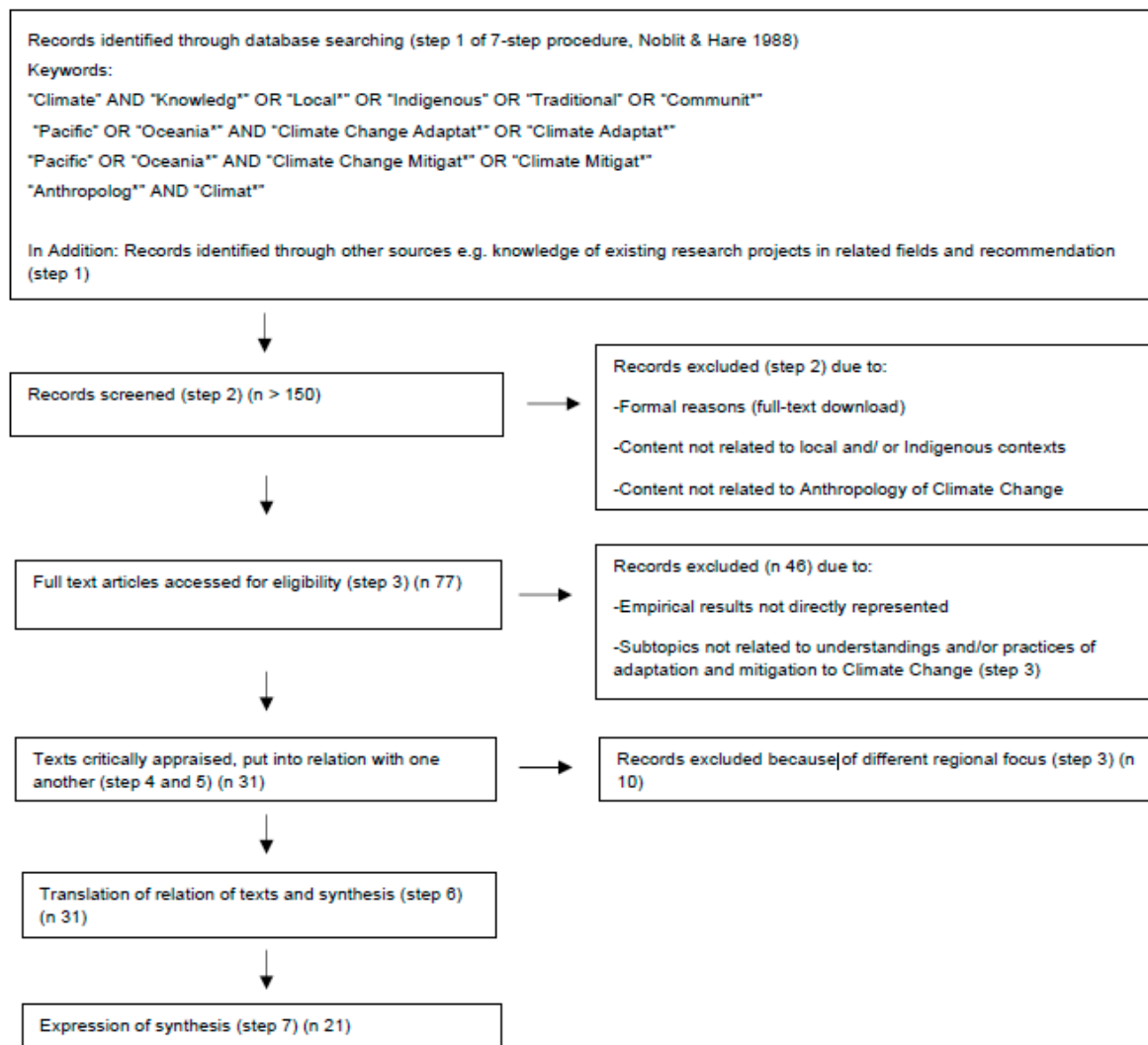
Figure 1. Flow Diagram of the Different Phases of the Applied Meta-Ethnography.

To begin with, a literary research was carried out with the library database of the Free University Berlin (included databases among others are ProQuest, ScienceDirect, and Web of Science (For additional information on which databases are included please see: https://dbis.ur.de/dbliste.php?bib_id=fub&colors=31&ocolors=40&lett=a&lc=S&fc=S#S)). The main keywords used for the literary research are to be summarized as following: "Climate" AND "Knowledg*" OR "Local*" OR "Indigenous" OR "Traditional" OR "Communit*"; "Pacific" OR "Oceania*" AND "Climate Change Adaptat*" OR "Climate Adaptat*"; "Pacific" OR "Oceania*" AND "Climate Change Mitigat*" OR "Climate Mitigat*"; "Anthropolog* AND "Climat*". Following extensive research (Step 1), over 150 documents were screened (Step 2) and reduced (n 77) based on the topic expressed in the title and/or abstract. Records were excluded (step 2) due to not matching the following criteria: Formal reasons (full-text download); Content related to local and/ or Indigenous contexts; Content related to an Anthropology of Climate Change. These criteria were also reflected in a practice question which I introduce in the following paragraph. During Step 3 all remaining texts were thoroughly read and thus more narrowly screened according to their topic or methodological relevance. On this basis, again, those texts were excluded, which were methodically or thematically not relevant. The inclusion criteria consisted of the representation of empirical data and the relation of its subtopic to understandings and/or practices of adaptation and mitigation to climate change. The remaining literature (n 31) was compared, put into context, and interpreted (steps 4–6). As a synthesizing basis for this article, texts that were

not regionally relevant were not considered (n 10). The only publications that remained were those that were thematically, methodically, and regionally pertinent (n 21). In a final step the results were synthesized (step 7). (The timeline of the search was defined as follows: The majority of the literature search was conducted from November 2019 to May 2020. Minimal follow-up research was conducted in September and October 2020 to synthesize the results). This synthesize is carried out in Section 3 throughout a descriptive summary and discussion of the results of the meta-ethnographic analysis concerning the following three thematical aspects: First I present what local understandings of climate change and beliefs about climate change could be identified within the analysis and how they are conceptualized within the different literature. Section 3.2 outlines one example of local and Indigenous practices on adaptation to climate change and expresses how this can be interpreted and further discussed throughout the results of the meta-ethnographic analysis. In Section 3.3 the insights concerning climate change mitigation are presented which lead to a synthesis of human-environment relationships and their meaning within an international context. Following the quintessence of meta-ethnography, the results also use individual texts from step 4–6 for interpretative classification.

While conducting the meta-ethnography, I added the aspect of using a practice question to the method. I adopted this procedure from the principles of rapid reviews [27]. The method was developed within the context of scientific policy advice to create a certain way of synthesizing evidence within the domain of public health by short deadlines [27]. (Rapid reviews have been used especially in response to ad-hoc events whose further research is being debated and where urgent social and political solutions are needed. Several examples of rapid reviews can be found concerning Covid-19.) Rapid reviews have been established in the scientific landscape mainly in the development and discussion of new fields of knowledge and were combined with meta-ethnography [28]. The creation of rapid reviews supported by meta-ethnography defines the following principles: development of practice question, defining the search for evidence, critical appraise of the information sources and synthesizing the evidence [27,29]. When using rapid reviews, it is important to underline that this type of review does not replace a systematic review [28], p. 717 and can only be understood as a condensed form of it, which is why I only added some of its principals to the meta-ethnographic approach. In this sense, the following practice question was used for the meta-ethnographic analysis: Which empirical results from the field of Climate Change Anthropology are already available on the use of local and Indigenous adaptation and mitigation of climate change with a regional focus on the South Pacific Island States? The search for evidence was further defined throughout the document types (policy briefs and anthropological scientific literature both peer-reviewed articles and book publications) and language (English and German).

Despite the above described benefits, meta-ethnography is also criticized for the danger of blurring a systematic literature analysis and a more inductive-interpretive approach, as well as for its vaguely defined structure [25,30]. For this purpose, on the one hand it is necessary, especially in the comparison of empirical results, to remain close to the empirical origin and to separate classifications and interpretations in the synthesis [24], p. 7. On the other hand, I created the flow diagram portrayed in Figure 1 to outline the structure of the methodical approach more thoroughly. A further limitation of the method can be linked to a scientific debate on postpositivism:

> "Validity of interpretations of meta-ethnographies is of concern to the scientific community partly due to postpositivist norms of replicability. However, this should not be an issue when conducting a meta-ethnography since this method stems from the interpretive paradigm, which accepts and recognizes that all interpretations are but one possible interpretation of findings". [24], p. 7

Also, due to the social phenomenon of climate change denial, it is important to illustrate in this context that objectively measurable impacts of climate change are already present for the Pacific region and are thus not interpreted. At the same time, I attempt to illustrate the

value of this analysis in terms of particularized findings of specific contexts in Section 1, which is additionally reflected in the clarification of regional specificities throughout Section 3.

3. Results and Discussion

In this Section the results of the meta-ethnographic analysis are presented whilst set into relation with another. They are further discussed in the light of additional literature.

3.1. Understandings of Climate Change in Local and Indigenous Contexts

The empirical results from the analysis of the different texts reveal that there is a diversity of understandings of climate change and adaptation amongst Indigenous groups: One study taken out in Fiji [31] showed that the participants of the studies had "different views about what climate change is and what impacts it will have on their livelihoods" [31], p. 60. This can either be the case within a single country, or as a comparative study of Tuvalu, Samoa and Tonga illustrates—within different countries [32]. But how were differing views and understandings of climate change further described and for what underlying reasons? The comparative study taken out in Tuvalu, Samoa and Tonga indicates that climate change was generally perceived by locals as

> "increases in temperature or »increased heat of the sun«. [...] Respondents from Tuvalu emphasized the lack of rain and severe drought conditions in their replies to the open questions. In Samoa, people described both extremes, i.e., too little and too much rain. And in Tonga, the experience and expectation of heavy rainfall were more prevalent than the experience and expectation of lack of rain. [...] With the regard to changes of wind, replies reveal that in Samoa and Tonga the focus lies mainly on the occurrence of tropical cyclones". [32], pp. 154–155

In Gucake's study on Fiji more than half of the participants expressed that "climate change is the changes in the weather patterns" [31], p. 52. Other field research, particularly in Tuvalu and Kiribati, illustrated that climate change was primarily associated with a rising seawater level and thus, was associated with the Christian Noah Story [32,33]. A repetition of the Noah Story was partially thought of as a non-recurring tragedy [33].

Data collected in Fiji, Lata and Nunn [34] found out that a call for climate change action was perceived as an "alien and remote" (p. 177) concept that does not relate to one's own daily life. The further description of this insight is that information on action leading towards climate change mitigation was provided in foreign languages, mainly English, which was not the participant's mother tongue (p. 177). Also, the participants have not yet felt threatened by it but only understood other Pacific countries like Australia or Kiribati (p. 180) as concerned nations, even though in another part of the survey they identified environmental concerns (p. 178). In addition to these results the study of Wit and colleagues [20], partly based on research carried out in Vanuatu, expresses the following: Local assessments of extreme weather events such as floods or storms differ massively from their representation and perception in the media, as people rather focus on traditional knowledge systems and in one case even neglected warnings on up-coming severe weather events [20], p. 11. In a recently published article in this Special Issue van der Ploeg and colleagues describe a media discourse on climate change in the Solomon Islands. They conclude that "a narrow focus on the projected impacts of climate change distracts attention and resources from more pressing environmental and development problems that are threatening rural livelihoods" [35], p. 1. Their localized description of the rural livelihoods of the Lau people and its comparison to the media narrative of sinking islands represent a challenging gap of different types of understandings and narratives on climate change.

Beyerl and colleagues explain the varying perceptions of environmental changes between inhabitants of Tuvalu, Samoa and Tonga and even within the countries throughout the following indicators:

> "(i) Geographical and climatic differences between the island states and (ii) selected socio-demographic variables. The socio-demographic factors that proved most relevant include (i) the size of the settlement in which respondents live, (ii) their distance to the sea, (iii) their interaction with nature, and (iv) their self-assessment of their own religiosity". [32], p. 143

The indicators presented in this study do not yet refer to the other studies but could provide an explanation for the other results [20,31,34]. Also, the indicator of ii.i and ii.iii are in line with the findings of Hetzel and Pascht [36]: They carried out research in Vanuatu on urban sense-making of climate change of young, urban Ni-Vanuatu and hinted towards a big interest of the participants in western scientific knowledge on climate change. The reasons for this will be further discussed in Section 3.2 but comparing their results for example to the ones of Gucake, where the research was taken out in a more rural place, the thesis becomes fortified, that one's livelihood needs to be aligned to the concept of climate change.

Next to these different understandings of climate change, the synthesis showed that in almost all of the studies concerning an Anthropology of Climate Change there is a discussion about how these different understandings can be contextualized and by which perspective a scientific consideration in consequence of postcolonial power distributions is meaningful [18,20,35]. Therefore, presenting the findings that scientifically discuss local and Indigenous understandings of climate change would be insufficient without describing that the phenomenon of climate change within this discourse is also understood as a peak of global power inequalities, as Crate and Nuttall sharpen up:

> "Climate change is environmental colonialism at its fullest development—its ultimate scale—with far-reaching social and cultural implications. Climate change is the result of global processes that were neither caused nor can be mitigated by the inhabitants of the majority of climate sensitive world regions now experiencing the most unprecedented change. Thus indigenous peoples and other place-based peoples find themselves at the mercy of—and having to adapt to—changes far beyond their control. Yet climate change is a threat multiplier. It magnifies and exacerbates existing social, economic, political, and environmental trends, problems, issues, tensions, and challenges". [17], p. 11

It is important to bear in mind that this perspective can also carry the risk of victimizing people from the 'Global South' as pointed out by van der Ploeg among others. In the investigation of how people from the 'Global South' understand their 'vulnerability', recent anthropological research has shown that local understandings are not accompanied by narratives of victimization as especially studies carried out in Fiji and Vanuatu but also in regions outside the South Pacific showed [20,34,37]. On the contrary Fair constituted that in Vanuatu climate change would allow (Indigenous) communities to articulate the importance of Indigenous knowledge and the practical and moral superiority of Ni-Vanuatu kastom practices [37], p. 187. Local responses to climate change would therefore have counter-hegemonic potential and would demonstrate the agency [37] of inhabitants of the so-called Small Island States [18]. Besides, empirical results with a focus on other regions presented that the vulnerability to climate change of individual population groups could thus be reduced and resilience created by using local, ecological, and intergenerational knowledge and practices [38–42] (I do not use resilience in this paper to describe the adaptive capabilities of a system in a scientific and technical sense [41]. Instead, adaptive resilience [38] is intended to describe the actor-centered process of dealing with and reacting to a changing environment and to focus on the transformative [38] core of practices and knowledge for adaptation to climate change [41]. However, the concept of resilience has also been strongly criticized scientifically: on the one hand, natural and social science definitions diverge widely [42]. On the other hand, the use of resilience, especially in governance contexts, suggests a kind of obligation for actors to adapt to changing living conditions, for example due to the effects of global capitalism or climate change [42].).

To be understood as a validation of the portrayed data so far, Beyerl and colleagues refer to the necessity to scientifically present different perceptions for setting a basis to discuss and create more sustainable ways of life [32], p. 186. For this aim, climate change needs to be defined in a more differentiated way. Furthermore, other anthropological research continues to examine how knowledge about climate change is developed into subjective, situational, and normative ideas in their local contexts [43,44]. Reviewing different approaches on how to grasp a notion that focusses particularly on the claim of differentiation, and the possibility to describe how changes in understanding occur, the definition of climate change as a travelling idea arose: By understanding climate change and the complex debate on it as a theoretical concept of a "travelling idea" [20] Wit and colleagues aim to understand local views on climate change and global ideas of climate change as coexisting realities, to analyze their interplay and to introduce decisive results into politics in the sense of applied and engaged anthropology [15]. The concept of climate change as a travelling idea enables researchers to recognize local understandings of climate change as dynamically intertwining understandings, to place them in new contexts of meaning, and thus to place their comparison and translation at the center of the analytical perspective. Building on Hulme [45], they, therefore, postulate that climate change should be understood as a "travelling idea" that contains different realities and perceptions (Following this approach, they do not devaluate "truths" of climate change.) depending on the local context [20] and the power structures that shape it.

Summarizing the meta-ethnographic findings on local and Indigenous knowledge concepts of climate change in the selected Pacific Island States a claim for a differentiated perspective on differing understandings of climate change appeared. Furthermore, the literature review showed that a current standard is to put climate change into the perspective of global power structures without victimizing Indigenous groups or people of the 'Global South' in general but also considering the possibilities and potential of environmental knowledge and creating resilience. Both claims could be met by theoretically defining different ideas on climate change as travelling ones, only becoming veritable in its individual contextualization.

3.2. Adaptation Practices on Climate Change based on Local and Indigenous Knowledges

What examples of local adaptation practices in the selected Pacific Island States based on local and Indigenous knowledge systems were found in the conducted meta-ethnographic analysis?

In 2019 Klöck and Fink [46] paint a picture of residents of these islands as resilient agents of knowledge production in the way they adapted to the long histories and respective environments the different islands have shaped and are still shaping (p. 1). The dependence and strong attachment to marine resources is seen as a high sensibility regarding consequences of climate change in other studies as well:

> "[I]n all three countries [Samoa, Tonga, and Tuvalu], changes of marine life were mentioned, mostly the decrease of fish and shellfish, and impacts on coral reefs. These changes were predominantly described in connection with increased temperatures, but also as results of human activities like pollution, coral and sand mining, land reclamation, as well as destructive fishing practices and overfishing.". [32] p. 157

The participants of Gucake's research in Fiji further recognize that they are vulnerable both to maritime impacts (e.g. sea-level rise, coastal erosion, salinization of soils), as well as to severe weather events (mainly tropical storms and rain) [31], p. 54–55. Characteristics of islands are further described as resource-limited and isolated [46]. Culture or more specific human-environment interactions are therefore outlined as to play an important part in the way to deal with living on an island. Especially traditional and orally transferred practices and knowledge systems are understood as key to adapting to climate change on islands [31,37,47,48]. In ethnographic studies, such reference was increasingly made to

the peculiarities of Indigenous knowledge concerning seasonal calendars, the observation of changes in their direct environment, and sea navigation in Tuvalu and Samoa [47,49]. In his empirical study, Lefale thus sets up a detailed designation calendar for different weather and wind analyses in Samoa, which is used for severe weather forecasts [49]. Also, in 2019, Moncada and Bambrick postulated that the inhabitants of Rabi Island in northern Fiji are already using strategies to deal with cyclones, flooding, and dry seasons, for example by setting up a water management system or better drainage systems [50]. In individual studies, which were integrated into the present meta-ethnography, the use of freshwater resources was addressed [51,52]. In southwestern Fiji local communities adapted to rationing borehole water as this resource was understood to be finite [51], p. 507. Also, the diet changed, including fewer vegetables and more fish cooked with coconut, and relatives from other regions became suppliers for those vegetables and fruits that could not be harvested in the participant's region due to water scarcity [ibid.]. In terms of agricultural land usage and protection against severe weather events Currenti and colleagues identify the following adaptation strategies:

> "In terms of planning ahead, some people are planting more fruit trees around their houses to provide both food and shelter in the future. [. . .] Villagers have also relocated agricultural plots from flood-prone areas to the steep slopes of the surrounding hills. This has reduced the exposure of agriculture to flooding but has created new problems through landslides, which have already damaged roads and buildings, and resulted in further loss of arable land". [52], p. 74

Also, my notes on-site mentioned in the introduction show that the inhabitants actively deal with climatic changes and adapt to them. Even though adaptation strategies in the Pacific region are discussed in many ways and do not only refer to dealing with severe weather events, this chapter focuses on these adaptation strategies and thus takes up my informant's estimation stated at the beginning of the article. To delve deeper into the practices themselves and the implication for the transfer of knowledge they bring, this chapter will focus on the example of housebuilding, mentioned in research conducted in Fiji, Tuvalu, and Vanuatu.

As early as 1972–1982 Campbell examined local adaptation to tropical storms in Fiji and explained why traditional construction methods can withstand storms to a greater extent than semi-modern building constructions [1]. This illustrates that the description of my Fijian informant regarding the wind-resisting qualities of "Bures" is scientifically mirrored. The person also postulated that the existing adaptations do not continue to exist due to a lack of disclosure. In the following which took place after Cyclone Pam, Fair points out a further reason why Kastom thatched houses are safer:

> "As just one example, of the thankfully few deaths that happened during the cyclone, many were reportedly caused by flying iron sheeting, torn from the roofs. In many accounts I heard of those, responsibility was not centred on the relationship between excessive emissions in faraway countries and increases in extreme weather events, but the failure to keep kastom. Kastom thatched houses are not deadly if they collapse in high winds, whereas those who had perished in the cyclone had become literal victims of Westernisation and its dangerous and unstable concrete houses. [. . .] Within Vanuatu it became evident that climate change was an opportunity to articulate the importance of indigenous knowledge, the practical and moral superiority of Ni-Vanuatu kastom practices, Christian forms of connection and care for nature and community, and potentially advocate for a renaissance of pre-capitalist values and forms of livelihood, in the face of increasing urbanisation and Westernisation". [37], p. 187

The accusation of 'modern' ways of life, which Fair refers to and for which corrugated iron roofs are one example, hint towards the possibility of reviewing whether Indigenous lifestyles and techniques might not be more suitable to climate change adaptation. Thereby

the view on Kastom thatched houses shifts from 'traditional' to, in a way, 'innovative' when adding safety to deal with the consequences of climate change. A different empirical study [50] focused on how coastal communities on remote Rabi Island, situated off the east coast of Fiji's second-largest island Vanua Levu, are affected by climate change. The study finds that participants tend to adopt sustainable short-term coping strategies when hit by shocks [50] like cyclones, floods, and dry seasons. Long-term adjustments seem to be related to cultural knowledge, but there was no detailed information based on empirical material found for this region within the analysis. Following these results, the question arises on how this cultural, traditional knowledge is passed on and secured?

Based on his research Gucake points out that oral narratives contain a specific value in transferring knowledge of adaptation to climatic changes over generations [31]. This tradition was already used in former times to adapt to previous climatic changes in interacting with the local environment by the respective Indigenous groups he researched (Itaukai of the province Nadroga in Viti Levu, the main island of Fiji) [31], p. 23. Gucake states that a lot of these oral narratives were lost since locals increasingly ignored them.

> "The replacement of this loss came in the form of western narratives such as posters, charts, and brochures. There is/was a lost opportunity to use oral narratives/traditional knowledge in long term and sustainable ways to address climate change issues". [31], pp. 16–17

He furthermore states that a loss of traditional knowledge has been caused by "the change in lifestyle and family structure, introduction of television and movies and urban drift" [31], p. 58. Literacy is also cited as a reason why less emphasis is placed on oral transmission [ibid.]. In addition to the described process of modernization, an empirical study of Hetzel and Pascht in Vanuatu provides further explanation as to why young ni-Vanuatu distance themselves from traditional knowledge: The authors describe it as a valuable tool for islanders to engage with the world beyond their island. For the younger generation, it was understood of particular value to create new lifestyles in line with a 'modern, westernized world' as which scientific knowledge towards climate change was perceived [36]. They further argue that traditional knowledge was over time complemented and even replaced. Contrarily to Gucake they recognize this as a possibility for young islanders to interact globally.

> "Climate change, together with scientific knowledge, experienced as a phenomenon that has local impacts, reaches Vanuatu from outside of the country. We argue that climate change and related scientific knowledge provide connections to the outside world, and thus is associated with this outside orientation". [36], p. 104

Traditional knowledge might be set into relation with rural areas whereas the younger urban generations have closer daily access and parallels to scientific knowledge, as well as the context in which it was generated [36], p. 121.

In Section 3.2 I used the example of housebuilding to depict how local and Indigenous knowledge systems create resilience in dealing with climate change. At the same time, it becomes clear that the implementation of this is not a guaranteed success, especially in a world, shaped by global and local influences: On the one hand, Indigenous strategies for adapting to climatic changes exist and even contain possibilities of creating resistance. On the other hand, the implementation of these practices is declining. One possible explanation for this phenomenon is that younger generations try to find answers to climate change within Western response systems, as the concept of climate change itself was brought to them by 'the West' too. This conceptualization was also displayed in Section 3.1. While offering the possibility of interaction with Western knowledge concepts of climate change, at the same time it undermines the importance of adaptation strategies inherited in Indigenous knowledge systems.

3.3. Local and Indigenous Human-Environment Relationships and International Climate Change Mitigation

The results of the meta-ethnographic analysis concerning mitigation strategies based on local and Indigenous knowledge systems in the Pacific Island States revealed that almost no direct mitigation practices could be identified for the region of the South Pacific. Nevertheless, examples of Indigenous peoples' mitigation practices beyond the region of the South Pacific were found in the methodical steps 4-6 such as the use of agroforestry in the Sahel zone which plays a special role in preserving biodiversity [53,54].

The only case hinting at the usage of a concrete mitigation practice close to permacultural agriculture systems was found in Hetzel and Pascht's publication in 2019 [55]. They portray the outcomes of a workshop carried out by an NGO in Vanuatu, during which permaculture techniques, among others, were taught. In this case, originally non-western knowledge was now used and taught to non-western societies [55]. Knowledge about the cultivation method as well as the examples of cultivation in gardens of two different regions showed that the participants creatively brought together different practices and knowledge systems, which they developed in NGO workshops, but also one already used before [55]. Moreover, since different species were found in the garden, the question came up whether biodiversity methods were in a way already cultivated before. Based on the information of their interlocutors the authors state that "creating diversity in the realm of cultivation is an established practice in Vanuatu" [55], p. 212.

Rather than finding more concrete examples of how mitigation practices are carried out in the Pacific Island States, the results of this article provide an indirect answer to this question of what mitigation practices occurred. Set into the context of human-environmental relationships, certain ways of life and livelihoods were depicted in different studies [31,32,55]. As one example Beyerl and colleagues describe the following:

> "In general, respondents, particularly in Tuvalu and Samoa, referred to an overuse, abuse, or unwise use of resources. Irresponsible and selfish behaviour of not taking care of the environment were mentioned along with valuing money more than the consequences of such behaviours, economic activities, greed, and modernisation. Changed conservation and consumption patterns, societal changes, bad manners of the youth, and new religious denominations came up in the explanations as well". [32], p. 158

What this statement presents is a specific approach on how to understand environmental 'positive' behavior and how this relates to local and traditional ways of life. Ramos-Castillo and colleagues underline that Indigenous peoples stand out through a close relationship with the environment they live in [48]. This relationship inherits knowledge in how to respond to climate change as discussed in Section 3.2. Indigenous knowledge, although new to climate science, has been long recognized as a key source of information and insight in domains such as agroforestry, traditional medicine, biodiversity conservation, customary resource management, impact assessment, and natural disaster preparedness and response [56]. These practices are based on knowledge systems that understand the long-term benefits of agriculture and biodiversity as a key indicator of success like the findings of Hetzel and Pascht constituted [53]. These practices, therefore, contain a knowledge-based quality. Fair explores religious responses on climate change in her study and concludes that through religious framings of climate change challenges as behavioral 'negative' options (e.g., carbon emission framed as a sin), counter-narratives are created which support the value of local, more sustainable lifestyles (a spiritual devotion) in contrast to western, industrialized lifestyles [37], p. 175. These rather philosophical human-environment relationships and livelihoods are understood as a form of mitigation strategy by themselves. This becomes very concrete in how Gucake describes oral narratives of the participants of his research: "Mitigation is inbuilt into oral narratives that demand a greater responsibility for our actions on the environment and I feel that this should not be left out of the equation" [31], p. 65. Gucake's account is supported by general

assessments of how livelihoods of Indigenous peoples are perceived as ways of life that can provide resilience for climate change and when looking at extreme prognoses, even a survival strategy:

> "Comprising only four per cent of the worlds population (between 250 to 300 million people), [indigenous peoples] utilize 22 per cent of the world's land surface. In doing so, they maintain 80 per cent of the planet's biodiversity in, or adjacent to, 85 per cent of the world's protected areas. Indigenous lands also contain hundreds of gigatons of carbon—a recognition that is gradually dawning on industrialized countries that seek to secure significant carbon stocks in an effort to mitigate climate change". [56]

If we look at Indigenous ways of life, these are mostly the ones producing the least CO2 and the least non-biodegradable waste as well as using the least non-renewable resources [56]. Moreover "Indigenous peoples play a fundamental role in the conservation of biological diversity and the protection of forests and other natural resources" [48], p. 2. Although the literature review of empirical findings on the mitigation of climate change through local and Indigenous knowledge in the selected Pacific Island States was limited, individual examples of diversity concepts and permaculture were found. Furthermore, the analysis showed that a mitigation quality is inherited within specific worldviews, understandings and creations of human-environment relationships.

4. Conclusions

Summarizing the results of the meta-ethnographic analysis, it can be expressed that the concept of local and Indigenous understandings of climate change needs a differentiated and contextualized view since local understandings differ. For this approach, the conception of climate change as a travelling idea seems fruitful to differentiate local understandings of climate change. In Section 3.2 several adaptation strategies in the Pacific were identified focusing on the example of housebuilding and passing on traditional practices via oral narratives as well as the discussion of how they further develop since the oral transmission is understood as challenged. Section 3.3 could show that a mitigation strategy not only lies in biodiversification techniques but in the value of understanding Indigenous peoples as knowledgeable actors with advanced awareness of sustainable livelihoods. Most importantly, human-environment interaction and an understanding of sustainable lifestyles can be recorded as a mitigation strategy that is in significant contrast to lifestyles in industrialized countries. Summarizing the review on climate change mitigation in the context of local knowledge systems and relating it to a narrative which urges us, as people, to save the ecosystem earth as we know it, one question arises: Is there a possibility that industrial nations can learn from an Indigenous knowledge on resourcefulness to reduce their ecological footprint without taking advantage of it or culturally imperialize it?

Knowledge of climate change mitigation, (i.e., understanding the advantages of parallel use of soils by perennial trees and annual crops), can be beneficial for other localities: Practices of agroforestry were successfully transformed into others contexts [54,57]. Still, an essential characteristic of Indigenous knowledge is precisely its local embedding and thus its high degree of contextualization, which becomes strengthened by the isolated dimension of islands. Nevertheless, as Lazrus [47], p. 285 argues, an understanding of islanders must not only show the isolation of islands but also the global connection of the island's lives to other countries on economic and social levels. Hau'ufa used the thesis of a "sea of islands" to show how a life lived on islands was also possible because of an exchange of people and goods with faraway places [58]. This notion supports the idea to transfer mitigation strategies into other parts of the world since islanders are here portrayed as interconnected centers to und influenced by the world instead of faraway isolated areas. At the same time, it is still questionable how this knowledge can be passed on and grasped in its high contextualization which would be necessary as the results of Section 3.2 identify. Furthermore, it is unclear how this knowledge will, could, or should not be given greater

significance in international policies, since the appropriation of this Indigenous knowledge system might support postcolonial policy structures [46,59].

At the international, educational level, this challenge is answered with global education policy programs such as ESD and CCE, which the individual countries implement on the recommendation of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). Local and Indigenous knowledge on climate change adaptation and mitigation has exactly the quality of knowledge that ESD wants to create to apply solution-oriented action for sustainability [60–62]. But even though they inherent important lessons for international policies of ESD [62], "we should be careful not to view local knowledge as a panacea, and integrating it with Western science as necessarily easy and effective" [46], p. 7. In this sense-making it is of importance to ensure that the usage of Indigenous knowledge does not follow a commercialized logic. In this context, ʻĀina-based education (ʻĀina-based education is defined as teaching and learning fundamentally through the connection of people and human community with ʻāina hence the land, sea and air. ʻĀina refers to the environment that nourishes, heals and thus preserves people. Didactic and content-related topics such as community-based learning, self-empowerment strategies or knowledge and handling of local vegetation are central themes [63,64].) from the North Pacific in Hawaiʻi might show that environmental knowledge of Indigenous peoples has been successfully integrated, not instrumentalized, and was implemented in local contexts defined by civil society, not into forgiven western educational structures [63,64]. This also secured the intergenerational disclosure of knowledge. Indigenous knowledge systems or livelihoods could additionally be perceived as a source to generate resilience beyond one social group within the framework of international policies: For example, as an own variation of education for industrialized societies that presents ideas for more sustainable human-environmental relationships.

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