Eidgenössische Technische Hochschule Zürich
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National Bureau of Statistics

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Department of Environmental Systems Science
Transdisciplinarity Lab · Science-Society Interface

MASTER THESIS

A composite indicator framework for general household resilience on Mahé, Seychelles

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Preface

The hereby presented master thesis follows a transdisciplinary approach. The two partners, the Transdisciplinarity Lab (TdLab) of the Department of Environmental Systems Science (USYS) of ETH Zurich and the Seychelles National Bureau of Statistics (NBS) jointly selected the study topic. It was aimed to select a topic which is, on one side, of relevance from a scientific point of view and, on the other side, of practical use for the local partner. The study was elaborated and conducted in close collaboration in order to enable knowledge exchange, to facilitate access to local information and to support local capacity building. Therefore, all of the major decisions in the development process have been discussed with both, the deputy CEO of NBS, Helena De Letourdis as representative of NBS and the main supervisor of the work, Dr. Pius Krütli as representative of the TdLab. However, the opinions expressed in this thesis are the author's opinions and do not necessarily reflect the official view of NBS and the TdLab.

Acknowledgement

First of all, I want to express my sincere gratitude to Dr. Pius Krütli, Co-Director USYS TdLab, Department of Environmental Systems Science, ETH Zurich, Switzerland, who supervised and guided the whole process of the thesis with great dedication. I highly appreciate the frequent exchange and the valuable discussions we had, the straightforward and challenging feedback I got and especially the constant willingness to provide support if needed. This is not taken for granted!

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Special thanks go to Laura Ah Time, CEO of the NBS who supported the thesis from the very beginning with providing a well-equipped workplace for my stay in the Seychelles. She was always willing to help if there was anything bothering me and, therefore, largely contributed to the fact that I felt very welcome at the office.

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ing to participate in one of the workshops and who contributed to this thesis with their valuable inputs.

I also want to express my sincere gratitude to Prof. Dr. Achim Walter, study director of Agricultural Sciences at ETH Zurich, Switzerland, who approved my application to conduct the master thesis on a topic outside the scope of my major in Animal Sciences.

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Assignment of tasks

Name of student	Andrin Schulthess
Title	A composite indicator framework for general household resilience on Mahé, Seychelles
Objectives	– To design a composite indicator framework for general household resilience on Mahé – To demonstrate the use of the composite indicator with several example cases
Research questions	– Which indicators are suitable to describe general household resilience on Mahé? – How can the indicators be measured at household level? – How should the indicators be organized and weighted into a composite indicator framework for general household resilience? – Is the developed composite indicator framework applicable?
Theoretical approach and methods	– Literature research, key informant interviews and informal talks to determine relevant shocks, trends and hazards of households on Mahé – Literature research, key informant interviews, informal talks and expert workshop to determine characteristics of a household which influence its resilience – Indicator selection and framework development for the composite indicator based on the obtained information – Designing and pilot-testing of a questionnaire for the measurement of the indicators at household level – Assignment of weights to the indicators and dimensions for the aggregation into the composite indicator – Application of the composite indicator to several household example cases
Expected results	– Literature review of the resilience concept with focus on composite indicators for household resilience – Description of characteristics (indicators) which influence household resilience – A questionnaire which enable the measurement of the indicators at household level – A resilience composite indicator framework which converts the information from the questionnaire into a composite indicator and, therefore, into a statement about the resilience of a household
Referent	Dr. Pius Krütli
Co-Referent	Helena De Letourdis

Declaration of originality

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Executive Summary

Households in the Seychelles are exposed to a highly vulnerable context and can be affected by both, covariant[1] (e.g. price shocks, natural disasters, water scarcity) and idiosyncratic[1] disturbances (e.g. illness, death, job loss, relationship problems, drug addiction). Increasing general household resilience is, therefore, of major importance. General household resilience can be seen as a combination of characteristics of a household and its surrounding which positively influence its ability to deal with any relevant disturbance. Despite the importance of this concept, it has not been widely discussed in literature. To my best knowledge, it has never been conceptualized and operationalized, even though a measurement tool for general household resilience would be of valuable use. It would allow assessing baseline information in regards to the resilience of households and identifying vulnerabilities which could be used to guide policy development. Consequently, this thesis aims to fill this gap by developing a composite indicator framework for the assessment of general household resilience on Mahé, Seychelles. The following four research questions have been defined to guide the project: (i) Which indicators are suitable to describe general household resilience on Mahé? (ii) How can the indicators be measured at household level? (iii) How should the indicators be organized and weighted into a composite indicator framework for general household resilience? (iv) Is the developed composite indicator framework applicable?

Extensive literature research on the concept of resilience and related concepts, 12 semi-structured key informant interviews, five semi-structured household interviews, two expert workshops and informal talks were conducted to design a composite indicator framework, to select appropriate indicators and to assign weights to each of the indicators. A questionnaire for the measurement of the indicators at household level was designed and pilot-tested. Subsequently, a method by which the survey data can be normalized in order to derive resilience scores for each of the indicators was elaborated. Finally, the fully developed composite indicator framework was applied to four example cases to test its applicability.

The developed composite indicator framework contains 44 indicators which allow describing general household resilience in the context of Mahé. The selected indicators are grouped into seven thematic dimensions: *Household's income situation, Household's money management, Household head characteristics, Household's family situation, Household's health situation, Household's social interaction* and *Household's infrastructure*. These dimensions describe different aspects of a household covering its financial, social, physical and human capital.

The indicators can be measured at household level using the developed questionnaire with 91 items. Different question types have been considered. Some indicators are assessed with one question only, some with two or more questions. In order to allow normalization of the survey data, categorical scale is used. Each indicator receives a resilience score ranging from 0 to 1. A score of 0 indicates a very low level of resilience whereas a score of 1 indicates a very high level of resilience.

[1] (Béné et al., 2012)

The composite indicator score is calculated in two steps by linearly aggregating the weighted indicator scores into dimension scores and by linearly aggregating the weighted dimension scores into the composite indicator score. The weights for all the indicators and dimensions have been calculated based on three different approaches: (i) Equal weighting of all the indicators (EIN), (ii) equal weighting of all the dimensions (EDI) and (iii) assignment of indicator weights by experts (EXP). The three different approaches resulted in rather similar indicator weights but yielded rather different dimension weights.

Pre-testing of the developed composite indicator framework with four example cases showed promising results. Nevertheless, additional testing of the validity, reliability and robustness of the tool is needed in order to conclusively verify its soundness.

One of the major limitations of the proposed composite indicator framework is the presence of different question types which introduce a bias in the indicator scoring. Therefore, scores of different indicators or dimensions of a household should not be compared. The tool, instead, can be used to compare resilience scores of different household types or districts in a given dimension or in the composite indicator in order to identify particular vulnerable groups. Additionally, it can be used to conduct temporal trend analysis which, for example, allows impact assessment of targeted programs.

Finally, it can be concluded that the composite indicator developed in this thesis is a promising tool for the measurement of general household resilience on Mahé and might serve as a proxy in other contexts. It is the first of its kind, and thus a groundbreaking achievement. Nevertheless, additional testing and modification on site will allow further improvement for its practical use in the Seychelles.

On the conceptual side, future research should (i) further develop the concept of general household resilience, (ii) aim to better link the indicator selection with a theoretical construct of general household resilience and (iii) investigate the different roles of specific[2] and crosscutting[3] indicators in the description of general household resilience. All these considerations will largely contribute to the improvement of the concept of general household resilience, will allow further improvement of the composite indicator proposed in this thesis and will facilitate the construction of similar composite indicators in other contexts.

[2] A specific indicator influences resilience of a household to a particular disturbance

[3] A crosscutting indicator influences resilience of a household to a wide range of disturbances

Abbreviations

ASP	Agency for social protection
DFID	Department for International Development
FAO	Food and Agriculture Organisation
FIES	Food Insecurity Experience Scale
FRAS	Family Resilience Assessment Scale
GoS	Government of Seychelles
HBS	Household Budget Survey
ICT	Department of Information, Communications, Technology
IPCC	Intergovernmental Panel on Climate Change
MHSD	Ministry of Health and Social Development
MSACDS	Ministry of Social Affairs, Community Development and Sports
NBS	National Bureau of Statistics
OECD	Organisation for Economic Co-operation and Development
RVAA	Regional Vulnerability Assessment and Analysis
SADC	Southern African Development Community
SCR	Seychelles Rupee
SHARP	Self-evaluation and Holistic Assessment of climate Resilience of Farmers and Pastoralists
SIDS	Small Island Developing State
WHO	World Health Organisation

1 Introduction

Seychelles is a Small Island Developing State (SIDS) located in the Western Indian Ocean with about 115 islands spread over a sea area of 1.4 million km^2 and with approximately 94'000 inhabitants living mainly on the three islands Mahé, Praslin and La Digue.

The country is vulnerable to economic and environmental disturbances due to several characteristics such as its remoteness, small land mass size (approximately $450km^2$), small scale of economy, dependency on international markets (including for food and energy), dependency on the tourism sector, vulnerability to natural disasters, lack of natural resources and limited fresh water supply (FAO & GoS, 2014; GoS, 2013a). This leads to a wide range of possible covariant shocks[4] such as price shocks (especially for food, see for example Muller, 2011), natural disasters (e.g. GoS, 2013b) and water scarcity (AWF, 2008) which could affect the population in the Seychelles. Furthermore, households are being affected by idiosyncratic shocks like illness, death, job loss, relationship problems and others (Muller, 2011). Drug addiction, mainly heroin and alcohol, domestic violence, child abuse and cheating behaviour resulting in breakdown of families and lack of role models are some of the major social challenges in the country (Larue, 2016; MHSD, 2010; MSACDS, 2016; SIM, 2012). Additionally, even though the country was recently ranked as a high income country (World Bank, 2016), a considerable fraction of the population lives, according to a recently published study, in poverty: Poverty headcount rate was 39.3% for the year 2013 with a national "basic need" poverty line of USD 13.49 Purchasing Power Parity (PPP) per day per capita. 24.3% of the population was classified as ultra-poor (NBS & World Bank, 2016).

Resilience is a concept which has the potential to address this highly vulnerable context of the Seychelles. It emerged in the early 1970s in the field of ecology (Holling, 1973) and, in broad terms, describes a system's ability to cope with disturbances (e.g. Adger, 2000; Folke, 2006; Gallopin, 2006; Holling, 1973; Miller et al., 2010; Walker et al., 2004). The concept of resilience gained more and more attention in the last 40 years. Nowadays it is not only applied to natural systems but also to social and social-ecological systems (Folke, 2006). It can be distinguished between general and specified resilience: General resilience is the ability to cope with any disturbance, whereas specified resilience describes the ability to cope with a particular disturbance (Folke et al., 2010) (for an overview on the resilience concept see chapter 2, conceptual background).

Given the highly vulnerable context of the Seychelles, increasing resilience of the population on all hierarchical human scales (e.g. individual, household, community and nation) to all the above mentioned possible disturbances is of major importance. In doing so, the household level should receive special attention: Most shocks affecting people in daily life are idiosyncratic shocks; shocks that only affect particular households. Additionally, most risk management and coping strategies are implemented at household level (Alinovi, Mane, et al., 2010).

[4] The terms *shock* and *disturbance* are used as synonyms in this thesis

To systematically increase the resilience of households, a measurement tool for household resilience is of great value (Béné, 2013; Ghanem et al., 2016). Such a tool allows assessing baseline information in regards to the resilience of the households and detects potential for improvement. That information can then be used to shape policy development. Additionally, such a measurement tool allows assessing trends, and thus conducting impact analysis of targeted programs.

Measurement tools for household resilience have been developed but they face major limitations. Some of them focus on specified resilience to particular disturbances (e.g. Nguyen & James, 2013). Such an approach can be problematic since increasing a system's specified resilience to a particular disturbance might even decrease the system's resilience to another disturbance (Miller et al., 2010). Others follow a multi-disturbance approach but only consider psychological and social characteristics of a household, without considering other aspects which influence a household's resilience (e.g. Sixbey, 2005). Such tools are not able to represent the multidimensional nature of the resilience concept (Béné, 2013). What would be needed instead is a multidimensional tool for the measurement of general household resilience[5]. To my best knowledge, no such tool has been developed so far. The present study, thus, aims to fill this gap by developing a composite indicator which enables the measurement of general resilience of households in the context of Mahé, Seychelles.

The study focuses on Mahé since it is the largest island of the Seychelles (one third of the total land mass), accommodates 85% of the Seychelles' population, includes major infrastructural facilities and is the centre of the economic activities in the Seychelles.

In summary, the objectives of this master thesis are:

- To design a composite indicator framework for general household resilience on Mahé;
- To demonstrate the use of the composite indicator with several example cases.

Based on the before mentioned research gap and objectives, the following research questions will guide this thesis:

- Which indicators are suitable to describe general household resilience on Mahé?
- How can the indicators be measured at household level?
- How should the indicators be organized and weighted into a composite indicator framework for general household resilience?
- Is the developed composite indicator framework applicable?

[5] This thesis defines general household resilience as the ability of a household to withstand or to rapidly recover from any internal or external disturbance

The present document is structured as follows: The next section (chapter 2) describes the state of the art of resilience and vulnerability definitions, the way these concepts are commonly conceptualized and measured, and how this study is related to other projects of the Seychelles. After that, an overview of the methods and approaches used in this thesis is given (chapter 3). In a next section (chapter 4), the results of the study are shown. This includes the composite indicator framework with its set of indicators, the normalisation, weighting and aggregation of the indicators into the composite indicator, the questionnaire to measure the indicators at household level and the example cases. Finally, the findings are discussed (chapter 5) and a conclusion is drawn (chapter 6).

2 Conceptual background

This section aims to embed the concept of general household resilience as used in this study in a broader conceptual context by reviewing relevant scientific literature. The concept of resilience and its sibling concept vulnerability are defined and discussed. Furthermore, the concept of general household resilience is specified and it is elaborated how it can be measured. Finally, it is shown, why Seychelles needs a resilience-tool for households and how this tool will be embedded in other household studies of the country.

2.1 Definition of vulnerability

The concept of vulnerability is an elusive concept used in many different disciplines and defined in manifold ways (Moret, 2014). It is a core concept in disaster risk management, in the study of livelihoods and poverty, food security, and climate change (Miller et al., 2010). However, there is no consensus on its meaning (Gallopin, 2006). Turner et al. (2003, p. 8074), for example, define vulnerability as "the degree to which a system, subsystem, or system component is likely to experience harm due to exposure to a hazard, either a perturbation or stress / stressor."

In the climate change literature, vulnerability is most commonly conceptualized as a function of the three components exposure, sensitivity and adaptive capacity (Adger, 2006). Adger (2006, p. 270) defines exposure as "the nature and degree to which a system experiences environmental or socio-political stress", sensitivity as "the degree to which a system is modified or affected by perturbations" and adaptive capacity as "the ability of a system to evolve in order to accommodate environmental hazards or policy change and to expand the range of variability with which it can cope." However, exposure is not always considered as being a part of vulnerability. If exposure is included, vulnerability becomes a property of the relationship between the system and its environment rather than a property of the system itself (Gallopin, 2006).

In social sciences, vulnerability has become an important concept in the development aid and poverty reduction community to guide the design and evaluation of programs (Moret, 2014). This has been emphasized by Naudé et al. (2009, p. 183) who stated that "development studies have advanced to the stage where it is clear that we cannot successfully deal with poverty unless we also deal with vulnerability." The strong interconnection between vulnerability as understood in the development context and poverty is illustrated by DFID (1999, p. 13): "The inherent fragility of poor people's livelihoods makes them unable to cope with stresses, whether predictable or not. It also makes them less able to manipulate or influence their environment to reduce those stresses; as a result they become increasingly vulnerable." An example of the trend to incorporate the concept of vulnerability into development programs is the Southern African Development Community (SADC) Regional Vulnerability Assessment and Analysis (RVAA) Programme in South Africa (SADC, 2014). The definition used in the SADC RVAA is pragmatic and similar to some of the resilience definitions. They define vulnerability as the "inability of people or households to cope with a defined hazard or shock" (SADC, 2014, p. 15).

Another commonly used concept of vulnerability related to poverty is the vulnerability to poverty concept. Some authors define vulnerability to poverty as the probability of being poor next year. According to this definition, people are vulnerable, if they have more than an even chance of being poor in the next period (Haughton & Khandker, 2009).

Other authors link vulnerability to food insecurity and define vulnerability as "presence of factors that place households at risk of becoming food insecure or malnourished" (Kureya 2013, as cited in Moret, 2014, p. 19).

It can be concluded that vulnerability research has been translated into various definitions, assessment methodologies, manuals, and tools (Miller et al., 2010). However, as stated by Miller et al. (2010) based on recent meta-analysis of vulnerability concepts and methodologies, there exists often little coherence between the theoretical definitions of the concept and the methodologies applied.

2.2 Definition of resilience

The concept of resilience emerged in natural sciences, mainly in ecology in the early 1970s. Holling (1973) was one of the first authors using the term resilience to describe the ability of an ecological system to absorb change and disturbances.

Nowadays, the concept is not only used for natural systems but also applied in studying social systems at different hierarchical levels like individual, group, community or national level and in studying social-ecological systems[6]. Adger (2000, p. 347), for example, defines social resilience as "the ability of groups or communities to cope with external stresses and disturbances as a result of social, political and environmental change".

Resilience is often defined context-specific resulting in a wide range of different definitions. Nevertheless, it is always about absorbing, coping, recovering, adapting or evolving to a disturbance/shock or stressor (Choptiany et al., 2015; Folke et al., 2010; IPCC, 2007; Walker et al., 2002). Some of the definitions are very specific for a defined system (e.g. *individual* resilience as defined by Choptiany et al., 2015), some are very specific for a defined disturbance (e.g. urban resilience *to floods* as defined by Liao, 2012). Other definitions are more general in terms of the system and the disturbances to which they can be applied. Choptiany et al. (2015, p. 19), for example, defines resilience as "the ability of a system to recover, reorganise and evolve following external stresses and disturbances".

Some authors distinguish between general and specified resilience. General resilience is the resilience of a system to all kind of disturbances, whereas specified resilience is the resilience to a particular disturbance (Folke et al., 2010). This distinction is of importance since increasing a system's specified resilience to a particular disturbance might decrease the system's resilience to another disturbance (Miller et al., 2010).

[6] A socio-ecological system is a system which includes societal and ecological subsystems in mutual interaction like for example a local community and its surrounding environment (Gallopin, 2006)

Despite the extensive resilience literature, the discussion of how the concept should be defined, operationalized and measured remains ongoing (for example Bahadur et al., 2010; Béné, 2013; Béné et al., 2012; Brand & Jax, 2007; Folke et al., 2010; Hosseini et al., 2016; Miller et al., 2010; Tendall et al., 2015; Walker et al., 2004).

2.3 Resilience and vulnerability

It is difficult to compare the concept of resilience and vulnerability due to the fact that more than one definition exist for both of the concepts. Nevertheless, several attempts have been made (for example Adger, 2006; Gallopin, 2006; Miller et al., 2010).

According to Gallopin (2006) and Miller et al. (2010) some authors see resilience as the flip-side of vulnerability. Others, who conceptualize vulnerability using the three dimensions exposure, sensitivity and adaptive capacity, argue that resilience is equal to the dimension adaptive capacity of vulnerability (for example Turner et al., 2003).

A major difference between the concept of resilience and some of the vulnerability concepts is that exposure is not considered as a dimension of resilience. Resilience rather refers to the reaction of the system when exposed to disturbances (Gallopin, 2006). Thus, resilience is a system property which is independent from whether the system currently is exposed to a disturbance or not, whereas vulnerability is often conceptualized including the aspect of exposure.

Another difference between resilience and vulnerability is that vulnerability is mostly conceptualized and measured specifically in the face of a particular disturbance (Gallopin, 2006) whereas resilience measures more often try to emphasize general resilience using holistic and systemic perspectives (Béné et al., 2012; FAO, 2010).

Additionally, vulnerability studies often focus on the weaknesses and risk factors of a system whereas resilience studies stress the strengths and capacity of a system. However, this is not always true. Depending on the definitions used, resilience does not necessarily have to be something positive and vulnerability not something negative. A system may remain in an undesirable state due to its resilience. Vulnerability on the other hand can lead to changes resulting in a more desirable state (Béné et al., 2012; Gallopin, 2006; Walker et al., 2004).

This short review on the concept of resilience and vulnerability shows that some differences between the two concepts resilience and vulnerability might exist. These differences, however, largely depend on the definitions used. It can, therefore, be concluded that, due to the vagueness of the two concepts, at the current stage it is not of crucial importance whether one chooses the term ”resilience” or “vulnerability” to guide studies, for example of households. Much more important and meaningful is how the term used is defined, conceptualized and operationalized in the study.

The concept of resilience has been selected in this thesis due to the fact that resilience studies more often focus on holistic multi-disturbance approaches focusing on the positive side of a system instead of stressing weaknesses. According to Miller et al. (2010), in social studies, a vulnerability perspective

can be stigmatizing especially if research is undertaken by people with little knowledge about the local context. Resilience, however, is usually interpreted as a positive trait. Therefore, a resilience perspective might facilitate the dialogue with the households.

2.4 Conceptualizing and measuring general household resilience

The system "household" is one of the social systems to which the concept of resilience has been applied in recent studies. These studies mainly focused on specified household resilience, for example to natural hazards (L. Jones & Samman, 2016; Nguyen & James, 2013), water scarcity (Maleksaeidi et al., 2015), food insecurity (Alinovi, D'Errico, et al., 2010; Lokosang et al., 2014) and disruptions of power supply (Ghanem et al., 2016), often in the context of developing countries and with a focus on rural households engaging in agriculture activities.

These studies define household resilience individually in relation to the considered disturbances. Maleksaedi (2015, p. 1307), for example, define farm households' resilience under water scarcity as "the capacity of a farm household to withstand water scarcity, moderating potential damages from it, maintaining its family and agricultural structure and still have the same identity as a farm household or possibly improve and advance in self-statue by learning, creativity, adapting and coping."

None of the studies investigated general household resilience so far; therefore, the term has never been defined. I, thus, suggest the following definition of general household resilience:

> *General household resilience is the ability of a household to withstand or to rapidly recover from any internal or external disturbance.*

A *disturbance* in this context is understood as anything which has the potential to harm a household. *Withstand* means being exposed to a disturbance without being affected negatively by it. *Recover* means being affected negatively by a disturbance but being able to come back to a state which is at least as satisfying as the pre-disturbance state. This might include adaptation, reorganization and evolution. A household is never absolutely resilient or not, but rather more or less resilient. Based on this definition, household resilience can be increased by increasing the capacity to withstand, by increasing the rapidity of recovering or by increasing the extent of recovery (Figure 1).

"Family resilience" is a concept with some similarities to "household resilience" and is widely used in literature (Black & Lobo, 2008; Conger & Conger, 2002; McCubbin & McCubbin, 1988; Orthner et al., 2004; Walsh, 2003). Family resilience as understood by Black & Lobo (2008, p. 33) is "the successful coping of family members under adversity that enables them to flourish with warmth, support, and cohesion". McCubbin & McCubbin (1988, p. 247) considers a family as resilient if it is "resistant to disruption in the face of change and adaptive in the face of crisis situations".

Studies on family resilience mostly focus on resilience in a psychological understanding concentrating on psychological characteristics of a family which make it able to cope with life crisis. Family resili-

ence measures like the Family Resilience Assessment Scale (FRAS), have been developed to support therapists, providing a measure which aids developing a focus and plan for therapy (Sixbey, 2005).

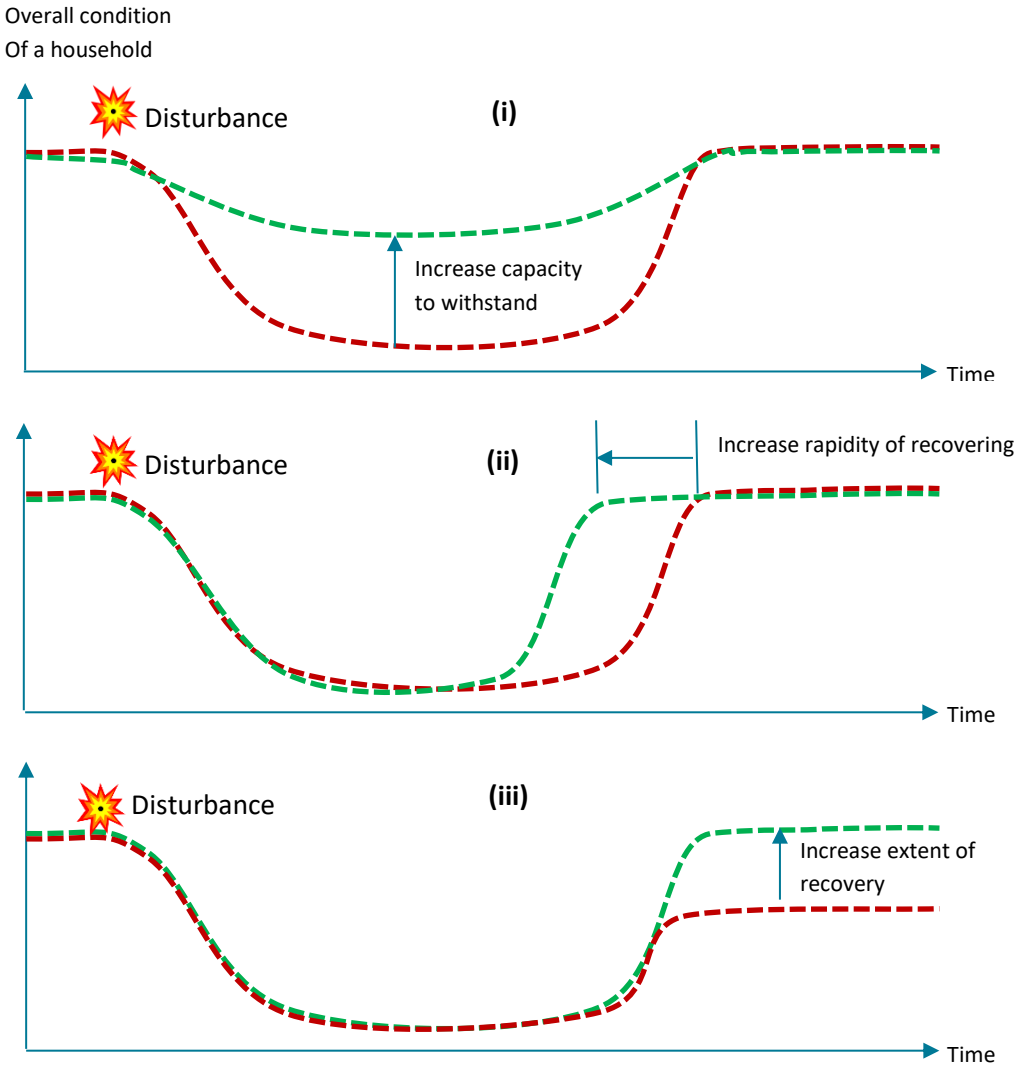

Figure 1 Increased household resilience can manifest itself in three different ways: With an increased capacity to withstand (i), with an increased rapidity of recovering (ii) or with an increased extend of recovering (iii). The green and the red lines represent the condition of two households after experiencing a disturbance. In each graph, the green line represents a household which is more resilient then the household represented by the red line (modified from Tendall et al., 2015)

The FRAS, for example, has been constructed based on a family resilience framework proposed by Walsh (Walsh 1998 as cited in Sixbey, 2005). Walsh divides family resilience into three components (A) belief systems, (B) organizational patterns and (C) communication/problem solving. The first component is characterised by (A1) making meaning of adversity, (A2) positive outlook and (A3) transcendence and spirituality, the second component by (B1) flexibility, (B2) connectedness and (B3) social and economic resources and the third component by (C1) clarity of communication, (C2) open emotional expression and (C3) collaborative problem solving (*ibid*). Similarly, Black & Lobo (2008) review literature in order to identify factors influencing family resilience. They identified eight factors which influence family resilience, namely *positive outlook, spirituality, family member accord, flexibil-*

ity, communication, financial management, family time, shared recreation, routines and rituals and *support network.* Both frameworks mainly incorporate social factors but also take economic considerations into account. Nevertheless, the FRAS, for example, does not consider economic aspects.

The concept of general household resilience as proposed in the present study follows a more holistic approach, complementing psychological and social factors by other aspects which influence household resilience such as a household's health status and infrastructure.

Literature about the conceptualization and operationalization of household resilience or relevant concepts is rare and the few frameworks which exist are rather diverse. The existing frameworks are mostly operationalized using a set of indicators (L. Jones & Tanner, 2015; Lisa et al., 2015). Jones & Samman (2016), for example, divided the concept of household resilience into three capacities *ability to prepare, ability to recover* and *ability to adapt* and developed questions to assess the subjective perception of a household head in regards to these three capacities of the household in the context of floods. Orthner et al. (2004) uses a family strength framework to measure family resilience. The framework is composed by the dimensions *economic strength assets, communication strength assets, problem-solving strength assets, family cohesion strength assets, social support strength assets* and *absence of risk factors* and contains 27 indicators. Maleksaeidi et al. (2015) developed a framework for the assessment of farm household's resilience under water scarcity in Iran. The framework consists of the five dimensions *cognitive, emotional/affective, behavioral, spiritual* and *physical* representing five reactions of a system during disaster. 16 indicators where then developed to assess these dimensions.

All these frameworks have been developed in a top-down approach by first defining a framework and then selecting appropriate indicators. Even though such an approach can be useful, the diversity of frameworks shows that it is anything but clear how household resilience should be conceptualized. Hence, using one of these frameworks is not a guarantee that resilience is really measured in its true nature. Furthermore, according to Miller et al. (2010), there is mostly little coherence between theoretical frameworks and their operationalization in resilience studies.

Another option is, therefore, to follow a bottom-up approach. This can be done by first identifying determining factors of resilience (resilience indicators) and then grouping these indicators into a framework. The difference between the top-down and the bottom-up approach is that in the top-down approach, the theoretical framework drives the indicator selection, whereas in the bottom-up approach, the set of indicators drive the development of a framework.

In both approaches, it is common to measure the concept of resilience with a composite indicator[7] (OECD, 2008). This can be done by normalizing, weighting and aggregating the selected indicators into a composite indicator. If a composite indicator is developed, the theoretical framework of the resilience concept meanwhile represents the framework for the composite indicator.

[7] A composite indicator is a tool to measure multidimensional concepts which cannot be captured by single indicators (OECD, 2008)

This thesis follows a bottom up-approach to develop a composite indicator framework for general household resilience. The bottom-up approach has been selected due to the mentioned limitations of the top-down approaches and due to a lack of a comprehensive framework for general household resilience in literature. Nevertheless, the indicator selection process has been influenced by the sustainable livelihood framework which divides livelihood assets into human capital, natural capital, financial capital, social capital and physical capital (DFID, 1999). Resilience is a direct function of the availability of such household assets and livelihood capitals (Lokosang et al., 2014). Moser (1998, p. 3) stressed that "the more assets people have, the less vulnerable they are, and the greater the erosion of people's assets, the greater their insecurity." Household resilience can thus be interpreted as a function of these assets (Figure 2).

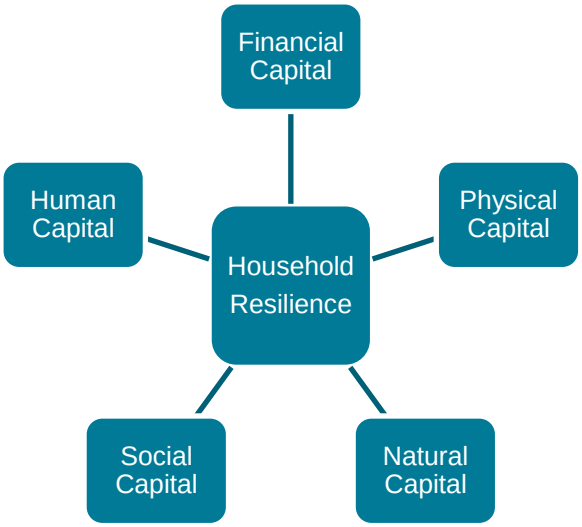

Figure 2 Household resilience can be seen as a function of household assets

Human capital describes the labour potential of a household including skills, knowledge, health, leadership potential etc. Social capital are the social resources upon which people draw and include, for example, social networks and informal safety nets, membership in groups and relationship of trust and reciprocity. Natural capital describes the natural resources from which useful services are derived (e.g. atmosphere, forest, land etc.). Physical capital includes the basic infrastructure and producer goods which are needed to support livelihoods. Financial capital describes the financial resources people can use to meet their livelihood objectives. All these assets are influenced by laws, policies, institutions and culture (DFID, 1999).

Developing a composite indicator for resilience using a bottom-up approach faces several challenges: First, identifying appropriate indicators is difficult, as there is little guidance on how indicators should be selected (Bahadur et al., 2010). Since resilience is normally measured using these indicators, it is not possible to statistically test which indicators really influence the "true" resilience. An independent way of measuring resilience would be needed for that purpose (a first attempt to develop such an independent measure has been made by Béné, 2013). As a result, the indicators are normally

selected based on some sort of subjective and/or experienced based judgement often influenced by the background and discipline of the person who design the composite indicator (Béné, 2013).

This difficulty cannot be solved in this thesis. As long as there does not exist an easy and sound independent way of measuring resilience to test indicators for their contribution to resilience, the pragmatic approach of selecting indicators using experience based and participatory approaches in my opinion presents the best option for the measurement of resilience of social systems[8]. All kind of subjectivity in the development process of the composite indicator should be mentioned and highlighted though. "Transparency must be the guiding principle of the entire exercise" (OECD, 2008, p. 17).

Focusing on general household resilience instead of focusing on specified resilience further complicates the indicator selection process: Imagine there are two indicators of household resilience. The first describes the amount of savings of a household and the second describes whether a house is constructed earthquake-resistant. Having a beneficial endowment of the first indicator (= having a lot of savings) increases the likelihood of being resilient since the savings can be of use to cope with many different possible disturbances. Having a beneficial endowment of the second indicator (=having an earthquake-resistant house) also increases the likelihood of being resilient as it helps a household to withstand an earthquake. The influence of the first indicator is crosscutting. It influences resilience of a household towards a wide range of disturbances. The influence of the second indicator is very specific. It only influences resilience of a household towards earthquakes. However, in the case of an earthquake, a positive endowment of the second indicator is of crucial importance. Which of these two indicators should be selected for the composite indicator? Or if both are selected, which should receive more weight for the description of general household resilience – the one which is crosscutting and helps to deal with many disturbances to a certain extent or to the one which is crucial for one dangerous disturbance but meaningless for the rest of the disturbances?

In my opinion, crosscutting indicators are more appropriate for a composite indicator framework of general household resilience since they allow describing general resilience without knowing what kind of disturbances might affect the household in future. If specified indicators are selected, they have to be very well justified. It has to be shown that the respective disturbances are of major relevance and, therefore, deserve special attention.

Another challenge with selecting appropriate indicators arises from the diversity of households and their livelihoods. Each household is unique. Thus, it has to be assumed, that not all indicators are of relevance for all type of households. A certain endowment of a particular indicator might help one household but could be meaningless or even obstructive for another household. For the resilience of a farmer it is, for example, important to have a diversified production (Choptiany et al., 2015). An indicator which assesses this aspect would thus be meaningful when applied to farming households, however, meaningless when applied to any other type of household.

[8] The importance of participatory approaches for the development of composite indicators has also been stressed in literature (ProVention, 2006; USAID et al., 2014)

Focusing on general household resilience instead of focusing on specified resilience also complicates the assignment of weights to each of the indicators. Some indicators might be beneficial to cope with one disturbance, but obstructive to cope with another disturbance. For example, burglar bars help to withstand burglary but might prevent a quick escape in case of a fire increasing the household's vulnerability to fire. How should such indicators being weighted in a composite indicator of general resilience? This problem could be avoided by only considering indicators which influence resilience in the same way for all kind of disturbances.

It can be concluded, that the best indicators would be the ones which influence resilience to a wide range of disturbances ("crosscutting" indicators); which are of relevance for all types of households and which influence resilience in the same way for all kind of disturbances.

2.5 Embedding of the thesis in the Seychelles context

The main body for data collection and analysis in the Seychelles is the National Bureau of Statistics (NBS), a small parastatal institution with around 30 permanent employees. The NBS conducts a household budget survey every five to seven years (NBS, 2013). The last two surveys have been conducted in 2006 and 2013. The HBS provides a rich collection of information about the households in Seychelles with the main focus on the expenditure and consumption patterns as well as on household income. Besides that, the HBS provides demographic information, information on housing conditions and standard of living and on socio-economic characteristics like level of education and labour force status of the population.

Based on the HBS 2013 a poverty profile for the Seychelles has been elaborated (NBS & World Bank, 2016). The high poverty headcount rate was shocking and surprising for some people and accordingly, has been discussed controversially. Thus, additional information on the household situation in a multi-dimensional and holistic way is needed to complement the economic-based poverty profile.

In 2016, the Seychelles, in collaboration with the Southern African Development Community (SADC), launched a "Sustainable Livelihoods and Vulnerability Assessment" project. The project aims to "develop a new understanding of poverty and vulnerability through the sustainable livelihoods approach by highlighting areas of vulnerability in Seychelles, identifying vulnerable population groups and issues related to vulnerability and proposing policies and measures to increase sustainable livelihoods of the population" (NBS, 2016b, p. 1). As a first step of the project, NBS launched a new household survey, namely a food insecurity experience scale (FIES) and plans to conduct the survey annually in future. The FIES is a short scale composed of 8 questions developed by the FAO and aims to measure food insecurity (Ballard et al., 2013).

In 2017, as second step of the project, NBS will conduct a household vulnerability assessment as it was done in other SADC countries (e.g. SADC, 2014). The assessment will collect a wide range of baseline information of different aspects of households and people's livelihoods with the aim of highlighting areas of vulnerability (NBS, 2016c).

Like the HBS, the vulnerability assessment is mainly a data collection tool to provide a wide set of baseline information. The FIES and the poverty profile on the other hand are tools to effectively measure household aspects, namely food insecurity and poverty. They enable the categorization and spatial comparison of households and the assessment of trends in these aspects. However, they are very specific, either concentrating on a household's subjective experience of food insecurity or on income-poverty of a household. A household might not be poor or food insecure but still could be very vulnerable due to other characteristics.

A composite indicator for general household resilience provides the opportunity to measure a household's situation in a multi-dimensional and holistic way resulting in a conclusion on the household's resilience. The household related indicators of the composite indicator, if selected wisely, will on one hand provide information on the current situation of the household and on the other hand provide information on the ability of the household to cope with future challenges.

The composite indicator will enable to assess temporal and spatial differences in household resilience on Mahé, will highlight strength and weaknesses of the households, will influence policies and will enable to assess the impact of development programs. No tool for the measurement of social resilience or vulnerability in the Seychelles exists so far. The composite indicator framework for general household resilience developed in this thesis is, therefore, a ground-breaking exercise for the country.

3 Methods

3.1 System boundaries

As indicated in the introduction, the composite indicator developed in this thesis focuses on the household level[9]. It is not applicable to institutional dwellings like police barracks, army barracks, retirement homes and institutional dwellings for foreign construction workers, nor is it applicable to single-person households.

3.2 Understanding the Seychelles context

In order to successfully develop a tailor-made composite indicator framework specifically for the context of the Seychelles and especially for Mahé, it was crucial to get a good understanding of the country and the situation households are living in. To do so, I first conducted a desk study of peer-reviewed and grey literature about the Seychelles, mainly focusing on difficulties households in Seychelles are facing and trends and hazards which could affect households in the future. The review exercise looked at documents related to economic-, social- and health aspects as well as at documents related to natural hazards.

As a second step, I conducted 12 semi-structured key informant interviews on Mahé between the 29th of September and the 10th of October 2016. The guiding questions for the interviews can be found in Appendix 1. The major aim of the interviews was to supplement my understanding of the Seychelles (vulnerability) context, to better understand Seychellois households and the difficulties people are facing. In addition, the interviews aimed to identify possible indicators for the composite indicator framework and to collect further literature. Furthermore, the interviews served as an occasion to build up a network of experts on which I could draw on at a later stage of the project. I selected key informants from different disciplines in order to cover a wide range of topics related to households and its resilience. Three key informants are experts in the field of social issues in the Seychelles, one is an expert in natural hazards, three are insurance experts, one is an expert in public utilities, one an expert on the economic situation of the country, one a health expert, one an expert in gas and oil supply of the country and one a representative of one of the churches in Seychelles. Notes have been taken during the interviews and all of the interviews have been recorded and subsequently summarized. However, for reasons of confidentiality, key informants' names and the record summaries are not shown in this report. In order to still meet scientific standards, I assigned numbers to each of the key informants and use these numbers when referring to them in this thesis.

[9] In this thesis a household is defined as follows: A household consists of one or more people who live in the same dwelling and eat together or from the same food supply

In summary, I gained insights on the situation of the households in the Seychelles mainly from (i) document analysis, and via (ii) key informants. These two information sources were completed and contrasted by (iii) informal talks with a number of people from different age and backgrounds such as alcohol and drug addicts, drug dealers, labourers as well as well-educated and well-off people and by (iv) daily observations during my 5 month stay on Mahé.

3.3 Development of the composite indicator framework

A review of scientific and grey literature of resilience and vulnerability composite indicators and frameworks was conducted. The aim was to identify a commonly used composite indicator framework suitable for the description of general household resilience in the context of Mahé. However, as stated in the conceptual background section of this document, such a framework could not be found.

I, therefore, followed a bottom-up approach during which I collected a set of 72 household related indicators which are assumed to measure aspects of household resilience. This was done in an iterative process and based on the knowledge gained from the previous steps (literature review, key informant interviews, informal talks). Mainly crosscutting indicators have been selected due to their value for describing general household resilience as mentioned in the conceptual background section. Not only published resilience composite indicators have been used for inspiration but also vulnerability composite indicators due to the similarities of the two concepts. I then aggregated the indicators to a set of 24 household dimensions (see Appendix 3).

To validate the comprehensiveness of the household dimension set and to include local knowledge and opinions, I (i) conducted five semi-structured interviews (see guiding questions in Appendix 2) with households from different wealth backgrounds (see Table 1) and life circumstances, (ii) conducted a workshop with five local experts (this workshop will be referred to as “resilience workshop” in the following parts of the document) and (iii) sent the list of dimensions for validation to four local stakeholders and my two supervisors. The importance of such a procedure to involve experts and stakeholders in this step of the composite indicator development process has been stressed by the OECD in their “Handbook on constructing composite indicators” (2008).

In the household interviews, participants were asked to talk about their life situation, about difficulties they experienced in the past and about factors which helped or hindered them to successfully cope with the different kind of difficulties. The aim of the interviews was to examine whether the respondents mention factors which influenced their resilience but which were not yet covered by the 24 elaborated household dimensions.

For the workshop, experts from different backgrounds were selected in order to cover different aspects of households (see Appendix 4 for participation list). The experts were asked to list factors which influence household resilience and, therefore, could be used for a composite indicator (a complete list of all the mentioned factors can be found in Appendix 5). The aim of the workshop was

again to examine whether resilience factors are mentioned which are not yet considered by the 24 household dimensions.

Table 1 Information on the conducted semi-structured household interviews

Household Code[1]	Date of Interview	Duration	District	Number of household members	Wealth group
1	08.11.2016	44’	Anse Boileau	3	Middle class
2	08.11.2016	20’	Baie Lazare	7	Poor
3	11.11.2016	30’	Bel Air	1	Middle class
4	11.11.2016	60’	Mont Buxton	9	Poor

[1]To preserve confidentiality, any information that allows individual persons to be identified are omitted

In order to design a compact composite indicator which is applicable at household level within a manageable timeframe (<35 minutes for one household interview), I aimed to reduce the set of dimensions by only considering the most important ones. In order to reduce the subjectivity in the reduction process and to incorporate local knowledge and opinions, I decided to assess the importance of each of the dimensions with a short questionnaire (see Appendix 12 for the questionnaire).

The developed questionnaire was validated by my two supervisors and tested for understanding by two Swiss students without previous knowledge about the concept of resilience. The questionnaire was then sent to the staff of the National Bureau of Statistics (NBS) and the Department of Information, Communications, Technology (ICT) by e-Mail (around 90 people in total). It was stated by the Deputy CEO of NBS, Helena De Letourdis that the staff of these two institutions provided a fair representation of the various economic and social groups of Seychelles and, therefore, could be used as a rough proxy for the country (personal communication, October 2016). Many respondents, however, reported difficulties in completing the questionnaire due to its complex nature. As a consequence, the questionnaire was translated into Creole and then pre-tested with a cleaner from the office, to see whether the questionnaire was understandable when completed face-to-face. The pre-testing proved successful. Thus, it was decided to carry out a small household survey with experienced interviewers. 18 interviewers were briefed and each of them was asked to conduct three household interviews in different districts resulting in a sample of 54 households. While accompanying several interviewers, it became apparent that the questionnaire was often still not properly understood neither by the interviewers nor by the respondents. Consequently, the survey was aborted.

Since it was not possible to reduce the number of dimensions in a non-subjective way, I decided to design an indicator-set which covers all of the aspects described by the 24 dimensions. However, in order to design an applicable composite indicator, I had to reduce the number of indicators. I selected indicators which are of interest and meaningful in the context of the Seychelles and which allow to differentiate between households. Indicators which could be used to describe resilience but which have the same value for all households on Mahé are, therefore, not considered. For example, almost all households on Mahé have a mobile phone (NBS, 2013). Therefore, an indicator describing whether a household has a mobile phone would not allow differentiating between households in terms of

resilience, and thus was not included. For the same reason, nation-wide indicators like access to social welfare system, or to education etc. have also not been considered. I finally selected 44 indicators and restructured them into seven dimensions describing different thematic areas of a household which is a common procedure (Foa & Tanner, 2012).

3.4 Development of the questionnaire

Indicators are often selected from existing data sources (USAID et al., 2014). However, appropriate data is not available in the context of the Seychelles. Therefore, a survey had to be designed in order to enable the collection of relevant primary data.

A questionnaire was developed to measure the 44 indicators at household level. Desk study of internal NBS questionnaires, other unpublished questionnaires and published literature (Bolte et al., 2016; Choptiany et al., 2015; Murphy & Scott, 2014) was conducted to search for appropriate questions for the operationalization of the selected indicators. An effort was made to use as few questions as possible for each indicator, but in some instances, more than one question was needed in order to capture the full spectrum of an indicator.

The aim was also to use only questions which have the same number of choices in order to harmonize the scaling of the responses of the different questions (see normalisation section below), and thus to avoid bias of the resilience scores caused by the question type. Ordinal scale questions with four choices (from strongly agree to strongly disagree) were selected as suitable question type. They allow assessing attitudes and opinions, they force the respondent to make a commitment in the direction of one or another extreme and they lead to more variance than dichotomous questions as such. A greater number of response options would lead to greater variance but would also increase the item complexity (Sixbey, 2005). Finally however, other question types also had to be included since the ordinal scale questions with 4 choices did not always allow measuring the information needed for particular indicators.

Questions were formulated considering a trade-off between the need for questions which precisely ask about the aspects described by the selected indicators and the need for applicable and understandable questions for practical use. The questionnaire was developed in an iterative process and revised by the supervisor team as well as by John Betsy, an experienced survey professional. The questionnaire was developed in English and translated into Creole. Four experienced interviewers were selected to pre-test the questionnaire by conducting eight household interviews. Each interviewer was accompanied for one interview by John Betsy or myself. A feedback discussion was held with all the interviewers and the questionnaire was modified based on the discussion. Finally, after applying the questionnaire to four example cases (see further blow) some more adjustments were made resulting in the final version of the questionnaire (see Appendix 10 for the English version and Appendix 11 for the creole version).

3.5 Normalisation of the questions

Individual items in the survey data have to be normalized in order to enable comparability and aggregation of the different indicators. Over 50% of the developed indicators are assessed with one question only. For those indicators, the responses to the questions have to be normalized. The other indicators are assessed by two or more questions. In some of those cases, the responses of the questions are normalized and then aggregated into the indicator score, in other cases, the responses are first processed into an indicator value (e.g. by calculating a ratio from two responses) and then the indicator value is normalized (see result section and Appendix 9 for more details).

There are different normalisation approaches available such as ranking, standardisation (z-scores), min-max normalisation, categorical scale and others (OECD, 2008). The ranking method assigns a ranking order to a given data set. The rank of the response of an objective (in our case of each household) in a given question would become the normalized score for that response. This method is most appropriate for composite indicators which are designed to compare a small set of objectives, and thus not suitable for my purpose. The z-score converts the data into a common scale with a mean of zero and standard deviation of one. The min-max normalisation normalizes the data in a way that each question receives an identical range [0, 1]. That means each response to a question is transformed by subtracting the minimum value of all the answers to that question and dividing the difference by the range of the responses to that question. The z-score and the min-max normalisation need numerical data. However, most of the questions used in the proposed questionnaire do not yield numerical values.

Finally, the categorical scale method was found to be suitable for the normalisation of the responses or indicator values in the present study. This approach individually assigns a score within a defined range to each possible response to a question or to each possible value of an indicator respectively. The scale used in this thesis ranges from zero to one. Zero indicates that the household has a very low likelihood of being resilient and one indicates that the household has a very high likelihood of being resilient. All in-between answers receive scores in the range between 0 and 1. Using this approach, each household receives a resilience score between 0 and 1 for each of the 44 indicators. Such an approach has also has been used in other resilience indicator frameworks (Bolte et al., 2016; Choptiany et al., 2015)

3.6 Weighting and aggregation of the indicators

Weighting and aggregation possibilities

The linear aggregation method was selected for the aggregation of the indicator scores to the composite indicator (for more details about linear aggregation see OECD, 2008). There are two ways to calculate the composite indicator score based on the indicator scores. This is illustrated with a fictive example of a composite indicator Z composed by three dimensions D_1, D_2 and D_3. Dimension D_1 contains m indicators (I_{11}, I_{12} … I_{1m}), dimension D_2 p indicators (I_{21}, I_{22} … I_{2p}) and dimension D_3 q indicators (I_{31}, I_{32} … I_{3q}). (i) One can calculate Z by aggregating the weighted indicator scores as shown in equation (1). The v's describe the relative weights of all the indicators. v_{I11} for example, is the relative

weight of the indicator I_{11}. (ii) One can also calculate Z by first calculating the dimension scores D_1, D_2 and D_3 and then based on the dimension scores calculate the composite indicator as shown in equation (2)-(5). For this approach, weights have to be assigned to the indicators for the calculation of the dimension score. These weights are indicated by the w_I's below. Furthermore, weights have to be assigned to the dimensions for the calculation of the composite indicator (indicated by the w_D's below).

(1) $Z = v_{I11} I_{11} + v_{I12} I_{12} + \dots + v_{1m} I_{1m} + v_{I21} I_{21} + v_{I22} I_{22} + \dots + v_{I2p} I_{2p} + v_{I31} I_{31} + v_{I32} I_{32} + \dots + v_{I3q} I_{3q}$

(2) $Z = w_{D1}D_1 + w_{D2}D_2 + w_{D3}D_3$

(3) $D_1 = w_{I11}I_{11} + w_{I12}I_{12} + \dots + w_{I1m}I_{1m}$

(4) $D_2 = w_{I21}I_{21} + w_{I22}I_{22} + \dots + w_{I2p}I_{2p}$

(5) $D_3 = w_{I31}I_{31} + w_{I32}I_{32} + \dots + w_{I3q}I_{3q}$

In this thesis, the dimension scores are of interest since they deliver more in-depth information than the composite indicator score on its own. This means that all the w_I's for the 44 indicators and the w_D's for the seven dimensions needed to be determined.

Several methods exist to assign weights. Some of them include statistical analysis like factor analysis. Since these statistical analysis need an already collected data set which was not available for this project, these approaches were not feasible. Other weighting methods include expert opinions. Some of the respective methods are budget allocation (see for example Nardo et al., 2004), ranking (e.g. Tibbetts & van Proosdij, 2013), analytic hierarchy process (e.g. Bjarnadottir et al., 2011; Mansur et al., 2016) and rating (e.g. Ahsan & Warner, 2014).

In the budget allocation, each expert receives a certain budget (e.g. 100 points) which he/she has to assign to the different indicators/dimensions. In the ranking method, the expert is asked to rank the indicators/dimensions based on their importance. The relative weight of each indicator/dimension can then be calculated based on its rank. In the analytic hierarchy process, the expert has to pairwise compare all of the indicators/dimensions and then for each pairwise comparison decide which of the two indicators/dimensions is more important and how much more important on a scale from 0 to 9. Based on all the pairwise comparison, the relative weights of all the indicators/dimensions can be calculated. In a rating exercise, each expert rates all of the indicators/dimensions on a given scale based on their importance. The rate of each indicator/dimension can be used to calculate the relative weights.

Besides statistical methods and expert opinions, another option is to assign equal weights, either on indicator level or on dimension level (e.g. Cutter et al., 2003). This approach is often selected with the argument that using differential weights is too subjective. However, the application of equal weights is not less a subjective decision (Tate, 2013).

Since in this thesis, weights had to be assigned on two levels for the calculation of the composite indicator, namely on indicator level and dimension level, several different weighting approaches were possible: *1) Equal weights of all the indicators in the composite indicator.* In order to achieve

that all the indicators receive equal weights in the composite indicator (all $v_{I'}$s equal), all indicators in a dimension have to receive equal weights for the calculation of the dimension score and the weights of the dimensions have to be calculated based on the number of indicators they are comprised of, to calculate the composite indicator score. In literature, this approach is often called *balanced weighted average approach* (for example Hahn et al., 2009; Orencio & Fujii, 2013; Pandey & Jha, 2012). Formally this means that:

(6) $w_{I11} = w_{I12} = \ldots = w_{I1m} = 1/m$ AND

(7) $w_{I21} = w_{I22} = \ldots = w_{I2p} = 1/p$ AND

(8) $w_{I31} = w_{I32} = \ldots = w_{I3q} = 1/q$ AND

(9) $w_{D1} = m / (m+p+q)$ AND

(10) $w_{D2} = p / (m+p+q)$ AND

(11) $w_{D3} = q / (m+p+q)$

2) Equal weights of all the dimensions and indicators. The second approach assigns equal weights to all the indicators within a dimension and equal weights to all the dimensions. Formally this means that:

(12) $w_{I11} = w_{I12} = \ldots = w_{I1m} = 1/m$ AND

(13) $w_{I21} = w_{I22} = \ldots = w_{I2p} = 1/p$ AND

(14) $w_{I31} = w_{I32} = \ldots = w_{I3q} = 1/q$ AND

(15) $w_{D1} = w_{D2} = w_{D3} = 1/3$

3) Equal weights of all the dimensions and expert weights for the indicators. This approach assigns equal weights to all the dimensions and calculates the weights of the indicators within a dimension based on expert opinions as described above. Formally this means that:

(16) $w_{D1} = w_{D2} = w_{D3} = 1/3$ AND

$w_{I11}, w_{I12},\ldots, w_{I1m}, w_{I21}, w_{I22},\ldots, w_{I2p}, w_{I31}, w_{I32},\ldots, w_{I3q}$ assigned by experts

4) Expert weights for the dimensions and indicators. This approach determines both, the weights of the dimensions and the weights of the indicators (the w_D's and w_I's) by expert opinions.

5) *Expert weights for the indicators.* This approach calculates the individual weight of each indicator (e.g. v_{I11} for the indicator 1 in the dimension 1) considering expert opinions. The composite indicator is then calculated by summing up all the weighted indicators (see equation 1). In order to calculate the dimension scores (as shown in equation 3, 4 and 5), the relative weight of each indicator for the dimension (the w_I) has to be calculated based on the relative weight of the indicator for the composite indicator. It is shown in equation 17 how this can be done taken the indicator I_{11} *as* an example. W_{I11} represents the weight of the indicator needed for the dimension calculation and v_{I11} the weight of the indicator needed for the composite indicator calculation. Equation 18 shows an example how the weights of the indicators in the second dimensions needed for the dimension calculation can be

calculated and equation 19 does the same for the first indicator of the third dimension (I_{31}). The weights of the other indicators can be calculated in the same way.

(3) $D_1 = w_{I11}I_{11} + w_{I12}I_{12} +\ldots+ w_{I1m}I_{1m}$

(4) $D_2 = w_{I21}I_{21} + w_{I22}I_{22}+\ldots+w_{I2p}I_{2p}$

(5) $D_3 = w_{I31}I_{31} + w_{I32}I_{32} +\ldots+w_{I3q}I_{3q}$

(17) $w_{I11} = \frac{v_{I11}}{\sum_{k=1}^{m} v_{I1k}}$

(18) $w_{I21} = \frac{v_{I21}}{\sum_{k=1}^{p} v_{I2k}}$

(19) $w_{I31} = \frac{v_{I31}}{\sum_{k=1}^{q} v_{I3k}}$

Weighting largely influences the outcome of the composite indicator. However, Tate (2013, p. 530) stated that "weighting of index components has been described as being among the most highly subjective decisions in the index construction process". Therefore, it is recommended to select more than one weighting approach and to conduct a sensitivity analysis (USAID et al., 2014). Thus, for the present study, approach 1), 2) and 5) have been selected. The approach whereby experts have to assign weights on dimension level was avoided. The dimensions contain a lot of information (mostly five to eight indicators) and in my opinion it is a cognitive overload to consider all these information when assigning weight to a dimension. Hence, the expert would apply individual heuristics that cannot be controlled for, which in consequence, would make the weighting worthless.

Weighting workshop

For the approach 5), I had to select a methodology which allows assigning weights considering expert opinions. The budget allocation approach and the ranking approach are both only appropriate for a small set of indicators (<12) and, therefore, not suitable (OECD, 2008). Applying the analytic hierarchy process to the 44 indicators would result in 924 pairwise comparisons, a task which is not manageable in a reasonable time. The rating approach has the benefit that it is applicable with a large set of indicators in reasonable time. Furthermore, since the weight is calculated based on individual rating of each indicator and not based on a comparison or ranking of all the indicators, indicators can be removed out of the framework if needed at a later stage without making the weights of the remaining indicators meaningless. This is especially important in the present framework. The current indicator set is quite large; therefore, it is likely that in future some of the indicators will be removed (see discussion). Consequently, this method has been chosen.

A workshop was held with 10 experts in two different groups (for participant list see Appendix 4) to conduct the rating exercise. In addition to the invited experts, the indicators have also been rated by me. It is stressed by the OECD, that experts from a wide spectrum of knowledge and experience should be considered for a weighting exercise (OECD, 2008). Thus, experts from different backgrounds covering different aspects of households (social problems, health, employment, criminality, education and religion) have been invited. At the beginning of the workshop, a small introduction was given. The concept of general household resilience was explained and briefly discussed and final-

ly the experts were asked to rate all of the 44 indicators individually on a scale from 0 to 10 with 0 meaning not important at all for the description of general household resilience and 10 extremely important for the description of general household resilience. Each expert had to rate the 44 indicators in a different order to avoid row effects, i.e., biases due to the position in the item construct (the form for one of the experts is shown in Appendix 6). To keep respondents' attention, the experts were asked to take a short break each time after rating 10 indicators. After the rating exercise, several indicators have been further discussed.

The relative weight of each indicator for the composite indicator was calculated by dividing the average expert score of an indicator by the sum of all the average expert scores of all indicators. This is illustrated with an example in equation 20 and 21 below. Equation 20 describes the calculation of the average expert score of the first indicator I_1 of the framework. S_{kI1} is the score expert "k" gave to the indicator I_1. $\bar{S}_{I1}$ is the average score of all the 11 expert ratings for indicator I_1. v_{I1} is the relative weight of indicator I_1. The relative weights of all the other indicators can be calculated likewise.

(20) $$\bar{S}_{I1} = \frac{\sum_{k=1}^{11} S_{kI1}}{11}$$

(21) $$v_{I1} = \frac{\bar{S}_{I1}}{\sum_{k=1}^{44} \bar{S}_{Ik}}$$

3.7 Example cases

In order to demonstrate the use of composite indicator framework to calculate general resilience of households on Mahé, the questionnaire was finally applied to four household example cases and indicator-, dimension- and composite indicator-scores were calculated for the four cases using the three selected weighting approaches as a sensitivity analysis.

4 Results

In this chapter, the results of the thesis are shown. In a first sub-chapter, the composite indicator framework with all its indicators is presented. Reasons are given why each of the indicators have been selected. In a second sub-chapter, the questionnaire for the measurement of the indicators at household level is explained and an illustration on how the survey-data will be normalized in future is provided. In a third sub-chapter, the weights for the aggregation of the indicator and dimension scores into the composite indicator score which have been derived using the before mentioned three different weighting methods are shown. Finally, in a fourth sub-chapter, the use of the composite indicator is demonstrated by several example cases.

4.1 Composite indicator framework

The composite indicator for general household resilience developed in the present study is composed by the 7 thematic dimensions *Household's income situation, Household's money management, Household head characteristics, Household's family situation, Household health situation, Household's social interaction* and *Household's infrastructure* (see Figure 3). Each dimension is composed by a set of indicators. The dimensions cover economic, social, health-related and physical aspects of a household and are influenced by the sustainable livelihood framework which divides livelihood assets into human capital, natural capital, financial capital, social capital and physical capital. The dimensions *Household's income situation* and *Household's money management* mainly describe the financial capital of a household, the dimensions *Household head characteristics* and *Household's health situation* the human capital of a household, the dimension *Household's family situation* and *Household's social interaction* the social capital of a household and the dimension *Household's infrastructure* mainly the physical capital of a household.

The natural capital which describes the natural resources from which useful services are derived (e.g. atmosphere, forest, land etc.) is not considered. First, Mahé is rather small, and thus most of the natural resources (atmosphere, forest etc.) provide their services (e.g. clean air) to all the households in the same way. Thus, considering them does not allow differentiating between different households in terms of resilience. Natural capital would become important when measuring resilience of certain livelihoods, for example in the case of resilience of farmers (Choptiany et al., 2015). However, the composite indicator developed in this thesis has to be applicable to all types of households. Therefore, considering assets which are only important for certain livelihoods – such as natural capital - cannot be considered.

In the following sections, I justify the selection of each dimension and indicator based on available resilience literature, based on the findings of my field work in the Seychelles and based on my own insights into the topic. I do not claim that the chosen indicators influence resilience as expected to each and every household in every situation. Nevertheless, I think in general, they increase or decrease the likelihood of being resilient as indicated. In application of the framework, it is not recom-

mended that any of the individual indicators is interpreted on its own. The design is such that the indicators describe resilience meaningfully when interpreted in combination.

It is worthwhile to mention that the approach selected in the present study does not allow justifying why other indicators have not been selected. It only allows justifying, why the selected indicators are suitable. This is an important difference and mainly testifies itself in the way I made use of the literature. I mainly used the literature on composite indicators of resilience and vulnerability to get ideas of different indicators. Based on the local context, I then selected appropriate indicators or designed new ones. However, it does not disqualify other indicators mentioned in literature, in the workshops or in the household situation interviews per se (see method section for more details about the workshops and interviews), nor does it give a literature overview of resilience indicators. Some reasons for not considering indicators have been that (i) they did not focus on the household itself but rather on community or nationwide issues like education system and, therefore, do not allow to differentiate between households, (ii) they are only meaningful for certain livelihoods as described above, (iii) they did not seem to be suitable for the context of the Seychelles, or that (iv) I felt they would be very difficult to assess in a household survey.

4.1.1 Household's income situation

The first dimension of the framework describes a household's income situation. Economic strains impacts on family resilience (Sixbey, 2005). An adequate income has the ability to reduce such strains. It can, therefore, be considered as a factor which influences household resilience. This has been confirmed by Orthner et al. (2004) who conclude that family strength is consistently linked to financial assets.

Average monthly net income per capita

This indicator describes the average monthly net income per household member of a household. In the proposed framework, a high net income per household member is considered as a factor which increases the likelihood of a household to be resilient. A similar interpretation was made by Murphy & Scott (2014). They designed a household vulnerability index in the context of global financial crisis and considered households with lower levels of income as more vulnerable against external disturbances than those with higher income. Yet, they did not explain why they selected this indicator.

In my opinion, money is an asset which can be supportive to cope with almost every kind of disturbances. It for example allows living in a safe neighbourhood, insuring people and assets, repairing or rebuilding a house in case of a natural disaster or paying treatment of health issues or counselling for psychological or social problems. The fact that in the context of the Seychelles, health care is provided for free (GoS, 2016) and a social welfare system is in place to support people in need (Larue, 2016) might reduce the importance of the income situation of a household vis-a-vis resilience. However, such advantages do not completely nullify the importance of an adequate income. According to key informant Nr. 1 people with a private health insurance, for example, receive faster and more sophisticated treatment than people relying on public health services. Furthermore, many households in need get no assistance by the social protection system (GoS, 2016). Hence, financial difficulties in daily life in the Seychelles still cause immense pressure on families (SIM, 2012) making income a valuable indicator for the assessment of household resilience.

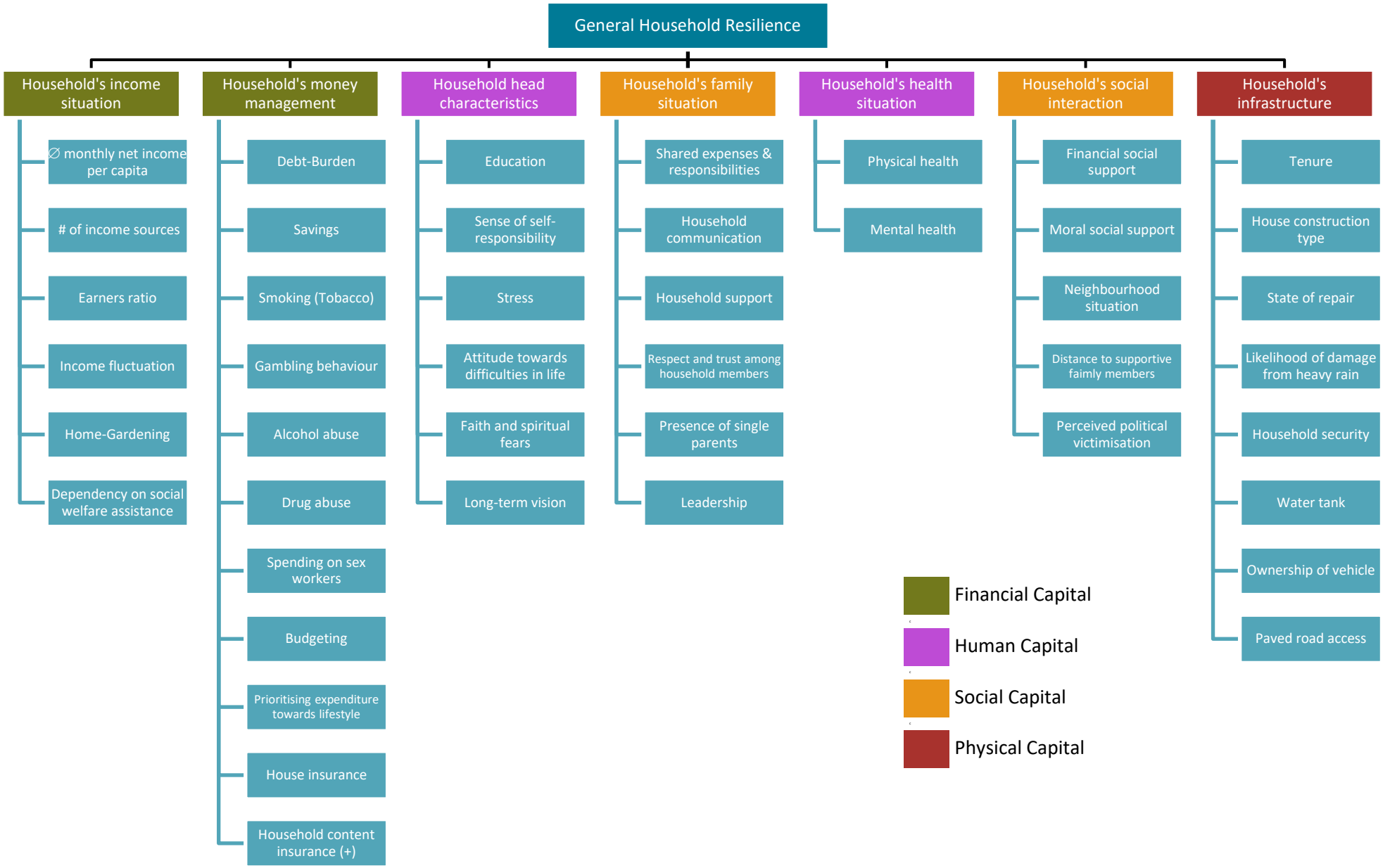

Figure 3 Composite indicator framework for the measurement of general household resilience on Mahé, Seychelles

Some of the experts in the resilience and weighting workshop, however, raised some pertinent points that considered the negative influences high incomes could have on household resilience. They argued, that high income can cause problems such as selfishness, lack of contribution etc. which finally decrease resilience. This is taken into account in this framework. High income is considered as a factor which increases resilience and negative social behaviours (maybe resulting from a high income) are assessed with other indicators. In combination, the indicators meaningfully describe resilience.

Number of income sources

This indicator describes how many different sources of income a household has. In the proposed framework, a high number of income sources is considered as a factor which increases the likelihood of a household to be resilient. The more income sources a household has, the less dependent it is on one income source. This makes the household more economically resilient in the case of losing one of the income sources – an idea which is shared by Choptiany et al. (2015). However, this indicator was challenged by one of the experts in the weighting workshop. The person argued that having a second job would increase the number of income sources. But as a result, it might happen that this person is never at home. This could cause stress and family issues, especially when kids are around. Therefore, based on that expert, increasing the number of income sources could even decrease a household's resilience. Consequently, this indicator is only justified in the combination with the other indicators of the framework, such as the indicator assessing the stress-level of the household head or the indicators assessing the family situation.

Earners ratio

The earners ratio describes the ratio between the number of earners in a household and the total number of household members. A high ratio is considered as a factor which increases the likelihood of being resilient in this thesis. A high number of household members without any sort of income (be it from employment, remittance, pension, school allowance etc.) can be a financial burden for the household causing stress and putting a lot of pressure on the remaining earners. The dependency on the household income of very few earners (in extreme case only one person) furthermore, makes the household economically vulnerable to any disturbance which affect the earner. If the sole breadwinner for example becomes ill, the household might face difficulties to meet economic demands (Sixbey, 2005).

Income fluctuation

The indicator income fluctuation describes to what extent the income of a household fluctuates within a year. I consider high income fluctuation as a factor which decreases the likelihood of being resilient. A large fluctuation in the household income can cause problems for a household if a shock, which would need economic resources to deal with, hits the household in a low income phase. This is especially true in the context of Seychelles, where many people do not have savings (see saving indicator below). In Seychelles income fluctuation can be an issue for people in self-employment, especially for those working in a field which is affected by the seasons like fishermen.

Home-Gardening

This indicator describes the extent to which a household can supply itself with food-products from its own garden. The proposed composite indicator considers growing own food as a factor which increases the likelihood of being resilient. Henly-Shepard et al. (2015) argued that an ownership of a garden positively influences the coping capacity of a household in the face of a disaster by providing food to enable survival. However, home-gardening not only boosts resilience because it provides food in times of crisis. It also has an economic aspect. It mitigates the negative impacts of food price shocks on a household's economic situation and food security. Food price shocks put poor households under economic pressure and can lead to food insecurity. This aspect is of importance in the context of the Seychelles. Households are very vulnerable in regards to food price shocks due to a large dependency on international markets (key informants Nr. 3 and 7; GoS, 2013a). Indeed, in 2011 around 72% of the food was imported (GoS, 2013a). Therefore, local food prices are vulnerable to price fluctuations of international markets, disruptions of international food chains (e.g. piracy), or inflation of the national currency (key informants Nr. 3 and 7). This became visible in late 2008: Consumer price index for food other than fish jumped from 65.21 to 88.49 points (NBS, 2016a). Based on key informants Nr. 7, the only chance to mitigate food insecurity is, therefore, to encourage home gardening. This is already being done by the Ministry of Agriculture and Fisheries (CLISSA, 2015).

Dependency on social welfare assistance

This indicator describes to what extent a household is economically dependent on social welfare assistance. Social welfare assistance is a social welfare instrument of the Agency for Social Protection (ASP) for "supplementing household income up to the value of a basic consumption basket" (Larue, 2016, p. 13). The ASP as an autonomous body under the Ministry of Social Affairs provides social support for households with a set of financial services. One of these services, the social welfare assistance, is the main tool to prevent people from falling into financial poverty (key informant Nr. 6). I consider a high dependency on social welfare assistance as a factor which decreases the likelihood of being resilient. Similarly, Fekete (2009) considers "social welfare recipients" as a factor which increases social vulnerability to natural hazards, without giving a reason though.

In my opinion, the following two reasons justify the selection of such an indicator: First, those who largely depend on social services are already "economically and socially marginalized", and thus more vulnerable to additional disturbances (Cutter et al., 2003, p. 249). Second, a long term dependency on social welfare assistance might decrease the willingness and capacity to stand on one's own feet. Key informant Nr. 6, for example, stated that the good social welfare system in the Seychelles is in place since many years. As a result, many people became too dependent on the state because they got used to being supported. Some even abuse the welfare system (Larue, 2016). Therefore, it is not surprising that service providers in the Seychelles in the field of family issues stated that "families should learn to rely on themselves" (SIM, 2012, p. 61).

It has to be mentioned at this point, however, that interpreting dependency on social welfare as a factor which decreases the likelihood of being resilient as done in the present study does not aim to deny the importance of social welfare assistance for people in need. I think having a nation-wide social protection system in place in general is a factor which increases the resilience of all the households in that nation. Nonetheless, when comparing households within a nation it can be concluded,

that those which do not depend on the social assistance are more likely to be resilient than the dependent ones.

A summary of all the indicators of the first dimension and its justifications can be found in Table 2.

Table 2 Indicator-set of the dimension *Household's income situation*

Indicator	Justification
Average monthly net income per capita	A high income e.g. allows living in a safe neighbourhood, paying insurances, repairing a house in case of a natural disaster, paying medical treatment and it reduces economic-related stress, it, therefore, both increases the ability to withstand disturbances but also to recover from disturbances
Number of income sources	Having several income sources makes a household more resilient in the case of losing one of the income sources
Earners ratio	A low earners ratio can lead to stress and make the household vulnerable to disturbances which affects the remaining earner(s) (e.g. death) (Sixbey, 2005)
Income fluctuation	Can cause problems for a household if a shock which would need economic resources to deal with hits the household in a low income phase
Home-Gardening	Reduces vulnerability to price shocks and provides food to enable survival in times of disaster (Henly-Shepard et al., 2015)
Dependency on social welfare assistance	Dependents might be economically and socially marginalized and, therefore, more vulnerable (Cutter et al., 2003) and might have a decreased willingness and capacity to stand on their own feet

4.1.2 Household's money management

As already described above, having money does not solve all the problems and whether having money can unfold its potential in strengthening a household largely depends on how the money is used. Thus, the second dimension of the general household resilience framework focuses on a household's money management – the way a household uses the money it has. Based on literature review, Black & Lobo (2008) identified financial management as one of 10 characteristics which are commonly attributed with healthy and resilient families, an opinion which is shared by Sixbey (2005). In the context of Seychelles, this aspect is of upmost importance as there are indications that Seychellois are facing difficulties to manage their finances. There are signs for financial distress among the population caused by a lack of planning and wise decision-making (Naidoo & Motsomi, 2016).

Debt-burden

This indicator describes the debt-burden of a household. In the proposed framework, a high debt burden is considered as a factor which decreases the likelihood of being resilient. A similar indicator has also been used by Murphy & Scott (2014) for their household vulnerability index and by the SHARP-tool assessing climate resilience of farmers (Choptiany et al., 2015). However, neither of both documents justifies the selection of the indicator. In my opinion, a highly indebted household might lack financial resources which could be needed for coping with any unforeseen disturbance. Thus, such a household can be considered as less resilient. This indicator has its justification in the context of Seychelles where approximately every fourth adult Seychellois shows signs of over-indebtedness.

This is considered as a high share (Naidoo & Motsomi, 2016; key informant Nr. 6). Additionally, credit is often used for consumption smoothing instead of using it for productive purposes (Naidoo & Motsomi, 2016).

Savings

This indicator assesses aspects related to saving practices of a household. Having and practicing savings is considered as a factor which increases the likelihood of being resilient in this thesis. A similar indicator has been used in the SHARP questionnaire for the assessment of climate resilience of farmers (Choptiany et al., 2015). Savings help to cover unforeseen expenses which might be needed to successfully deal with a disturbance (Naidoo & Motsomi, 2016). Household Nr. 1 (see Table 1), for example, stressed that its savings have been very important for its successful coping with the experienced life challenges (health-issues and death of a family member). Household Nr. 3 and 4 and the experts in the weighting workshop also emphasized the importance of savings for resilience (without giving further explanation though).

This indicator has its justification in the context of the Seychelles. In a survey with 400 households in October 2011, half of the households indicated to have less than one thousand Seychelles Rupee (SCR) savings (1 SCR is around 0.74 USD[10]). The study concludes that "half of households are unable to cope with any unexpected financial demands which may come their way" (SIM, 2012, p. 64). 30% of the adults have a life assurance (Naidoo & Motsomi, 2016). The absence of saving behaviour among Seychellois has also been mentioned by key informants Nr. 6 and 7.

It has to be mentioned, that this indicator only covers cash savings and savings in form of life assurance. It is not able to cover any investment in goods such as jewellery, cars etc. which could also be converted into cash in difficult times.

Smoking (Tobacco)

This indicator describes whether any of the household members regularly smokes. According to the participants in the resilience workshop, any addiction decreases resilience. However, smoking was discussed controversially. One workshop participant, for example, stated that smoking reduces stress which leads to increased resilience. On the other hand, smoking can cause health issues such as non-communicable diseases (Bovet et al., 2013). Furthermore, smoking can have a large impact on the economic situation of a household since cigarettes are expensive in the Seychelles. A cigarette pack costs around 60 SCR. Someone who smokes one pack per day, therefore, spends around 1800 SCR per month. This is about 1/3 of the minimum wage. In addition, since smoking is an addiction, prioritising expenditure towards smoking is likely. This can decrease resilience in cases where the money would be needed to successfully cope with a disturbance. Therefore, the proposed composite indicator considers the presence of smokers in a household as a factor which decreases the likelihood of being resilient.

[10] Retrieved February 13, 2017 from http://www.xe.com/currencyconverter/convert/?Amount=1&From=SCR&To=USD

Presence of gambling behaviour

This indicator describes whether any household member regularly plays games of chance. The presence of gambling behaviour is considered as a factor which decreases the likelihood of being resilient in the present study. Gambling, like smoking, can have a large impact on the economic situation. In addition, it can be addictive which can lead to wrong prioritising of expenditures. I argue that it can also cause disputes and disfavour in a household and, therefore, reduce the household cohesion if one of the household members often loses money from the household in his/her gambling activities. As already stated above, in the resilience workshop it was concluded that any kind of addiction decreases resilience. Different kinds of games of chance exist in Seychelles such as playing lottery and bingo, informally playing cards with people in the community or going to one of the two gambling houses. The data from Naidoo & Motsomi (2016) indicated that 12% of the population aged 18 or above are engaging in games of chance. These are the self-reported cases though. Consequently, the effective share could be higher.

Alcohol abuse

This indicator describes whether any household member is a victim of alcohol abuse. In the proposed composite indicator, the presence of a victim of alcohol abuse in a household is considered as a factor which decreases the likelihood of a household to be resilient. Heavy alcohol drinking is frequent in the Seychelles (Bovet et al., 2013; MSACDS, 2016; SIM, 2012), affecting the economic, social and health situation of a household. Most of the alcohol in the Seychelles is expensive. The cheapest bear costs around 25 SCR, a 0.5 litre bottle of local rum or vodka around 150 SCR. Imported alcohols are even more expensive. Alcohol abusive behaviour can, therefore, largely reduce the household's budget for other expenses which would lead to increased resilience (e.g. insurances) or which would be needed to overcome a disturbance. Alcohol abusive behaviour, furthermore, largely influences the family situation. It often leads to disputes, relationship issues, mistrust etc. reducing the wellbeing and cohesion of the family. Alcohol abuse can also negatively influence the victim by causing health problems, can reduce the capacity of the person to be productive and can inhibit the ability to cope with daily life challenges.

Drug abuse

This indicator describes whether any household member is a victim of drug abuse. In this study, the presence of a victim of drug abuse in a household is considered as a factor which decreases the likelihood of a household to be resilient. This opinion has been shared by the experts in the resilience workshop. In the Seychelles, substance abuse and linked to that HIV/AIDS and hepatitis C is increasing (MSACDS, 2016). The drug situation has even been declared as a national disaster due to its severity (WHO, 2014). Heroin exploded out of nowhere in 2005 (WHO, 2014; key informant Nr. 5). Since then, drug consumption trends have been changing from the use of marijuana to heroin and poly drugs (cocktails of ecstasy, heroin, cocaine and phencyclidine). This resulted in addicts with reduced work ethics, reduced sense of responsibility, increased engagement in criminal activities (WHO, 2014) and increased engagement in prostitution (key informant Nr. 5 and 6; Rosalie et al., 2011; Volcy & Duncan, 2010). Sometimes, heroin addicts steal money or other merchandisable goods from other household members to gather money to buy drugs (household interview Nr. 2 and key informant Nr. 8) or just disappear for several days (example case Nr. 4) causing stress, disputes, rela-

tionship issues and mistrust among the household members, sometimes even leading to breakdown of families (key informants Nr. 5 and 6).

Frequent spending on services of sex workers

This indicator describes whether any household member frequently spends on services of sex workers. It is considered as a factor which decreases the likelihood of being resilient in the present study. In my opinion, frequent spending on services of sex workers can have a large impact on the economic situation of a household and can be addictive. It can also cause disputes and disfavour in a household reducing the household's cohesion. However, one of the experts in the weighting workshop argued that for a single man who has a lot of money, spending on services of sex workers does not have to decrease his resilience. Thus, this indicator is only meaningful in combination with other indicators assessing the economic and family situation of a household.

Budgeting

This indicator assesses the budgeting practices of a household. In the present study, budgeting is considered as a factor which increases the likelihood of being resilient. It helps to allocate resources to meet basic needs, to make savings (Naidoo & Motsomi, 2016), to spend money purposefully and to avoid indebtedness. In case of any disturbance which puts the economic situation of a household under pressure, it is beneficial to know how to economize. This opinion is shared by household Nr. 1 and by the experts in the resilience and weighting workshops. In regards to the situation in the Seychelles, around 83% of adults know how much they earn, but only 42% know how they spend the money. This is an indication of a lack of planning and tracking of expenditure (Naidoo & Motsomi, 2016).

Prioritising expenditures towards lifestyle

This indicator assesses whether a household prioritises expenditures towards lifestyle due to the fear of not being up to standard and left out. This is considered as a factor which decreases the likelihood of being resilient in the present thesis. According to the experts in the resilience and weighting workshop, many people in Seychelles are making wrong choices and do not prioritise their expenses wisely. They are under influence of peer pressure, try to imitate western stars and want to have all the toys and joys of western culture (smart phone, sweet 16 and Halloween party etc.), even though they do not have the money for it. Another person explained to me in an informal talk that Seychellois are proud and because of that spend a lot of money on status symbols like a nice TV. This kind of behaviour can lead to self-inflicted poverty (household Nr. 1, key informant Nr. 5), which is not beneficial in relation to resilience. The money could be spent more wisely, for example, for productive long-term investments or saved for unexpected circumstances.

House insurance

This indicator describes whether a household has a house insurance. Having a house insurance is considered as a factor which increases the likelihood of being resilient in the proposed composite indicator. It has been done likewise in the SHARP questionnaire for the assessment of climate resilience of farmers (Choptiany et al., 2015). A house insurance is an important risk mitigation tool and serves as an economic back-up to absorb a wide range of possible shocks (Naidoo & Motsomi, 2016).

Household content insurance

This indicator describes whether a household has a household content insurance. Like the house insurance, it is considered as a factor which increases the likelihood of a household to be resilient based on the same argument.

A summary of all the indicators of the second dimension and its justifications can be found in Table 3.

Table 3 Indicator-set of the dimension *Household's money management*

Indicator	Justification
Debt-burden	Can be an indicator for a lack of financial resources which could be needed for coping with any unforeseen disturbance
Savings	Help to cover unforeseen expenses which might be needed to successfully deal with a disturbance (Choptiany et al., 2015)
Smoking (Tobacco)	Can negatively affect the economic and health situation of a household (Bovet et al., 2013) reducing the ability of the household to deal with additional disturbances. Additionally, it can lead to wrong prioritising of expenditures which can cause problems in times of disturbances.
Presence of gambling behaviour	Can negatively affect the economic situation and the cohesion of a household and, therefore, reduce the ability of the household to deal with additional disturbances. Additionally, it can lead to wrong prioritising of expenditures which can cause problems in times of disturbances
Alcohol abuse	Can negatively affect the economic- and health situation and the cohesion of a household reducing the ability of the household to deal with additional disturbances. Additionally, it can lead to wrong prioritising of expenditures which can cause problems in times of disturbances
Drug abuse	Same reasons as for alcohol abuse (WHO, 2014)
Frequent spending on services of sex workers	Can negatively affect the economic situation and the cohesion of a household and, therefore, reduce the ability of the household to deal with additional disturbances
Budgeting	Helps to economize, to make savings (Naidoo & Motsomi, 2016), to spend purposeful and to avoid indebtedness, all of it can be very valuable in times of hardship
Prioritising expenditures towards lifestyle	It can lead to self-inflicted poverty which makes coping with disturbances more difficult. Furthermore, money could be spent more wisely to increase resilience (e.g. investing in insurance)
House insurance	Risk mitigation and economic back-up in case of a disturbance affecting the building
Household content insurance	Risk mitigation and economic back-up in case of a disturbance affecting the household content

4.1.3 Household head characteristics

The third dimension of the indicator framework focuses on the household head characteristics. It is not only money which is needed to successfully cope as a household when facing disturbances. In my opinion, attitudes and characteristics of the household members are at least as important. Due to the restriction in the size of the composite indicator framework it is not possible to assess characteristics of all the household members. The household head is, therefore, used as a proxy for all the household members.

Education

This indicator describes the level of education of the household head. A high educational degree is considered as a factor which increases the likelihood of being resilient in the present study. This opinion has been shared by most experts in the resilience and weighting workshop. It is also in line with Fekete (2009) who considers "graduates with high school graduation" and "university students" as factors which decrease social vulnerability to natural hazards. However, no explanation is given by the author why such an indicator should be considered. Cutter et al. (2003) argued that a high educational attainment results in higher socioeconomic status, whereas a low educational attainment can constrain the capacity to understand warnings and to access to recovery information which increases vulnerability to natural disasters. The impact of education on the socioeconomic status has also been shown in the recently published poverty study in the Seychelles. The lowest incidence of poverty is found among individuals with a university or post-graduate degree (NBS & World Bank, 2016). I argue furthermore, that high educational attainments can positively influence risk awareness and the way of decision making of a household, and thus increase resilience.

Sense of self-responsibility

This indicator measures the sense of responsibility of the household head. A lacking sense of responsibility is considered as a factor which decreases a household's likelihood of being resilient. I think realizing that one is not a victim of its circumstances but rather has the possibility to change something with its own action increases both, the psychological wellbeing and the motivation to work towards change in times of hardship. Furthermore, it can lead to reduced dependency. Based on informal talks, my own observations and key informant interviews, this indicator is of importance in the context of the Seychelles. Two key informants mentioned that many Seychellois have a low sense of responsibility. It, for example, manifests itself in an abuse of the social protection system (Larue, 2016) and in the fact that things often are taken for granted (key informants Nr. 3 and 5). Family support providers, therefore, claim that families should learn to rely on themselves (SIM, 2012).

Experienced stress & stress management

This indicator describes the level of stress a household head is experiencing and whether he/she knows practices to reduce stress. I consider a highly stressed household head as a factor which decreases the likelihood of being resilient. A similar indicator has been used by Murphy & Scott (2014) for their household vulnerability index without giving justification. Someone who already experiences high levels of stress might be overwhelmed by any additional disturbance and, therefore, less resilient. Most of the experts from the resilience workshop agreed on that. In the context of the Seychelles, frequently reported causes for social stress include drug abuse among family members, heavy drinking by some members of the family, domestic violence and problems with neighbours (Chamik et al., 2016).

Attitude towards difficulties in life

This indicator assesses the attitude of the household head towards difficulties in life and its willingness to seek help if needed. I consider a positive attitude as a factor which increases a household's likelihood of being resilient. It allows accepting change, it beneficially influences the well-being of the person and it gives motivation and hope to keep going in difficult times. Black & Lobo (2008), based on a literature review, list 10 characteristics which are commonly attributed to healthy and resilient

families. One of these characteristics is having a "positive outlook". They stated that an optimistic confidence lies at the heart of resilience (Black & Lobo, 2008). Furthermore, according to Walsh (1998, as cited in Black & Lobo, 2008), resilient families do admit when they need help, and thus more likely seek support if needed. The importance of this indicator has also been highlighted in the household interviews. Household Nr. 1 and 3, based on their own experiences, stressed the importance of accepting difficult situations; household Nr. 3 highlighted the importance of being optimistic and household Nr. 2 and 3, furthermore, stressed the importance of seeking counselling or help in times of hardship.

Faith and spiritual fears

This indicator describes the degree to which a household head has faith and spiritual fears. In the present framework, I consider strong faith as a factor which increases the likelihood of being resilient, whereas spiritual fears decrease the likelihood of being resilient. This is in line with Black & Lobo (2008), who based on literature review identified "spirituality" as one of 10 characteristics which are commonly attributed with healthy and resilient families. Furthermore, household 3 and 4 and the experts in the weighting workshop also stated that spirituality contributes to a better coping with disturbances.

Religion plays an important role in the lives of many Seychellois. 90% of the population is Christian of which 76% are roman catholic, 6% Anglican and 8% other groups like the Jehovah Witness (NBS, 2012). The church provides support to people in need, be it in the form of counselling, with clothes, food, school materials, or with activities for children (Key informant Nr. 9; SIM, 2012).

In my opinion, faith increases the likelihood of being resilient since it can give hope, strength and motivation to keep going in times of hardship and can help to accept change and difficulties. This has been confirmed by Household Nr. 1, who stressed that praying together and having faith in god has largely helped the household to deal with the life challenges experienced. In the resilience workshop, it was furthermore mentioned that spirituality can help to wisely prioritise, can lead to healing and can increase the level of self-contentment.

However, I think spirituality reduces resilience if it is linked to fear. Around 50 years ago, many Seychellois held strong beliefs in the supernatural. People believed in witchcraft and sought counselling from so called *bonhomme de bois*, men who "dispensed potions, charms and medicines" (Thomas, 1968, p. 33). My research revealed some indications that the fear from evil spirits, demons and witchcraft is still present on Mahé. Exorcism is a practice used by both the Anglican and Catholic Church on the island. Furthermore, several people confirmed that there are still *bonhomme de bois* on the island. Household Nr. 4, for example, thinks that it is affected negatively by evil spirits. The household head attributes many issues in the household to the influence of evil spirits such as health problems and the inconsiderate spending of money by the household members. The household head is convinced that these evil spirits have been imposed by a relative who wants to harm the household. The household head, therefore, sought counselling from the priest and from a *bonhomme de bois*. The *bonhomme de bois* read the cards and sold powders which have to be lighted twice a week in front and in the back of the house to keep the evil spirits away.

The fear of witchcraft also became apparent when I was talking to a young man. I told him that I want to visit a *bonhomme de bois* for my research. He advised me not to go there since it could be dangerous for me. Additionally, a young woman asked me to stop talking about these issues because she was afraid of it. Key informant Nr. 9 agreed that there is still a lot of occult in Seychelles.

In my opinion, the belief in such evil spirits, witchcraft etc. reduces the resilience of the people. It can cause dependency on *bonhomme de bois* which can be expensive. Furthermore, it causes mistrust and superstitious perceptions which can negatively influence social networks. Additionally, it leads to fear which absorbs energy and which can cause avoidance of certain activities. Finally, in my opinion the fear can lead to a reduced sense of self-efficacy. It might happen that the household members attribute a difficult situation to dark forces and consequently, feel unable to deal with the situation.

In conclusion, spirituality and faith can be beneficial in terms of resilience, whereas spiritual fears might reduce the likelihood of being resilient.

Long-term vision

This indicator describes whether the household head has a long-term vision for his/her household. In the present study, having a long-term vision is considered as a factor which increases the likelihood of being resilient. The importance of visions for resilience has been stressed in the resilience workshop. Having a vision motivates and mobilizes energy to keep going, especially in times of hardship.

A summary of all the indicators of the third dimension and its justifications can be found in Table 4.

Table 4 Indicator-set of the dimension *Household head characteristics*

Indicator	Justification
Education	High educational attainment can result in higher socioeconomic status (NBS & World Bank, 2016) and can positively influence risk awareness (Cutter et al., 2003) and the way of decision making
Sense of self-responsibility	Can increase psychological wellbeing and motivation to work towards change in times of hardship
Experienced stress & stress management	Someone who already experiences high levels of stress might be overwhelmed by any additional disturbance and, therefore, less resilient
Attitude towards difficulties in life	A positive attitude allows accepting change, beneficially influences the well-being of a person and gives motivation and hope to keep going in times of hardship. People who have the strength to admit when they need help have been shown to be more resilient (Walsh, 1998 as cited in Black & Lobo, 2008)
Faith and spiritual fears	Faith: Can give hope, strength and motivation to keep going in times of hardship, can help to accept change and difficulties, can help to wisely prioritise and can increase the level of self-content. Spiritual fears: Can cause dependency on *bonhomme de bois* which can be expensive, can make mistrustful and superstitious, absorb energy and might cause avoidance of certain activities
Long-Term vision	Motivates and mobilizes energy to keep going in times of hardship

4.1.4 Household's family situation

The fourth dimension of the composite indicator focuses on the social situation in a household. Since most households in the Seychelles are families, the dimension is called "Household's family situation". This dimension is of great importance in the context of the Seychelles: Divorces increased by 51% between 2001 and 2011 (SIM, 2012). Around 78% of children are born outside wedlock and about 18% of birth are not recognized by the father (NBS, 2011). In many households, the mother ,therefore, has to carry the full responsibility to carry for the children (Chang-Him, 2002; key informant Nr. 5). Only around 53% of the children in Seychelles live with both of their biological parents (ADB, 2009). Reports of domestic violence and child abuse and number of parents in prison are increasing (MSACDS, 2016). In a national survey on domestic violence from the Gender Secretariat in 2006, 62% of women and 64% of men indicated that they have witnessed an incidence of domestic violence (emotional/physical/economic/sexual violence) and 27% of women and 23% of men admitted that they experienced moderate physical violence. 11% of the women even admitted that they have been raped by an intimate partner (SIM, 2012).

Respect and trust among household members

This indicator describes the level of respect and trust among the household members. I consider a respectful and trustful atmosphere in a household as a factor which increases the likelihood of being resilient. This is in line with Black & Lobo (2008), who, based on a literature review, stressed the importance of mutual respect for family resilience. Respect and trust enables cooperation among the household members and positively influence the household atmosphere. This indicator can also be interpreted as an indirect measure of the presence of harmful behaviour such as cheating behaviour, domestic violence and child abuse. These behaviours unlikely occur in households where household members truly respect and trust each other.

Household support

This indicator describes the degree of support among the household members. A strong support is considered as a factor which increases the likelihood of being resilient in the proposed composite indicator. Evidence is given, for example, by Conger & Conger (2002), who revealed that emotional support between parents is an important factor for resilience to economic hardship. Furthermore, according to Black & Lobo's review on factors which increase family resilience (2008), pulling together as a family and supporting each other has been found to be one of the most important factors for resilience. This has also been confirmed in the household interviews. Household Nr. 1 and 4 both stressed that the support of the family has been very important for their coping with hardship. Despite the family issues described above, in terms of household support, the situation in the Seychelles seems to be rather good. In a study conducted in 2009 in the Seychelles, only 5% of the respondents disagreed that family members help and support each other. 85% agreed or strongly agreed that there is a feeling of togetherness in their family (SIM, 2012).

Household communication

This indicator assesses the communication between household members of a household. A good communication culture is considered as a factor which increases the likelihood of being resilient. Household communication is an important determinant for the cohesion, trust and support of the

household members (Black & Lobo, 2008). Based on a literature review, McCubbin & McCubbin (1988) identified communication as an important factor for family resilience. It has, furthermore, been shown by Orthner et al. (2004), that household communication predicts positive outcomes for low-income families. Good household communication has also been mentioned in the resilience workshop, the weighting workshop and by household Nr. 1 as an aspect which increases resilience of a household.

According to household Nr. 1, families in Seychelles nowadays lack communication. This has also been stated in a focus group discussion with social support providers (SIM, 2012). However, in a survey conducted in 2009, 75% of household heads stated that their family communication is positive. Furthermore, about 67% of the households reported that they inform their children about decisions made concerning the family (SIM, 2012).

Shared expenses and responsibilities

This indicator measures whether expenses and responsibilities are shared in a fair way among the household members. I consider sharing expenses and responsibilities as a factor which increases the likelihood of being resilient as a household. In my opinion, sharing responsibilities and expenses reduces the pressure/burden on each of the household members and, furthermore, leads to a sense of togetherness which can be beneficial in times of hardship. It has been stated in informal talks, that in Seychelles, responsibilities sometimes are not shared fairly between parents and their children. This can lead to a bad household atmosphere, disputes and resentments.

Presence of single parents

This indicator describes whether there is a single parent living in the household. The presence of a single parent is considered as a factor which decreases the likelihood of being resilient in the present study due to several reasons. First, single-parent households often struggle with juggling work responsibilities and care for the children which causes stress and affects resilience (Cutter et al., 2003). This has been confirmed by key informant Nr. 7, who describes the life of single-mothers in the Seychelles as a catalogue of daily stresses. Second, according to Sun & Li (2009), single mother headed households are more likely to experience poverty, lower educational attainment and teen and non-marital childbearing. This is illustrated by the fact that around ¾ of the social welfare assistance recipients in the Seychelles are single-mothers (key informant Nr. 6). Third, children from two-parent families are most advantaged in terms of health and behaviour and children from single-parent most disadvantaged (Ming, 2008). Many of the psychological problems of children from divorced families appear because of the absence of a supportive father figure (Schor, 2003). It has also been shown, that Seychellois boys at primary and secondary level have better school performance when they live in two-parent families (Geisler & Pardiwalla, 2010). It can, therefore, be concluded that besides the daily stress of juggling work responsibilities and care, single-parents also more likely experience stress due to behavioural problems of their children.

Leadership

This indicator describes the presence of a leader in the household. In this study, the presence of a leader is considered as a factor which increases the likelihood of being resilient. This is in accordance with the opinion of the experts in the resilience workshop. I define a leader as someone who actively

takes responsibility and action to handle things when there is a crisis and someone other household members can look to for guidance in life matters.

A summary of all the indicators of the fourth dimension and its justifications can be found in Table 5.

Table 5 Indicator-set of the dimension *Household's family situation*

Indicator	Justification
Respect and trust among household members	Enables cooperation among the household members and positively influence household atmosphere. Can be used as an indirect measure of harmful behaviour such as domestic violence and child abuse
Household support	Pulling together as a household can help to deal with disturbances, an thus increase resilience (Black & Lobo, 2008; Conger & Conger, 2002)
Household communication	Important determinant for the wellbeing, cohesion, trust and support of the household members (Black & Lobo, 2008) and predicts positive outcome for low-income families (Orthner et al., 2004)
Shared expenses and responsibilities	Reduces the pressure/burden on each of the household members and leads to a sense of togetherness which can be beneficial in times of hardship
Presence of single parents	More likely struggle with poverty (Sun & Li, 2009), can cause high level of stress due to juggling work responsibilities and care (Cutter et al., 2003), can cause behavioural problems among the children (Geisler & Pardiwalla, 2010; Ming, 2008; Schor, 2003) which leads to additional stress, all reducing the capacity of the household to deal with additional disturbances
Leadership	Takes actively responsibility and action to handle things when there is a crisis and acts as a support pole for the other household members

4.1.5 Household's health situation

A household's health situation is the 5th dimension of the proposed framework of general household resilience. Based on literature review, McCubbin & McCubbin (1988) identified a household's health situation as an important factor for household resilience. They argued that physical and mental well-being of household members can reduce stress. Other authors also consider good health as a factor which increases resilience and decreases vulnerability, however, without giving further justification (Choptiany et al., 2015; Fekete, 2009; Orthner et al., 2004; Shah et al., 2013). In my opinion, health, be it physical or mental, is a valuable good when it comes to the ability to deal with disturbances. Health issues in a household negatively affect the human capital of the household, absorb money, time and energy of the household members, reducing the capacity of the household to deal with other disturbances. This view has been shared by the experts in the resilience and weighting workshop.

Physical health

This indicator describes the physical health situation of a household. In the present study, physical health issues are considered as a factor which decreases the likelihood of the household of being resilient.

Mental health

This indicator describes the mental health situation of a household. In the present study, mental health issues are considered as a factor which decreases the likelihood of the household of being resilient.

A summary of the indicators of the fifth dimension and its justifications can be found in Table 6.

Table 6 Indicator-set of the dimension *Household's health situation*

Indicator	Justification
Physical health	Health issues (physical and mental) can cause stress(McCubbin & McCubbin, 1988), negatively affect the human capital of a household, absorb money, time and energy of the household members and, therefore, reduce the capacity of a household to deal with other disturbances
Mental health	Same reason as for physical health

4.1.6 Household's social interaction

The 6th dimension of the general household resilience framework focuses on social interactions. It includes the aspect of social networks and the aspect of perceived political victimisation. Social network is often stated as an important factor for households to deal with disturbances (Black & Lobo, 2008; DFID, 1999; McCubbin & McCubbin, 1988; Orthner et al., 2004). Social networks can provide support in times of need, be it financially or morally. As stated by Black & Lobo (2008, p. 46) a "family's community and social support system can offer a rich, protective sense of belonging and cohesion." On the other side, (perceived) political victimization can lead to exclusion and marginalisation which, in my opinion, negatively influences resilience of a household.

Financial social support

This indicator describes to what extent a household would receive financial support from its social network if needed. Based on the reasons mentioned above, I consider financial social support as a factor which increases the likelihood of a household to be resilient. A similar indicator has been used by Murphy & Scott for their household vulnerability index without giving justification though.

Moral social support

This indicator describes to what extent a household would receive moral support from its social network if needed. I consider moral social support as a factor which increases the likelihood of a household to be resilient due to the above mentioned reasons.

Neighbourhood situation (cooperation and security)

This indicator describes the neighbourhood situation of a household. I consider a trustful and cooperative neighbourhood as a factor which increases the likelihood of being resilient since it can act as a valuable safety-net in times of hardship. Household Nr. 1, for example, stressed that its supportive neighbourhood was very helpful in the past times of hardship. To the contrary, an unsafe neighbourhood can be considered as a risk factor which negatively influences family resilience (Orthner et al., 2004). This is of importance in the context of Mahé. Based on the participants in the resilience workshop, some of the neighbourhoods are at risk for drugs, violence etc. Additionally, as experienced by

example case Nr. 4, an untrustworthy neighbourhood and difficult relations to the neighbours can cause difficulties and stress, absorbing energy, and thus reducing a household's ability to cope with additional disturbances.

Distance to supportive family members

This indicator assesses whether a household has relatives in close distance and whether they actively support each other in daily life (for example looking after the children, helping each other out with transport etc.). I consider the presence of supportive family members in close distance as a factor which increases the likelihood of being resilient. Responsibilities and burden can be shared. Therefore, having supportive relatives in close distance can be very valuable in times of hardship and serve as a powerful safety-net. According to the experts in the resilience workshop and key informant Nr. 6, it has been a trend lately on Mahé that the distance between the houses of relatives increased resulting in a reduced daily support for each other. This trend is mainly driven by the construction of large housing estates. Family members who are looking for a housing possibility often have to move to one of these newly built housing estates which are not necessarily located in the same district as the family has been living.

Perceived political victimisation

It seems that political victimisation has been an issue in the Seychelles. According to Veenendaal (2013) opposition supporters often appear hesitating or fearful to openly express their affiliation. A former presidential candidate, Alexia Armesbury, made a similar statement in a newspaper interview. She said that during the presidential election, she realized that despite the multi-party democracy in place, there is a political fear existing within the Seychellois people (Vannier et al., 2015). One of the key informants confirmed that such a fear exists and I made similar observations during the key informant interviews. Some of the key informants hesitated to speak up freely about political issues. One of them, after making a politically sensitive statement, became afraid when he remembered that the interview has been recorded.

According to different statements, different kinds of political victimisation exist: In 2011, one of the opposition parties claimed that its sympathizers are harassed by police and victimized in public sector by job-related security investigations (Freedom House, 2011). Based on a statement from one of the key informants, politic affiliation has also been influencing the way government allocated social housing to people. In an informal talk, another person stated that there have been complaints from households that if they are not associated with certain political parties, they are marginalised and have problems in accessing certain services.

However, none of these claims have been officially proven. Furthermore, it has to be mentioned that the political landscape in the Seychelles changed in 2016 – shortly before I started my field work in the Seychelles: The opposition gained the majority in the national assembly for the first time since independence of the country in 1976 and the former president handed over the presidency to his former vice president. I do not know whether the perception of the population in regards to occurring political victimisation is changing under the new political situation.

Whatever the case, it can be concluded that likely (perceived) political victimisation has been an issue in the Seychelles. This is why this indicator has been included in the proposed framework for the assessment of general household resilience. The indicator assesses to what extent a household feels that it has been or could be politically victimized.

I consider perceived political victimisation as a factor which decreases the likelihood of being resilient in the proposed framework because of following reasons: (i) Household's, which feel that they are politically victimized, might lose trust in governmental institutions. Consequently, they might hesitate to seek help from these institutions in times of hardship which can further reduce their resilience. Additionally, (ii) someone who feels that he/she gets politically victimized might hesitate to apply for a job in public sector due to an assumed lack of chance of success. (iii) Finally, perceived political victimisation can discourage and cause fear which affects the well-being of a person.

A summary of the indicators of the sixth dimension and its justifications can be found in Table 7.

Table 7 Indicator-set of the dimension *Household's social interaction*

Indicator	Justification
Financial social support	Support can help to deal with disturbances, and thus increase resilience (Black & Lobo, 2008; McCubbin & McCubbin, 1988; Orthner et al., 2004)
Moral social support	Support can help to deal with disturbances and consequently increase resilience (Black & Lobo, 2008; McCubbin & McCubbin, 1988; Orthner et al., 2004)
Neighbourhood situation	Supportive neighbourhood can act as a valuable safety-net, an untrustworthy neighbourhood or dispute with the neighbours can cause stress and absorb energy which reduces the ability to cope with disturbances (Orthner et al., 2004)
Distance to supportive family members	Responsibilities and burden can be shared. Act as a powerful safety-net in times of hardship
Perceived political victimisation	Can discourage and cause fear reducing the well-being, affected people might hesitate to seek help from governmental institutions in times of hardship and hesitate to apply for jobs in public sector reducing their job-opportunities

4.1.7 Household's infrastructure

None of the indicators considered so far are related to the housing situation of a household and other physical capital even though they play an important role in household resilience. Hence, the dimension *Household's infrastructure* covers some of these aspects.

Tenure

This indicator describes the tenure status of a household. I consider owning a house without loan as most beneficial for household resilience, followed by owning a house with loan, renting a house from government and finally renting a house privately or rent free. In my opinion, this hierarchy is justified since it follows the long-term security of a house. In the context of Seychelles, the house is most secured as a place to live in in the long term when owned, less secured when rented from government and even less when rented privately or rent free.

It is a common approach to rate owning a house as most beneficial in vulnerability / resilience literature. For example, Shah et al. (2013) considers owning a house as a factor which decreases vulnerability of livelihoods to climate change. Henly-Shepard et al. (2015) considers owning a house as a factor which contributes to household social resilience with the argument that owning a house facilitates repayment of losses and the ability to rebuild. Based on literature review, Cutter et al. (2003) considers renters as more vulnerable than owners since in extreme cases, renters lack shelter options when housing becomes too expensive.

Some of the experts in the weighting workshop agreed that owning a house should be considered as increasing resilience compared to renting a house as it ensures a guaranteed shelter for the future. Yet, some other experts argued that renting a house could be cheaper than paying a mortgage and that renting leads to more flexibility which could increase resilience. This view is shared by Murphy & Scott (2014), who consider households with a mortgage as more vulnerable than rented households. In my opinion, the point of an increased flexibility when renting is true but not very relevant in the context of Mahé. As I understood, the housing market is dried out which makes it difficult to find an affordable house or apartment for renting. Around 82% of households in the Seychelles own their dwelling (NBS, 2013). People who rent their house theoretically have the flexibility to change their housing (for example when a move would be beneficial to cope with a disturbance). However, they might not find something affordable in an appropriate time. Therefore, I support the argument of the long-term secured shelter and value owning a house as the best option in terms of resilience.

House construction-type

This indicator describes whether the house is constructed by stone/bricks or wood/corrugated iron. In the Seychelles, around 87% of the households live in housing made out of bricks/stones (NBS, 2013). I consider a house which is robustly constructed with stone/bricks as a factor which increases the likelihood of being resilient. As elaborated in the conceptual background section of this document, resilience can be increased by increasing the ability to withstand disturbances. A solidly built house can better withstand possible threats such as cyclones and falling branches or trees which make it reasonable to consider it as a factor which increases resilience. This opinion is shared by Cutter et al. (2003) who, based on a literature review, stresses the importance of the type and quality of the house for social vulnerability.

State of repair

This indicator describes the state of repair of a house. I consider a house which is in good condition as a factor which increases the likelihood of the household of being resilient. This is in line with Orthner et al. (2004) who considers a house with need for repair as a risk factor which negatively influences family resilience, however, without giving justification. In my view, a bad state of repair decreases the capacity of the housing to withstand certain disturbances such as cyclones or falling branches or trees. In addition, few houses on Mahé are leaking. Leaking roofs can cause stress which can reduce the ability to cope with additional disturbances.

Likelihood of damage from heavy rain

This indicator assesses the likelihood of damage to the house by flooding or landslides caused by heavy rain. I consider households which are likely to be damaged as less resilient.

Mahé can be affected by different natural hazards. Landslides and flooding caused by heavy rains are the most common ones (Seng & Guillande, 2008 and key informant Nr. 3). Besides that, the country has, for example, been affected by the Indian Ocean tsunami in 2004. Furthermore, climate change triggered sea-level rise combined with tsunami-flooding is seen as a future threat (Brown et al., 2011; GoS, 2012, 2013b; Seng & Guillande, 2008). Tropical cyclones, so far, occur rarely but could become more and more of an issue in the future (key informant Nr. 3).

The proposed composite indicator does not allow capturing the full range of natural hazards on Mahé. Nevertheless, it tries at least to incorporate the most common natural hazards: Flooding and landslides caused by heavy rains.

Shah et al. (2013) considers households which are not elevated by posts/ high ground to avoid flooding as more vulnerable in his livelihood vulnerability index to climate change. Such an indicator makes sense, only when applied in flooding areas. On Mahé, however, many areas are not flood prone. Therefore, it is not justifiable to rate all households which are not elevated by posts/high ground to avoid flooding as more vulnerable. What would be needed is a combination of two indicators; the first assessing whether a household lives in a risk zone and the second assessing whether a household has protective infrastructure if living in a risk zone. However, no detailed and up-to-date risk zone mapping exists. Consequently, I selected a subjective indicator assessing the perception of the household head. Households which, based on the opinion of the household head, are likely to be damaged by flooding or landslides are considered as less resilient. As such, this indicator combines whether a household lives in an exposed area and whether the house has protective infrastructure (e.g. retaining wall for landslides).

Household security

This indicator assesses the extent to which a house is secured. I consider a well secured house as a factor which increases the likelihood of being resilient. It increases the ability of the household to withstand disturbances such as burglary and theft. Household Nr. 1 stressed in the household situation interview that there have been incidents of break-ins in the neighbourhood. However, their house has never been affected so far. They attribute it to the burglar bars and dogs they have as a means of protection. This shows the importance of such protective measures in the context of Seychelles. The importance of security for household resilience has also been stressed in the weighting workshop.

Water tank

This indicator assesses whether a household is endowed with a rainwater or drinking water tank. I consider having water tanks as a factor which increases the likelihood of being resilient. Seychelles has limited fresh water supply leading to water supply restrictions during dry seasons (FAO & GoS, 2014; GoS, 2013a). In times of water restriction, households do not have access to water for several hours per day which leads to an additional burden to the household's daily life. Houses with drinking water tanks can bridge over these hours without any restriction (key informant Nr. 11). A drinking water tank can also back-up any water supply shortcut caused by other reasons (key informant Nr. 11). Key informant Nr. 3 confirmed that it is encouraged that households have some drinking water storage, especially in dry season. Furthermore, households with rain-water tanks are able to reduce

their drinking water consumption. Henly-Shepard et al. (2015) mentioned that ownership or access to water supplies positively influences the coping capacity of a household in the face of a disaster by providing water to enable survival. In the HBS in 2013, around 45% of the households indicated to have a water storage tank. The survey question didn't differentiate between drinking water tank and rainwater tank (NBS, 2013).

Ownership of vehicle

This indicator describes whether a household owns a motorized vehicle. I consider owning a vehicle as a factor which increases the likelihood of being resilient. It is extremely valuable to have a vehicle on Mahé. The bus system is well developed. However, the buses don't drive in the evenings, and on the weekends the service is irregular. Furthermore, given the hilly landscape of Mahé, houses are often constructed far away from the main roads and bus stops. Sometimes, the nearest bus station is more than 15 minutes' foot walk from the house. Therefore, having a vehicle largely increases flexibility and facilitates many activities. It can, therefore, be a valuable support in times of hardship.

Table 8 Indicator-set of the dimension *Household's infrastructure*

Indicator	Justification
Tenure	Owning a dwelling secures having a shelter
House construction-type	A solidly built house better withstands possible threats such as cyclones and falling branches or trees
State of repair	Good state of repair increases the capacity to withstand certain disturbances such as cyclones or falling branches or tress. Leaking roofs can cause daily stress which can reduce the ability to cope with additional disturbances
Likelihood of damage from heavy rain	Indicates reduced capacity to withstand damage from heavy rain
Household security	Increases the ability of the household to withstand disturbances such as burglary and theft
Water tank	Enables bridging over water restrictions, can back-up water supply shortcut
Ownership of vehicle	Increases flexibility and facilitates many activities, can, therefore, be a valuable support in times of hardship
Paved road access	Enables fast emergency health-care, enables people with certain health issues to move around, facilitates daily life activities such as transporting food to the house

Paved road access

This indicator describes whether a household is accessible by a paved road and if not, how far away the next road access is. I consider access to a paved road as a factor which increases the likelihood of being resilient. Many houses on Mahé are not accessible by a paved road. As stated by key informant Nr. 8, this can cause major logistic problems when household members suffer from sickness or handicap. For example, household members who suffer from arthrosis, a common condition among older people, will experience major difficulties to leave the house if the next road is far away. People who have a stroke, which is another long lasting invalidating condition that is fairly commonly found in Seychelles, must be carried with the help of others up to the next road access, sometimes in steep places. In case of a health-related emergency, it is less likely that the ambulance arrives on time if the

house is not accessible by a paved road. Furthermore, a house located far away from a paved road increases the effort to transport goods like food and furniture to the household which can be an additional burden in times of hardship.

A summary of the indicators of the seventh dimension and its justifications can be found in Table 8.

4.2 Questionnaire and normalisation

As already described in the method section, a questionnaire was developed in order to assess the 44 indicators at the household level. The questionnaire contains 91 questions (see Appendix 10 for the full questionnaire in English and Appendix 11 for the Creole version). Not all of the questions directly collect indicator data. Some of them just deliver additional background information of the household which can be used for data analysis such as the sex of the household head for example. Appendix 9 shows for each indicator in detail, what kind of questions are asked, how the responses to the questions are normalized and for the indicators assessed with more than one question, how the response-scores are aggregated into an indicator score. The questionnaire contains different question types such as forced-choice ordinal scale questions with four choices (mostly from strongly agree to strongly disagree), dichotomous questions with YES/NO choices and nominal questions. To give an insight into the questionnaire and to show the diversity and complexity of it, some of the indicators are explained in detail in this section.

4.2.1 Indicators assessed with one question

26 indicators are measured with one question only. Table 9 shows three examples. The numbers in brackets indicate the question numbers in the questionnaire. The indicator *income fluctuation* is assessed using a forced-choice ordinal scale question with four choices. For this thesis, I assume that the ordinal scale using the choices strongly agree to strongly disagree can be interpreted as an interval scale with fixed intervals. Therefore, the answers are scored accordingly with a score of 0, 0.33, 0.66 and 1 respectively. The indicator *presence of gambling behaviour* is assessed using a dichotomous question. A “yes” answer receives a resilience score of 0 and a “no” answer a score of 1. The *indicator paved road access* is assessed with an ordinal question with four choices. The answers are again scored using fixed intervals.

4.2.2 Indicators assessed with two questions

10 indicators are measured using two questions. Two examples are shown in Table 10. The indicator *earners ratio* needs two questions to collect the necessary information in order to calculate the earners ratio. It is then the ratio which is scored and not the individual answers of the two questions. To the contrary, the two questions of the indicator *water storage* assess two different aspects of the indicator, namely the presence of a drinking water tank and the presence of a rainwater tank. The answer of each question is scored individually and the indicator score is then calculated by averaging the two scores.

Table 9 Examples of indicators measured with one question

Indicator	Question	Answer	Score
Income fluctuation	*(Q81) To what extent do you agree with the following statement regarding your household: "The household income varies a lot between different times in the year"*	Strongly agree, Rather agree, Rather disagree, Strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1
Presence of gambling behaviour	*(Q17) Is there any household member who regularly plays games of chance – let's say more or less every week?*	Yes No	Yes = 0 No = 1
Paved road access	*(Q35) How long does it take for a healthy person to walk from the house/flat to the next road (accessible by a vehicle)?*	<30 seconds 30 – 60 seconds 1 – 2 minutes > 2 minutes	<30 seconds = 1 30 – 60 seconds = 0.66 1 – 2 minutes = 0.33 >2 minutes = 0

Table 10 Examples of indicators measured with two questions

Indicator	Question	Answer	Score
Earners Ratio	*(Q9) How many household members does your household have?*	[Any number above 0]	
	(Q78) From all the household members, how many people do receive a regular income, be it from work, social welfare assistance, remittance, pension, school allowance or others?	[Any number equal or above 0]	
	Calculated total indicator value	[Q78 / Q9]	0 – 0.25 = 0 0.26 – 0.49 = 0.33 0.5 – 0.74 = 0.66 0.75 – 1 = 1
Water storage	*(Q31) Do you have a drinking water tank?*	Yes, No	Yes = 1, No = 0
	(Q32) Do you have a rainwater tank?	Yes, No	Yes = 1, No = 0
	Calculated total indicator score		Average (Score Q31 and Q32)

4.2.3 Indicators assessed by three or more questions

8 indicators are assessed with three or more questions. One example is the indicator savings (see Table 11). Three questions have been developed in order to assess different aspects of savings. The first question assesses the current amount of savings in relation to the current expenses. The second question assesses saving practices and the third question assesses whether the household head has a life assurance. The response to the first question is scored with fixed intervals. The answer to the second question however not. This was decided since I felt that the difference between the second and the third option of the second question is larger than 0.33 points. The overall indicator score is calculated by averaging the scores of the three questions. However, the score of the first question is

Table 11 Examples of indicators assessed with three or more questions

Indicator	Question	Answer	Score
Savings (including life assurance)	(Q84) *Imagine you lose all your sources of income for example by losing your job. For how many months would you be able to cover your expenses with your own cash savings without reducing the expenses?*	[Any number equal or above 0]	0-1 months = 0 2-3 months = 0.33 4-5 months = 0.66 6 or more months = 1
	(Q85) Which of the *following statement best describes your situation in regards to saving practices? Please note that we are not considering life assurances and pension payments as savings in this question.*	- I'm usually not able to make any savings - I'm sometimes able to make some savings but I normally use it in the same year - I'm able to make some savings on a regular basis. I have more savings today than one year ago. - I have enough savings to feel secure and ready for most eventualities	- I'm usually not able to make any savings = 0 - I'm sometimes able to make some savings but I normally use it in the same year = 0.33 - I'm able to make some savings on a regular basis. I have more savings today than one year ago = 0.8 - I have enough savings to feel secure and ready for most eventualities = 1
	(Q86) Do you have *a life assurance?*	Yes, No	Yes = 1, No = 0
	Calculated total indicator score		(2 x score Q84 + score Q85 + score Q86) / 4
Physical Health	*(Q9) How* many *household members does your household have?*	[Any number above 0]	
	(Q48) How many household members *have a poor or very poor health, if any?*	[Any number equal or above 0]	
	Calculated "poor health" sub-indicator value	[Q48/ Q9]	0-0.2 = 1, 0.21-0.4 = 0.66, 0.41-0.6 = 0.33, 0.61- 1= 0
	(Q9) How many household members does your household have?	[Any number above 0]	
	(Q49) *How many people in your household are suffering from at least one chronic disease like stroke, cancer, diabetes, obesity, hypertension, arthritis etc.?*	[Any number equal or above 0]	
	Calculated "chronic disease" sub-indicator value	[Q49/ Q9]	0-0.2 = 1, 0.21-0.4 = 0.66, 0.41-0.6 = 0.33, 0.61- 1= 0
	(Q9) How many household members *does your household have?*	[Any number above 0]	
	(Q50) *How many people in your household need intensive home-care, if any?*	[Any number equal or above 0]	
	Calculated "home-care" sub-indicator value	[Q50/Q9]	0-0.2 = 1, 0.21-0.4 = 0.66 0.41-0.6 = 0.33, 0.61- 1= 0
	Calculated total indicator score		Average (score sub-indicator "poor health", "chronic disease and "home-care")

counted double. I introduced this double counting based on the results of the example case Nr. 4 (see below). That household had savings for 3-4 years but no life assurance and chose the third option of question 85 ("I'm able to make some savings on a regular basis. I have more savings today than one year ago question") with the explanation that you can never have enough savings. With equal weighting of the three questions, the household would have received a total score of a bit more than 0.5 in the savings indicator even though it has plenty of savings. Thus, I adjusted the scoring. With the current scoring, the mentioned example case gets a score of slightly above 0.7 which is still not very high given the amount of savings the household has. Due to fact that life assurance is assessed individually with a Yes/No question, the yes answer being scored with the score 1, the aspect of life assurances still has a large influence on the total indicator score.

A second example of an indicator which is assessed by more than two questions is the *physical health* indicator which is composed by three sub indicators. The first sub-indicator describes the ratio of household members with a poor health state to the total number of household members. The second sub-indicator assesses the ratio of household members suffering from a chronic disease to the total number of household members. The third sub-indicator describes the ratio of household members needing intensive home care to the total number of household members. The first sub-indicator has been introduced to cover all kind of health issues. Due to the restriction in the number of questions, it was not possible to assess all different possible health issues a household could experience. Therefore, this pragmatic question was selected to get an idea of the health situation of a household. The second sub-indicator focusing on chronic diseases has been selected because, based on key informant Nr. 8, chronic diseases are common in the Seychelles (e.g. stroke, diabetes) and can typically cause severe medical complications for those affected. In addition, they typically have and important social and financial impact on the household members. The third sub-indicator has been selected because people who need home care may be a large burden for the household. The total indicator score for *physical health* is calculated by averaging the three sub-indicator scores.

4.3 Weighting

As described in the methodology section, the indicators and dimensions of the composite indicator have been weighted based on three approaches. The first approach *equal weights of all the indicators in the composite indicator* (in this thesis abbreviated with EIN) assigned equal weights to all the indicators for the calculation of the composite indicator score. *The second approach equal weights of all the dimensions and indicators* (abbreviated with EDI) assigned equal weights to all the indicators of a dimension for the calculation of the dimension score and equal weights to all the dimensions for the calculation of the composite indicator score. The third approach *expert weights for the indicators* (abbreviated with EXP) was to assign weights to all indicators for the calculation of the composite indicator score based on expert opinions (rating approach) and to calculate the dimension weight based on the weights of the containing indicators. The experts had to rate each indicator on a scale from 0 to 10 (for more details see method section).

This section first shows the results from the expert workshop and then compares the weights from the different weighting approaches.

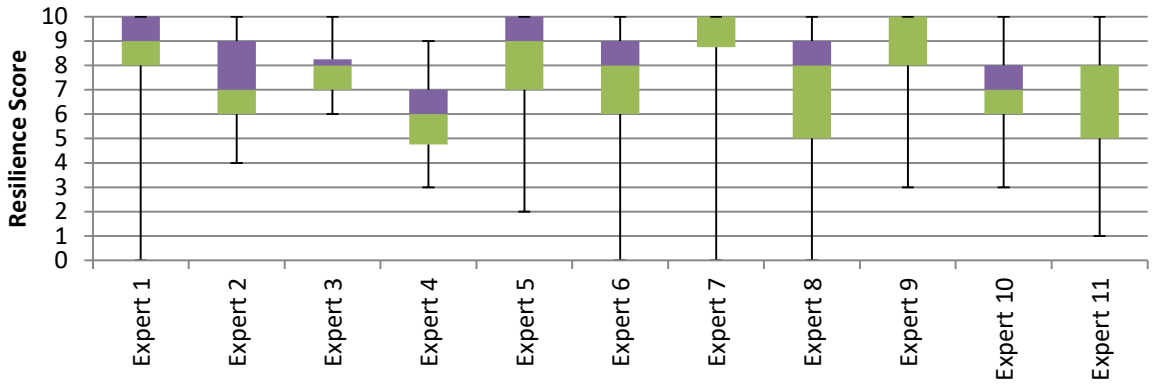

Figure 4 Scoring distribution for each of the experts of the weighting workshop for the 44 indicators. The lower whisker indicates the range of the lowest 25% of the scores, the green box the range of the second lowest 25% of the scores, the purple box the second highest 25% of the scores and the upper whisker the highest 25% of the scores

The rating pattern of the different experts in the weighting workshop can be seen in Figure 4 (see Appendix 7 for full list of all the expert rates for each indicator). The upper whisker in the boxplot of expert 1 merges with the third quartile since expert 1 assigned the score 10 to 21 indicators which is almost 50% of the indicators. Therefore both, the third quartile and the maximum score (which indicates the upper end of the upper whisker) have the value 10. This is also the case for expert 5. Expert 7 and 9 assigned the score 10 to more than 50% of the indicators. Thus, the median, the third quartile and the maximum value all have the score 10 which explains why no purple box is visible. In the boxplot of the expert 11, the purple box disappears because both, the median and the third quartile have the value 8.

Three issues become visible when looking at Figure 4: (i) It becomes visible that most of the experts scored the indicators in a rather narrow range. Expert 1, for example, assigned 75% of all the indicators with a score between 8 and 10. (iii) Furthermore, it is notable, that most of the scores are rather high. All of the experts scored at least 75% of the indicators with a score above 4. (iii) It is also visible that the distance between the minimum value and the first Quartile is often larger than the distance between the other neighbouring quartiles (e.g. expert 1, 6, 7 and 8). This can partly be explained with the special meaning of a score of 0. The experts were asked to rate indicators which they think do not influence resilience in the way I assume with a score of 0. To make an example, I consider the presence of a single parent in a household as a factor which decreases resilience. If an expert disagrees with that, he/she should rate this indicator with 0. Expert 1, 7 and 8 each rated one indicator with 0 and expert 6 two. The following five indicators have been rated with a 0 each time by only one expert: *House construction type, income fluctuation, education, presence of gambling behaviour* and *presence of single parents*.

Figure 5 shows for each dimension the average indicator score from each expert. Expert 6, for example, rated the indicators from the dimension *Household's income situation* on average with a score of 5. The figure shows three things: (i) There is a considerable variation in the way different experts rated indicators from a particular dimension. Expert 4, for example, rated the indicators from the dimension *Household's infrastructure* on average with a score of 4.38, whereas expert 7 rated them on average with a score of 8.88. (ii) Different experts seemed to apply different weighting strategies.

Expert 1, for example, rated most of the indicators rather high, whereas expert 4 rated most of them rather low. (iii) Not all of the experts valued the indicators from the same dimension highest. Expert 10, for example, rated the indicators from the dimension *Household's health situation* highest, expert 5 the ones from the dimension *Household's money management*, and expert 6 the ones from the dimension *Household's family situation.*

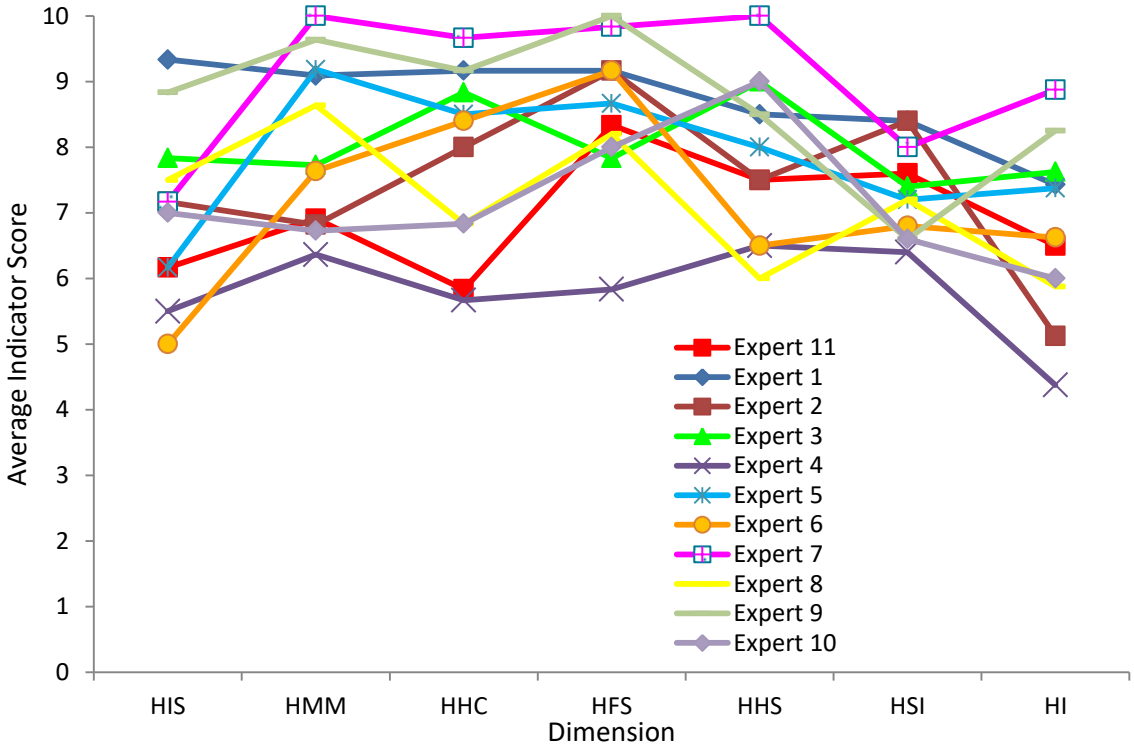

Figure 5 Average indicator score per expert and dimension. HIS = Household's income situation, HMM = Household's money management, HHC = Household's head characteristics, HFS = Household's family situation, HHS = Household's health situation, HSI = Household's social interaction, HI = Household's infrastructure

The expert-scores of the indicators were finally used to calculate the relative weight of each indicator as explained in the method section. Table 12 shows these weights and also the indicator and dimension weights for the other two weighting approaches (EIN & EDI). The relative indicator weights from the column *Relative weight for composite indicator* can be used to directly calculate the composite indicator score based on the indicator scores. However, when the dimension scores should be calculated, the indicator weights from the column *relative weights for composite indicator* have to be transformed into relative indicator weights for the calculation of the dimension scores. These weights are shown in the column *Relative weight for dimension*. The dimension weights shown in the column *Dimension weight* can be used to calculate the composite indicator score based on the dimension scores.

Looking at Table 12 it becomes apparent that the contribution of each indicator to the composite indicator is rather small due to the large set of indicators. For the expert-based approach, the indicator weights fluctuate between 1.6% and 2.8%, for the EIN-approach, each indicator received the

weight of 2.3% and in the EDI-approach the indicator weights ranged from 1.3% - 7.1% with only two indicators (physical health and mental health) having a weight above 2.9%. The weights of the individual indicators only change moderately when changing the weighting approach. Exceptions are again the two indicators *physical health* and *mental health.* Their weights fluctuate between 2.3% and 7.1% depending on the weighting approach. The high weights (7.1%) of the two health indicators in the EDI-approach can be explained by the dimension size. In the EDI-approach, each dimension receives the same weight (14.3%). The weight of each indicator in a dimension is then calculated based on the dimension weight divided by the number of indicators in the dimension. The dimension *Household's health situation* only contains two indicators. Therefore, these two indicators receive high weights. At the other extreme, the dimension *Household's money management* contains 11 indicators; consequently, these indicators receive small weights (1.3%).

When looking at the relative weights of the indicators for the calculation of the dimension scores it becomes apparent that the EIN and EDI-approach assign the same weights to the indicators by just dividing 100% by the number of indicators in a dimension. The relative weights of the indicators for the calculation of the dimension score in the EXP-approach differ only slightly from the ones from the EIN and EDI approach.

The dimension weights, however, change considerably based on the selected weighting approach. The dimension *Household's money management,* for example, receives the weight of 26.4% in the EXP-approach, but only 14.3% in the EDI-approach. The *Household's health situation* on the other side receives only 4.8% in the EXP-approach, but 14.3% in the EDI-approach. Since most of the indicators have rather similar weights, the dimension weight in the EXP and EIN-approach becomes largely a function of the dimension size. The largest dimension *Household's money management* receives the highest weight in both approaches, whereas the smallest dimension *Household's health situation* in both approaches receive the lowest weight.

In conclusion, the contribution of each indicator to the composite indicator is small. Furthermore, the three different weighting approaches resulted in rather similar indicator weights but yielded rather different dimension weights. Finally, it became visible that the dimension size has an influence on the weights of the indicators (in the EDI approach) and on the dimension weights itself (in the EXP and EIN approach).

Table 12 Indicator and dimension weights for the calculation of the composite indicator

Di-mension	Indicator	Relative weight for composite indicator			Relative weight for dimension			Dimension weight		
		EXP	EIN	EDI	EXP	EIN	EDI	EXP	EIN	EDI
HIS	Average monthly net income per capita	2.4%	2.3%	2.4%	19.0%	16.7%	16.7%	12.7%	13.6%	14.3%
	Number of income sources	1.9%	2.3%	2.4%	14.9%	16.7%	16.7%			
	Earners ratio	2.0%	2.3%	2.4%	16.2%	16.7%	16.7%			
	Income fluctuation	2.1%	2.3%	2.4%	16.8%	16.7%	16.7%			
	Home-Gardening	2.0%	2.3%	2.4%	15.8%	16.7%	16.7%			
	Dependency on social welfare assistance	2.2%	2.3%	2.4%	17.3%	16.7%	16.7%			
HMM	Debt-Burden	2.6%	2.3%	1.3%	9.7%	9.1%	9.1%	26.4%	25.0%	14.3%
	Savings (including life assurance)	2.3%	2.3%	1.3%	8.9%	9.1%	9.1%			
	Smoking (Tobacco)	2.1%	2.3%	1.3%	8.0%	9.1%	9.1%			
	Presence of gambling behaviour	2.1%	2.3%	1.3%	7.9%	9.1%	9.1%			
	Alcohol abuse	2.7%	2.3%	1.3%	10.4%	9.1%	9.1%			
	Drug abuse	2.8%	2.3%	1.3%	10.6%	9.1%	9.1%			
	Frequent spending on services of sex workers	2.4%	2.3%	1.3%	9.1%	9.1%	9.1%			
	Budgeting	2.6%	2.3%	1.3%	9.7%	9.1%	9.1%			
	Prioritising expenditures towards lifestyle	2.3%	2.3%	1.3%	8.9%	9.1%	9.1%			
	House insurance	2.3%	2.3%	1.3%	8.8%	9.1%	9.1%			
	Household content insurance	2.1%	2.3%	1.3%	8.1%	9.1%	9.1%			
HHC	Education	1.9%	2.3%	2.4%	13.5%	16.7%	16.7%	14.0%	13.6%	14.3%
	Sense of self-responsibility	2.6%	2.3%	2.4%	18.7%	16.7%	16.7%			
	Experienced stress & stress management	2.3%	2.3%	2.4%	16.6%	16.7%	16.7%			
	Attitude towards difficulties in life	2.6%	2.3%	2.4%	18.9%	16.7%	16.7%			
	Faith and spiritual fears	2.3%	2.3%	2.4%	16.6%	16.7%	16.7%			
	Long-Term Vision	2.2%	2.3%	2.4%	15.8%	16.7%	16.7%			

HFS	Shared expenses and responsibilities	2.3%	2.3%	2.4%	15.4%	16.7%	16.7%	15.2%	13.6%	14.3%
	Household communication	2.7%	2.3%	2.4%	18.0%	16.7%	16.7%			
	Household support	2.6%	2.3%	2.4%	17.4%	16.7%	16.7%			
	Respect and trust among the household members	2.6%	2.3%	2.4%	16.9%	16.7%	16.7%			
	Presence of single parents	2.3%	2.3%	2.4%	15.1%	16.7%	16.7%			
	Leadership	2.6%	2.3%	2.4%	17.2%	16.7%	16.7%			
HHS	Physical Health	2.3%	2.3%	7.1%	48.9%	50.0%	50.0%	4.8%	4.5%	14.3%
	Mental Health	2.4%	2.3%	7.1%	51.1%	50.0%	50.0%			
HSI	Financial social support	2.3%	2.3%	2.9%	20.6%	20.0%	20.0%	11.0%	11.4%	14.3%
	Moral social support	2.3%	2.3%	2.9%	20.8%	20.0%	20.0%			
	Neighbourhood situation (Cooperation and security)	2.6%	2.3%	2.9%	23.3%	20.0%	20.0%			
	Distance to supportive family members	1.9%	2.3%	2.9%	16.9%	20.0%	20.0%			
	Perceived political victimisation	2.0%	2.3%	2.9%	18.4%	20.0%	20.0%			
HI	Tenure	1.9%	2.3%	1.8%	12.0%	12.5%	12.5%	16.0%	18.2%	14.3%
	House Construction-Type	1.7%	2.3%	1.8%	10.6%	12.5%	12.5%			
	State of repair	2.3%	2.3%	1.8%	14.5%	12.5%	12.5%			
	Likelihood of damage from heavy rain	2.5%	2.3%	1.8%	15.4%	12.5%	12.5%			
	Household security	2.2%	2.3%	1.8%	13.5%	12.5%	12.5%			
	Water tank	2.0%	2.3%	1.8%	12.5%	12.5%	12.5%			
	Ownership of vehicle	1.6%	2.3%	1.8%	10.1%	12.5%	12.5%			
	Paved road access	1.8%	2.3%	1.8%	11.5%	12.5%	12.5%			
	Total	100%	100%	100%				100%	100%	100%

HIS = Household's income situation, HMM = Household's money management, HHC = Household's head characteristics, HFS = Household's family situation, HHS = Household's health situation, HIS = Household's social interaction, HI = Household's infrastructure, EXP = Weighting approach, where all the relative weights of the indicators for the composite indicator calculation are derived from an expert workshop. EIN = Weighting approach, where all the indicators receive equal weights for the calculation of the composite indicator. EDI = Weighting approach, where all the dimensions receive equal weights for the calculation of the composite indicator

4.4 Example cases

As already indicated, the composite indicator framework was applied to four example cases in order to test and demonstrate its use. The households were interviewed with the developed questionnaire. The data was used to calculate the indicator, dimension and composite indicator scores with all the three different weighting approaches. The results are shown in this section. To get a feeling of how the indicator information is transformed into a dimension score, two example cases are described in detail: The households are characterized dimensions-wise using the indicator information and the resulting dimension scores are shown. Finally, the dimension and composite indicator scores of all the four example cases are compared with each other using a radar chart[11].

4.4.1 Example case Nr. 1

This household is composed by seven people from three generations.

Household's income situation: The household head stated that five people receive a regular income from a total of eight different income sources with little fluctuation. The household head was not able to state the average monthly net income of the household. Thus, I made an estimation based on the information from the interview. In my estimation the average net income per household member exceeds 6000 SCR per month. Home-gardening does not largely contribute to the food supply of the household. *(Resilience-Score of 0.78,* see Table 13).

Household's money management: According to the interviewee, none of the household members regularly smokes, plays games of chance, uses the services of sex-workers or is a victim of alcohol or drug abuse. The household does not depend on social welfare assistance, does practice budgeting and save. The savings of the household head would last 3 to 4 years when it would be needed to cover daily expenses. The household, furthermore, insures its house and the household content. *(Resilience-Score of 0.97)*

Household head characteristics: Based on the interview, the household head has a rather positive attitude towards difficulties in life, a good sense of self-responsibility, visions for the future and a strong faith. He experiences moderate stress and knows efficient practices to release stress. *(Resilience-Score of 0.82-0.83)*

Household's family situation: According to the household head, the relationship between the household members is good: Responsibilities and expenses are shared in a fair way, there is integrative and honest communication and the household members support each other. There are very few arguments and the household members mostly trust each other. *(Resilience-Score of 0.97)*

Household's health situation: The health situation of the household members is rather good. The household head stated that three household members have hypertension and one household mem-

[11] The resilience scores of all the individual indicators of each example case can be seen in Appendix 8

ber is in psychotherapy. None of the household members has a poor health and no one needs homecare. *(Resilience-Score of 0.89)*

Household's social interaction: The household has a good social network. According to the interviewee, the household would be economically and morally supported from its social network if needed and live in a safe and rather supportive neighbourhood. *(Resilience-Score of 0.86)*

Household's infrastructure: The house made out of bricks/stones is fully owned by the family and in very good condition. It is equipped with a drinking water tank and a rain water tank, protected by burglar bars and accessible by a road. The household members, furthermore, own several cars. *(Resilience-Score of 0.93-0.94)*

Summary: The composite indicator score of the household ranges from 0.89 to 0.91 depending on the selected weighting method (EXP, EIN or EDI) as seen in Table 13. The dimension scores do not change considerable by changing the weighting method. The dimension *Household's income situation* receives the lowest score (0.78) due to very little home gardening (resilience score of 0.33), some income fluctuation (resilience score of 0.66) and due to a resilience score of 0.66 in the earners ratio (see Appendix 8 for all the indicator scores). The dimension *Household's family situation* receives the highest score (0.97).

Table 13 Summary of the resilience scores for the example cases based on three weighting approaches

Dimension	Case 1 scores			Case 2 scores			Case 3 scores			Case 4 scores		
	EXP	EIN	EDI	EXP	EIN	EDI	EXP	EIN	EDI	EXP	EIN	EDI
HH's income situation	0.78	0.78	0.78	0.71	0.72	0.72	0.56	0.55	0.55	0.61	0.61	0.61
HH's money management	0.97	0.97	0.97	0.48	0.46	0.46	0.46	0.45	0.45	0.62	0.61	0.61
HH head characteristics	0.83	0.82	0.82	0.61	0.60	0.60	0.59	0.57	0.57	0.59	0.57	0.57
HH's family situation	0.97	0.97	0.97	0.76	0.75	0.75	0.90	0.91	0.91	0.60	0.60	0.60
HH's health situation	0.89	0.89	0.89	0.89	0.89	0.89	1.00	1.00	1.00	0.38	0.39	0.39
HH's social interaction	0.86	0.86	0.86	0.50	0.50	0.50	0.79	0.80	0.80	0.60	0.63	0.63
HH's infrastructure	0.93	0.94	0.94	0.60	0.59	0.59	0.44	0.41	0.41	0.60	0.60	0.60
Composite Indicator Score	0.91	0.90	0.89	0.61	0.60	0.64	0.62	0.60	0.67	0.59	0.59	0.57

HH = Household, EXP = Weighting approach, where all the relative weights of the indicators for the composite indicator calculation are derived from an expert workshop. EIN = Weighting approach, where all the indicators receive equal weights for the calculation of the composite indicator. EDI = Weighting approach, where all the dimensions receive equal weights for the calculation of the composite indicator.

4.4.2 Example case Nr. 2

This household is composed by 9 people from 4 generations.

Household's income situation: The income situation of the household is rather good. According to the interviewee, 7 household members receive a regular income without considerably fluctuation. The household does not depend on social welfare assistance. They do little home-gardening. According to the household head, the household could be more advanced based on the income situation,

but somehow the money is not wisely spent. The household head was not able to indicate the average monthly net income of the household. Therefore, in order to calculate the resilience score for this indicator, I had to make an estimation on my own. *(Resilience-Score of 0.71-0.72)*

Household's money management: Based on the household head, some of the household members regularly smoke. At least one of the household members regularly plays games of chance and one of the household members is a victim of alcohol abuse. Current debts are a burden for the household. The household head is able to make some savings but normally uses it in the same year. His savings would only last for 3 months when they would be used to cover daily expenses. *(Resilience score of 0.46-0.48)*

Household head characteristics: The household head is fairly educated (obligatory school completed), faithful with a rather positive attitude towards difficulties in life. However, the household head also fears evil forces and thinks that the household strongly has been affected by evil spirits in the past. Therefore, he indicated a stress level of 5 on a scale from 0 to 10. *(Resilience score of 0.6-0.61)*

Household's family situation: The relationship between the household members is rather good. According to the interview, responsibilities and expenses are shared in a fair way, important decisions are discussed together, household members support and trust each other and feelings are expressed rather freely. There are quite a lot of arguments in the household but the household head does not consider it as a problem since he thinks that these disputes are needed in order to build consensus. Physical violence sometimes occurs during arguments. One of the household members is a single parent. *(Resilience score of 0.75-0.76)*

Household's health situation: There are some health issues in the household. 5 people suffer from a chronic disease (hypertension) and one household member needs intensive home-care. Nevertheless, the household head stated that none of the household members has a poor health. One person has a mental disorder. The person is either in psychotherapy nor unable to work due to the mental disorder. *(Resilience score of 0.89)*

Household's social interaction: In terms of social networks, the household could count on moral support from its network if needed, but getting financial support would be very difficult. The household does not live in close distance to supportive family members. The neighbourhood is supportive but not very safe. *(Resilience score of 0.5)*

Household's infrastructure: The house is owned by the family but mortgaged. It is accessible by road, partly built by stones/bricks and partly by corrugated iron sheets. It is insured and simply furnished. The household owns some dogs as protective measures. No water tanks are installed and none of the household members own a motorized vehicle. (*Resilience score of 0.59-0.6*)

Summary: The composite indicator score ranges from 0.6 to 0.64 depending on the weighting approach (Table 13). The weighting method EDI yields the highest composite indicator score. This can be explained partly by the fact that this household has a rather low score in the dimension *Household's money management* (0.46-0.48) and a high score in the dimension *Household's health* situation (0.89). In the EDI approach, the dimension *Household's health* situation receives a considerably larger weight than in the other two approaches (14.3% instead of 4.5% or 4.8%), whereas the dimen-

sion *Household's money management* receives a considerably smaller weight (14.3% instead of 25% or 26.4%). The dimension scores do not change considerable by changing the weighting methods.

4.4.3 Comparing the example cases

A radar chart is a useful tool to illustrate results from composite indicator frameworks and often used for that purpose (for example Bolte et al., 2016; Shaw et al., 2010). It allows drawing a multidimensional graphical profile of a study unit (in this case a household) and can, for example, be used to compare different units. Figure 6 shows the dimension scores of the 4 example cases using the EXP-weighting approach in a radar chart. Each spoke represents one of the dimensions of the composite indicator framework. The centre of the radar represents a resilience score of 0 and the outer end of each spoke a score of 1. For each case, a so called "star" is drawn by connecting the resilience scores of the individual dimensions on each spoke with each other. The radar chart easily allows comparing the scores of the different cases in the different dimensions. It is visible, for example, that example case 1 ranks best in most of the dimensions. Example case 4, furthermore, drops in the dimension *Household's health situation* and in the *Household's family situation*. Besides that, example cases 2, 3 and 4 have rather similar scores in the other dimensions. However, the radar chart could not only be used to compare different households but also to show the development of a household over time. Different stars in the chart would then represent different survey-dates of the same household (e.g. year 2016 and year 2017) allowing to illustrate change over time.

So far, I always spoke about households. But it is worth mentioning that with the composite indicator framework from this study, it is also be possible to average the dimension scores and composite indicator scores of all the households of a certain household type or of a district and then compare these different household types / districts with each other. This could also be graphically illustrated with a radar chart, with each star representing one household type / district. Furthermore, when comparing districts, thresholds could be defined and the district results could be mapped. The mapping could be done for each dimension individually or just for the total composite indicator score.

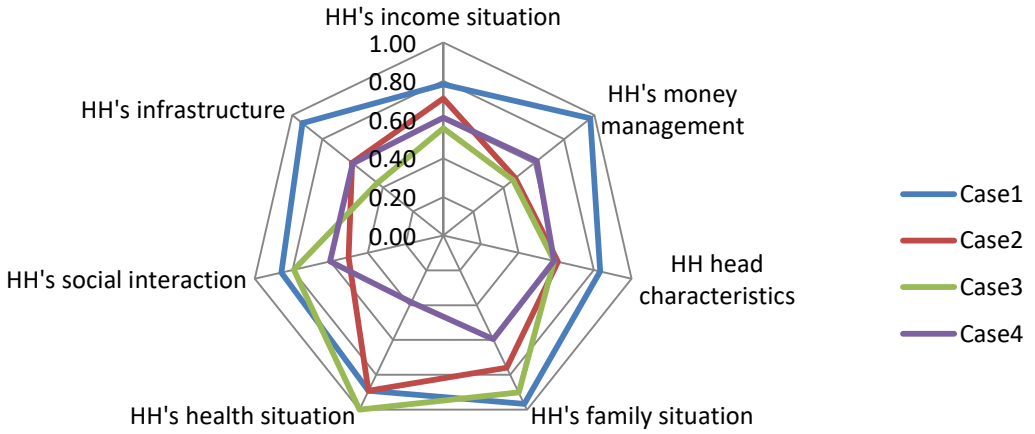

Figure 6 Radar chart showing the resilience scores of each example case for the seven dimensions of the composite indicator framework. HH = Household

5 Discussion

This thesis aimed to develop a composite indicator framework for general household resilience on Mahé, Seychelles. The following four research questions guided the project:

- Which indicators are suitable to describe general resilience of households on Mahé?
- How can the indicators be assessed at household level?
- How should the indicators be organized and weighted into a composite indicator for general household resilience?
- Is the developed composite indicator framework applicable?

This section aims to discuss (i) the results and limitations of the thesis along the four research questions and (ii) how the next steps could look like, both for the international resilience research and for the practical use of the composite indicator on Mahé.

5.1 Discussion of results and limitations

5.1.1 Research question 1

> *"Which indicators are suitable to describe general household resilience on Mahé?"*

This section aims to discuss to what extent the first research question has been answered. First, the indicator set is characterized and second, the selection process of the indicators is reflected. Finally, a conclusion is drawn.

Type of indicators

The study identified 44 indicators which can be used to describe general household resilience on Mahé. These indicators describe different thematic aspects of a household and, therefore, can be seen as a multidimensional set. Some of the indicators cover economic aspects, for example the debt-burden or the saving situation of a household. Other indicators describe the characteristics of the household members such as their attitude towards difficulties in life, their sense of self-responsibility and their faith. Another group of indicators cover the relationship among the household members like the level of respect, trust and support among the household members. Two other fields which have been shown to be important for household resilience are the health state of the household members and a household's social network. Therefore, some of the indicators cover these aspects. The last set of indicators describes infrastructure related aspects of a household. All these aspects have been shown to be of relevance for household resilience.

This multidimensional nature of the indicator set is a strength of the proposed composite indicator since it is important to integrate the multidimensional nature of the resilience concept into resilience frameworks (Béné, 2013). Most current tools to measure resilience do not do so (*ibid*).

The indicator set proposed in this thesis contains indicators which highlight positive aspects of a household (e.g. savings) but also indicators which describe weaknesses of a household (e.g. alcohol abuse). This is in contradiction with what I stated in the conceptual background section: I claimed that the concept of resilience, compared to the concept of vulnerability, stresses positive sides of a system instead of pointing at weaknesses. The proposed composite indicator framework, yet, reveals that it is important to look at both, strength and weaknesses of a household in order to increase resilience. Resilience increasing factors have to be promoted and resilience decreasing factors to be reduced.

Most of the selected indicators are crosscutting indicators – indicators which influence household resilience to a wide range of disturbances. This was intended since I consider them suitable for the description of general household resilience. However, the indicator set also contains a few rather specific indicators (e.g. water tank) which are not of importance for most disturbances. As argued in the conceptual background section, the incorporation of such specific indicators into a framework which aims to describe general household resilience is justified, as long as they influence resilience to common and important disturbances. Water restriction, for example, is a common disturbance in the context of Mahé (AWF, 2008). Thus, the incorporation of the specific indicator *water tank* is justified.

Selection process

In principle, the methodology applied for the selection process of the indicators meet international recommendations: First, local knowledge has been considered as recommended (e.g. ProVention, 2006; USAID et al., 2014). Second, the selection of each indicator is explained and justified. This contributes to the transparency of the developing process which is of special importance (OECD, 2008). Most of the published resilience and vulnerability composite indicator frameworks do not give explanation for their indicator selection (e.g. Choptiany et al., 2015; Maleksaeidi et al., 2015; Murphy & Scott, 2014) which makes it difficult to evaluate their indicator-set.

Nevertheless, the selection process also faced some limitations: (i) It was elaborated in the conceptual background section that it is important to select indicators which have the same influence on all kind of households. However, this aspect could not be investigated in this thesis. It, therefore, had to be assumed, that all the selected indicators have the same impact on all kind of households. Further studies could test, whether this assumption is true.

(ii) The quality of justification for the selection of each indicator varies among the indicators. In principal, there is some clear evidence that at least some of them very well reflect aspects which influence a household's ability to deal with disturbances. The weighting workshop, for example, indicated that the experts mostly agree that the selected indicators influence resilience in the way it was assumed in this thesis. Only five indicators were rated with a score of 0 (which means disagreement) by only one expert each. Nevertheless, some of the selected indicators are less well justified then others and their influence on resilience could be discussed controversially (for example the indicators *ten-*

ure, *smoking* and *frequent spending on services of sex workers*). Consequently, the proposed indicator set can be seen as a set of hypothesis that should be tested and refined in future research.

Overall, it can be concluded that the first research question has been successfully answered. The thesis presents an indicator set which seems to be suitable for the description of general household resilience on Mahé. Since a few indicators might still be controversial, the indicator set can be seen as a set of hypothesis that should be tested and refined in future research. The proposed indicator set has a desired multidimensional nature covering a wide range of different aspects of a household which makes it unique. It mostly contains crosscutting indicators. However, a few specific indicators which are important for common disturbances have also been included. The thesis successfully incorporated local knowledge in the indicator selection process as recommended in literature and the explanation and justification of the selection of each indicator positively distinguishes the thesis from other resilience composite indicator documents.

5.1.2 Research question 2

"How can the indicators be measured at household level?"

This research question has been answered by developing a questionnaire with 91 items for the measurement of the indicators at household level. Furthermore, a method by which the survey data can be normalized in order to derive a resilience score for each of the indicators was elaborated. The questionnaire is discussed in the first part of this section and the normalization scheme in the second part.

Questionnaire

The questionnaire has successfully been pre-tested and proved to be applicable. The questions have been well understood by the respondents, with two exceptions: First, Q79[12] was difficult to understand for both, the interviewer as well as the respondents and, therefore, might have to be modified or replaced for future surveys. Second, the forced choice question type which confronts the respondent with a statement to which he/she has to strongly agree, rather agree, rather disagree or strongly disagree, has shown to be challenging. Even though the respondents were provided with a Showcard which listed the four choices, they were tempted to answer with "yes" or "no". Consequently, it often needed some additional effort from the interviewer to yield a correct answer. According to the Deputy CEO of NBS, Helena De Letourdis, some contribution to this difficulty can be attributed to the fact that Seychellois are not often interviewed using this question type (personal communication, February 2, 2017). It can, therefore, be assumed that this difficulty vanishes as soon as the households get used it.

[12] (Q79) "How many monthly income sources does your household have?" (E.g. employment, social welfare, pension, remittance, etc.)

Besides these two difficulties, five additional aspects, which might be considered when using the questionnaire, became apparent during the pre-testing:

(i) Even though the questionnaire was designed to interview the household head, it is recommended that other household members also participate in the interview. The members can discuss certain questions together and then give the answer which best represents the household. Such an approach would prolong the interview but could be of valuable use due to the following two reasons: First, the opinion regarding a household topic might differ between different household members. Only considering the opinion of the household head thus might lead to wrong conclusions. This can, for example, be the case for the questions in the dimension *Household's family* situation such as question 40: *To what extent do you agree with the following statement regarding your household: "In your household, the household members express their feelings freely."* Additionally, the household head might not always have the necessary information about the whole household which could lead to missing values in the survey data. This has become apparent for the indicator *average monthly net income per capita*. In the example cases, two out of the four household heads were not able to state the total monthly net income of the household. The other two had to make estimations.

(ii) The language situation in the Seychelles needs special consideration. It is common practice to develop an English and a Creole version of the questionnaire. The interviewers mostly use the Creole version to conduct the interview but fill in the responses into the English version. I observed in the pilot testing that some of the interviewers read the English question and then rephrased it in Creole to the respondent instead of reading out loud the Creole version. Thereby the meaning of the question sometimes changed. Therefore, it would be strongly advised to always read the questions from the Creole version when the interview is conducted in Creole.

(iii) Many questions are very personal. The interviewers, therefore, need an adequate level of empathy. For one of the example cases, the interview was a very welcome opportunity to talk with someone about the problems the household is facing. In such situations, the interviewers need to find a good balance between the need to finish the interview in a reasonable time and the responsibility to listen to this person who might be severely struggling. It could be advisable to inform the interviewers about the social institutions in the country so that they can refer a household in need to a specific institution if necessary.

(iv) The purpose of the survey should be well explained to the respondent. Key informant Nr. 5 stated that people in Seychelles do not really trust people coming to their home and asking questions. Consequently, a good publicity and awareness programme with profound explanation of the purpose might facilitate the interview and encourage response.

(v) Given the sensitive nature of some of the questions (e.g. question 21: *Is there any household member who frequently pays for the services of sex workers – let's say more or less every week?*), the occurrence of social desirability bias cannot be ruled out (e.g. Dahlgren & Hansen, 2015; M. K. Jones et al., 2016). The respondents, influenced by the presence of the interviewer, might be tempted to answer in a way they think is socially desirable even though it does not represent the truth. The interviewer should try to be as neutral as possible in order to prevent such biases.

So far I discussed the comprehensibility of the questionnaire and issues which have to be considered when administering it. Another important point to discuss is the fact that the questionnaire is composed by different question types. The presence of different question types is both, a strength and weakness. It is a strength, because it allows monitoring both, objective facts and figures like the presence of single parents, the number of income sources etc. and subjective perceptions such as the perception in regards to political victimisation, the perception in regards to quality of the household communication etc. The consideration of both types of information for resilience measures has been stressed in literature (Béné, 2013).

On the other hand, different question types introduce a bias when it comes to the normalization of the responses. With the used categorical scale approach for normalizing the responses, it is for example "easier" to achieve a high score in a dichotomous question than in a question with more than two options. This can be illustrated with an example: To assess an indicator describing a household's savings, it could, for example, be asked "do you regularly save?" A "yes" would be scored with a 1, which indicates high resilience, and a "no" with a 0, which indicates low resilience. Alternatively, one could ask "how much money do you save per month?" and give, for example, the four choices 0-1000 SCR, 1000-2000 SCR, 2000-3000 SCR and >3000 SCR with scoring the choices with 0, 0.33, 0.66 and 1 respectively. A household which regularly saves 1000 SCR per month would receive a score of 1 in the first version of the question but a score of 0 in the second version. Concluding, since different question types have been used for different indicators in this thesis, the comparability of the scores of the different indicators and dimensions is compromised.

Normalization

As previously illustrated, this thesis proposes a normalization scheme of the survey data using categorical scales (OECD, 2008). In principle, based on the four example cases, the proposed scheme seems to be reasonable. However, one issue could be identified which should be corrected for in future: The normalization of the responses to Q53[13] turned out to be challenging and can lead to wrong interpretation with regards to resilience. I used household members who are in psychotherapy as a proxy for the presence of mental disorders in the household, and thus considered household members who are in psychotherapy as a resilience decreasing factor. However, being in psychotherapy actually can be something beneficial for someone with a mental disorder, and thus might even increase resilience. This has become apparent in example case 4. Only one person out of three who suffer from mental disorders is in psychotherapy. Accordingly, the household receives a rather good score in Q53 (0.66). The resilience score would decrease if the other two household members with mental disorders also would seek help in psychotherapy even though this probably would be beneficial for the household's resilience.

Even though using categorical scales has several advantages as described in the method section, it is limited by its subjectivity. In consultation with the supervisor team, I decided about the allocation of the scores to the possible responses. Other expert opinions have not been considered in this step due to time limitation. To increase the validity of the scoring scheme, the assignment of the scores

[13] (Q53) "*How many household members are in psychotherapy at the moment, if any?*"

could, therefore, be discussed with additional local stakeholders or experts in a future step[14]. Furthermore, for the questions without predefined choices (for example the question "*What is the average monthly net income of your household from all income sources including salary, pension, remittance, child maintenance allowance, social welfare support etc.?*), I suggest to analyse the range of responses after a first survey has been conducted and in a subsequent step to review the allocation of the scores.

In summary, the thesis developed a questionnaire which allows measuring the 44 selected indicators at household level. Besides a few exceptions, the questions were well understood by the respondents in the pre-testing and in the example cases and could be easily administered. Nevertheless, additional testing and minor modifications might further improve the applicability. A major limitation of the questionnaire is the presence of different question types, which introduce a bias in the indicator scoring. Therefore, scores of different indicators and dimensions should only be compared with caution. The thesis proposes a scoring scheme using categorical scales to derive resilience scores for each of the indicators. In principle, based on the four example cases, the proposed scheme seems to be reasonable. However, validity testing of the composite indicator will be needed in order to conclusively verify the adequacy of the proposed scoring.

5.1.3 Research question 3

"How should the indicators be organized and weighted into a composite indicator framework for general household resilience?"

The first part of this section discusses how the proposed composite indicator framework is organized and how the indicators are aggregated. The second part discusses the weights of the different indicators for the aggregation. Finally, a conclusion is drawn.

Organization and aggregation of the indicators

The 44 indicators have been grouped into seven dimensions which can be further aggregated into the composite indicator. The dimensions were constructed in a way that they represent understandable thematic units. This facilitates the interpretation of the results of the composite indicator and is a common approach (Foa & Tanner, 2012). As already stated, the construction of the seven dimensions was influenced by the four livelihood capitals[15] human capital (represented by the dimensions *Household head characteristics* and *Household health situation*), financial capital (represented by the dimensions *Household's income situation* and *Household's money management*), social capital (represented by the dimensions *Household's family situation* and *Household's social interaction*) and physical capital (represented by the dimension *Household's infrastructure*). These livelihood capitals are assumed to influence resilience of a household (Lokosang et al., 2014; Moser, 1998).

[14] Such an approach has for example been chosen for the normalization of the indicators in the SHARP tool from FAO for the assessment of climate resilience of farmers (Diserens, 2016)

[15] (DFID, 1999)

Based on that framework, the composite indicator is calculated by weighted linear aggregation of the indicator and dimension scores which is standard practice (Munda & Nardo, 2005). However, there has been some criticism to the use of this method for the calculation of a composite indicator. It is criticised that there exists an inconsistency between the theoretical meaning of linear aggregation and its practical use (*ibid*, OECD, 2008). Two aspects lead to this inconsistency. First, the use of linear aggregation is theoretically meaningful and correct, only if the variables (indicators) are independent. The condition of independency means that each variable represents a specific issue, i.e. there should be no synergies or conflicts between the variables. This is often an unrealistic assumption (OECD, 2008). Second, interpreting and defining weights of the variables in a linear aggregation as "importance coefficients" as it has been done in the present study and in many other composite indicators "is not defensible on theoretical grounds" (Munda & Nardo, 2005, p. 7). Weights in linear aggregation always have to be seen as "trade-off" ratios. The only method to derive weights for linear aggregation which are consistent with theory, therefore, would be the trade-off method. In that method, however, the weights are calculated based on the quantitative scores of the variables and can, therefore, not be seen as traits of the variables itself (*ibid*). As such, that method would not be meaningful for the purpose of this thesis.

In summary, there exists inconsistency between the theoretical meaning of linear aggregation and its practical use in this thesis which can be seen as a limitation of the proposed composite indicator framework. However, due to the pragmatic nature of the proposed tool and due to a lack of practicable alternatives, the inconsistency is accepted. This is standard practice. The mentioned inconsistency "applies to most of the empirical applications" *(ibid*, p. 8).

The linear aggregation method also implies compensability among the indicators (*ibid*). Compensability describes the "possibility of offsetting a disadvantage on some variables by a sufficiently large advantage on another variable" (*ibid,* p. 4). In the present framework this means, for example, that having a lot of savings would compensate for having a bad household communication or having a road access would compensate for a lack of house insurance etc. Focusing on single disturbances such compensability does not make sense. If a house burns down, a house insurance would be needed in order to cover the losses. Road access does not compensate for that. However, since the composite framework focuses on general resilience, compensability does make sense. A household without house insurance and road access is vulnerable against any disturbances which could damage the house and would experience major challenges if one of the household members would be affected by a health issue. A household with a house insurance but without road access would still face major challenges in the case of health problems, but would be prepared for any disturbances which could damage the house. Therefore, its general resilience is higher than the one from the first household. A household without any house insurance but with road access would still be vulnerable against disturbances which could damage the house. But it would be better prepared for any health problem, and consequently also can be considered as more resilient as the first household. This shows that a having a road access actually can compensate for a lack of house insurance in terms of general resilience.

Indicator and dimension weights

In this study, weights have been assigned to the indicators and dimensions using three different approaches. For one of these approaches, experts had to rate all the indicators on a scale from 0 to 10

based on their importance for general household resilience. In the result section, it has been shown that not all of the experts valued the indicators from the same dimension highest. Expert 10, for example, rated the indicators from the dimension *Household's health situation* highest, expert 5 the ones from the dimension *Household's money management*, and expert 6 the ones from the dimension *Household's family situation.* Such preferences for indicators from certain dimensions could be influenced by the field of expertise and background of the expert. However, since the rates have been collected in an anonymous way in order to guarantee confidentiality, this hypothesis cannot be tested. Nevertheless, the variation highlights the importance of considering various experts from different backgrounds in such an exercise as it has been recommended by OECD in the "Handbook on constructing composite indicators" (OECD, 2008).

The results of the weighting workshop, furthermore, show that most of the indicators have been rated rather high. This can be interpreted as an indication that the experts mainly agreed, that the selected indicators influence resilience. Disagreement would have led to a score of 0 as explained in the result section.

Overall, it can be concluded that the expert weighting exercise was successful. One limitation, however, was that this approach did not consider the opinion of the "ordinary" people. Most of the participants in the weighting workshop are well educated and beyond 40. They represent a particular group of the society. Other groups may weight the indicators differently. This could be tested in future by conducting a second weighting workshop with "ordinary" people from different age groups.

Even though the weighting exercise was successful, the derived weights should be used with caution. Assigning weights to indicators for the description of general household resilience is not as simple as for the description of specified resilience. In the case of specified resilience, the expert can concentrate on a particular disturbance. He/she can ask himself/herself, how important the influence of each of the indicators is to deal with that particular disturbance. Such a rational cannot be applied when assigning weights to indicators for general household resilience which makes the task very complex for the experts. As a consequence, the weights derived from such an exercise should always be compared with other weighting approaches.

Results show that the two weighting approaches EXP[16] and EIN[17] yielded very similar indicator and dimension weights which makes one of them redundant. Since it is simpler to calculate the dimension and composite indicator scores with the EIN approach, (especially when missing values are present, see further below) I recommend to stick with the EIN weights and to discard the EXP weights.

Results further show that the dimension weights in the EXP and EIN approaches largely depend on the number of indicators in a dimension. This means that the designer of the framework influences the dimension weights by selecting the number of indicators to include in each dimension. The dimension *Household's health situation,* for example, receives low weights in the EXP and EIN approaches because it only contains two indicators. It would have been possible to split up these two

[16] Weighting approach, where all the relative weights of the indicators for the composite indicator calculation are derived from an expert workshop

[17] Weighting approach, where all the indicators receive equal weights for the calculation of the composite indicator

indicators into a larger set of indicators instead, which would have increased the weight of the dimension. This difficulty has been highlighted in the "Handbook on constructing composite indicators" (OECD, 2008). A balanced design with equal numbers of indicators in each dimension could solve this issue. However, it would reduce the flexibility in the design process. Consequently, it has not been selected in this thesis. The dimension weights in the EDI[18] approach do not depend on the number of indicators in a dimension - they are all equal. Accordingly, considering the weights from this approach and comparing the composite indicator scores derived from them with the composite indicator scores derived using the weights from the EIN approach will be highly valuable.

In summary, research question three could be answered. A reasonable framework composed by seven dimensions has been developed in order to meaningfully group the 44 indicators into a composite indicator. The composite indicator score is calculated by weighted linear aggregation of the indicator and dimension scores. This approach, however, faces some theoretical limitations which could not be eliminated in this thesis. Weights for the indicators and dimensions have been calculated based on three different approaches to allow future sensitivity analysis. One of the approaches includes expert opinions. It became apparent that the weights from the EXP approach are very similar to the ones from the EDI approach, and thus can be left out in future studies. Using the weights from the other two approaches (EDI and EIN) and comparing the outcome, however, will be very valuable.

5.1.4 Research question 4

"Is the developed composite indicator applicable?"

The composite indicator has been tested with four example cases and found to be applicable. The questionnaire could be successfully administered and the indicator, dimension and composite indicator scores calculated. Nevertheless, it became apparent, that certain issues have to be considered when calculating the composite indicator score:

Usually there are missing values in the data set of a household. Consequently, it is normally not possible to calculate the resilience scores of all the 44 indicators. Missing values can be caused by three reasons: First, the household might refuse to answer certain questions. Second, the household might not be able to answer certain questions. Third, one of the questions[19] is only applicable to households which own their dwelling, and thus all other types of households do not yield a score in this question.

There are two ways to deal with the fact that almost each household lacks resilience scores for some of the indicators: (i) The missing resilience scores are imputed, or (ii) the dimension and composite indicator scores are calculated based on the reduced indicator set. The first approach can reduce the acceptance of the composite indicator score by the household itself (Tanner et al., 2015). Concerning

[18] Weighting approach, where all the dimensions receive equal weights for the calculation of the composite indicator

[19] (Q25) "Is your house/flat insured by a household insurance?"

the second approach, two aspects have to be considered. First, it might happen that misleading conclusions are drawn. It could, for example, happen, that a household only answers questions where it assumes to get high scores. This would result in an overestimated resilience score which does not represent the real situation of the household. Second, in order to calculate the dimension score based on a reduced indicator set, the relative weights of the remaining indicators in a dimension have to be transformed so that the new weights again sum up to 100%. The transformation has to be done for each household individually depending on how many and which indicators remain. It would have to be established, therefore, in a next step, whether a computer program can be designed with reasonable resources which conducts this transformation automatically for each household based on the survey data. Finally, independent of whether the first or the second approach is selected, it is advisable to exclude households with a large number of missing values.

To avoid the appearance of too many missing values, the interviewers should be motivated to get a high yield of answers. In the pilot testing, it could be observed that many respondents quickly chose the option “I don’t know” when they did not understand the question. But the persistent interviewers who explained the question again often managed to receive an answer.

There is an additional issue which should be considered when applying the composite indicator proposed in this thesis: One might be tempted to use the information from the composite indicator framework to allocate funds and to prioritise development programs. The dimension with the lowest score on average could receive highest priority in development programs. However, in my opinion, such use of the composite indicator framework is not justifiable. The scores of the different dimensions should not be compared with each other. The score of each dimension is calculated differently. Different types of questions are used, and the dimensions are composed by different number of indicators as previously explained. Therefore, it is possible that in some dimensions it is easier to achieve a high score than in others. What the proposed composite indicator framework does allow is comparing the composite indicator scores and the scores of particular dimensions between different households, household types or districts for example. Furthermore, it allows tracking change over time.

In summary, the composite indicator has shown to be applicable. For its future use, it has to be decided how missing values will be treated and it has to be tested whether the calculation of the indicator, dimension and composite indicator scores can be automatized. It is not appropriate to use the composite indicator to compare scores between different indicators or dimensions. However, the composite indicator allows comparing the composite indicator scores and the scores of particular dimensions between different households, household types or districts and allows conducting temporal trend analysis.

5.2 Outlook

5.2.1 Remaining research gap

This thesis proposes a new concept; the concept of general household resilience. This concept aims to describe resilience of a household without focusing on a particular disturbance. Resilience as understood in this concept can be seen as a combination of characteristics of a household and its surrounding which positively influence its ability to deal with any relevant disturbance. This approach is promising since focusing on specified resilience has been shown to be of limited use. Increasing a system's specified resilience to a particular disturbance sometimes decreases the system's resilience to another disturbance (Miller et al., 2010) and leads to new kinds of instability (Folke et al., 2010). Consequently, it is not guaranteed, that a household effectively benefits from increasing specified resilience to a particular disturbance. The concept of general household resilience - with its holistic approach - presents new possibilities to address this issue.

Additionally, if only crosscutting[20] indicators are considered, general resilience can be increased without knowing what kind of disturbances might affect the household in future. This is useful given the high level of uncertainties associated with future changes (Choptiany et al., 2015; Folke et al., 2010; Tyler & Moench, 2012).

Nevertheless, based on the insights of the preceding discussion and limitation section, additional research is needed to improve the understanding for this concept and to facilitate the construction of composite indicators as done in this thesis. The following aspects should receive special attention: (i) The concept of general household resilience should be further developed and specified. (ii) It should be aimed to improve the linkage between the indicator selection and a theoretical construct of general household resilience (Miller et al., 2010). (iii) The different roles of specific[21] and crosscutting indicators in the description of general household resilience should be further investigated and discussed. All these considerations will largely contribute to the improvement of the concept of general household resilience, will allow further improvement of the composite indicator proposed in this thesis and will facilitate the construction of similar composite indicators in other contexts.

5.2.2 How to proceed with the proposed composite indicator on Mahé

There are two possibilities to use the proposed composite indicator framework on Mahé. The first possibility is to use it in a large scale survey which allows assessing baseline information in regards to household resilience and detecting potential for improvement. This information can be used to shape the development of policies and programs in order to systematically increase resilience. Additionally, such a survey, when applied regularly, allows assessing trends, and thus conducting impact analysis of targeted programs.

[20] An indicator which influences resilience to a wide range of disturbances

[21] An indicator which influences resilience to a particular disturbance

The second possibility is to use the composite indicator as a consultant tool like the SHARP tool developed by the FAO which assesses climate resilience of farmers (Choptiany et al., 2015). The questionnaire could be filled out with the household on a tablet using a program which automatically calculates the indicator and dimension scores. The interviewer (for example a social worker) could then directly discuss the results with the household and identify possible steps the household could take to improve its resilience. The interviewer could return to the household after a given time period in order to assess and discuss the situation again. However, since the composite indicator has been developed for a large scale survey and not for such a purpose, this possibility is not further discussed in this thesis.

I suggest that the following three steps might be considered in order to prepare the proposed composite indicator for a large scale survey:

- The validity and reliability of the proposed composite indicator need to be tested. Depending on the outcome of the testing, some modifications might be necessary. This could include changes in the indicator set, the questionnaire, the normalization or the weighting. In order to guide such changes, local opinions from "ordinary" people, from experts and other stakeholders could be considered as discussed in the preceding sections.

- A computer program has to be designed which calculates the indicator, dimension and composite indicator scores based on survey data. The program should be designed in a way that it allows modifications at any time.

- A pilot-survey with an adequate household sample with respective variation could be conducted. Such a survey would allow identifying questions which do not yield variation, therefore, do not allow differentiating between households and could be removed from the framework. Furthermore, the survey would allow revising the assignment of the scores for the questions without predefined choices as previously described.

  In addition, it would allow analysing correlation between indicators. So far, correlation issues have not been given any attention in this framework, even though it is more than likely that many of the indicators (highly) correlate with each other. These correlations need to be considered (OECD, 2008). It is discussed controversially, however, whether correlation among indicators is a desired or an undesired condition (Hudrlikova, 2013; Nardo et al., 2004; OECD, 2005, 2008; USAID et al., 2014). Some argue that indicators need to be correlated; otherwise they do not measure the same overarching concept. Others argue that highly correlated indicators should be removed from the indicator set since they introduce an overweighting of certain aspects and enlarge the indicator set without covering additional aspects.

  The pilot-survey should, furthermore, be used to conduct uncertainty and sensitivity analysis in order to test the robustness of the tool (OECD, 2008; USAID et al., 2014). Several decisions and judgments have to be made during the composite indicator development. Uncertainty and sensitivity analysis show to what extent these decisions affect the outcome of the composite indicator. The uncertainty and sensitivity analysis could, for example, analyse the impact of excluding some of the indicators from the framework, using different imputation strategies, using alternative data normalisation schemes, using different weighting schemes

and using different aggregating schemes on the composite indicator scores of the data set. "Ideally, all potential sources of uncertainty should be addressed" (OECD, 2008, p. 34). Examples for sensitivity analysis can be found in Schmidtlein et al. (2008) and Tate (2013).

After these steps, the composite indicator will be ready for its application in a large scale survey. Such a survey will attract public attention to the concept of resilience, raise awareness, promote discussion and support decision making (OECD, 2008; USAID et al., 2014). It will be advisable to combine and compare the results from such a survey with other available information and indicators of households on Mahé in order to catch the "bigger picture". Even though the assessment of general household resilience will provide valuable insights about the resilience situation on Mahé, it should not remain the only resilience study. As stated by Ghanem et al. (2016, p. 173) "resilience should be considered at different scales in order to understand how the actions at one scale influence those above and below." The proposed general household resilience composite indicator framework, therefore, hopefully marks only the beginning of a larger set of resilience studies in the Seychelles also incorporating national, community and individual level of resilience and their interaction.

6 Conclusion

This thesis proposes a composite indicator framework for the measurement of general household resilience on Mahé, Seychelles. Such a tool has never been developed before, neither for Mahé, nor in other contexts. Pre-testing of the composite indicator framework showed promising results. Nevertheless, additional testing of the validity, reliability and robustness of the tool is needed in order to conclusively verify its soundness.

Each household, to which the tool is applied, receives resilience scores for 44 indicators, for seven dimensions and for the composite indicator. These results can be used to compare different household types or districts on dimension or composite indicator level. Such comparisons allow, for example, identifying household types which are particularly vulnerable. Additionally, the tool can be used to conduct temporal trend analysis which allows impact assessment of targeted programs. The composite indicator framework, however, is not designed for comparing resilience scores of different indicators or dimensions of a household due to differences in the way these scores are calculated.

On the conceptual side, this thesis provides a valuable contribution to the development of the concept of general household resilience. Nevertheless, future research should (i) further develop the concept of general household resilience, (ii) aim to better link the indicator selection with a theoretical construct of general household resilience and (iii) investigate the different roles of specific[22] and crosscutting[23] indicators in the description of general household resilience. All these considerations will largely contribute to the improvement of the concept, will allow further improvement of the composite indicator framework proposed in this thesis and will facilitate the construction of similar composite indicators frameworks in other contexts.

[22] A specific indicator influences resilience of a household to a particular disturbance

[23] A crosscutting indicator influences resilience of a household to a wide range of disturbances

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8 Appendices

Appendix 1

Guiding questions used in the semi structured key informant interviews

The guiding questions from the interview with an expert in public utilities and an expert in gas and oil supply are not listed due to confidentiality reasons.

Interview with a representative from a church

- What are the most relevant social problems on Mahé?
- What do households struggle with? Is there poverty? What kind of?
- What are the most visible social trends? (Moral, relationship, sex, religion, consumption, family pattern etc.)
- What about prostitution?
- What can you tell about the relationship between men and women on Mahé (sexually and relationship, child, marriage etc.)
- What is the today's role of the church on Mahé in this context?
- Do different churches on Mahé deal differently with it (e.g. provide different support or acceptance etc.?)
- Is the social welfare system working well?
- Family structure, family as a safety net
- Social institutions as a safety net
- Religion as a safety net
- Are there any reports regarding the development of being religious in Seychelles in the past years?

Interview with an expert in social issues

- What are the most relevant social problems on Mahé?
- What do households struggle with? Is there poverty? What kind of?
- What are the most visible social trends? (Moral, relationship, sex, religion, consumption, family pattern etc.)
- What about prostitution?
- What about food security?
- What can you tell about the relationship between men and women on Mahé (sexually and relationship, child, marriage etc.)
- How does the social welfare system work? –Reports or documents?
- Is the social welfare system working well?
- Who can apply for social housing, everyone?
- Family structure, family as a safety net
- Social institutions as a safety net

- Religion as a safety net
- Is there data available regarding teenage pregnancy, average pregnancy age, whether the couple stays in a relationship after having a child, how many men pay for one child etc.?

Interview with a second expert in social issues

No questions prepared

Interview with a third expert in social issues

- Are there any reports regarding the whole social system in Seychelles where it is described which instruments are in place, who get supported with which amount of money etc. strategic plan, family policy, social renaissance etc.
- What are the flaws of the current social welfare system if there are any?
- Where is the document "study on families in Seychelles" coming from?
- Social housing – how does it works?
- What do households struggle with? Is there poverty? What kind of?
- Family structure, family as a safety net
- Social institutions as a safety net
- Religion as a safety net
- What are the most visible social trends? (Moral, relationship, sex, religion, consumption, family pattern, prostitution etc.)
- What about food security?
- What can you tell about the relationship between men and women on Mahé (sexually and relationship, child, marriage etc.)
- Is there data available regarding teenage pregnancy, average pregnancy age, whether the couple stay in a relationship after having a child, how many men pay for one child etc.?

Interview with a health expert

- How is the health care system in Seychelles organized?
- Which are the most relevant diseases (physically and psychologically) in Seychelles and what is there economic impact?
- Which health-related indicators would make sense in a vulnerability index? E.g. is a household with overweighed people more vulnerable?
- How well is the country prepared for pandemia?
- How well is the health system prepared for natural disasters?
- What about sexually transmitted diseases?
- Why do people have to spend for health care even if it is for free?
- Which are the most relevant documents regarding these questions as a source for citation?
- Is there data available regarding teenage pregnancy, average pregnancy age, whether the couple stays in a relationship after having a child, how many men pay for one child etc.?

Interview with an expert in natural disasters

- Which are the most relevant disasters in Seychelles?
- Which are the most up to date documents regarding disaster risks in Seychelles?
- Are there detailed risk-maps available for different disasters like tsunami, flood, landslide, earthquake etc. where I could assess whether a household is in a risk zone or not?
- Is there an early warning system? If yes for which disasters and how are people informed?
- What do you think about a vulnerability index at household levels for disasters?
- Which disaster should be included in such an index based on your opinion?
- What could be possible indicators for these disasters? (E.g. is there knowledge available on how a house would have to be constructed to be resistant against a tsunami etc.?)
- Do you think the people feel vulnerable to disasters? Do they think about disasters in their daily live?

Interview with an economist

- Which are the best documents to get an overview over the economic situation of the country (importance of different sectors etc.)?
- How would you describe the employment situation? Which people find a job easily, which struggle to find one?
- What do you think are the biggest threats for the households in Seychelles economically?
- What about savings?
- What is your opinion to the minimum wage – is it enough?
- What do you think about the increase of the minimum wage and the pension and the ongoing discussion regarding a 13th month salary?
- Which upon your opinion are characteristics which make households more resilient in general?
- Which are the economic trends for the future? Which sectors will grow, which will have problems?
- What's the influence of seasonality on the economy in Seychelles? Which sectors are affected by seasonality?

Interview with a first insurance expert

- Please briefly describe your company
- Information about insurance products (maybe any documentation?)
    - Insurance of houses, household assets (fire, natural hazards, accident, break-in etc.
    - Insurance of job loss
    - Health insurance
    - Insurance of death / life insurance
    - Insurance of loss of income due to illness
    - Insurance of natural disasters?
- Survey about the coverage of some insurance products
    - E.g. how many households are covered against natural hazards?
    - Are some insurance obligatory by law (e.g. house insurance?)

- What happens if I kill someone by accident or hurt someone? Do I have to pay the cost of his treatment or a cost to his family for the death? Is there any insurance to cover it?
- What happens if I accidently destroy someone's house or car etc. am I insured?

Interview with a second insurance expert

- Do you have detailed documentation / brochures / terms & conditions of all your insurance products? (if not, need more time for explanation below)
- Which insurances are mandatory by law?
- House Holder's Insurance Policy:
  - Natural hazards included? All of them?
  - How many people on Mahé do insure their house?
  - Cost / year for a standard house (approx.)
- Insurance of household content? (E.g. in terms of fire, flood, earthquake, tsunami etc.)
- Motor insurance policy: (Comprehensive cover, Third party fire & theft ,Third party only)
  - Which insurance is mandatory by law?
  - Which insurance is mandatory for a loan?
  - What happens if the car has been bought by credit and gets destroyed without being insured?
- Private liability insurance
  - Does it exist?
- Medical Insurance Policy
  - What is the difference to the public health care?
  - Does it include the insurance of loss of income due to illness?
- Life assurances: (Endowment with profit, special endowment plans, junior education, mortgage protection, group universal life)
  - Are there any documents available about these insurance products?
- Are there any surveys about the coverage of some insurance products?
  - E.g. how many households are covered against natural hazards?
  - Which percentage of the insured households did have damage due to fire in the last 5 years etc.

Interview with a third insurance expert

- Which insurances are mandatory by law?
- Information about insurance products (maybe any documentation?)
  - Insurance of houses, household assets (fire, natural hazards, accident, break-in etc.
  - Insurance of job loss
  - Health insurance
  - Insurance of natural disasters?
  - Insurance of loss of income due to illness
  - Liability insurance? (if I kill someone by accident, or destroy his assets)
  - Terms and conditions of the different insurance products
  - Natural disasters?

- Survey about the coverage of some insurance products or any governmental reports about the insurance landscape in Seychelles.
    - E.g. how many households are covered against natural hazards?

Appendix 2

Guiding questions used in the semi-structured household situation interviews

- What kind of challenges (if any) does your household face in daily live? - What keeps you awake at night (if anything?)
- What kind of difficulties (if any) did your household face in the last 24 months? (Health, economic, social, natural hazard etc.)
- What did you do to deal with these difficult situations?
- What kind of support (if any) did you get to deal with these difficult situations? Was it helpful?
- Besides the support you may got, what else would have been helpful to deal with the difficult situations? Did you miss anything which would have been useful for you to bounce-back after the mentioned difficulties?
- Besides the mentioned difficult situation itself, was there something else bothering you at the same time and, therefore, made it difficult for you to successfully cope with the mentioned difficulties?
- Do you know any other households who have had difficulties in the past? If yes how did they deal with it?
- Or in general, what do households need to have to bounce back after experiencing shocks and difficult times?
- Some households are able to recover fast after a negative event in their life (bounce-back) and some households struggle more and longer. What do you think is the reason for that?

Appendix 3

Initial proposed list with 24 household dimensions affecting household resilience

Dimension	Specification
Household's income level	
Household's income sources	e.g. number of income sources, income regularity, income security
Household's saving habits and capacity	
Insurance coverage of the household and ist members	
Dependency on financial support for basic needs	Household's dependency on welfare and other financial support
Household's level of over-indebtedness	
Ownership of assets	Household's ownership of car, TV, furniture etc.
Presence of problematic expenditure patterns	e.g. Prioritising expenditures towards substance abuse, gambling, prostitution
Housing situation	Tenuership status of dwelling
Household composition	Number of household members & demographic structure of the household members
Education level of household member	
Faith of household member	Religious practices and beliefs of the household members
Household's cohesion	e.g. way of decision making, ability to build consensus, mutual respect within the household
Presence of problematic behaviour in the household	e.g. substance abuse, domestic violence, and family relationships issues within the household
Household health situation	including physically and psychologically dimensions
Characteristics of the household head	e.g. socio-economic status, attitude to life and work, sense of responsibility, budget management skills
Household's embeddedness in social networks	Connectivity of the household to family, friends and others in the community for support in times of need
Level of group membership of household members	Participation in community live outside the household
Level of trust & cooperation within neighbourhood	Degree of trust & cooperation with people from the neighbourhood
Access to information	Household's access to TV, radio, newspaper and internet
Type of building	House structure type and repair condition
Level of self-subsistence	Household's capacity for self-sufficiency in producing own food and electricity and in storing water
Community infrastructure	e.g. Road access to the house, distance to health facility, distance to day care
Exposure to disturbances in the past	The extent to which the household faced difficult situations in the past and had to find ways to adapt to them

Appendix 4

Participation lists of the two workshops

Participants in the resilience workshop of the 17th of November 2016

First Name	Surname	Organisation	Function
Sharon	Ernesta	Gender and Media Association Seychelles	Member
Désirée	Hermitte	Ministry of Education (School Counselling Service)	Counsellor
Marie-Nella	Azemia	Nell's Consultancy Services	Educator (Gender, social issues, civil society etc.)
Robert	Moumou	Family Council	Chairman
Helena	De Letourdis	National Bureau of Statistics	Deputy CEO

Participants in the weighting workshops of the 9th and 12th of December 2016

First Name	Surname	Organisation	Function	Workshop Date
Susan	Morel	Employment Department	Technical Advisor	9.12.2016
Patricia	Baquero	National Aids Council	Program Manager	9.12.2016
Elsa	Nourrice	Home Affairs	Principal Probation Officer	9.12.2016
Helena	De Letourdis	National Bureau of Statistics	Deputy CEO	9.12.2016 12.12.2016
Désirée	Hermitte	Ministry of Education	Educator	12.12.2016
Alice	Vivien	Roman Catholic Church	Sister, Counsellor	12.12.2016
Christine	Benoit	Anglican Church	Anglican Priest	12.12.2016
Chrissant	Barbe	National Aids Council	Program manager	12.12.2016
Marie-Therese	Purvis	Consultant in Education	Self-Employed	12.12.2016
Erine	Lespoire	National Institute of Health and Social Studies	Social work student	12.12.2016

Appendix 5

Results from the resilience workshop

List of factors which influence household resilience elaborated in the resilience workshop

Aspect	How it influences resilience
Involvement, Communication and Participation	Good communication is important to increase resilience. Important decisions should be taken together or at least communicated and explained to the other household members. Every family member feels involved in family live and part of the family. This increases resilience
Leadership	To have an appropriate style of leadership in the household increases resilience. To have someone who takes responsibility and action.
Long-Term Vision	To have a long term vision and goals as a family increases resilience
Budgeting	To be able and practice budgeting increases resilience.
Trust	Trust increases resilience
Backyard-Gardening	Backyard-Gardening helps to save money and, therefore, increase resilience.
Substance Abuse	Presence of substance abuse decreases resilience of the household.
Relationship Issues	Relationship issues decrease resilience
Sickness and Death	Sickness and death decrease resilience
Disaster	Disasters (natural or man-made) decrease resilience
Good parenting and role models	Increase resilience
High income	Can increase or decrease resilience. Depending on how it is used and how it changes people. Can cause problems like selfishness, lack of contribution etc.
Housing situation	Due to the influence of western culture and the trend for individualism people more and more want to live in their own house. Flats are built to meet the huge demand. These flats don't have backyard gardens anymore, don't have space to hang out the laundry, don't have space to clean an entire fish, don't have space to put a washing machine etc. Furthermore, the individualistic housing trends increase costs for the family. Fix-costs can't be shared among the family members. - > This decreases resilience.
Education	Having a good education is the major factor for resilience. It influences all aspects of life. Poorly educated children will become poorly educated parents. Poorly educated parents again will more likely raise poorly educated children.
Life-Skills	It increases your resilience, if you have good skills and if you are open to learn new skills (reskilling)
Values and Moral	The way you treat other people and you perceive other people etc. influences your resilience. Character building increases your resilience (morals, values etc.).
Spirituality	Spirituality helps to wisely prioritise, to take care of little things, which help you to also take care of bigger issues and makes you more self-content. It can also lead to healing. On the other side, spirituality can lead to strong fears and dependency which can decrease resilience.
To be grounded	To be grounded personally increases your resilience
Attitude towards difficulties in life	Taking challenges as an opportunity and not giving up too fast increases your resilience
Self-Responsibility	To feel that you are self-responsible for your live and your achievements increase resilience.
Level of willpower / Motivation	People who are motivated to address certain issues and have a strong will are more resilient.
Level of awareness / information	People who are well informed are more resilient. They know for example where they find help in times of hardship.
Depression	Depression decreases resilience
Addiction	Any Addiction (gambling, drug abuse, prostitution, fashion etc.) decreases resilience
Stress	Stress decreases resilience (e.g. heavy work-load)
Prioritising expendi-	Many people are making wrong choices / don't prioritise their expenses wisely. They try to imitate

tures towards life-style	western stars, are under influence of peer pressure, want to have all the toys and joys of western culture (mobile phone, sweet 16 party, Halloween party etc.) even though they don't have the money for it. This decreases resilience.
Network	To have a good network increases resilience
Social support	To have good social support (aid group, church, network etc.) increases resilience. Current trend of individualistic behaviour decreases the support among people. Current trend of internal migration reduces support within the family since family members don't live in the same district anymore.
National policies	National policies (e.g. social policies or economic policies) influence resilience. They could for example increase sense of self-responsibility.
Neighbourhood	There are neighbourhoods which are at risk for drugs, violence etc. Living in such a neighbourhood decreases resilience.
Macroeconomic Issues	Price shocks (food / fuel etc.), foreign exchange shortage, war etc. decrease resilience
Laws / Justice	If laws are not enforced properly and people don't feel treated in a righteous way they become bitter and discouraged which decrease their resilience.

Appendix 6

Example of a rating form for one of the experts in the weighting workshop

Indicator	Explanation	Importance	Rate 0 - 10
Dependency on social welfare support	Describes to what extent the household is dependent on social welfare assistance	How important is a low dependency on social welfare assistance for household resilience?	
Distance to supportive family members	Describes whether there are supportive family members who live in close distance to the household	How important is it for household resilience to live in close distance to supportive family members?	
Long-Term Vision	Describes to what extent the household head has a long-term vision for him/herself and the household	How important is having a long-term vision for household resilience?	
Faith and spiritual fears	Describes the household head's faith in god(s) and the level of fear from evil spirits	How important is it for household resilience that the household head has a strong faith and does not fear evil forces?	
Frequent spending on services of sex workers	Describes if any household member frequently pays for services of sex workers	How important is it for household resilience, that none of the household members frequently spends on services of sex workers?	
Smoking	Describes whether any household member smokes at least 4 days per week	How important is it for household resilience, that none of the household members frequently smokes?	

Drug abuse	Describes if any household member is victim of drug abuse	How important is it for household resilience, that none of the household members is a victim of drug abuse?	
Budgeting	Describes to what extent the household practices budgeting	How important is it for household resilience that the household head does budgeting?	
Prioritising expenditures towards lifestyle	Describes to what extent the household head feels pressured to buy lifestyle goods to be "up to standard"	How important is it for household resilience to have a household head who does not feel pressured to buy all the lifestyle goods to be "up to standard"?	
Paved road access	Describes how well the household is accessible by a vehicle	How important is it for household resilience that, the household is located in close distance to a paved road?	
Please make a small break of 2-3 minutes to relax before continuing with the exercise.			
When you continue please make sure that you always have the concept of resilience in mind. Remember that you have to rate how important the listed indicators are in terms of general resilience of the household towards a wide range of possible disturbances and shocks; To what extent the indicator influence a household's ability to withstand, recover from and cope with a wide range of shocks and difficult situations. You can think about the different disturbances which can affect a household and then think about how the aspect described by an indicator influence a household's ability to cope with these disturbances. Remember to give higher rates to the indicators which are more cross-cutting then to the ones who address only very specific shocks/disturbances.			
Neighbourhood situation (Cooperation and security)	Describes whether the neighbourhood is safe and to what extent neighbours cooperate with each other	How important is it for household resilience to live in a safe and cooperative neighbourhood?	

Household support	Describes to what extent the household members support each other	How important is a good support among the household members for household resilience?	
Shared expenses and responsibilities	Describes to what extent expenses and responsibilities are shared in a fair way among the household members	How important is it for household resilience that the household members share expenses and responsibilities in a fair way?	
Income fluctuation	Describes to what extent the monthly household income fluctuates within the year. As an example: Household A gets its income mainly from fishing. Depending on the season, its income varies significantly. Household B gets its income mainly from employment and therefore has a constant income.	How important is a low income fluctuation for household resilience?	
Moral social support	Describes to what extent the household would get moral support from its social network if needed	How important is it for household resilience to have a social network which would be able to support the household morally in times of need?	
Experienced stress & stress management	Describes the stress-level of the household head	How important is a low stress-level of the household head for household resilience?	
Earners ratio	Calculates the ratio of earners of a household to the total number of household members. Every person who receives some kind of income be it from employment, pension, social welfare etc. is considered as earner.	How important is a high earners ratio for household resilience?	

State of repair	Describes the state of repair of the house	How important is a good state of repair of the house for household resilience?	
Financial social support	Describes to what extent the household would be able to get financial support from its social net-work if needed	How important is it for household resilience to have a social network which would be able to support the household financially in times of need?	
Sense of self-responsibility	Describes the sense of self-responsibility of the household head	How important is a high sense of self-responsibility of the household head for household resilience?	
Please make a small break of 2-3 minutes to relax before continuing with the exercise.			
When you continue please make sure that you always have the concept of resilience in mind. Remember that you have to rate how important the listed indicators are in terms of general resilience of the household towards a wide range of possible disturbances and shocks; To what extent the indicator in-fluence a household's ability to withstand, recover from and cope with a wide range of shocks and difficult situations. You can think about the different disturbances which can affect a household and then think about how the aspect described by an indicator influence a household's ability to cope with these disturbances. Remember to give higher rates to the indicators which are more cross-cutting then to the ones who address only very specific shocks/disturbances.			
Savings (including life assurance)	Describes the saving situation of the household	How important are savings for household resilience?	

Leadership	Describes whether there is a leader in the household. (With leader we mean someone who actively takes responsibility and action to handle things when there is a crisis. In the meantime a leader is someone other household members can look to for guidance in life matters.)	How important is it for household resilience to have a leader in the household?	
Perceived political victimisation	Describes whether the household head feels or fears to be politically victimised	How important is it for household resilience that the household members don't feel and fear to be politically victimized	
Number of income sources	Describes how many sources of income a household has. As an example: Imagine a household with two household members. Person 1 has one job and therefore one salary, person 2 has two jobs and therefore two salaries. In addition, the household gets social welfare assistance. That household therefore has 4 sources of income.	How important is a high number of income sources for household resilience?	
Household security	Describes to what extent the household is protected by burglar bars, dog(s) and/or an alarm system	How important is it for household resilience to live in a house which has at least some form of protection against burglars / theft.	
Home-Gardening	Describes to what extent home gardening contributes to the household's food supply	How important is a high degree of self-sufficiency with fruits, vegetables and root crops for household resilience?	

House Construction-Type	Describes whether the house is built out of bricks/stones or corrugated iron/wood	How important is having a house made of bricks/stones instead of corrugated iron and wood for household resilience?	
Respect and trust among the household members	Describes to what extent the household members respect and trust each other	How important is a respectful and trustful atmosphere in the household for household resilience?	
Likelihood of damage from heavy rain	Describes how likely it is in the face of heavy rain that the house experiences major damage by flooding or landslide.	How important is it for household resilience to live in a house/flat which is not prone to be damaged by landslide or flooding?	
Tenure	Describes whether the house is owned or rented, and if rented whether it is rented from government or on the private market	How important is owning a house instead of renting it for household resilience?	
Please make a small break of 2-3 minutes to relax before continuing with the exercise.			
When you continue please make sure that you always have the concept of resilience in mind. Remember that you have to rate how important the listed indicators are in terms of general resilience of the household towards a wide range of possible disturbances and shocks; To what extent the indicator influence a household's ability to withstand, recover from and cope with a wide range of shocks and difficult situations. You can think about the different disturbances which can affect a household and then think about how the aspect described by an indicator influence a household's ability to cope with these disturbances. Remember to give higher rates to the indicators which are more cross-cutting then to the ones who address only very specific shocks/disturbances.			

Ownership of vehicle	Indicates whether any household member owns a vehicle	How important is owning a vehicle in terms of household resilience?	
Presence of single parents	Describes whether there is a single parent living in the household	Imagine a household with underaged children. How important is it for the resilience of that household, that the parents of the children are in union or at least share the day-to-day responsibilities for raising the children?	
Education	Describes the level of education of the household head	How important is a high level of education of the household head for household resilience?	
Mental Health	Describes the mental health situation of the household members	How important is it for household resilience to have mentally healthy household members?	
Household communication	Describes to what extent the household members have a good communication with each other	How important is a good communication in the household for household resilience?	
Household content insurance	Indicates whether the household content is insured	How important is it for household insurance to have a household content insurance?	

Water tank	Describes whether the household is equipped with a rainwater tank and/or a drinking water tank	How important is it for household resilience to have a drinking water tank and/or a rainwater tank	
Alcohol abuse	Describes if any household member is a victim of alcohol abuse	How important is it for household resilience, that none of the household members is a victim of alcohol abuse?	
Physical Health	Describes the physical health situation of the household members	How important is it for household resilience to have physically healthy household members?	
Attitude towards difficulties in life	Describes the household head's attitude towards difficulties in life	How important is it for household resilience that the household head has a positive attitude towards life's challenges?	
Please make a small break of 2-3 minutes to relax before continuing with the exercise.			
When you continue please make sure that you always have the concept of resilience in mind. Remember that you have to rate how important the listed indicators are in terms of general resilience of the household towards a wide range of possible disturbances and shocks; To what extent the indicator influence a household's ability to withstand, recover from and cope with a wide range of shocks and difficult situations. You can think about the different disturbances which can affect a household and then think about how the aspect described by an indicator influence a household's ability to cope with these disturbances. Remember to give higher rates to the indicators which are more cross-cutting then to the ones who address only very specific shocks/disturbances.			
Presence of gambling behaviour	Describes whether any household member regularly plays games of chance	How important is it for household resilience, that none of the household members frequently plays games of chance?	

Debt-Burden	Describes the debt-burden of a household	How important is a low level of debt-burden for household resilience?	
Average monthly net income per capita	Describes a household's total amount of net income from all income sources (including pension, remittance, social welfare etc.) divided by the number of household members	How important is a high monthly net income per capita for household resilience?	
House insurance	Indicates whether the house is insured	How important is it for household resilience to have a house insurance?	

Appendix 7

Expert rating

Expert rating of the 44 indicators in the weighting workshop on the 9th and 12th of December 2016.

Indicator	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Expert 11
Average monthly net income per capita	9	7	8	8	9	6	9	8	8	8	8
Number of income sources	10	9	9	6	4	5	5	5	7	4	5
Earners ratio	10	8	8	4	2	5	8	9	8	8	5
Income fluctuation	10	8	8	4	7	0	8	8	10	7	8
Home-Gardening	9	5	7	6	7	4	7	8	10	7	3
Dependency on social welfare assistance	8	6	7	5	8		6	7	10	8	8
Debt-Burden	8	8	8	9	8	8	10	9	8	9	9
Savings (including life assurance)	10	7	9	7	5	4	10	8	10	8	8
Smoking (Tobacco)	10	4	6	4	10	8	10	9	8	5	3
Presence of gambling behaviour	8	8	6	7	10	6	0	9	10	6	6
Alcohol abuse	10	8	9	7	10	9	10	8	10	9	10
Drug abuse	10	9	9	7	10	10	10	10	10	7	10
Frequent spending on services of sex workers	7	5	9	6	10	9	10	10	10	6	6
Budgeting	10	8	8	6	10	9	10	9	10	9	5
Prioritising expenditures towards lifestyle	10	7	6	8	10	8	10	5	10	7	5
House insurance	8	7	8	5	10	7	10	9	10	3	8
Household content insurance	9	4	7	4	8	6	10	9	10	5	6
Education	7	8	9	7	5	0	9	4	7	7	6
Sense of self-responsibility	10	9	9	7	9	9	10	10	10	8	5
Experienced stress & stress management	8	7	8	5	9	6	10	7	10	7	8
Attitude towards difficulties in life	10	10	9	5	9	8	10	9	10	7	10

Faith and spiritual fears	10	7	10	6	9	9	9	5	10	5	5
Long-Term Vision	10	7	8	4	10	10	10	6	8	7	1
Shared expenses and responsibilities	10	6	7	6	6	9	9	5	10	9	9
Household communication	8	10	8	6	10	10	10	10	10	9	9
Household support	10	10	8	6	10	8	10	10	10	7	8
Respect and trust among the household members	7	10	8	5	10	10	10	8	10	8	8
Presence of single parents	10	9	8	6	7	10	10	0	10	7	7
Leadership	10	10	8	6	9	8	10	8	10	8	9
Physical Health	7	8	9	7	9	6	10	5	7	10	7
Mental Health	10	7	9	6	7	7	10	7	10	8	8
Financial social support	8	9	7	7	8	6	8	9	5	8	8
Moral social support	10	10	8	7	9	6	8	6	5	7	8
Neighbourhood situation (Cooperation and security)	8	9	8	8	9	9	10	9	10	6	8
Distance to supportive family members	10	8	6	5	6	6	5	7	3	6	6
Perceived political victimisation	6	6	8	5	4	7	9	5	10	6	8
Tenure	10	7	7	4	3	8	7	2	10	7	5
House Construction-Type	0	5	8	4	9	4	10	5	5	7	5
State of repair	8	6	7	4	9	5	10	10	10	8	8
Likelihood of damage from heavy rain	7	6	8	6	10	10	10	9	10	6	8
Household security	7	4	8	4	8	9	10	5	10	6	8
Water tank	7	4	7	4	10	7	10	5	10	4	5
Ownership of vehicle	8	5	8	3	2	2	9	5	5	4	8
Paved road access	5	4	8	6	8	8	5	6	6	6	5

Appendix 8

Indicator scores of the example cases

Dim-ension	Indicator	Example Case 1	Example Case 2	Example Case 3	Example Case 4
HIS	Average monthly net income per capita	1*	0.33*	0.33	0.66
	Number of income sources	1.00	1.00	0.66	1.00
	Earners ratio	0.66	1.00	0.33	1.00
	Income fluctuation	0.66	0.66	1.00	0.00
	Home-Gardening	0.33	0.33	0.00	0.00
	Dependency on social welfare assistance	1.00	1.00	1.00	1.00
MM	Debt-Burden	1.00	0.33	0.00	1.00
	Savings (including life assurance)	0.70	0.25	0.00	0.70
	Smoking (Tobacco)	1.00	0.00	0.00	0.00
	Presence of gambling behaviour	1.00	0.00	1.00	1.00
	Alcohol abuse	1.00	0.00	0.00	1.00
	Drug abuse	1.00	1.00	1.00	0.00
	Frequent spending on services of sex workers	1.00	1.00	1.00	1*
	Budgeting	1.00	0.50	1.00	1.00
	Prioritising expenditures towards lifestyle	1.00	1.00	1.00	1.00
	House insurance	1.00	1.00	0.00	0.00
	Household content insurance	1.00	0.00	0.00	0.00
HHCH	Education	0.50	0.25	0.00	0.25
	Sense of self-responsibility	1.00	0.83	0.83	1.00
	Experienced stress & stress management	0.66	0.33	0.66	0.00
	Attitude towards difficulties in life	0.77	0.66	0.44	0.67
	Faith and spiritual fears	1.00	0.50	0.50	0.50
	Long-Term Vision	1.00	1.00	1.00	1.00
HFS	Shared expenses and responsibilities	1.00	1.00	1.00	0.00
	Household communication	0.89	0.89	0.77	0.33
	Household support	1.00	1.00	1.00	0.66
	Respect and trust among the household members	0.92	0.58	0.66	0.58
	Presence of single parents	1.00	0.00	1.00	1.00
	Leadership	1.00	1.00	1.00	1.00
HHS	Physical Health	0.78	0.78	1.00	0.55
	Mental Health	1.00	1.00	1.00	0.22
HESN	Financial social support	0.66	0.00	0.00	0.00
	Moral social support	1.00	0.66	1.00	1.00
	Neighbourhood situation (Cooperation and security)	0.83	0.67	1.00	0.17
	Distance to supportive family members	1.00	0.33	1.00	1.00
	Perceived political victimisation	0.83	0.83	1.00	1.00
HI	Tenure	1.00	0.75	0.75	1.00
	House Construction-Type	1.00	1.00	0.00	1.00
	State of repair	1.00	0.50	0.00	1.00
	Likelihood of damage from heavy rain	1.00	1.00	1.00	0.33
	Household security	0.50	0.50	0.50	0.00
	Water tank	1.00	0.00	1.00	0.50
	Ownership of vehicle	1.00	0.00	0.00	0.00
	Paved road access	1.00	1.00	0.00	1.00

* Scores have been estimated by the author due to missing values in the questionnaire

Appendix 9

Linking the questions with the indicators

This table shows with which questions the 44 indicators are assessed and how the responses are scored and aggregated into the indicator scores.

Household's Income situation

Indicator	*Question(s)*	*Answer*	*Score*	*Comment*
Average monthly net income per capita	*(Q80) What is the average monthly net income of your household from all income sources including salary, pension, remittance, child maintenance allowance, social welfare support etc.?* [after total deductions for taxes, insurances, loans and pension fund contribution]	[Any number equal or above 0]		
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated total indicator value	[Q80/ Q9]	<2000 = 0 2000 – 4000 = 0.33 4000 – 6000 = 0.66 >6000 = 1	
Number of income sources	(*Q79) How many monthly income sources does your household have? (E.g. employment, social welfare, pension, remittance, etc.)*	[Any number equal or above 0]	0-1 = 0 2 = 0.33 3= 0.66 4= 1	Large households receive more likely a high score in this question due to the high number of household members. This is desired. Larger households can live more economically due to the "economy of scale". Furthermore, large households also have more possibilities to support each other.
Earners Ratio	*(Q78) From all the household members, how many people do receive a regular income, be it from work, social welfare assistance, remittance, pension, school allowance or others?*	[Any number equal or above 0]		
	(Q9) How many household members does your household have?	[Any number above 0]		

	Calculated total indicator value	[Q78 / Q9]	0-0.25 = 0 0.26 – 0.49 = 0.33 0.5 – 0.74 = 0.66 0.75 – 1 = 1
Income fluctuation	*(Q81) To what extent do you agree with the following statement regarding your household: "The household income varies a lot between different times in the year"*	Strongly agree, Rather agree, Rather disagree, Strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1
Home-Gardening	*(Q22) Do you get fruits, vegetables or other food from your garden?*	Yes No	
	(Q23) To what extent do you agree with the following statement regarding your household: "The quantity of food from your own garden is substantial for your food supply."	Strongly agree, Rather agree, Rather disagree, Strongly disagree	
	Calculated total indicator score	[Combination of Q22. and Q23]	Q22(Yes) + Q23(Strongly agree) = 1 Q22(Yes) + Q23(rather agree) = 0.66 Q22(Yes) + Q23(rather disagree) = 0.33 Q22(Yes) + Q23(strongly disagree) = 0 Q22(No) = 0
Dependency on social welfare	*(Q83) To what extent do you agree with the following statement regarding your household: "Social welfare assistance contributes largely to your household in-come"*	Strongly agree, Rather agree, Rather disagree, Strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1

Household's money management				
Debt-Burden	(Q87) *Does any household member have debts at the moment?*	Yes No		
	(Q88) To what extent do you agree with the following statement regarding your household: "Your current debt repayments and interest on debts are a huge financial burden for your household"	Strongly agree, Rather agree, Rather disagree, Strongly disagree		
	Calculated total indicator score	[Combination of Q87 and Q88]	Q87(Yes) + Q88(Strongly agree) = 0 Q87(Yes) + Q88(rather agree) = 0.33 Q87(Yes) + Q88(rather disagree) = 0.66 Q87(Yes) + Q88(strongly disagree) = 0 Q87(No) = 0	
Savings (including life assurance)	(Q84) *Imagine you lose all your sources of income for example by losing your job. For how many months would you be able to cover your expenses with your own <u>cash</u> savings without reducing the expenses?*	[Any number equal or above 0]	0-1 months = 0 2-3 months = 0.33 4-5 months = 0.66 6 or more months = 1	This question serves as a proxy for the amount of savings a household head has. It does not consider the amount of savings in an absolute way but rather relative to the expenditures. This question does not cover the amount of savings of the entire household. In the context of Seychelles, the household head often does not know how much savings the other household members have. Therefore in the present questionnaire, the savings of the household head serve as a proxy for the savings of the household.
	(Q85) Which of the following statements best describes your situation in regards to saving practices? Please note that we are <u>not</u> considering life assurances and pension payments as savings in this question.	I'm usually not able to make any savings I'm sometimes able to make some savings but I normally use it in the same year I'm able to make some savings on a regular basis. I	I'm usually not able to make any savings = 0 I'm sometimes able to make some savings but I normally use it in the same year. = 0.33 I'm able to make some savings on a	This question assesses the saving practices of the household head. Again the practices of the household head serve as a proxy for the entire household. I did not assign the scores in a balanced way to the four options (0, 0.33, 0.66 and 1) but rather assigned a higher score (0.8) to the

		have more savings today than one year ago. I have enough savings to feel secure and ready for most eventualities	regular basis. I have more savings today than one year ago. = 0.8 I have enough savings to feel secure and ready for most eventualities = 1	third option because I felt it describes a situation which is worthy a higher score than 0.66.
	(Q86) Do you have a life assurance?	Yes, No	Yes = 1 No = 0	
	Calculated total indicator score		(2 x score Q84 + score Q85 + score Q86) / 4	Example case Nr. 4 had savings for 3-4 years but no live insurance and chose option 3 in question 2 with the explanation that you can never have enough savings. With equal weighting of the three questions, he would have get a total score in the saving indicator of a bit more than 0.5 only even though he has plenty of savings. Therefore I adjusted the scoring of the indicator and introduced a double counting of the score of question 1. With the current scoring, the mentioned example case gets a score of little above 0.7 which I consider still as less than it should be but acceptable. Life assurance still has a large influence of the indicator score. This might be justifiable since life assurances are long-term commitments of the households. This can help households in the context of Seychelles where saving discipline is rather weak.
Budgeting	*(Q89) To what extent do you agree with the following statement regarding your household: "You usually make a budget for your expenses."*	Strongly agree, Rather agree, Rather disagree, Strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	

	(Q90) To what extent do you agree with the following statement regarding your household: "You <u>don't</u> know how much money you spent in the last month and for what you spent it."	Strongly agree, Rather agree, Rather disagree, Strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	Calculated total indicator score		Average(score Q89 and score Q90)	
Prioritising expenditures towards lifestyle	*(Q70) Do you feel that you are not up to standard and left out, if you don't have a smart-phone?*	Yes, No	Yes = 0 No = 1	
	(Q71) Do you feel that you are not up to standard and left out, if you don't have a flat-screen TV?	Yes, No	Yes = 0 No = 1	
	(Q72) Do you feel that you are not up to standard and left out, if you don't have cable-TV?	Yes, No	Yes = 0 No = 1	
	(Q73) Do you feel that you are not up to standard and left out, if you don't have special rims at the car?	Yes, No	Yes = 0 No = 1	
	(Q74) Do you feel that you are not up to standard and left out, if you don't organize big parties for special family events?	Yes, No	Yes = 0 No = 1	
	(Q75) Do you feel that you are not up to standard and left out, if you don't wear latest fashion?	Yes, No	Yes = 0 No = 1	
	Calculated total indicator score		Average(Score Q70 to Q75)	
House insurance	*(Q25) Is your house/flat insured by a household insurance?*		Yes = 1 No = 0	
household content insurance	(Q26) *Is the household content insured?*	Yes, No	Yes = 1 No = 0	
Presence of gambling behaviour	(Q17) *Is there any household member who regularly plays games of chance – let's say more or less every week?*	Yes, No	Yes = 0 No = 1	
Frequent spending on services of sex workers	*(Q21) Is there any household member who frequently pays for the services of sex workers – let's say more or less every week?*	Yes, No	Yes = 0 No = 1	
Smoking (Tobacco)	(Q18) *Is there any household member who smokes cigarettes at least 4 days a week?*	Yes, No	Yes = 0 No = 1	
Alcohol abuse	(Q19) *Is there any household member who is a victim of alcohol abuse?*	Yes, No	Yes = 0 No = 1	

Drug abuse	(Q20) *Is there any household member who is a victim of drug abuse?*	Yes, No	Yes = 0 No = 1	
Household head characteristics				
Education	(Q8) *What is the highest level of education you have completed?*	obligatory (primary/secondary) school not completed = 0 obligatory (primary/secondary) school completed = 0.25 Vocational school = 0.5 Polytechnic school, A level or similar = 0.75 University or equivalent = 1	Obligatory (primary/secondary) school not completed = 0 obligatory (primary/secondary) school completed = 0.25 Vocational school = 0.5 Polytechnic school, A level or similar = 0.75 University or equivalent = 1	
Sense of self-responsibility	*(Q68) To what extent do you agree with the following statement regarding your household: "It is the duty of government to provide the people with all they need since people contribute with their taxes."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	(Q69) To what extent do you agree with the following statement regarding your household: "People have too high expectations of what government should do for them. People should rather take more self-responsibility."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Calculated total indicator score		Average(score Q68 and Q69)	
Experienced stress & stress management	*(Q59) Stress is a state of physical and mental tension caused by problems in your life. People under a lot of stress may experience headaches, minor pains and sleeping difficulties among other symptoms. On a scale from 0 to 10 with 0 not stressed at all and 10 extremely stressed, how would you define your "stress level" during the past 2 months?*	[Any number between 0 and 10]	0-2 = 1 3-4 = 0.66 5-7 = 0.33 8-10 = 0	

	(Q60) To what extent do you agree with the following statement regarding yourself: "You know efficient practices or activities which help you to release stress".	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Calculated total indicator score		Average(Score Q59 and Q60)	
Attitude towards difficulties in life	*(Q62) To what extent do you agree with the following statement regarding yourself: "You face difficulties in life with zest for action and see them as an opportunity for learning and personal growth".*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	(Q63) To what extent do you agree with the following statement regarding yourself: "You get discouraged quickly when facing difficulties in life."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	(Q64) To what extent do you agree with the following statement regarding yourself: "You would be too ashamed or proud to seek help when facing a difficult time in life ""	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	Calculated total indicator score		Average(Score Q62, Q63 and Q64)	
Faith and spiritual fears	(Q65) *To what extent do you agree with the following statement regarding yourself: "You have a strong faith in god(s). This faith supports you when facing difficulties in life."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	(Q66) To what extent do you agree with the following statement regarding yourself: "Negative or evil forces and spirits have been trying to harm your household in the past 12 months".	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	This question tries to assess whether the household head believes in and fears some sort of evil forces.
	Calculated total indicator score		Average(Score Q65 and Q66)	
Long term vision	*(Q67) To what extent do you agree with the following statement regarding yourself: "You have a very clear idea of what you want to achieve for yourself and for your household in the long run."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	

Household's family situation				
Shared expenses and responsibilities	*(Q38) To what extent do you agree with the following statement regarding your household: "In your household, responsibilities and expenses are shared in a fair way among the household members."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
Household communication	*(Q39) To what extent do you agree with the following statement regarding your household: "In your household, you have a good communication"*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	(Q40) To what extent do you agree with the following statement regarding your household: "In your household, the household members express their feelings freely"	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	(Q41) To what extent do you agree with the following statement regarding your household: "In your household, important decisions which affect the whole household are discussed together"	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Calculated total indicator score		Average (Score Q38, Q39, Q40 and Q41)	
Household support	*(Q42) To what extent do you agree with the following statement regarding your household: "In your household, the household members support each other and can rely on each other"*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
Respect and trust among the household members	*(Q43) To what extent do you agree with the following statement regarding your household: "There are a lot of arguments in your household."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	(Q44) To what extent do you agree with the following statement regarding your household: "When there is an argument in your household, it happens sometimes that the household members insult each other."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	

	(Q45) To what extent do you agree with the following statement regarding your household: "When there is an argument in your household, it happens sometimes that the household members engage in physical violence."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	(Q46) "In your household, the household members trust each other".	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Calculated total indicator score		Average (Score Q43, Q44, Q45 and Q46)	
Presence of a single parent	(Q16) *Is there a single parent living in the household? – By this I mean someone who shoulders most or all of the day-to-day responsibilities for raising a child or children without the help of a partner.*	Yes, No	Yes = 0 No = 1	
Leadership	*(Q47) To what extent do you agree with the following statement regarding your household: "There is a someone in your household, who actively takes responsibility and action to handle things when there is a crisis – someone other household members can look to for guidance in life matters."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
Household's health situation				
Physical Health	(Q48) *How many household members have a poor or very poor health, if any?*	[Any number equal or above 0]		Due to the restriction in the number of questions, it was not possible to assess all the different possible health issues a household could experience. Therefore this pragmatic question was selected to get an idea of the health situation of a household.
	(Q9) How many household members does your household have?	[Any number above 0]		

	Calculated "poor health" sub-indicator value	[Q48/ Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	
	(Q49) *How many people in your household are suffering from at least one chronic disease like stroke, cancer, diabetes, obesity, hypertension, arthritis etc.?*	[Any number equal or above 0]		Chronic diseases have been selected in the questionnaire because based on key-informant Nr. 8 they are very common in the Seychelles and cause severe problems to the household.
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated "chronic disease" sub-indicator value	[Q49/ Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	
	(Q50) *How many people in your household need intensive home-care, if any?*	[Any number equal or above 0]		
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated "home-care" sub-indicator value	[Q50/Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	
	Calculated total indicator score		Average (score sub-indicator "poor health". "chronic disease and "home-care")	This averaging of the three sub-indicators "poor health", "chronic disease" and "home-care" could in some cases cause some problems which I want to illustrate with a fictive example. Imagine a household with 4 household members. One of the household members has a broken leg, one has arthrosis and one needs home-care. I could be that the household head indicates that one person has a poor health (the one with a broken leg), that one has a chronic disease

				(the one with arthrosis) and one needs home-care. This means that for each of the three sub-indicators, the resilience score would be 0.66 and therefore the total indicator score 0.66 even though 3 of 4 people have a health problem. If instead of asking three question, one would have only asked "how many people have health problems?" the answers would have been 3. 3 out of 4 people with health issues would then have had to be considered as rather bad in terms of resilience.
Mental health	*(Q51) How many household members have a mental disorder, if any?*	[Any number equal or above 0]		
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated sub-indicator "mental disorder" value	[Q51/Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	
	(Q52) *How many household members <u>in working age</u> are unable to work regularly due to a mental disorder, if any?*	[Any number equal or above 0]		This question tries to capture the severity of the health disorders in a household. However, it only catches the severity of the health disorders of people in working age.
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated sub-indicator "unemployable" value	[Q52/Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	

	(Q53) *How many household members are in psychotherapy at the moment, if any?*	[Any number equal or above 0]		This question also tries to capture the severity of the health disorders in a household.
	(Q9) How many household members does your household have?	[Any number above 0]		
	Calculated sub-indicator "psychotherapy" value	[Q53/Q9]	0-0.2 = 1 0.21-0.4 = 0.66 0.41-0.6 = 0.33 0.61- 1= 0	The difficulty with this question is that being in psychotherapy is negatively scored in terms of resilience. However, being in psychotherapy actually can be something very good for someone with mental health disorders and therefore might even increase resilience. This has become apparent in example case 4. Only 1 person of 3 with mental disorders is in psychotherapy. Therefore the household gets a rather good score in this section (0.66). However, it would be much more beneficial if the other two household members with mental disorders (drug addiction) also would seek some kind of help.
	Calculated total indicator score		Average (score sub- indicator "mental disorder", "unemployable" and "psychotherapy")	
Household's social interactions				
Financial social support	*(Q54) Imagine your household faces an emergency and immediately needs 3000 Rupee. How easy would it be to get the money from relatives outside the household or from friends?*	Very easy, rather easy, rather difficult, very difficult	Very easy = 1 Rather easy = 0.66 Rather difficult = 0.33 Very difficult = 0	
Moral social support	*(Q55) To what extent do you agree with the following statement regarding your household: "If your household would face a difficult situation in life, relatives from outside the household or friends would provide you strong moral support."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	

Neighbourhood situation (Cooperation and security)	*(Q56) To what extent do you agree with the following statement regarding your neighbourhood "In your neighbourhood, people support each other"*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Q57) " To what extent do you agree with the following statement regarding your neighbourhood: "You live in a safe neighbourhood."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
	Calculated total indicator score		Average (Score Q56 and Q57)	
Distance to supportive family members	*(Q58) To what extent do you agree with the following statement: "You have relatives who live in close distance and you actively support each other in daily life (for example sharing fruits from the garden, looking after the children, caring for the elderly, helping each other out with car-transport etc."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 1 Rather agree = 0.66 Rather disagree = 0.33 Strongly disagree = 0	
Perceived political victimisation	*(Q76) To what extent do you agree with the following statement regarding yourself: "You feel that your household or you personally have been politically victimized in the past three years."*	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	(Q77) To what extent do you agree with the following statement regarding yourself: "You don't talk freely about your political opinion in public because you fear to be politically victimized."	Strongly agree, rather agree, rather disagree, strongly disagree	Strongly agree = 0 Rather agree = 0.33 Rather disagree = 0.66 Strongly disagree = 1	
	Calculated total indicator score		Average (Score Q76 and Q77)	
Household's Infrastructure				
Tenure	(Q24) Tenure of the house/flat:	Owner occupied, no loan Owner occupied, with loan Rented from government/parastatal Rented privately and rent free Homeless	Owner occupied, no loan = 1 Owner occupied, with loan = 0.75 Rented from government/parastatal = 0.5 Rented privately and rent free = 0.25 Homeless = 0	

House Construction Type	(Q36) Construction of the house [by observation]	Stone/Blocks Wood/Corrugated Iron	Stone/Blocks = 1 Wood/Corrugated iron = 0	
State of repair	(Q37) State of repair [by observation]	Very good (watertight and solidly built) Fair (Others that fall in-between good and poor) Poor (looks unsound and leaking, may need major re-pairs in next few years)	Very good (watertight and solidly built) = 1 Fair (Others that fall in-between good and poor) = 0.5 Poor (looks unsound and leaking, may need major repairs in next few years) = 0	
Likelihood of dam-age from heavy rain	*(Q27) In the face of heavy rain, how likely is it that you experience major damage to your home by flooding or landslide?*	Definitely, Likely, Unlikely, Not likely at all	Definitely = 0 Likely = 0.33 Unlikely = 0.66 Not likely at all = 1	
Household security	(Q28) *Does your house/flat have burglar bars?*	Yes, No		
	(Q29) *Does your house/flat have an alarm system?*	Yes, No		
	(Q30) *Does your house/flat have a dog as protection?*	Yes, No		
	Calculated total indicator score		3 x No = 0 1 x Yes = 0.5 2 x Yes = 0.8 3 x Yes = 1	This indicator is scored in an unbalanced way. Instead of scoring 3x No with a 0, 1 x Yes with 0.33, 2 x Yes with 0.66 and 3 x Yes with 1, I scored 1 x Yes with 0.5 and 2 x Yes with 0.8. In my opinion, having one of the three security measures already increases the security of a household considerably and therefore 0.3 seemed to be too low.
Water storage	(Q31) *Do you have a drinking water tank?*	Yes, No	Yes = 1 No = 0	
	(Q32) *Do you have a rainwater tank?*	Yes, No	Yes = 1 No = 0	
	Calculated total indicator score		Average (Score Q31 and Q32)	
Ownership of vehi-cle	(Q33) *Does any household member have a motorized vehicle*	Yes, No	Yes = 1 No = 0	

Paved road access	*(Q35) How long does it take <u>for a healthy person</u> to walk from the house/flat to the next road (accessible by a vehicle)?*	<30 seconds 30 – 60 seconds 1-2 minutes >2 minutes	<30 seconds = 1 30 – 60 seconds = 0.66 1 – 2 minutes = 0.33 >2 minutes = 0	This question serves as a proxy for the distance and the difficulty of the path from the household to the next paved road access.

Appendix 10

Composite indicator questionnaire (English)

Resilience-Survey

(Q1) ID		**(Q4) Interviewer Code**	
(Q2) District		**Interviewer Signature**	
(Q3) Date of Interview *[DD,MM,YYYY]*		**(Q5) Start time** *[24 hour clock, hh:mm]*	

[Make sure that you have the household head as respondent. The household head is the person who is mainly responsible for managing the budget and making important decisions.
Don't leave any response field empty. Indicate if the respondent was not able to or did not want to answer a question]

Thank you very much for agreeing to participate in this survey. Let's start with a short introduction:

This questionnaire was developed by a Swiss student as part of his Master thesis in close collaboration with the National Bureau of Statistics. The questionnaire assesses resilience of households. Resilience describes the ability of a household to withstand or recover from disturbances. Disturbances affecting a household can be a job-loss, health-issues, natural hazards and many others. The questionnaire tries to assess how well equipped households are to withstand or recover from these disturbances. The information collected with this questionnaire will help to better understand the situation of households in Seychelles and what is needed to improve it. You help us to improve this tool by participating in this interview. I would like to remind you that this questionnaire is anonymous and that there will be no way to link you to your answers. The information will remain confidential. We aim to protect your privacy because we want you to feel free in answering our questions. We know some questions are more difficult to answer than others. Please take your time and relax. All the questions are about your life and your ideas. There are no right or wrong answers. If there is a question you do not want to answer please tell me and I will skip to the next question.

(Q6) Sex [by observation] *[1 = male, 2 = female]*		
(Q7) ***How old are you?*** *[Number of years]*		

(Q8) ***What is the highest level of education you have completed?*** **[tick only one]**

1 ☐ obligatory (primary/secondary) school not completed
2 ☐ obligatory (primary/secondary) school completed
3 ☐ Vocational school
4 ☐ Polytechnic school, A level or similar
5 ☐ University or equivalent

[read out] In this questionnaire, there will be many questions in regards to your household and the members of your household. We define a household as follows: "A household consists of one or more people who live in the same dwelling and eat together or from the same food supply". We define household members as all the people who live in your household at least 4 days per week. People who are victims of substance abuse and therefore only irregularly sleep at home are also considered as household members even if they live in the household less than 4 days per week. If there are people in your house who eat from another food supply, they are not considered as members of your household even if they are family members.	
(Q9) ***With the just mentioned definition of a household and of household members in mind, how many household members does your household have?***	
[Skip if only 1 household member] **(Q10)** ***Do all these people eat together or from the same food supply?*** *[1= Yes, 2=No]* **[If answer = no, explain definition of the term household again and revise Question 9. Make sure that the following questions and all the other questions related to the households are answered with the right definition of a household in mind]**	
(Q11) ***How many household members aged below 15 years does your household have?***	
(Q12) ***How many household members aged between 15 and 24 years does your household have?***	
(Q13) ***How many household members aged between 25 and 62 years does your household have?***	
(Q14) ***How many household members aged above 62 years does your household have?***	

[Skip if only 1 household member]
(Q15) ***How are the household members related to you?***
[tick all of the present relatives]

1 □ Spouse / Partner
2 □ Son or son in law
3 □ Daughter or daughter in law
4 □ Brother/Sister
5 □ Parent or parent in law
6 □ other relatives or friends

[Skip if only 1 household member]
(Q16) ***Is there a single parent living in the household? – By this I mean someone who shoulders most or all of the day-to-day responsibilities for raising a child or children without the help of a partner.***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q17) ***Is there any household member who regularly plays games of chance – let's say more or less every week?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q18) ***Is there any household member who smokes cigarettes at least 4 days a week?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q19) ***Is there any household member who is a victim of alcohol abuse?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q20) ***Is there any household member who is a victim of drug abuse?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q21) ***Is there any household member who frequently pays for the services of sex workers – let's say more or less every week? I know that this is a highly sensitive question. I appreciate your valuable contribution and honest answer. You do not have to mention any names.***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q22) ***Do you get fruits, vegetables or other food from your garden?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know
[If Answer = No -> Skip Question Q23]

Now follows a question-type which will be used frequently in this questionnaire. I will read out a statement regarding your household and you have to indicate to what extent the statement is true for your household. You will have the option strongly agree, rather agree, rather disagree, strongly disagree or No answer / I don't know as showed on this Showcard. It might happen that you automatically want to answer with Yes or No when you hear the statement. However, we kindly ask to select one of the options on the Showcard since this enables us to collect more detailed information. The first statement I want to read out is the following one:

(Q23) ***"The quantity of food from your own garden is substantial for your food supply."***
[-> Showcard]

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

(Q24) Tenure of the house/flat:

1 □ Owner occupied, no loan-> *Q25*
2 □ Owner occupied, with loan -> *Q25*
3 □ Rented from government/parastatal -> *Q26*
4 □ Rented privately and rent free -> *Q26*
5 □ Homeless -> *Q26*

[only if dwelling owner occupied]
(Q25) ***Is your house/flat insured by a household insurance?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q26) ***Is the household content insured?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q27) ***In the face of heavy rain, how likely is it that you experience major damage to your home by flooding or landslide?*** **[-> Showcard]**

1 □ Definitely
2 □ likely
3 □ unlikely
4 □ Not likely at all
5 □ No answer / I don't know

(Q28) ***Does your house/flat have burglar bars?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q29) ***Does your house/flat have an alarm system?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q30) ***Does your house/flat have a dog as protection?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q31) ***Do you have a drinking water tank?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q32) ***Do you have a rainwater tank?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q33) ***Does any household member have a motorized vehicle? [remember, in this questionnaire we only consider someone as a household member if the person lives in the house at least 4 days a week or someone who is a victim of substance abuse and irregularly sleeps at home]***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q34) ***Is your house accessible by a vehicle?***

1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q35) ***How long does it take <u>for a healthy person</u> to walk from the house/flat to the next road (accessible by a vehicle)?*** **[combine own observation and answer from the respondent]**

1 □ < 30 seconds
2 □ 30 seconds – 60 seconds
3 □ 1-2 minutes
4 □ >2 minutes

(Q36) Construction of the house [by observation]

1 □ Stone/Blocks 2 □ Wood/Corrugated Iron 3 □ others, specify:_____

(Q37) State of repair [by observation]

1 □ Very good (watertight and solidly built)
2 □ Fair (Others that fall in-between good and poor
3 □ Poor (Looks unsound and leaking, may need major repairs in next few years)

I will again read out some statements in regards to you and your household. Please indicate for each statement to what extent you agree on it:

[Skip if only 1 household member]

(Q38) ***"In your household, responsibilities and expenses are shared in a fair way among the household members."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

[Skip if only 1 household member]

(Q39) ***"In your household, you have a good communication"*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

[Skip if only 1 household member]
(Q40) ***"In your household, the household members express their feelings freely"*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q41) ***"In your household, important decisions which affect the whole household are discussed together"*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q42) ***"In your household, the household members support each other and can rely on each other"*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q43) ***"There are a lot of arguments in your household."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q44) ***"When there is an argument in your household, it happens sometimes that the household members insult each other."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q45) ***"When there is an argument in your household, it happens sometimes that the household members engage in physical violence."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

[Skip if only 1 household member]
(Q46) ***"In your household, the household members trust each other".*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

In the next question I would like to talk about the presence or absence of a leader in your household. A leader is someone who actively takes responsibility and action to handle things when there is a crisis. I will again read out a statement and you will have to say to what extent you agree on it based on the Showcard. The statement is:

[Skip if only 1 household member]
(Q47) ***"There is a someone in your household, who actively takes responsibility and action to handle things when there is a crisis – someone other household members can look to for guidance in life matters."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

Now, I would like to ask you some questions in regards to the health situation of the household members. The presence of health issues in a household can be a burden for the household members and therefore influence a household's resilience.

(Q48) ***How many household members have a poor or very poor health, if any?***	
(Q49) ***How many people in your household are suffering from at least one chronic disease like stroke, cancer, diabetes, obesity, hypertension, arthritis etc.?***	
(Q50) ***How many people in your household need intensive home-care, if any?***	

The next four questions will be about the presence or absence of mental disorders in the household. Examples for mental disorders are drug addiction, alcohol addiction, depression, anxiety disorder, obsessive-compulsive disorder, schizophrenia, borderline personality disorder, anorexia and bulimia. These are just some examples of mental disorders.

(Q51) ***How many household members have a mental disorder, if any*****?**	
(Q52) ***How many household members <u>in working age</u> are unable to work regularly due to a mental disorder, if any?***	
(Q53) ***How many household members are in psychotherapy at the moment, if any?***	

Now, I would like to ask you some questions in regards to the social network of your household.

(Q54) ***Imagine your household faces an emergency and immediately needs 3000 Rupee. How easy would it be to get the money from relatives outside the household or from friends?*** **[-> Showcard]**

1 □ Very easy
2 □ Rather easy
3 □ Rather difficult
4 □ Very difficult
5 □ No answer / I don't know

I will again read out some statements in regards to you and your household. Please indicate for each statement to what extent you agree on it:

(Q55) ***"If your household would face a difficult situation in life, relatives from outside the household or friends would provide you strong moral support."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

(Q56) ***"In your neighbourhood, people support each other"*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

(Q57) ***"You live in a safe neighbourhood."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer /I don't know

(Q58) ***"You have relatives who live in close distance and you actively support each other in daily life (for example sharing fruits from the garden, looking after the children, caring for the elderly, helping each other out with car-transport etc."*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer / I don't know

Now, I would like to ask you some personal questions. Please remember that the information will be treated confidentially.

Let's start with talking about stress: Stress is a state of physical and mental tension caused by problems in your life. People under a lot of stress may experience headaches, minor pains and sleeping difficulties among other symptoms.
(Q59) ***On a scale from 0 to 10 with 0 not stressed at all and 10 extremely stressed, how would you define your "stress level" during the past 2 months?***

To what extent do you agree with the following statement regarding yourself:
(Q60) ***"You know efficient practices or activities which help you to release stress".*** **[-> Showcard]**

1 ☐ Strongly agree
2 ☐ Rather agree
3 ☐ Rather disagree
4 ☐ Strongly disagree
5 ☐ No answer /I don't understand the question

(Q61) ***What helps you to release stress?***

I will read out some more statements in regards to you. Please indicate for each statement to what extent you agree on it:

(Q62) ***"You face difficulties in life with zest for action and see them as an opportunity for learning and personal growth".*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q63) ***"You get discouraged quickly when facing difficulties in life."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q64) ***"You would be too ashamed or proud to seek help when facing a difficult time in life".***
[-> Showcard]

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q65) ***"You have a strong faith in god(s). This faith supports you when facing difficulties in life."***
[-> Showcard]

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q66) ***"Negative or evil forces and spirits have been trying to harm your household in the past 12 months".*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q67) ***"You have a very clear idea of what you want to achieve for yourself and for your household in the long run."***
[-> Showcard]

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q68) ***"It is the duty of government to provide the people with all they need since people contribute with their taxes."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

(Q69) ***"People have too high expectations of what government should do for them. People should rather take more self-responsibility."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

Let's briefly talk about lifestyle:

Do you feel that you are not up to standard and left out, if you don't **[read this sentence each time]**

(Q70) ***have a smart-phone*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q71) ***have a flat-screen TV*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q72) ***have cable-TV*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q73) ***have special rims at the car*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q74) ***organize big parties for special family events*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

(Q75) ***wear latest fashion*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

Let's very briefly talk about politics. I want to remind you that the information you provide is treated confidentially. There will be no way to link you to your answers. The aim of the questions related to politics is to find out to what extent people fear to be politically victimized. This fear might influence the household in a negative way and therefore reduces household resilience.

To what extent do you agree with the following statements regarding yourself:

(Q76) ***"You feel that your household or you personally have been politically victimized in the past three years."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

(Q77) ***"You don't talk freely about your political opinion in public because you fear to be politically victimized."*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer / I don't know

Now, I would like to ask you some questions in regards to the economic situation of the household. I know that these questions are highly sensitive. I appreciate your valuable contribution and I assure you that the information will be treated confidential. Please remember that this information will help to better understand the situation of the households in Seychelles.

(Q78) ***From all the household members, how many people do receive a regular income, be it from work, social welfare assistance, remittance, pension, school allowance or others?***	
(Q79) ***How many monthly income sources does your household have? (E.g. employment, social welfare, pension, remittance, etc.)*** **[Count all the different sources of income for the whole household, attention: difference to Q78 is that one person might have more than one monthly income. Give also attention to pension. One person can get two types of pension = already two sources]**	
(Q80) ***What is the average monthly <u>net income of</u> <u>your household</u> from all income sources including salary, pension, remittance, child maintenance allowance, social welfare support etc.*****? [after total deductions for taxes, insurances, loans and pension fund contribution]**	

To what extent do you agree with the following statements regarding your household:

(Q81) ***"The household income varies a lot between different times in the year"***
[-> Showcard]

1 □ Strongly agree -> Q82
2 □ Rather agree -> Q82
3 □ Rather disagree -> Q83
4 □ Strongly disagree -> Q83
5 □ No answer /I don't know -> Q83

(Q82) ***"What are the reasons for the income fluctuation?"***

_____

(Q83) ***"Social welfare assistance contributes largely to your household income."*** **[Attention: With social welfare assistance we mean means testing assistance for families with no or low income. Social welfare assistance is not referring to retirement benefit, allowance, invalidity or disability benefits etc. -> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

Let's talk about cash savings:

(Q84) ***Imagine you lose all your sources of income for example by losing your job. For how many months would you be able to cover your expenses with your own <u>cash</u> savings without reducing the expenses?*** **[Attention: Only include private expenses, don't include expenses related to a business like salary for employees of the own business etc.]**

(Q85) ***Which of the following statements best describes your situation in regards to saving practices? Please note that we are <u>not</u> considering life assurances and pension payments as savings in this question.*** **[tick only one option-> Showcard]**

1 □ I'm usually not able to make any savings
2 □ I'm sometimes able to make some savings but I normally use it in the same year.
3 □ I'm able to make some savings on a regular basis. I have more savings today than one year ago.
4 □ I have enough savings to feel secure and ready for most eventualities.

(Q86) ***Do you have a life assurance?*** 1 □ Yes / 2 □ No / 3 □ No answer or I don't know

To what extent do you agree with the following statements regarding your household:

(Q87) ***Does any household member have debts at the moment?***
1 □ Yes / 2 □ No / 3 □ No answer or I don't know
[If Answer = No -> Skip Q88]

(Q88) ***"Your current debt repayments and interest on debts are a huge financial burden for your household"*** **[-> Showcard]**

1 □ Strongly agree
2 □ Rather agree
3 □ Rather disagree
4 □ Strongly disagree
5 □ No answer /I don't know

The next question refers to budgeting practices.

(Q89) ***"You usually make a budget for your expenses."*** **[-> Showcard]** 1 □ Strongly agree 2 □ Rather agree 3 □ Rather disagree 4 □ Strongly disagree 5 □ No answer / I don't know	
(Q90) ***"You <u>don't</u> know how much money you spent in the last month and for what you spent it."*** **[-> Showcard]** 1 □ Strongly agree 2 □ Rather agree 3 □ Rather disagree 4 □ Strongly disagree 5 □ No answer / I don't understand the question	
(Q91) End-Time [24 hour clock, hh:mm]	
This was my last question. I want to thank you very much for your valuable contribution. Do you have any questions to me?	

Appendix 11

Composite indicator questionnaire (Creole)

Resilience-Survey

(Q1) Nimero endentite		**(Q4) Kod enketer**	
(Q2) Distrik		**Sinyatir enketer**	
(Q3) Dat enterogasyon *[Dat,Mwan,Lannen]*		**(Q5) Ler konmanse** *Ler an system 24 er (hh:mm)*	

[Sa dimoun ki ansarz en fwaye i responsab pou zer bidze sa fanmir e fer bann desizyon ki responsab. -> Pran sa dimoun ki responsab pou reponn tou kestyon. Pa kit okenn landrwa vid. Endike si sa dimoun pa ti kapab ou pa ti oule reponn okenn kestyon.

Mersi bokou pou agree pou partisip dan sa serve. Annou konmans ek en kourt entrodiksyon.

Sa kestyonner in ganny devlope par en etidyant sorti dan en liniversite an Swiss an kolaborasyon avek Biro Nasyonal Statistik. Sa kestyonner devret kapab mezir nivo rezilyans dan bann fwaye. Rezilyans i dekri kapasite en fwaye pou debout for, reziste e repran kont bann fleo ou problenm. Bann diferan fakter ki kapab afekte en fanmir i varye, i kapab lapert en lanplwa, maladi, en lanmor dan la fanmir e plen lezot. Bi sa kestyonner se pou mye evalye ki pli byen ekipe bann fwaye i été pou kapab fer fas oubyen reziste kont bann fleo sosyal. Lenformasyon kolekte dan sa bann kestyonner pou ede mye konpran sitiasyon bann fwaye dan Sesel e ki keksoz ki kapab ganny fer pou amelyor zot. Nou dan son premye faz. Nou pe teste sa bann kestyonner dan diferan fwaye pou vwar si bann kestyon ki marse e ki bann ki pe poz difikilte. Ou partisipasyon pou vin en gran led dan sa resers .Mon oule asir ou ki ou partisipasyon ek bann larepons ki oun donnen pou reste konfidansyel e anonim. Ou devret santi ou lib e konfortab an repondan nou bann kestyon. Serten kestyon pou paret pli fasil pou reponn ki lezot alor pran ou letan. Tou keston i baze lo lavi e ou bann lide. Napa okenn larepons ki pou ganny konsidere byen ou mal. Si i annan okenn keston ki ou pa santi ou konfortab pou reponn endik mwan e mon a sote.

(Q6) Seks [par lobzervasyon] *[1 = mal, 2 = femel]*		
(Q7) ***ki laz ou annan ?*** *[kantite lannen]*		

(Q8) ***Ki ou pli o letid oun fer?*** **[tik enn selman]**

1 ☐ obligatwar (primer /segonder) pann konplet lekol
2 ☐ obligatwar(primer/segonder) konplet lekol
3 ☐ Lekol vokasyonnel
4 ☐ Lekol Polyteknik, A level oubyen ekivalan
5 ☐ Liniversite oubyen lekivalan

[Lir] Dan sa kestyonner, bann kesyon pou an rapor avek ou fwaye e lezot manm ou fanmir. En fwaye i ganny definir koumsa: "En fwaye i konstyen enn ou plizyer dimoun ki pe okip sa landwra, reste la, ki pe manz ansanm ouswa partaz manze..". En fwaye i ganny definir par lakantite dimoun ki reste dan sa landrwa o mwen 4 zoue par semenn. Okenn manm, lafanmir ki lo okenn sibstans e ki pa vin regilyerman kot sa fwaye i osi devret form par sa fwaye menm si i absante mwens ki 4 zour par semenn. Si i annan okenn manm ou fanmir ki manz ayer zot pa ganny konsidere en manm ou fwaye menm si zot en manm ou fanmir.	
(Q9) Avek sa definisyon en fwaye e lezot manm ou fanmir an tet, konbyen manm i annan dan ou fwaye?	
[Al lo lot kestyon si i annan zis en manm dan sa fwaye] ***(Q10)Eski tou sa bann dimoun i manz ansanm oubyen partaz menm komodite?*** **[1=Wi, 2=Non]** **[Si larepons i non, eksplik definisyon en fwaye, eksplik ankor e revize. Fer sir ki apartir kestyon nimero 9 tou bann kestyon i ganny reponn an relasyon ek bon definisyon an tet lo kwa en fwaye]**	
(Q11) Konbyen manm dan ou fwaye i aze anba 15 an?	
(Q12)Konbyen manm dan ou fwaye i aze ant ant 15 a 25 an?	
(Q13) Konbyen manm dan ou fwaye i aze ant 25 a 62 an?	
(Q14) Konbyen manm dan ou fwaye i aze par lao 62 an?	

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q15) Ki relasyon familyal sa bann manm dan ou fwaye i trouve pou ou?
[Met en tik kotbann manm fanmir]

1 □ madanm / Partner
2 □ Garson ouswa zann
3 □ Fir ouswa bel fiy
4 □ Frer/Ser
5 □ Paran ouswa boper ouswa belmer
6 □ Lezot manm fanmir ouswa zanmi

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q16) Eski i annan en paran tou sel ki pe reste dan sa fwaye? – Par sa mon le dir en dimoun ki annan tou resposabilite tou le zour pou elve en zanfan ouswa plizyer zanfan san led son partner.
1 □ wi / 2 □ Non / 3 □ napa larepons ouswa mon pa konnen.

(Q17) ***Eski i annan okenn manm lafanmir ki al dan kasino ? – Pliz ou mwen enn fwa par semenn?***
1 □ wi / 2 □ Non/ 3 □ Napa larepons ouswa mon pa konnen.

(Q18) Eski i annan okenn manm dan lafanmir ki fim sigaret (ki vann laboutik) omwen 4 fwa par semenn?
1 □ wi / 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q19) ***Eski i annan okenn manm lafanmir ki viktim labi lalkol?***
1 □ Wi/ 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q20) ***Eski i annan okenn manm lafanmir ki viktim labi drog?***
1 □ Wi/ 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q21) Eski i annan okenn manm lafanmir ki pey servis bann prostitye souvan (anou dir pliz-ou-mwen enn fwa par semenn)? Mon konnen sa i en kestyon tre sansib e personnel. Mon apresye ou bann larepons valab e onet. Ou pa bezwen mansyonn okenn non.
1 □ wi/ 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q22)Eski okenn manm lafanmir i kiltiv fri, legim oubyen gro manze kot lakour pour zot prop konsomasyon ? **Silvouple, enkli ban fri ki dan zalantour menm si ou pann plante oubyen ou pa bezwen okipe.**
1 □ wi / 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen.
[Si larepons i non, sot kestyon nimero23.

A prezan sa bann kestyon ki swiz pou pran en formil ki nou pou rankontre souvan dan sa entervyou. Mon pou lir en fraz lo size ou lakour e ou pou dir mwan ki degree sa deklarasyon ki monn fer I vre. Ou pou an-nan opsyon vreman dakor, plito dakor, plito pa dakor oubyen vreman pa dakor.
I posib ou pou otomatikman anvi reponn WI oubyn NON letan mon pou lir bann deklarasyon. Me Selman mon pou demann ou pou selekte enn bann lareponse lo sa kart ki mon pou montre ou, akoz sa pou ed nou anmas lenformasyon da en fason pli detaye.
Mon pou a prezan lir ou en deklarasyon konseran ou pti zarden. Sil vou ple endike ki kantite sa i vre:

(Q23) ***"Sa ki nou kiltive dan lakour i anmenn en gran kontribisyon anver bidze nou fwaye".***
[-> Montre kart lenformasyon]

1 □ konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q24)Lapartenans sa lakaz ouswa flat:

1 □ okipe par son met, napa lonn lakaz *-> Q25*
2 □ okipe par son met, me pe pey lonn *-> Q25*
3 □ Lwe ek gouvernman / konpani paraetatik *-> Q26*
4 □ Lwe prive oubyen pa pe pey lokasyon *-> Q26*
5 □ Napa landrwa reste *-> Q26*

[Selman si son met pe okip sa landwra]
(Q25) Eski ou lakaz / flat in ganny kouver par en lasirans?
1 □ WI/ 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q26) Eski bann keksoz ki dan sa lakaz in ganny kouver par en lasirans?
1 □ wi / 2 □ Non / 3 □ Napa larepons ouswa mon pa konnen

(Q27)Dan le ka gro lapli, ki risk ou posibilite ou pou eksperyans later grennen ouswa linondayon?
[-> Montre kart lenformasyon]

1 □ Definitivman
2 □ Petet
3 □ Pa probab
4 □ Napa posibilite
5 □ Napa larepons/ mon pa konnen

(Q28)Eski ou lakaz / flat i annan "burglar bars"?

1 □ Wi / 2 □ Non/ 3 □ Napa larepons / Mon pa konnen

(Q29) Eski ou lakaz / flat i annan en system alarm ?

1 □ wi / 2 □ Non/ 3 □ Napa larepons / Mon pa konnen

(Q30) Eski ou lakaz / flat i annan en lisyen konman en proteksyon ?

1 □ wi / 2 □ Non / 3 □ Napa larepons / Mon pa konnen

(Q31)Eski ou annan en tenk delo potab (delo bwar/kwi manze)?

1 □ Wi / 2 □ Non / 3 □ Napa larepons / Mon pa konnen

(Q32) Eski ou fwaye i posed en tenk delo lapli ?

1 □ Wi / 2 □ Non / 3 □ Napa larepons /Mon pa konnen

(Q33) Eski okenn manm dan ou fwaye i posed en transpor ? [mazinen, nou pe konsider en fwaye ler nou annan bann dimoun ki pe reste dan menm lakaz e dormi dan menm lakaz o mwen 4 fwa par semen ouswa en dimoun ki victim labi sibstans e parfwa dormi kot lakour]

1 □ wi / 2 □ Non / 3 □ Napa larepons / Mon pa konnen

(Q34) Eski ou annan semen loto ki ariv kot ou lakour ?

1 □ wi / 2 □ Non / 3 □ Napa larepons / Mon pa konnen

***(Q35) Konbyen letan i pran en dimoun fit pou sorti kot ou lakaz / Flat pou ariv lo semen ki aksesib ek transport?* [analiz larepons sorti kot enketer]**

1 □ < 30 segonn
2 □ 30 segonn – 60 segonn
3 □ 1-2 minit
4 □ >2 minit

***(Q36) Materyo avek ki lakaz in ganny konstri* [etabli par lobzervasyon]**

1 □ Ros/Blok / 2 □ Dibwa / Tol/ 3 □ lezot, spesifye:_____

***(Q37) Leta reparasyon* [etabli par lobzervasyon]**

1 □ Tre bon (Tre for e in ganny byen batir)
2 □ Bon (ant bon e pa tro bon)
3 □ Pa tro bon (Pa an bonn eta, pa safe,paret koule, pou bezwen reparasyon dan detrwa lannen)

Mon pou ankor lir en deklarasyon baze lo ou e ou fwaye.Endike pou sak deklarasyon ki kantite ou dakor :

[Al lo lot kestyon si i annan zis en dimoun dan sa fwaye]
(Q38) ***"Dan ou fwaye, eski bann responsabilite ek depans i ganny i ganny byen partaze par bann diferan manm."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q39) ***"Dan ou fwaye, zot annan bon konminikasyon"*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q40) ***"Dan ou fwaye, bann manm i eksprim libreman zot santimay"*** **[-Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q41) ***"Dan ou fwaye,okenn desizyon ki afekte bann manm i ganny diskite ansanm"*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q42) ***"Dan ou fwaye,bann manm i siport kanmarad e zot kapab depan lo kamarad"*** **[->Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q43) ***"I annan bokou desagreman/dezakor/dispite dan ou fwaye."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Sote si i annan zis en dimoun dan sa fwaye]
(Q44) ***"Ler i annan en dispite/desagreman dan ou fwaye, parfwa bann manm i ensilte kanmarad."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q45) ***"Ler i annan en dispite /desagreman dan ou fwaye, parfwa i annan latak fizik parey tape, redi oubyen bat kanmarad parmi bann manm fanmir."*** **[-> Montre kart lanformasyon]**

1 □ Konpletman dakor
2 □ Enpr dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
(Q46) ***"Dan ou fwaye, bann manm i annan konfyans dan kanmarar".*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

[Al lo lot kestyon si i annan zis en manm dan sa fwaye]
Dan kestyon swivan, mon pou koz lo prezans en dimoun ki pran sarz oubyen pran responsabilite keksoz ler I annan en kriz oubyen keksoz grav ki arrive kot lakour, parey nou dir, en 'leader'. Ankor, mon pou lir en deklarasyon e ou pou dir mwan ki degre sa deklarasyon I vre.
(Q47) ***"I annan en dimoun dan fwaye ki aktivman pran responsabilite pou rezourd problenm e remedye sitiasyon ler i annan en problenm. En dimoun ki lezot manm fanmir i kapab sers gidans oubyen konsey. "***
[-> Montre kart lenformasyon]

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

Prezan mon pou demann ou en pe kestyon ki konsern e lasante ek bann manm dan ou fwaye. Bann problem lasante i kapab vin en lobstak e enflians zot fwaye e okazyonn en problem rezilyans.

(Q48) Eski i annan okenn manm dan ou fwaye ki annan en problenm lasante? Si wi, konbyen zot ki annan en tel problenm?	
(Q49) Konbyen manm dan ou fwaye ki pe soufer ek en maladi kronik tel ki latak, kanser, dyabet, obesite, tansyon, malad lezo eksetera?	
(Q50) Konbyen manm dan ou fwaye ki bezwen swen entansiv a plen tan?	

Sa 4 kesyon swivan i baze lo prezans e labsans maladi mantal dan ou fwaye. Legzanp bann maladi mantal ki koze par adiksyon drog, lalkol,depresyon, laper, obsesyon pou lord e lapropte, boulimi, personalite abnormal. Sa i zis detwra legzanp bann maladi mantal.

(Q51) Konbyen manm dan ou fwaye (si i annan), ki annan en maladi mantal?	
(Q52) Konbyen manm dan ou fwaye ki annan laz pou travay e pa pe kapab travay akoz problenm maladi mantal?	
(Q53)Konbyen manm dan ou fwaye ki pe swiv tretman pou maladi mantal pour le moman?	

Aprezan mon oule demann enn de kestyon an relasyon avek ou relasyon sosyal dan ou fwaye.

(Q54) Fer kwar ou fwaye i bezwen 3000 roupi pou en ka irzan. Eski ou pou war li fasil pou ganny en tel sonm sorti kot bann manm ou fanmiy ki pa reste ek ou, oubyen zanmi? **[-> Montre kart laenformasyon]**

1 □ Tre fasil
2 □ Ase fasil
3 □ Ase difisil
4 □ Tre difisil
5 □ Napa larepons / Mon pa konnen

Mon pou lir ankor enpe deklarasyon ki konsern ou ek ou fwaye. Sil vou ple endik pou sak deklarasyon ki kantite ou dakor avek:

(Q55) ***"Si ou fwaye pou fer fas ek en sitiasyon difisil dan lavi, eski bann manm ou fanmiy ki pa reste ek ou ouswa zanmi pou donn ou sipor moral ki ou bezwen."*** **[-> Montre kart lenformasyon]**

1 ☐ Konpletman dkor
2 ☐ Enpe dakor
3 ☐ Pa tro dakor
4 ☐ Pa dakor ditou
5 ☐ Napa larepons / Mon pa konnen

(Q56) ***"Dan ou vwazinaz, bann dimoun i siport kanmarad."*** **[-> Montre kart lenformasyon]**

1 ☐ Konpletman dakor
2 ☐ Enpe dakor
3 ☐ Pa tro dakor
4 ☐ Pa dakor ditou
5 ☐ Napa larepons / Mon pa konnen

(Q57) ***"Eski ou viv dan en vwazinaz kot ou an sekirite."*** **[-> Montre kart lenformasyon]**

1 ☐ Konpletman dakor
2 ☐ Enpe dakor
3 ☐ Pa tro dakor
4 ☐ Pa dakor ditou
5 ☐ Napa lareponsr / Mon pa konnen

(Q58) ***"Eski ou viv ase pros ek bann manm ou fanmiy e zot donn kanmarad sipor ek led dan lavi toulezour (par egzanp an partazan fri ki zot plante, ede vey zanfan, donn swen bann dimoun aze, ede avek transport kan i annan bezwen eksetera."*** **[-> Montr kart lenformasyon]**

1 ☐ Konpletman dakor
2 ☐ Enpe dakor
3 ☐ Pa tro dakor
4 ☐ Pa dakor ditou
5 ☐ Napa lareponsr / Mon pa konnen

Prezan mon pou demann en pe kestyon personnel. Mazinen ki ou bann lenformasyon pou ganny garde konfidansyel.

Annou koz lo STRESS : Stress i en leta fizik ek mantal ki ganny koze par problenm dan lavi. Dimoun anba stress i eksperyans latet fermal,douler ek problem pou dormi e lezot sentonm. (Q59) Lo en balans 0 ziska 10 avek 0 ki napa stress ditou e 10 ki tre stresan ,ki ou stress level pou sa dernyen 2 mwan?	

Ki nivo ou pou dakor ek sa deklarasyon swivan baze lo ou lekor:
(Q60) ***" Ou konnen e egzers bann bon pratik ek aktivite pou ed ou konbat stress".*** **[-> Montre kart lenformasyon]**

1 ☐ Konpletman dakor
2 ☐ Enpe dakor
3 ☐ Pa tro dakor
4 ☐ Pa dakor ditou
5 ☐ Napa larepons / Mon pa konnen/ Mon pa konpran kestyon

(Q61) Kwa ki ed ou pou konbat stress?	

Mon pou lir en pe deklarasyon an relasyon avek ou. Silvouple endik pou sakenn ki degre ou dakor:

(Q62) ***"Ou fer fas ek bann difikilte lavi dan en fason pozitiv e war zot konman bann loportinite pou avans devan e amelyor ou lavi an zeneral."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q63) ***'Ou ganny dekouraze fasilman kan ou rankontre difikilte dan lavi."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q64) ***"Ou santi ou onte ouswa orgeye pou rod led dan moman difisil dan ou lavi ".***
[-> Showcard]

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q65) ***"Ou annan gran lafwa dan Bondye. Sa lafwa i donn ou sipor ler ou pe fer fas ek bann difikilte dan lavi."***
[-> Montre kart lenformasyon]

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q66) ***"Bann lafors negativ ek bann move lespri in sey fer ou dimal pandan sa 12 dernyen mwan".*** **[-> Showcard]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q67) ***"Ou annan en vizyon kler ki ou anvi pou ou avek ou famir a lon term."***
[-> Montre kart lenformasyon]

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q68) ***"I devwar gouvernman pou donn dimoun tou sa ki zot neseser akoz zot pey taks."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa lareponsr / Mon pa konnen

(Q69) ***"Dimoun i annan tro bokou lekspektasyon lo sa ki gouvernman i devret fer pou zot. Dimoun i devret pran plis zot responsabilite."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

Brefman annou koz lo fason ki ou viv:

Eski ou santi ki ou pa lo nivo ki ou ti devret e ou santi ou rezete, si ou **[lir sak fraz]**

(Q70) napa en smart phone 1 □ wi / 2 □ Non / 3 □ Napa larepons / pa konnen
(Q71) napa en *flat-screen TV* 1 □ wi / 2 □ Non/ 3 □ Napa larepons / Pa konnen
(Q72) *napa cable-TV* 1 □ wi / 2 □ Non / 3 □ Napa larepons / Pa konnen
(Q73) *napa rims spesyal ek loto* 1 □ wi / 2 □ Non / 3 □ Napa larepons / Pa Konnen
(Q74) pa *organiz gro lafet pou rankont familial* 1 □ wi / 2 □ Non / 3 □ Napa larepons / Pa konnen
(Q75) pa *met lenz ki a lamod* 1 □ wi / 2 □ Non / 3 □ Napa larepons / Pa konnen

Annou koz brevman lo politik Mon anvi refer ou mazinen ki tou lenformasyon ki ou pe donnen pou reste konfidansyel. Pou napa okenn fason ki ou pou ganny asosye ek bann larepons ki ou pe donnen Lobzektif sa kestyonner avek politik i pou war ziska ki nivo dimoun i per vikyimizasyon politik. Sa lafreyer i kapab en-flians ou fwaye dan en fason negativ e kapab redwir nivo rezilyans dan ou fwaye.

Ziska ki nivo ou dakor ek sa deklarasyon swivan, baze lo ou lekor:
(Q76) ***"Ou santi ki ou fwaye ouswa ou menm in ganny victimize politikman pandan sa dernye trwa zan."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q77) ***"Ou pa koz ouvertman ou piblikman lo bann size politik akoz ou per ou a ganny viktimize."*** **[-> Montre kart lenformasyon]**

1 □Konpletman dakor
2 Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa lareponsr / Mon pa konnen

Prezan, mon pou demann enpe kestyon an relasyon ek sitiasyon ekonomik dan ou fwaye. Mon konnen ki sa bann kesyon i vreman sansib. Mon apresye ou kontribisyon e asir ou ki tou ou bann lenformasyon pou ganny trete avek konfidansyalite. Mazinen ki sa lenformation pou ede mye konpran sitiasyon lavi dan bann fwaye Seselwa.

(Q78) Konbyen manm dan ou fanmiy i resevwar en saler regilyerman, par son travay, lasistans sosyal, pansyon, alawens lekol e lezot form?	
(Q79) ***Konbyen larzan tou le mwan i antre dan ou fwaye ? (legzanp dan lanplwa, welfer sosysl, pansyon, remitans, eksetera.)*** **[Kont tou bann diferan sours reveni dan ou fwaye antye, atansyon : diferans avek kestyon nimero 79 i ki en manm lafanmiy i kapab ganny plis ki en saler par mwan oubyen plis ki en sours pansyon. De diferan pansyon i ganny konte koman de sours.**	
(Q80) ***Ki poursantaz saler mansyel an gro dan ou fwaye enkli tou lezot sours reveni parey pan-syon, saler, remitans, pansyon pou zanfan, welfer sosyal eksetera?*** **[Apre dediksyon total pou taks, lasirans, lonn , fon pansyon]**	

Ziska ki nivo ou dakor ek sa bann deklarasyon swivan konsernan ou fwaye :

(Q81) ***"Reveni dan fwaye i varye bokou pandan diferan letan dan lannen."***
[-> Montre kart lenformasyon]

1 □ Konpletman dakor -> Q82
2 □ Enpe dakor -> Q82
3 □ Pa tro dakor -> Q83
4 □ Pa dakor ditou -> Q83
5 □ Napa larepons / Mon pa konnen -> Q83

(Q82) ***Ki rezon pou sa bann variasyon dan reveni?***

_____

(Q83) ***"Lasistans welfer sosyal i kontribye bokou anver ou reveni dan ou fwaye."*** **[-> Montre kart lenformasyon]. Atansyon: Nou pe konsider zis welfer (ki ganny peye atraver lazans proteksyon sosyal) e non pa sekirite sosyal, ni bann benefis pou envalidite oubyen alawens lekol.**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

Annou koz lo larzan ki oun ekonomize:

(Q84) ***Mazinen si ou perdi tou ou sours reveni, par egzanp si ou perdi ou plas travay. Pour konbyen letan ou pou kapab pey tou ou bann depans <u>prive</u> an servan ou larzan ki oun ekonomize san redwir lakantite depans.*** **Pa konsider okenn depans relye avek biznes parey saler bann anploye.**

(Q85) ***Lekel dan sa bann deklarasyon swivan ki pli byen dekri ou sitiasyon dan la fason ki ou ekonomize? Nou pa pe consider lasirans lavi ek peyman pansyon en fason economize dan sa kestyon*** **[swazir zis en opsyon -> [Montre kart lenformasyon]**

1 □ mon pa kapab ekonomiz mon larzan
2 □ Parfwa mon ekonomize me mon servi li pandan menm lannen.
3 □Mon kapab ekonomiz mon larzan dan en fason regilye . Mon kapab ekonomiz plis ozordi ki enn an pase.
4 □ Mon annan ase larzan pou santi mwan an sekirite e pare pou laplipar evantyalite.

(Q86) ***Eski ou annan en lasirans lavi?*** 1 □ wi / 2 □ No / 3 □ Napa larepons / Mon pa konnen

Ki degre ou dakor ek sa bann deklarasyon swivan konsernan ou fwaye:

(Q87) ***Eski okenn manm fanmiy i anna det an se moman?***

1 □ wi / 2 □ No / 3 □ Napa larepons / Mon pa konnen
2 Si lareponse i « Non » al lo Q89

(Q88) ***"Ou bann depans regilye ek lentere i en gro problem finansyel pou ou fwaye"*** **[-> Montree kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa lareponsr / Mon pa konnen

(Q89) ***"Normalman, Ou plann bidze ou bannn depans."*** **[-> Montre kart lenformasyon]**

1 □ Konpletman dakor
2 □ Enpe dakor
3 □ Pa tro dakor
4 □ Pa dakor ditou
5 □ Napa larepons / Mon pa konnen

(Q90) ***"Ou <u>pa</u> konnen konbyen larzan oun depanse mwan pase e ki mannyer oun depans li ?."*** **[-> Montre kart lenformasyon]** 1 ☐ Konpletman dakor 2 ☐ Enpe dakor 3 ☐ Pa tro dakor 4 ☐ Pa dakor ditou 5 ☐ Napa larepons / Mon pa konnen / Mon pa konpran kestyon	
(Q91) Letan pour konplesyon [Ler an system 24er (hh:mm)]	
Sa ti mon dernyen kestyon. Mon anvi remersye ou pou ou bann kontribisyon. Eski ou annan okenn kestyon ?	

Appendix 12

Questionnaire for the evaluation of household dimensions which affect household resilience

Questionnaire: Assessing household characteristics which influence a households ability to deal with difficult situations

Introduction:

Andrin Schulthess, Master student at the Swiss Federal Institute of Technology (ETH Zurich), Switzerland currently conducts his Master Thesis in collaboration with the National Bureau of Statistics in the Seychelles. The aim of his master thesis is to develop an index which enables the assessment of the ability of a household to deal with disturbances. A household can be affected by many different disturbances, for example Job-loss of the household head, a severe illness of a household member, damage of the house through a natural hazard and many others. The disturbances can be social-related, health-related and economic-related. Not every household reacts the same way when exposed to such disturbances. Some households cope with such difficulties more successfully than others. A relevant question for the master thesis of Andrin Schulthess is how the households which better cope with such difficulties differ from households which struggle more. The present questionnaire should provide information to answer this question. *In this questionnaire a household is defined as follows: "A household consists of one or more people who live in the same dwelling and eat together or from the same food supply." This definition doesn't include institutional housing like homes for the elderly.*

Note: The information given in this questionnaire will be treated confidentially! The answers will be anonymized as soon as received. Andrin Schulthess is the only person who will be able to track the answers back to the interviewee. He will not share the personalized answers with anyone else - not within NBS nor outside NBS. The anonymized data set will be used for further analysis.

Table 1 lists a set of household characteristics which might influence a household's ability to deal with difficult situations as mentioned before. The questions in this questionnaire refer to this table and are found below the table.

Table 1: List of 27 household characteristics which might influence a household's ability to deal with difficult situations

Dimension		Characteristic	Explanatory notes
Household's economic situation	1	Household's total income	
	2	Household's type of income sources	e.g. number of income sources, income regularity, income security
	3	Household's saving habits and capacity	
	4	Household's budget management skills	Presence/absence of budgeting practices and keeping record of expenditures.
	5	Insurance coverage of the household and its members	e.g. health or life insurance for the household members, house insurance and others
	6	Dependency on financial support for basic needs	Household's dependency on welfare and other financial support
	7	Household's debt-burden	
	8	Ownership of assets	Household's ownership of car, TV, furniture etc.
	9	Presence of problematic expenditure patterns	e.g. Prioritising expenditures towards substance abuse, gambling, prostitution
	10	Ownership status of the dwelling	Describes whether the house is owned or rented and if rented, whether the house is rented on the private market or rented from government
Household composition	11	Household size & demographic structure	e.g. Number of household members, age of household members, marital status, single-headed households or not
	12	Education of household member	
	13	Religious practices and beliefs of the household members	
	14	Household's atmosphere	presence/absence of a warm and respectful atmosphere, degree of solidarity among the household members
	15	Way of decision making & communication	E.g. How are the household-related decisions (e.g. expenses) taken? How are the opinions of the different household members taken into account? What are the communication habits and practices of the household?
	16	Presence of difficult behaviour in the household	e.g. substance abuse, domestic violence, criminal household members and family relationships issues within the household
	17	Household health situation	Physical and psychological health status of the household members
	18	Attitude of the household head(s)	e.g. attitude to life and work, sense of responsibility, acceptance of life circumstances
	19	Experienced level of stress of the household head(s)	This characteristic describes to what extent the household head(s) feels overwhelmed by his/her economic and social responsibility
	20	Exposure to disturbances in the past	The extent to which the household faced difficult situations in the past and had to find ways to adapt to them
Household's Connectivity	21	Household's connection to and position in social networks	Connectivity of the household to family, friends and others in the community for support in times of need
	22	Level of group membership of household members	Participation in community life outside the household
	23	Level of trust & cooperation within neighbourhood	Degree of trust & cooperation with people from the neighbourhood
	24	Type of information source	Use of national or international TV programs, radio, (online) newspaper, and/or social media as a source of information for the household
Infra-structure	25	Type of building	House structure type, resistance of the house to natural hazards, repair condition
	26	Level of self-subsistence	Household's capacity for self-sufficiency in producing own food and electricity and in storing water
	27	Community infrastructure	e.g. Road access to the house, distance to health facility, distance to day care
Answers for Question 2	28		
	29		
	30		
	31		

Question 1	Answer	Additional Comments
What is your sex? (male/female)		
What is your age?		
Do you have children? (Yes/No)		
How many persons with age below 15 years live in your household?		
How many persons with age between 15 and 24 years live in your household?		
How many persons with age between 25 and 62 years live in your household?		
How many persons with age above 62 years live in your household?		
What is the average monthly total gross income from all sources of your household? (including pension, remittance, social welfare and other financial support)		

Question 2

The household characteristics listed above might influence the ability of a household to deal with difficult situations. Some might influence in a good way by helping to deal with difficult situations and some might influence in a bad way by hampering to deal with difficult situations.

Did we miss some characteristics which influence a household's ability to deal with difficult situations?

Think about health-related difficulties, social-related difficulties, economic challenges, natural-hazard related difficulties and other difficulties which could affect a household and then think about which household characteristics would help or hamper to deal with these challenges. You can list the missing characteristics in the empty rows of table 1 above. Please list the missing characteristics also in the table of question 3 and 5.

Question 3

Imagine you want to get a complete picture of a household's general ability to deal with difficult situations. In order to achieve that, you do a household survey where you assess 10 of the above listed characteristics.

Which 10 characteristics would you choose for the survey and why?

Please fill in your answers in the table below. You can also choose characteristics which you might have added in question 2.

		Which 10 characteristics would you choose? Please indicate with a tick for each selected characteristic	*Please rank the 10 selected characteristics based on their importance from 1 to 10. Rank 1 means "most important". Every rank should be used only once.*	*Please describe in a few words, why you choose the characteristic.*
1	Household's total income			
2	Household's type of income sources			
3	Household's saving habits and capacity			
4	Household's budget management skills			
5	Insurance coverage of the household and its members			
6	Dependency on financial support for basic needs			
7	Household's debt-burden			
8	Ownership of assets			
9	Presence of problematic expenditure patterns			
10	Ownership status of the dwelling			
11	Household size & demographic structure			
12	Education of household member			
13	Religious practices and beliefs of the household members			
14	Household's atmosphere			
15	Way of decision making & communication			
16	Presence of difficult behaviour in the household			
17	Household health situation			
18	Attitude of the household head(s)			
19	Experienced level of stress of the household head(s)			
20	Exposure to disturbances in the past			
21	Household's connection to and position in social networks			
22	Level of group membership of household members			
23	Level of trust & cooperation within neighbourhood			
24	Type of information source			
25	Type of building			
26	Level of self-subsistence			
27	Community infrastructure			
28				
29				
30				

Question 4

Are there any characteristics listed in table 1 you feel describe the same thing?

If so, please list the various combinations of characteristics which describe the same thing below.

_____

_____

Question 5

Some household characteristics help or hamper to deal with many different kinds of difficulties and some only help or hamper to deal with few very specific difficulties. As an example: To have an own water tank is a characteristic of a household which only helps to deal with a very specific difficulty, namely with a drought period. Whereas having a high income helps to deal with a wide range of different difficulties.

Please tick for each characteristic (including for the ones you might have added in question 2) the most appropriate statement in the table below. Please tick only once per row.

		The characteristic helps or hampers to deal with many different kind of difficulties	The characteristic helps or hampers to deal with few different kind of difficulties	The characteristic doesn't influence a households ability to deal with difficult situations	I don't know
1	Household's total income				
2	Household's type of income sources				
3	Household's saving habits and capacity				
4	Household's budget management skills				
5	Insurance coverage of the household and its members				
6	Dependency on financial support for basic needs				
7	Household's debt-burden				
8	Ownership of assets				
9	Presence of problematic expenditure patterns				
10	Ownership status of the dwelling				
11	Household size & demographic structure				

12	Education of household member				
13	Religious practices and beliefs of the household members				
14	Household's atmosphere				
15	Way of decision making & communication				
16	Presence of difficult behaviour in the household				
17	Household health situation				
18	Attitude of the household head(s)				
19	Experienced level of stress of the household head(s)				
20	Exposure to disturbances in the past				
21	Household's connection to and position in social networks				
22	Level of group membership of household members				
23	Level of trust & cooperation within neighbourhood				
24	Type of information source				
25	Type of building				
26	Level of self-subsistence				
27	Community infrastructure				
28					
29					
30					

Any additional comments?

Thank you very much for taking the time to fill out the questionnaire!