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PATHWAYS TO THE IMPLEMENTATION OF TRANSDISCIPLINARY RESEARCH - THE CASE OF THE SUSTAINABILITY LEARNING LAB IN SEYCHELLES

Master's Thesis – MSc Agricultural Science

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Project Description

The Transdisciplinarity Lab (TdLab) of the ETH Department Environmental Systems Science (D-USYS) established a Sustainability Learning Lab (SLL) in the Seychelles in 2015 in collaboration with the University of Seychelles (UniSey) and the Ministry of Environment, Energy and Climate Change (MEECC; in the meantime, renamed to Ministry of Agriculture, Climate Change and Environment MACCE). The function and main purpose of the Sustainability Learning Lab is to provide a learning and activity platform for students, teachers, researchers and actors from local government, the private sector and civil society (Krütli et al., 2018b); where transdisciplinarity (e.g., Lang et al., 2012) is the scientific vehicle that fuels the lab. Some of the first research and teaching activities as part of the SLL were studies on solid waste management, a pressing sustainability issue for the island state. The two transdisciplinary case studies (tdCS) in 2016 (Lai et al., 2016) and 2018 (Krütli et al., 2018) with students from ETH and the University of Seychelles (UniSey) and in close collaboration with the MEECC, produced scientific reports with the goal to inform policy makers (Meylan et al., 2018). Furthermore, internships and master's theses on e-waste recycling were conducted (Rapold, 2019; Rajković, 2018; Williams, 2020). In 2021 a third tdCS was completed on the topic «Sustainable land use – the Seychelles transport system» (Krütli et al., 2022) also accompanied by master's theses. Several other topics such as plant and river rehabilitation, agriculture in small developing island states (SIDS), household resilience, planning processes or the potential for roof top PV were researched in the SLL as well. All the activities have in common that they are jointly framed together with local partners (e.g., MACCE) and have therefore a strong problem and solution orientation. The findings from the studies are intended to support the local government in its efforts to achieve more sustainable development and to promote its implementation. However, the uptake and implementation of findings and measures into the real world is a very challenging step of a transdisciplinary research project (Klein, 2008; Lang et al., 2012). The goal of this master's thesis is to take stock of the state of implementation of the provided research focusing on solid waste management and provide insights into the pathways of implementation as well as the governance setting in which this is taking place. The results are expected to give impulses to further improving the collaboration within the SLL and hence advance it towards its goal to help resolve or transition a societal problem.

The research question to be answered is:

What mode of use of the SLL-products, governance environment and pathways led to the current state of implementation of the research on solid waste management carried out within the SLL?

To do so:

- an overview will be given of the state of implementation of the suggestions and tools provided in the tdCSs and master's theses conducted on the topics solid waste management and transport
- a stakeholder analysis on the topics solid waste management and transport will be carried out.

- the pathways to implementation (and/or non-implementation) on solid waste management and transport are to be qualitatively investigated to provide insights into the dynamics of implementation or non-implementation.
- the pathways to implementation (and non-implementation) are to be analysed with the help of the Multiple Streams Approach (Kingdon, 2011) and the Kaleidoscope Model (Resnick et al., 2018)

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Acronyms and Abbreviations

AD	Anaerobic Digestion
AFD	Agence Française de Développement
AG	Attorney General
AIMS	Atlantic, Indian Ocean, Mediterranean, and South China Sea
CEO	Chief Executive Officer
COP	Conference of the Parties
COVID-19	Corona Virus Disease 2019
CV	Curriculum Vitae
DfCAPM	Department of Civil Aviation, Ports and Marine
DoLT	Department of Land Transport
Dopplmayr	Doppelmayr Seilbahnen GmbH
e.g.	exempli gratia (for example 
EDF	European Development Fund
EE	Electrical Equipment
EIA	Environmental Impact Assessment
EMPS	Environment Management Plan of Seychelles 2000 - 2010
EPA	Environment Protection Act
ETF	Environment Trust Fund
ETH	Eidgenössische Technische Hochschule Zürich (Swiss Federal Institute of Technology in Zurich)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FSPI	Fonds de Solidarité pour les Projets Innovants (Solidarity Fund for Innovative Projects)
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	Gesellschaft für Internationale Zusammenarbeit GmbH (German Agency for International Cooperation GmbH)
GSTC	Global Sustainable Tourism Council
HFC	Hydrofluorocarbon
HR	Human Resources
IEO	Independent Evaluation Office
IFC	International Finance Corporation
IMF	International Monetary Fund
IOC	Indian Ocean Commission
IOT	Indian Ocean Tuna Limited
IS	Institutional Strengthening Projects under the Multilateral Fund for the Implementation of the Montreal Protocol


ISLANDS	Implementing Sustainable Low and non-Chemical Development in SIDS GEF Programme
KM	Kaleidoscope Model
LDS	Linyon Democratic Seselwa
LWMA	Landscape and Waste Management Agency
MACCE	Ministry of Agriculture, Climate Change and Environment of the Republic of Seychelles
MIP	Multi-Annual indicative Work Programme
MSA	Multiple Streams Approach
MTR	Mid-term Review
Multilateral Fund	Multilateral Fund for the Implementation of the Montreal Protocol
NGO	Non-governmental Organization
OACPS	Organisation of African, Caribbean and Pacific States
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
PCU	GEF-UNDP Programme Coordination Unit
PDCS	Programme Development and Coordination Section
PET	Polyethylene terephthalate
PS	Principal Secretary
Resource Efficiency Project	Promotion and up-scaling of climate-resilient, resource efficient technologies in a Tropical Island Context GEF Project
S.I.	Statutory Instrument
S4S	Sustainability for Seychelles
SIDS	Small Island Developing State
SLL	Sustainability Learning Lab
SPPF	Seychelles People's Progressive Front
SPTC	Seychelles Public Transport Corporation
SRC	Seychelles Revenue Commission
SSDS	Seychelles Sustainable Development Strategy 2012 – 2020
SSTF	Seychelles Sustainable Tourism Foundation
STAR	System for Transparent Allocation of Resources
SWM	Solid Waste Management
SYAH	SIDS Youth AIMS Hub Seychelles
tdCS	Transdisciplinary Case Study
TdLab	Transdisciplinarity Lab at ETH Zurich
TOR	Terms of Reference
TWENex	Transformation of the waste sector towards a waste-energy nexus in the Southwest Indian Ocean region
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

UNWTO	World Tourism Organization
UniSey	University of Seychelles
USD	United States Dollars
WMF	Waste Management Fund
WTO	World Trade Organization

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Abstract

Transdisciplinary research has been and is being conducted in the Seychelles since 2015, when ETH Zurich together with the University of Seychelles and the Ministry of Environment, Energy and Climate Change (MACCE) established a Sustainability Learning Lab (SLL). While the range of topics researched was very broad, solid waste management and transport were two foci. The implementation of any research finding in the real world can pose a challenge. That also holds true for transdisciplinary research, that is conducted in close collaboration with stakeholders. Nevertheless, researching such implementation processes is relevant maybe especially for transdisciplinary research, as it's the clear goal of this collaborative knowledge production to contribute to the transition of a societal problem, as are solid waste management and transport in the Small Island Developing State Seychelles. While the SLL-products are found to be used for their data, it is difficult to verify a direct link to the implementation of policies and projects regarding solid waste management in Seychelles. The pathways that lead to this implementation are characterized by uncertainty regarding various types of resources.

1 Introduction

Seychelles is an island nation in the Indian Ocean consisting of 115 islands (of which 3 are inhabited). The country greatly profited from its geographical setting: The GDP has seen constant growth between 2008 and 2018, a development largely dependent on the tourism sector (Muhumuza et al., 2021; World Bank, n.d.-a). Since 2015, Seychelles is considered a high-income country (IEO - UNDP, 2020). Simultaneously, it is classified by the United Nations as a Small Island Developing State (SIDS) (United Nations, n.d.) and as such faces specific challenges, among them scarce land and few people.

To support the country with the sustainability challenges this entails, the Transdisciplinarity Lab (TdLab) of ETH Zurich established a Sustainability Learning Lab (SLL) in Seychelles in 2015 in collaboration with the University of Seychelles (UniSey) and the Ministry of Environment, Energy and Climate Change (In the meantime, renamed to Ministry of Agriculture, Climate Change and Environment: MACCE, shall from here on be called MACCE). The function and main purpose of the SLL is to provide a learning and activity platform for students, teachers, researchers and actors from local government, the private sector and civil society (Krütli et al., 2018).

One of the first sustainability issue that the SLL-members jointly decided to focus on in its research and teaching activities was solid waste management, a pressing  problem for the island state. The two transdisciplinary case studies (tdCS) in 2016 (Lai A., Hensley J., Krütli P., 2016) and 2018 (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018) with students  n ETH and UniSey and in close collaboration with the MACCE produced scientific reports with the goal to support policy makers (Meylan et al., 2018). Besides the tdCS, other SLL-products also focused on solid waste management: internships and master's theses on e-waste recycling were conducted (Rajković, 2018; Rapold, 2019; Williams, 2020). In 2021 a third tdCS was completed on the topic «Sustainable land use – the Seychelles transport system» (Krütli P., Nef, D., Kangethe, P., Etongo, D., Stauffacher, 2022) also accompanied by two master's theses in the area of transport (Schaniel, 2022; Simon, 2018). Several other topics continued to be researched in the SLL as well. All the activities have in common that they are jointly framed together with local partners (e.g., MACCE) and have therefore a strong problem and solution orientation. The findings from the studies are intended to support the local government in its efforts to achieve more sustainable development and to promote its implementation (personal Information Pius Krütli, September 2022).

In all its activities, the SLL works with and is based on the concept of transdisciplinarity. Transdisciplinarity is closely interlinked with sustainability challenges: It emerged from a discourse taking place in the second half of the 20th century about the role of science in society. New issues at stake – such as environmental sustainability – could no longer be accounted for solely with knowledge produced in classical scientific processes. The concept of transdisciplinarity dates to the 1970ies and gained momentum in the 1990ies. (Bernstein, 2015; Jahn et al., 2012; Pohl, 2008). In the year 2000, an international conference on transdisciplinarity was held in Zurich, setting the path for it to become a centre of the emerging field (Bernstein, 2015). The conference proceedings state that “the core idea of transdisciplinarity is different academic disciplines working jointly with practitioners to solve a real-world problem” (Klein et al., 2001)”.

By the early 2010-years, transdisciplinarity was deemed to have gained significant momentum (Klein, 2013) and an “evolving shared framework in the academic discourse” while also still facing critique and a lack of consensus regarding fundamental questions – such as a shared definition (Jahn et al., 2012). Pohl et al., (2017) describe the process of transdisciplinary research as one of providing links between the societal process – the realm of “practice”, “emphasizing the rationality of relevance and workability” – and the realm of science “driven by questions about how things are and how they function” (p. 44). However, the uptake and implementation of findings and measures into the real world is a very challenging step of a transdisciplinary research project (Klein, 2008; Lang et al., 2012). As it is the goal of transdisciplinarity to contribute to a real-world problem, this implementation is crucial for the success of any project adhering to these principles.

The SLL-products are mainly directed at policy makers and most of the suggestions would, to be implemented, need a political or policy decision. Hence the pathway from a suggestion to an implementation falls into two domains: First the suggestion has to (1) effectively pass into the domain of practice (as called in the aforementioned description of the transdisciplinary process) and (2) once the suggestion has taken this hurdle, the suggestion has to be made into a policy (or implemented in another way) by the actors within the domain of practice. The two main research fields relevant to this process question are for (1) boundary bridging and the uptake and implementation of scientific results in policy and for (2) how policy and decision-making processes work. The literature on both is vast. A short overview over (1) is given here while (2) will be further discussed in chapter 2.2.2.

While there is abundant research on the implementation and application of scientific research, respectively the “practice-science gap” or “research – implementation gap” and how to close it, there is barely any research specifically focusing on the implementation and application of results and products stemming from transdisciplinary processes. Transdisciplinarity happens to be on the “answer” side rather than the question side of this literature as it has been suggested as one approach to bridge the research – implementation gap (Knight et al., 2008; Pohl, 2008). Hence, research focusing on the requirements of effective bridging of science and practice can be assumed to also hold validity for transdisciplinary processes. The emergence of “boundary organizations” specifically concerned with such “boundary management” between science and policy has been suggested as a facilitating factor for this bridging (Cash, 2001; Cash et al., 2003; Guston, 2001). While transdisciplinarity can be seen as a general approach to bridge the boundary, the SLL can be considered such a boundary organization and all its products boundary objects. Therefore, research considering boundary bridging, organizations and objects hold relevance for the work of the SLL.

An effective bridging has long been considered to be greatly dependent on the credibility, salience (in other literature the term “relevance” is used instead (Sarkki et al., 2015)) and legitimacy of knowledge. These features are considered crucial requirements for knowledge to pass boundaries between science and other domains of society. The difficulty this entails is that there can be significant trade-offs between the three and that actors on the two sides of the bridge might lack a common understanding of the meaning of credibility, salience and legitimacy. (Cash et al., 2002)

Sarkki et al., (2015) propose that for the success of boundary organizations on the science-policy interface the credibility, legitimacy and relevance of the organization and its outputs is more relevant, than the credibility, legitimacy and relevance of the knowledge itself. The work also suggested “iterativity” to be added as a fourth main criteria, (others call it simply “building relationship” (Jacobs et al., 2005). Dilling and Lemos, (2011) argue that this is heavily dependent on actors and organizations deliberately taking on the task of creating these conditions for iterativity or “owning the problem” of usable science, (similar to the concept of boundary management) and characterize the production and uptake of knowledge as push-pull-process. According to Van Kerkhoff and Lebel, (2006) “owning the problem” has further consequences: They argue that the initiator of an engagement has the biggest say regarding structure and consequently the allocation of power.

Further positive impacts Dilling & Lemos, (2011) found on the uptake of knowledge are (1) users’ perception of specific benefits such as cost savings; (2) the existence of organizational resources such as technical capacity to understand climate information or (3) the presence of institutional support for the incorporation. The trust – analogous to the “credibility” – of users in the information and the accessibility also proved crucial. Additionally, even when information “might seem relevant in a general sense” the competition with other information and factors shaping the decision context might lead to the information not being used, e.g. because it “doesn’t fit policy goals” (Dilling & Lemos, 2011, p. 683).

Similarly, when Weichselgartner and Kasperson, (2010) analysed barriers in the science-policy-practice interface, one major reason they found for science not being implemented is that scientists propose solutions that are unworkable in practice “often due to a poor understanding of the institutional and other constraints to implementing changes in practice” (p. 273). On the other hand, they found the saliency of research to be improved when knowledge was co-produced for specific context and to meet local decision-making needs. For example, it has been argued that the information wishing to contribute has to be made available at the “right time” within the annual or seasonal decision making processes and hence researchers have to understand this processes (Jacobs et al., 2005). Also Morgenstern Brenner, (2011) points to the need for scientists to take into account the political-economic context as policy decisions are often driven by economic factors and political agendas. Inherent to taking these factors into account is the danger of science catering to the needs of already powerful groups potentially to the disadvantage of groups not holding thus power. Van Kerkhoff and Lebel, (2006) concluded that while there are no easy solutions to this tension, awareness is nevertheless crucial.

When working in “north-south” collaborations (as the SLL) de Vos and Schwartz, (2022) point out that addressing context to find credible, salient and legitimate solutions also means addressing questions of historical power. Research by people from high-income/ex-colonial/northern-hemisphere countries in formerly colonized/low/middle-income/southern-hemisphere countries has in recent years been criticized for reproducing power structures from colonial times, essentially exploiting the countries where they conduct their research (though it doesn’t lack a certain irony that a large proportion of this publication body is authored by “northern” researchers (Bradley, 2007)). A term often used is “parachute science”: Researchers come, take data (often with help of local researchers), leave to analyse data, and then advance their careers with hence analysed data ((de Vos, 2022; de Vos & Schwartz, 2022; Genda et al., 2022; Odeny & Bosurgi, 2022). While transdisciplinary or collaborative research partnerships, similar

to the use of science for policy making discussed above, has been suggested as a solution to that problem, these collaborations might nevertheless be reproducing asymmetrical relationships (Asare et al., 2022; Bender, 2022; Dannecker, 2022; Genda et al., 2022; Kotze & Dymitrow, 2022). They are also not free from political and power relations (Turnhout et al., 2020). Hence, collaborative and transdisciplinary projects are subject to the danger of knowingly or unknowingly exploitative practices as are others and require ongoing critical reflection (Bender, 2022; Dannecker, 2022). While this will not be the focus of this thesis it nevertheless seems important to have it in mind.

To understand context is also crucial according to the “how to guide” for actionable science that Beier et al., (2017) developed. In it, the notion of co-production is set as prerequisite for actionable science. “Recommended practices” 2 and 6 of the guide are:

2. For scientists to make sure you understand the decision to be made, and the environment in which the decision will be made before suggesting specific products (p.290)
6. For decision makers to explain to scientists how risk is evaluated and managed in their organization, to help scientists appreciate how they make informed decisions (not perfect decisions) despite uncertainty about current or future conditions and the outcomes of interventions. To explain the context in which decisions are made, the limitations on your authority, and to whom you are accountable (...). (p. 292)

This thesis will try to work on these two suggestions, improving the understanding of the decision-making context in Seychelles. These decisions made mainly concern new policies (or projects decided for in a similar context as policies). Explaining why and how a new policy is adopted and implemented is hence part of the context. It is also the topic of numerous theories, models, frameworks, and books (Cerna, 2013; Sabatier, 2007). The two models used later in this thesis are the Multiple Streams Approach and the Kaleidoscope Model and will be explained in the Methods and Procedure section (see chapter 2.2.2.). **When talking** about policies and solid waste management it is also important to know that the relationship between “good” policies and “good” solid waste management is not straightforward: Solid waste management is a problem of both technical and political complexity (Fourchard & Bekker, 2013). Accordingly, what and how policies (once decided on) lead to more efficient solid waste management is contested. Muheirwe et al., (2022) observed, that virtually all types of possible combinations exist between “adequate” regulation and the outcome on the ground in sub-Saharan Africa: some places have such an adequate regulation but nevertheless fail to implement it, some don’t have it but still manage their waste quite successfully and others have such policy, and it has shown a positive effect in terms of waste management.

The goal of this master’s thesis is to consider the uptake and implementation for the case of the SLL-products on solid waste management: It wants to understand how the products of the SLL are used and take stock of the state of implementation of the provided research on solid waste management and hence understand pathways to this implementation and the governance environment they are unfolding in. Wherever the “current” stage is mentioned, it means the stage as of November 2022.

This thesis will try to explain:

1. How the SLL-products are used
2. If suggestions provided in the SLL are being implemented
3. In what environment policy and decision-making for solid waste policies and projects take place
4. How policy and decision-making work in this environment
5. Which pathways led to the current stage of implementation of policies and projects related to the suggestions of the SLL
6. How these pathways can be characterized

The research question to be answered is:

What mode of use of the SLL-products, governance environment and pathways led to the current state of implementation of the research on solid waste management carried out within the SLL?

While the focus of this project is clearly on the SLL-work on solid waste management, considerations regarding the SLL-work on the more recent focus area of transport will be added at some points of this thesis to allow for a certain amount of comparison and to provide first insights into the implementation and uptake of these SLL-products on transport. The results are expected to give impulses to further improve the collaboration within the SLL and hence advance it regarding its goal to help resolve or transition a societal problem.

2 Methods and Procedures

The overall procedure to answer the above outlined research question entailed several steps: The previous work conducted in the SLL on solid waste management and transport was screened for the suggestions and tools it provided. Policies and projects connected to these suggestions and recently implemented or those attempted to be implemented were identified with a literature review and interviews. The data collected in the interviews and literature was used to retrace pathways leading to the current stage (current meaning as of November 2022) of implementation of these policies and projects and the governance environment they unfolded in. The Multiple Streams Approach and the Kaleidoscope Model were then applied to the pathways to provide structured insights into the pathways. Key stakeholders were identified with literature research and characterized with a stakeholder analysis. These steps will consecutively be explained in more details.

2.1 Data Collection

2.1.1 Literature review

A literature review was conducted to (1.) screen the previous work of the SLL on solid waste management and transport for the provision of suggestions and tools, (2.) identify stakeholders for a stakeholder analysis and the selection of interviewees, (3.) provide an overview of the history, economy, and government structure of the Seychelles necessary to characterize the governance environment and to enable an understanding of the dynamics unfolding in it, (4.) identify recent policies and projects implemented (or attempted to be implemented) in the area of solid waste management and (5.) identify

further areas within the broader topic of solid waste management where the SLL outputted a significant amount of work.

The previous work considered as sources of the above-mentioned suggestions and tools provided via the SLL were:

- Transdisciplinary Case Studies:
 - Lai A., Hensley J., Krütli P., (2016)
 - Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, (2018)
 - Krütli P., Nef, D., Kangethe, P., Etongo, D., Stauffacher, (2022)
- Master's Thesis & Internship Reports:
 - Rajković, (2018)
 - Rapold, (2019)
 - Williams, (2020)
 - Schaniel, (2022)



The suggestions and tools provided through these SLL-products were compiled in a list that can be found in Appendix B. Excluded from the analysis was one Master thesis in the area of transport. This due to the fact that it was never made publicly available.

2.1.2 Stakeholder Interviews

Representatives of government, NGOs, multilateral organizations, and the private sector were interviewed in 27 interviews. An overview over all interviewees can be found in Table 1. The main goals of the interviews were to gain information on (1) how the interviewees use the SLL-products and (2) the pathways leading to the stage of implementation of the defined policies and projects. A further goal of the interviews was as pointed out above the identification of other stakeholders not identified in literature research. Interviewees were provided with a power-vs.-interest-grid of stakeholders and asked to comment on it (see chapter 2.2.1). The interviews were semi-structured, using an interview guide and enriching it spontaneously based on previous answers of the interviewee (See Appendix A for the interview guide). Among others, questions on the use of the SLL-products and on the pathways were asked. The questions asked varied depending on the group the interviewee represented.

The interviews were approved by ETHs ethics committee (application EK-2022-N-177, final approval on the 6. October 2022). The interviews lasted between 30 and 120 minutes. They were conducted in person in Seychelles with three exceptions, which were conducted via phone or zoom. The interviews were conducted between mid-October and mid-December 2022. The interviews were recorded to prevent the loss of information with the exception of the cases where the interviewee asked for it not to be recorded. In all instances, notes were taken on a computer to later facilitate the analysis of the interviews. The interviewees were informed about the scope of the project with a simplified version of the proposal of the project, provided in an "Information and consent form". They were given the possibility to ask any arising questions.

Table 1: Name and organization of the interviewees. Where names are listed in the same row they were interviewed together.

Name	Organisation
Cliff Gonzalves	AAI Enterprise Pty Ltd
Francesca Adrienne	Brikole
Wim Van Breusegem	COWI A/S
Andreas Beer	Dopplmayr
Wallace Cosgrow	formerly MACCE
Didier Dogley	formerly MACCE
Rahul Mangroo	LWMA
Camille Mondon	LWMA
Nanette Laure	MACCE
Fredrick Kinloch	MACCE
Denis Matatiken	MACCE
Sharon Gerry	MACCE
Flavien Joubert	MACCE
Inese Chang-Waye	MACCE
Cindy Clair	MACCE
Fatime Kante & Evita Auguste	Ministry for Fisheries & Blue Economy
Patrick Andre	Ministry for Transport
Rickey Barbe	Ministry of Finance, National Planning and Trade
Marco Larsen	Ministry of Foreign Affairs and Tourism
Angela Servina, Julie Low, Bernard Belle	Planning Authority
Donald Ernesta	Redeem Center St. Louis
Rhoderick Rampal	SeyGlass
Marie-Therese Purvis	Sustainability for Seychelles
Victoria Alis	The Ocean Project
Alexander Mancham	UN in Seychelles and Mauritius
Preethi Sushil	UNDP
Marc Houareau	independent

2.2 Data analysis

2.2.1 Stakeholder Analysis

Important stakeholders identified through the literature research were placed on a power vs. interest grid for decision-making regarding solid waste management respectively transport according to how their interest and power were portrayed in literature (Bryson, 2004) to (1) effectively choose the interviewees for stakeholder interviews and (2) be able to better understand the dynamics behind pathways and trajectories of implementation.

Interviewees with a direct link to the decision-making processes regarding solid waste management (n=15) respectively transport (n=3) were asked to draw on the original version of the grid according to their reflections. Their comments were transferred from the print-out to the digital version of the grid.

2.2.2 Pathway Deduction and Analysis

With the literature review and interviews, new (initiated after 2015) projects and policies in the area of solid waste management and hence related to suggestions made by the SLL were identified, both such completed and ongoing. The goal of the pathway deduction was to use the information from interviews and literature to “puzzle together” as detailed as possible timelines, trying to understand actors and actions leading to the current stage of these projects and policies.

The following policies and projects were identified through literature review and stakeholder interviews:

- Introduction of a balloon ban
- Introduction of straw restrictions
- Introduction of a glass levy scheme,
- Purchase of a waste shredder
- Recycling of fishing nets by the company Brikole
- Efforts to implement a pilot project in Perseverance
- New composition of the LWMA board
- New solid waste management policy and solid waste masterplan
- New landfill-fees
- New levies on refrigerant equipment and gas

From the review of the SLL-products, areas where a substantial amount of work was provided were identified:

- Hazardous Waste
- Waste-to-Energy/Incineration

Also here, interviews and literature were used to deduct pathways and puzzle together actions that were taken in this area. For these timelines no clear timeframe was set but instead it was left to interviewee’s memory: Questions were asked relatively openly here on what the interviewees remember to have happened regarding these areas (see Appendix A) and also events recalled from before 2016 were taken into account.

From the area of transport, a project regarding a cable-car-connection was identified through a personal information due to its likelihood to get implemented and its strong connection to the work of the SLL.

The pathways leading to implementation or non-implementation that were “puzzled together” as described above were then analysed with the Multiple Streams Approach and the Kaleidoscope Model, that will be explained below. Both were developed to explain policy change but will here also be applied to projects emerging from the same or a very similar setting as policies and subject to similar decision processes.

2.2.2.1 *The Kaleidoscope Model*



The Kaleidoscope Model (KM) by Resnick et al. (2018) is the more structured approach of the two models used and was applied to gain an overview of the characteristics of the pathways. The KM identifies 16 key determinants for policy change. The pathways were checked for the presence of these

16 determinants and the type of influence on advancing it (positive, negative, mixed). It is a common feature of policy models to describe the process in stages. The names and numbers of these stages differ. In the KM, the stages of a policy cycle are called agenda setting, design, adoption, implementation and evaluation and reform. In the KM, the key determinants were assigned to these phases. For the application of the model to the pathways, where a factor was a relevant influence on the process but in a different phase that was considered a “present”. The bar for counting a determinant as “present” was set low: If there were credible hints from interviewees accounts towards a determinant, it was in the application of the KM considered to be present. The KM was in this thesis also applied to projects that are not directly policies but were (e.g., the purchase of the shredder) decided for in a policy environment and decided for through similar processes and by similar actors as the policies. The KM was also applied to the cable car project, even though these criteria were not strictly met, to test if it was nevertheless subject to similar determinants (as it still will partially be decided for by actors in the administration). Excluded from the analysis with the KM was the recycling of fishing nets, organized by the company Brikole, due to the fact that this project was largely implemented by private actors. An overview of the determinants and phases of the KM can be found in Figure 1. It seems important to point out that the factors can be overlapping or heavily dependent on one another. One single event/fact/circumstance can lead to the presence of several of the determinants.

The 16 determinants were originally identified by Resnick et al., (2018) by using previous work on policy change in African countries. When tested for cases in Zambia, nine of the factors always played a role in the policy change. Three of them were present in less than 75% of instances these being norms, biases, ideology and beliefs, propitious timing, and institutional shifts.

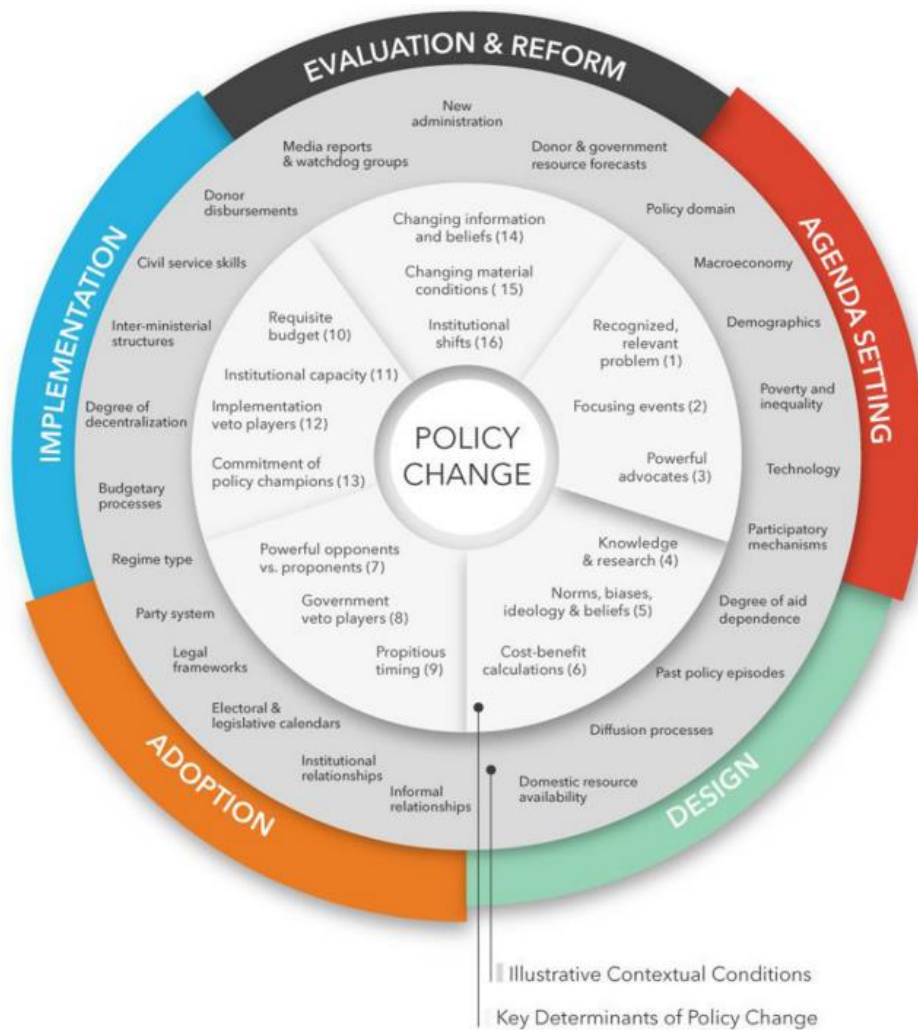


Figure 1: The Kaleidoscope Model of Policy Change with the 16 key determinants in the inner circle and possible influences on them in the middle circle. Source: (Resnick et al., 2018)

2.2.2.2 The Multiple Streams Approach

The structured approach of the KM is very useful to organise the analysis, but leaves “blind spots” that are outside that structure. To cover these “blind spots”, the Multiple Streams Approach (MSA) was applied. It is inherently designed to explain processes that are only partially structured. The model works with the presumption of “organized anarchies” with three main characteristics: problematic preferences, unclear technology and fluid participation. Problematic preferences are the notion that the organization runs on a “variety of inconsistent and ill-defined preferences” with the action shaping the preference instead of vice versa. Unclear technology means that the members of the organization don’t fully understand its processes and are much dependent on trial-and-error. Fluid participation is the variance of time and effort participants assign to different domains (Kingdon, 2011). Through the pathways deduced it was considered if the governance environment for Solid Waste Management can be considered such an “organized anarchy”. This was the case and the MSA was hence considered to be applicable. The MSA was originally designed to discuss agenda setting events but was later also applied the whole policy process (Zahariadis, 1992, 2003). Here, analogous to the KM, the MSA was applied to discuss the deduced pathways, examining whole process of decisions taken in a policy environment even when not resulting in policy.

The MSA was derived from the so-called Garbage Can Model. The Garbage Can Model was originally developed to explain decision making at universities in the 1970s (Fioretti & Lomi, 2008). It was “imported” and adapted to political science by Kingdon in 1984 (Béland & Howlett, 2016; Mucciaroni, 2012). The main feature of the MSA are the three streams “problems”, “policy” (or “solutions”) and “politics”. The three streams work largely independent from each other during normal times. The problems stream consists of issues deemed public, meaning in need of governmental attention. The policy stream is made up of the output of suggested policies. The policy stream is also called the policy primeval soup. Which ideas survive in the soup depend on their technical feasibility, resource adequacy and value acceptability. The politics stream then is the political landscape and changes to it. There are “policy windows” that can open, which are windows of opportunity for certain topics and their relevant policies. Policy windows open in the problems stream when a problem becomes especially accentuated, or in the politics stream, when a window of opportunity opens there, e.g., due to a new government or changes in high position. To make use of the policy window, all three streams have to be “ripe” and have to align: A policy-solution has to be coupled to a relevant problem and politics have to be in line with the suggested solution. (Kingdon, 2011)

The model introduces “policy entrepreneurs”, actively trying to manipulate the streams, respectively couple them for their preferred policies, called “pet solutions”. (Béland & Howlett, 2016; Kingdon, 2011; Mucciaroni, 2012; Sabatier, 2007). Policy entrepreneurs can be in or out of government, in appointed or elected positions, as long as they are advocates for a certain idea (Kingdon, 2011, p.123). Policy entrepreneurs are not merely sitting around waiting for policy windows to happen but also contribute to opening them (Natali 2004).

The MSA was for this thesis mainly applied to screen the pathways for policy windows and their use. It was tried to identify when policy windows opened in the pathways, what made these window open and what work happened in and on the streams until they could be coupled, and the window used. To do so the pathways were also screened for the presence of policy entrepreneurs.

3 Results

The results will try to give an overview how the SLL-products are used, how policy making for solid waste management in Seychelles works and in which environment the two happen. To do so the results will (1.) outline the contextual setting with the economy, history and politics of Seychelles, (2.) give an overview of the governance environment regarding the government-structure, legislative instruments and relevant processes, (3.) present the stakeholder analysis, (4.) describe how the SLL-products are used by interviewees, (5.) sketch the pathways of the policies and projects mentioned in chapter 2.2.2 and (6.) analyse the pathways with the KM and the MSA.

3.1 The Big Picture: Contextual Setting

Seychelles is a unique country, as very shortly described in the introduction. It is a high-income country, a SIDS, an ex-colony (of two different states). Some further insights into this complex setting are to be provided in this section.

3.1.1 Economy

In 2008 Seychelles faced a public debt crisis resulting in missed payments of public obligations, a near-exhaustion of foreign reserves and inflation. The country involved the International Monetary Fund (IMF) which led to a far reaching economic reform programme bringing about, among other things, the condition to aim for a yearly budget surplus, lasting until the present. (Government of Seychelles, 2019b; IMF, 2008; Rojid et al., 2013). Between the market liberalization in 2008 (IMF, 2013) and the onset of the Covid-19-pandemic the GDP/capita saw a constant growth. GDP/ capita was at 13,306.7 USD in 2021 (World Bank, n.d.-a). In 2015, the year of the onset of the cooperation of ETH with Seychelles, the country “graduated” to the list of high-income countries (IEO - UNDP, 2020; World Bank, n.d.-d).

Today’s economic prosperity of Seychelles is heavily dependent on the tourism sector (Muhumuza et al., 2021). The sector organized itself in several groups: There is a Seychelles Hospitality and Tourism Association (Seychelles Hospitality and Tourism Association, n.d.) and a Seychelles Sustainable Tourism Foundation (SSTF) (Seychelles Sustainable Tourism Foundation, n.d.). In 2017 the World Tourism Organization reported, that the SSTF wanted to support the Seychelles in becoming a destination certified by the Global Sustainable Tourism Council (GSTC) by 2022 (UNWTO, n.d.). The GSTC-certification criteria include requirements on solid waste management (GSTC, 2019). Especially the big dependency on tourism made the Seychelles a sensitive country to Covid-19 bringing about travel restrictions and tighter budgets for many people of the main customer-base of the tourism industry, the pandemic severely impacted Seychelles economy (World Bank, n.d.-c).

The second major economic pillar of Seychelles is fisheries (Muhumuza et al., 2021). The capital Victoria is home to the largest tuna hub in the Indian ocean with a majority of catches of the region passing through and canned tuna is the most important export-product of the island state (Caillart et al., 2019; Le Manach et al., 2015). The Seychelles have had a contract with the European Union (EU) allowing ships to fish for tuna in the waters belonging to the Seychelles since 1987. Under the current contract, in force since 2020 and valid until 2026, the EU pays 5’300’000 Euros yearly with 2’800’000 dedicated to the support of the fisheries sectors in the Seychelles. (European Commission - Oceans and Fisheries, n.d.). An evaluation conducted by the EU found several areas of dissatisfaction of local stakeholders with the contract (Caillart et al., 2019).

3.1.2 History

There is no knowledge of an indigenous population on the Seychelles. The islands were uninhabited when the French and their slaves first settled in 1770. At the time it was an outpost of the colony in Mauritius. As did the “mother colony”, the Seychelles fell to the British Empire in 1810. In the capitulation it was explicitly stated that the inhabitants were to keep their laws, customs, and religion. In practice that meant a mixing of French and British laws, a fact that caused friction when the British abolished slave trade in 1811 and slavery in 1835. In 1903 the Seychelles were “upgraded” from a dependency to a colony and hence “independent” from Mauritius. In 1976 the Seychelles became an independent nation. The years preceding were characterized by a further mixing of laws, languages and colour of skins, leading to a relatively homogenous creole population. The mixed colonial history left its trace until today: While the civil law is based on the French code civil, the public and criminal law stem from the British common law. (Robinson, 2019; Twomey, 2017)

3.1.3 Politics: Independence - Today

Less than a year after independence the Prime Minister Albert René overthrew the government. In 1979 the country was given a new, second constitution declaring the Seychelles as a socialist state with a one-party system under the Seychelles People's Progressive Front (SPPF). Its leader René had been involved in Seychellois politics well before independence. In 1993 the country was again given a new constitution, this time as a democratic state with a multiparty system (Twomey, 2017) and democratic elections were held (World Bank, n.d.-c). René remained president until 2004. He was succeeded by James Michel, who was in office until 2016. Before being elected president, James Michel had been a minister since 1977 and moved through a vast number of portfolio responsibilities ("President James Alix Michel's Biography," 2014). The party continued (through various renaming) to hold the president's office and a majority in parliament until 2016 when the opposition party Linyon Demokratik Seselwa (LDS) won the majority in the National Assembly. In the most recent presidential elections in 2020 their candidate Wavel Ramkalawan won, becoming the first ever successful opposition candidate. (Malbrook, 2018; Thande, 2016; Twomey, 2017, World Bank, n.d.-c)


In 2022 people connected to the former president were charged in a case of a donation of \$50 million which disappeared. The trial is planned for 2023 (Bonnelame, 2022; Muirhead, 2022). In 2018, a truth and reconciliation commission was established to "investigate alleged human rights violations in relation to the 1977 Coup" (Nicette, 2022; Truth Reconciliation and National Unity Commission, n.d.). The history of Seychelles as first a colony and then one party in power for 40 years came up with several interviewees without the interview guide planning for it. The interviewees mentioned it as a side note on various occasions, e.g., corruption when speaking of difficulties in financing certain ideas, the education system when speaking of difficulties in recruiting people or the alleged reluctance of people to take decisions. The Seychelles National Development Strategy speaks of "perceived high levels of corruption and political interference in the public service" (Government of Seychelles, 2019b, p.45).

3.2 The Medium-Sized Picture: Governance Environment

3.2.1 Government-Structure

The state of Seychelles is organized as a republic. President Ramkalawan as head of the executive oversees a cabinet with a total of 15 ministers, whom he appoints. Ministries are subdivided into departments; the head of a department has the title "principal secretary" (PS). While these departments are responsible for development of policy and regulatory frameworks, the responsibility to then put them into practice lies with so called authorities and agencies, which report to the ministries but enjoy (varying degrees) of independence. (Mols et al., 2020)

The legislature of the Seychelles is the National Assembly with 35 members. 25 of them currently belong to the ruling party LDS, the other 10 to the now opposition party United Seychelles. A term lasts five years. While the majority in parliament is led by a "leader of government business" – currently (September 2022) Bernard Georges – the opposition is led by a "leader of opposition" – currently Sebastien Pillay. (National Assembly of Seychelles, n.d.-b, n.d.-a; State House Seychelles - Office of the President, n.d.-a)

For this project mainly the Ministry of Transport and the Ministry of Agriculture, Climate Change and Environment are of interest. The Ministry of Fisheries and Blue Economy has the lead regarding circular economy, also potentially affecting solid waste management and is therefore mentioned. 

3.2.1.1 Ministry of Transport

The Ministry of Transport was founded in its current form in 2019 and is currently headed by Anthony Derjacques (Ministry of Transport - Republic of Seychelles, n.d.). The Ministry has several attached Agencies and Associations, such as the Seychelles Public Transport Corporation (SPTC) it is responsible for. The ministry is subdivided into the Department of Civil Aviation, Ports and Marine (DfCAPM) and the Department of Land Transport (DoLT). An overview over the organizational structure of the Ministry of Transport, as provided on its website can be found in Figure 2.

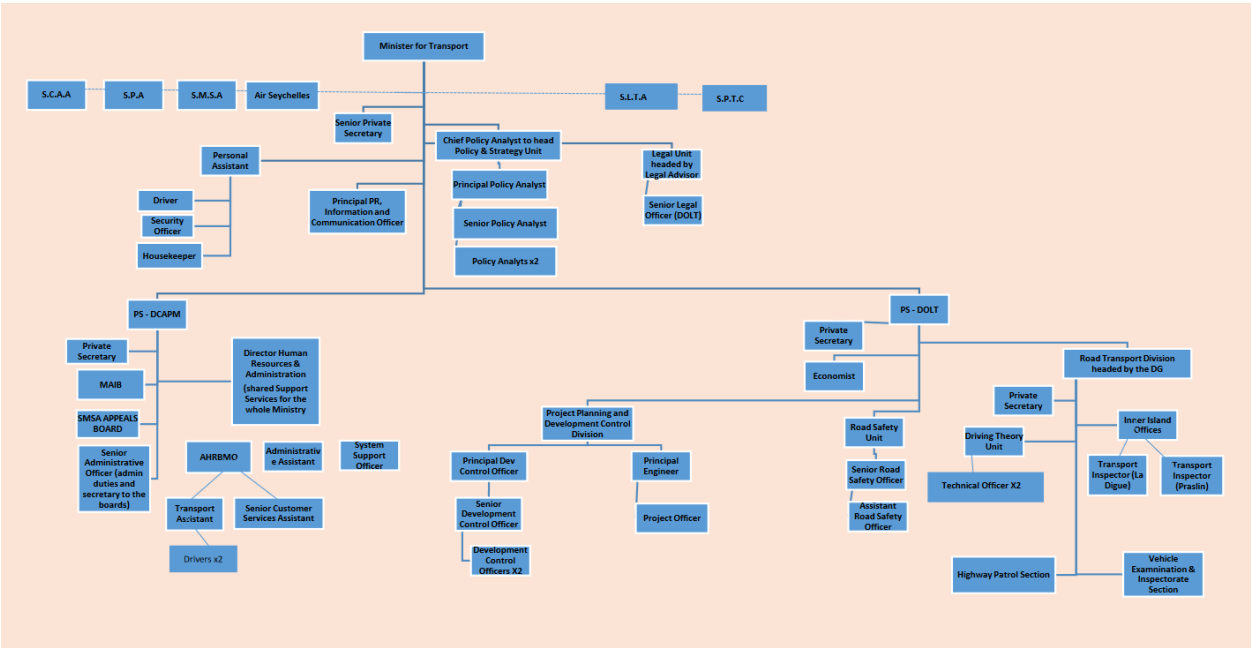


Figure 2: Overview over the structure of the Ministry of Transport. (<https://transport.gov.sc/images/Structure.pdf>, accessed 31.8.2022) 

3.2.1.2 Ministry of Agriculture, Climate Change and Environment

The Ministry of Agriculture, Climate Change and Environment (MACCE) is as of today headed by Flavien Joubert. It was formerly called the Ministry of Environment, Energy and Climate Change (UNDP & Rijkpma, 2022). Agriculture was formerly paired in a Ministry with Fisheries (Ministry of Fisheries and Agriculture - Republic of Seychelles, n.d.). Joubert himself headed the LWMA before his appointment as minister. (Ministry of Agriculture Climate Change and Environment - Republic of Seychelles, n.d.-b)

The MACCE is subdivided into the three departments agriculture, environment, and climate change. A diagram of the organization can be found in Figure 3. The department of climate change is currently undergoing restructuring with this diagram being subject to ongoing change, according to interviewees. Interviewees also mention that the agriculture department is in practice not very well integrated in the ministry and operates largely independent. A sign of this is for example that the agriculture department has its own HR section. Also, the organizational diagram seen below was compiled from two different ones provided by MACCE: One for the agriculture department, one for the other two. The HR and admin

section and the legal office report to the department of climate change but are content-wise also responsible for the department of environment.

The Programme Development and Coordination Section (PDCS) was founded in 2022, before it was called the GEF-UNDP Programme Coordination Unit (PCU), according to interviewees. The idea is to have a central responsibility within the ministry for donor-related projects (see also chapter 3.2.3.3.)

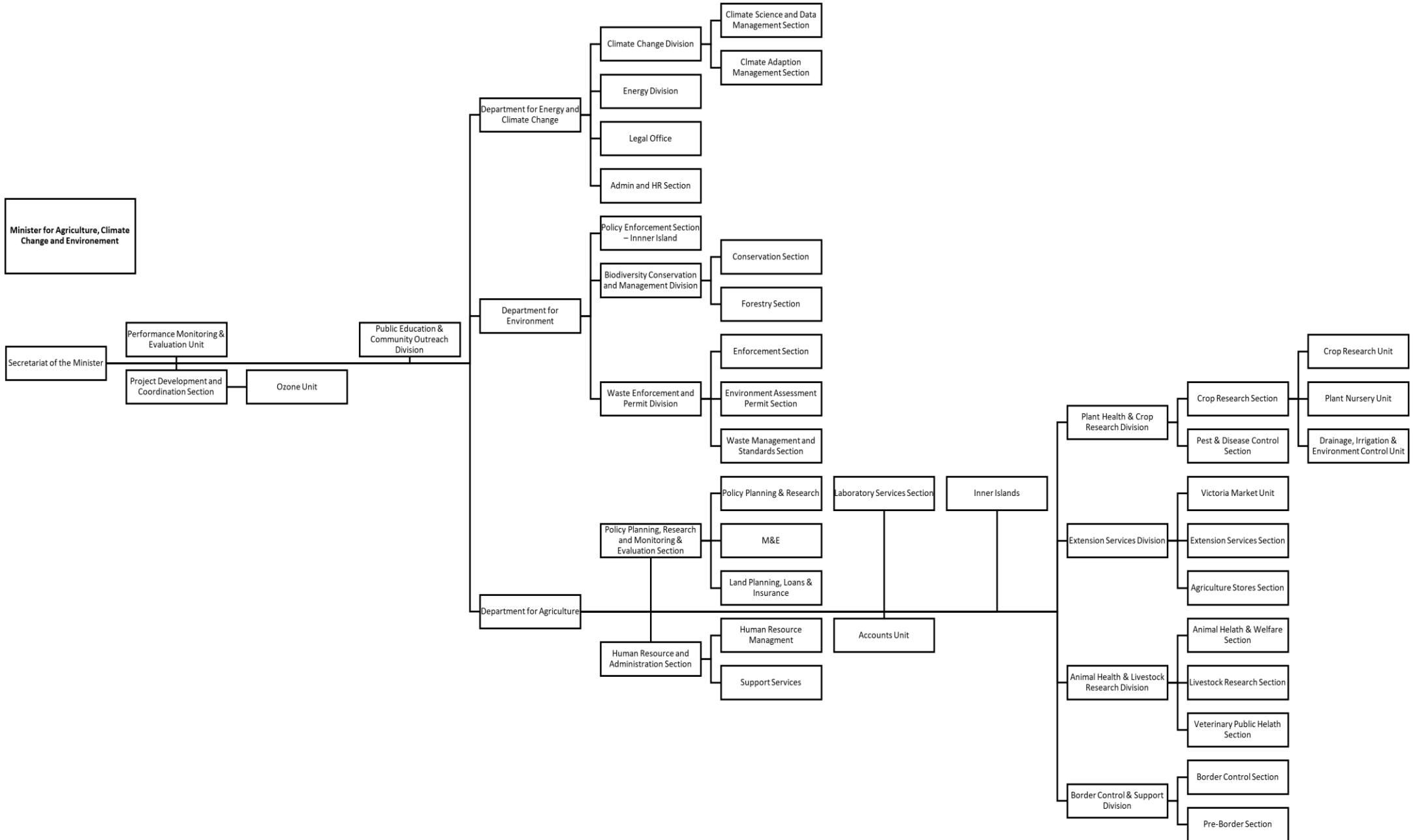



Figure 3: The organisational structure of the Ministry of Agriculture, Climate Change and Environment (MACCE). M&E stands for Monitoring and Evaluation. Source: MACCE/Xenia Klaus

3.2.1.3 Ministry of Fisheries and Blue Economy

While the dossier on agriculture was moved to the MACCE, the former Ministry of Fisheries and Agriculture is now called the  Ministry of Fisheries and Blue Economy and headed by Jean-Francois Ferrary, a **founding member of LDS**. (Ministry of Fisheries and Blue Economy - Republic of Seychelles, n.d.-b, n.d.-a; State House Seychelles - Office of the President, n.d.-b). **The ministry is of relevance for the waste sector because it has according to interviewees the lead on the topic of circular economy, a circumstance which seems to hold some potential for conflict: The interviewees disagree whether this ministry is the right one to have the lead on this topic. The interviewee arguing that it is say that the Ministry of Fisheries and Blue Economy is stronger than other ministries in simultaneously considering environmental and economic aspects.** The Ministry of Fisheries and Blue Economy is subdivided into a department for fisheries and one for blue economy.



3.2.2 Legislative Instruments

The information in this chapter originates from interviews and describe the legislative instrument used in the Seychelles.

Acts: Originating from the British System, laws are called “Acts” in the Seychelles. They are decided upon by a majority in the National Assembly. Before it goes to the National Assembly, the law passes through cabinet, which has the power to block an Act being presented to National Assembly. Acts have to be signed by the president before coming into force. Acts are legally binding.

Statutory Instruments (S.I.): Statutory Instruments are provisions to an existing law, drafted by a ministry and passed in the cabinet of ministers. Once passed by cabinet, they are presented in the next sitting of the National Assembly. Any member of the National Assembly can also request an S.I. to be voted on in the National Assembly. S.I.s do not require a signature by the president but the responsible minister instead. S.I.s are legally binding.

Private member bills: Members of parliament have the possibility to suggest new laws. This instrument is barely used.

Policies: Policies are documents describing the general direction that the government wants to pursue in an area of government responsibility (like solid waste management). Policies are not legally binding; their purpose is similar to the one of a strategy, providing guidance, but nevertheless they have to pass through cabinet.

3.2.3 Processes

The information in this chapter stems from interviews and describes the some processes within the administration of Seychelles, relevant to the later discussed pathways.

3.2.3.1 Typical Preparation of new S.I./Acts

Both Acts and S.I.s are usually not directly presented to cabinet but are announced through a cabinet memorandum (also called cabinet paper), presenting a general outline, background and reasons for the new law, though there might be exceptions (e.g., see chapter 3.6.7) where this step is skipped, according

to interviewees, e.g., when the president announces or requests a new law. If cabinet does not agree with points presented in the memorandum, they usually protest at this point. Based on the memorandum and cabinet's comments, the text of the new law is then drafted by the responsible ministry (or a consultant hired by the responsible ministry). Before the law is re-presented to cabinet or the National Assembly, the Department of Legal Affairs/Office of the Attorney General (AG) checks the text. Interviewees describe that the time that passes between presenting the text to the AGs Office and receiving its comments can vary greatly and is unpredictable. Once received, the comments are addressed, and the draft sent back to the AGs office for tabling it for a cabinet meeting.

According to some interviewees, before this official process starts, stakeholder consultations are held. Stakeholders might be other units within the government structure or independent from government. There is no ministry-wide guideline on how to consult stakeholders, the responsible section or unit decides on how to do it, according to an interviewee. There is no common "rule" on who drafts S.I.s, it might be technical staff in a section or the legal office of MACCE. Once a draft is compiled it is circulated within the ministry and potentially with outside stakeholders before shared with the AGs office.

Besides new laws other projects, documents, plans, agreements of national importance also must be approved by cabinet. An interviewee says that there are internal guidelines within MACCE on when that is the case. Interviewees describe that everything with "national importance" must pass through cabinet, while minor projects can be approached without cabinet approval. In the Ministry of Transport, all projects are classified as being of minor medium or high importance, according to an interviewee. All projects with medium or high importance are presented to cabinet. An interviewee describes that presenting a plan to cabinet can be beneficial regarding the access to funds or might also be done for matters of visibility.

By the end of a calendar year, the AGs office requests a list of items that are expected to be put forward during the following year, according to an interviewee. The list is not binding and can be amended according to upcoming issues, according to that interviewee.

3.2.3.2 National Budget

The budget of ministries and agencies is presented to and has to be approved by the National Assembly usually in November or December of the previous year. The work on the budget for the following year starts as early as March/April, according to interviewees. Between spring and winter of one year, there is a back-and-forth process between the respective ministry/agency and the Ministry of Finance, National Planning and Trade, according to interviewees. The Ministry of Finance, National Planning and Trade has far-reaching powers regarding the annual budget, based on the constitution and the Public Finance Management Act of 2012. The budget agreed upon for a public body is presented first to cabinet according to interviewees and then to the National Assembly, which can make amendments if it wishes to. The budget is approved through an "appropriation act", determining the sum of money a ministry, department or agency is entitled to receive in the following year. (Government of Seychelles, 1993, 2012; National Assembly of Seychelles, 2021)

Starting from 2013, Seychelles implemented a "Programme Performance Based Budgeting" with support from the World Bank. Among other things the budgeting now includes a mid-term strategic

planning to “ensure resources are allocated to government priority areas” and according to the World Bank the project introduced performance-indicators and “strengthened” their monitoring. (World Bank, 2019)

Some interviewees see the power of the Ministry of Finance, National Planning and Trade over the budget as too extensive, arguing that it gets involved and forces amendments to the budget on a technical level without the necessary expertise. One interviewee describes that if a ministry or agency feels a budget ceiling given is too low, they can take it to cabinet with the cabinet acting as a “referee”.

3.2.3.3 Donor Relationships

According to interviewees, it is becoming more difficult for Seychelles to receive funds by donors due to this graduation to a high-income country. In 2018 Seychelles was removed from the OECD List of eligible countries for Official Development Assistance (ODA) (IEO - UNDP, 2020). The amount of ODA it had received had before almost steadily declined since 2012 (World Bank, n.d.-b). If support is transferred to a country not on the OECD list, it is not seen as ODA (OECD, n.d.). Nevertheless, support from foreign entities do play a role still in Seychelles. For the pathways investigated (see chapter 3.6), especially the Global Environment Facility (GEF) (with United Nations Development Programme (UNDP) as main implementing agency) and the EU have been important donors. France volontaires has repeatedly provided human resources. Currently, a possible agreement with the International Finance Corporation (IFC) is being worked on (see chapter 3.6.6.). For regulations regarding ozone, the Multilateral Fund of the Montreal Protocol is of major importance.

The oversight and main responsibility for the relationships with these donors are handled by different authorities within the Government of Seychelles, according to the nature of the donor, say interviewees:

- Multilateral institutions (GEF, UNDP...): Programme Development and Coordination Section (PDCS), part of MACCE (tough interviewees say that the Ministry of Foreign Affairs has the overall supervision and is responsible for first contacts). The PDCS was created in 2022, before it was called the GEF-UNDP Program Coordination Unit (PCU) according to an interviewee.
- Financial institutions (World Bank, IFC, various development banks): Ministry of Finance, National Planning and Trade
- Bilateral donors: Ministry of Foreign Affairs

Interviewees describe a currently somewhat chaotic approach to the question of which donor projects are pursued and which not. An Interviewee describes that sometimes opportunities might come up rather spontaneously and have to be acted upon quickly. Another interviewee points out, that a sense of dependency on donors can lead to pressure to implement measures without thoroughly considering them for the context. According to an interviewee there is an initiative by the PDCS to organize the approach to projects more thoroughly to ensure an overall alignment with goals and priorities of MACCE.

One interviewee mentions an instance where they are ordered by a ministry to produce work for a donor project without knowing which project it is for or what the benefits from the project will be. The interviewee said, the work was something on a “to do list” already but with a lower priority. The interviewee describes a soft power of the donor: They were told to work for the donor by another entity

within the government of Seychelles. They now follow the orders of that donor, assuming that the funds are needed and will benefit the country in some way. The interviewee says the extent of clarity and information provided differs a lot between donors and, as a rule of thumb, donors with representations in Seychelles are easier to work with.

If and how money is transferred by the donor to the implementing authority depends. There are instances where no money is transferred at all, but technical assistance is directly paid for by the donor (e.g., in the case of the Solid Waste Masterplan). Interviewees describe that if the project implementation entails the handling of money by the beneficiary, the sum gets transferred to a special account managed by the Ministry of Finance, National Planning and Trade. The projects are often subdivided into activities and objectives. Money is often transferred for an activity once the previous activity is completed, according to interviewees.

Donors have different work modalities and instruments through which they offer their support. Some which are relevant for the waste sector are presented below.

GEF:

For GEF-Projects two basic categories exist: STAR-funds are allocated to countries for a replenishment period of four years (GEF-7: July 1, 2018 to June 30, 2022) and based on a formula. These funds can be used relatively freely by that nation to implement projects of their choice in the three focal areas of STAR, which are biodiversity, climate change and land degradation, through the new replenishment cycle GEF-8 determines 11 integrated programmes with incentives for countries to join them. Additionally, the GEF defines international waters and chemicals and waste as focal areas. These are supported with non-STAR projects. (GEF, n.d., 2018b, 2018a)

These, says an interviewee, can be more complicated as they are less straightforward and tend to have a stronger “political” connotation. An interviewee says, GEF, respectively the implementing agency (e.g., the UNDP) usually “invite” countries to regional projects that they might be eligible for. Between project ideation to implementation around two to three years will pass, says the stakeholder. The implementation will be organized by the implementing agency, while the GEF provides funding. Project managers will, according to this interviewee, be hired through the local government to promote national ownership of the projects. The “national implementation modality” through the PDCS is quite unique, according to the interviewee.

EU:

The EU manages its relationship with Seychelles from a representation based in Mauritius. The EU has recently re-structured its development cooperation, before organized in several funds that now all operate under the common EU budget. Before, Seychelles received funds under the “European Development Fund” in cycles, the last one “EDF 11” ran until 2020 and according to an interviewee supported projects that are still ongoing. The new funding cycle is organized with a “Multi-Annual indicative Work Programme (MIP)”. The MIP 2021 – 2027 foresees 2 million euros available for the priority areas climate change, environment and good governance in Seychelles. Specifically mentioned

is also the “promotion of circular economy (with a priority on waste management)”. (European Commission, 2022; Pouwels, 2021)

An interviewee says that in the beginning of a cycle, the EU will communicate with the Ministry of Foreign Affairs. The Ministry of Foreign Affairs will then go to the ministries potentially eligible for support under the EU's priority areas. The eligible ministry chooses priority projects, presents them to cabinet and if approved, communicate them to the Ministry of Foreign Affairs who again communicates with the EU.

Additionally, the government of Seychelles and the EU hold a yearly political dialogue, until 2021 under the Contonou Agreement (European Commission, 2021; European External Action Service, 2017). According to an interviewee, the dialogue is an opportunity to put forward projects or priorities the Government would like support with. According to interviewees, it is also possible to receive EU funds outside of the funding cycles.

Montreal Protocol Multilateral Fund:

The Ozone Unit of the MACCE is heavily supported by the Multilateral fund of the Montreal protocol according to an interviewee: While office space and salaries of the employees is paid for by the Government of Seychelles, virtually all activities are funded via the Institutional Strengthening (IS) of the multilateral fund. The IS is renewed on a biannual basis. Financed with this were e.g., an awareness campaign, the Ozone Roadshow and the development of standards for natural cooling gases, according to the interviewee. The receiving government can choose the implementing agencies they want to collaborate with. Seychelles opted for United Nations Environment Programme (UNEP) and the Gesellschaft für Internationale Zusammenarbeit (GIZ) because they were supportive of projects on natural cooling gases, according to an interviewee. The Ozone Unit can additionally to the IS apply for additional funds for bigger projects.

3.3 Stakeholder Analysis

As outlined in chapter 2.2.1, a power-vs.-interest grid for the decision-making process was compiled both for solid waste management and transport based on how stakeholders were depicted in literature. The respective diagram was then presented to the interviewees, and they were asked to draw and comment on it, explaining the alternations they would make. The results are elaborated below.

3.3.1 Solid Waste Management

The comments of interviewees from government (n =10) on the original power vs. interest grid can be found in Figure 4 while Figure 5 shows the answers of non-government (n= 5) interviewees. With most regards, there were very different opinions on how interested and how powerful the suggested stakeholders are in the decision-making process regarding solid waste management. There were four remarks made three or more times:

- The tourism sector is more interested than depicted in the original diagram (named six times by government interviewees)
- NGOs are more powerful than depicted in the original diagram (named four times by governmental and four times by non-governmental interviewees)

- The Ministry of Fisheries and Blue Economy is less interested than in the original diagram (named three times by government interviewees)
- Importers of goods are more powerful than depicted in the original diagram (named once by a government interviewee and twice by non-government interviewees)

When talking about the influence of NGOs, Sustainability for Seychelles (S4S) was often emphasized as holding a special status among them as a pioneer with their work being well known and recognized. One interviewee called them legends and emphasised that people will listen to what S4S representatives say.

While the tourism sector was following the diagram “only” seen as more interested and not as more powerful in the case of the straw ban (see chapter 3.6.8.), interviewees described the process leading up to it as easy and attributed this mainly to the circumstance, that the tourism sector was on board quickly and that they had started moving in the direction of stopping the use of plastic straw before the legal ban started to be prepared. This might be a hint that on these issues the tourism sector probably not just interested but holds significant political influence which isn’t surprising considering the enormous economic importance for the country.

Interviewees also mentioned the instance of balloon retailers asking for a prolonging of the grace period for the selling of the balloons. While cabinet did not grant it, MACCE did take it there upon their request. Hence, they seem to have a certain power.

New stakeholders named by interviewees were:

- Ministry of Finance, National Planning and Trade
- Environmental Trust Fund
- Seychelles Revenue Commission
- Waste Management Fund
- Schools
- The public
- Retail Association
- The Ozone Unit
- Disaster Risk Management Division

None of these were named more than once, though the Ministry of Finance, National Planning and Trade was often mentioned during the interviews as very influential actor but then not again when discussing the diagram.

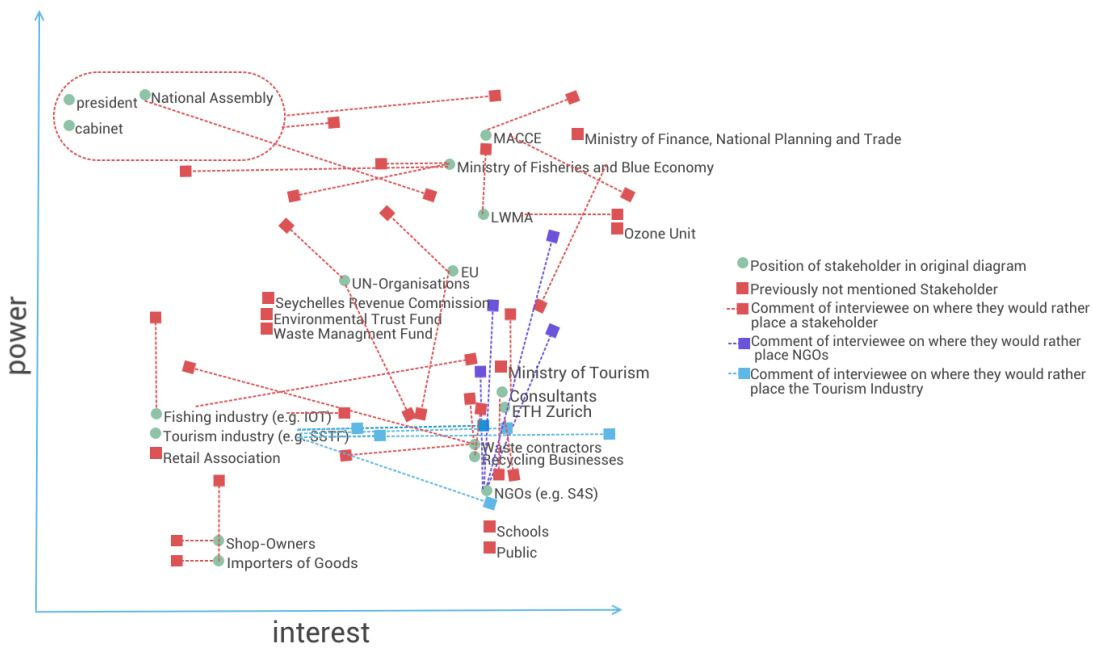


Figure 4: Answers of interviewees from government (n=10) on the original power-vs.-interest-grid of decisions-making processes regarding solid waste management in Seychelles.

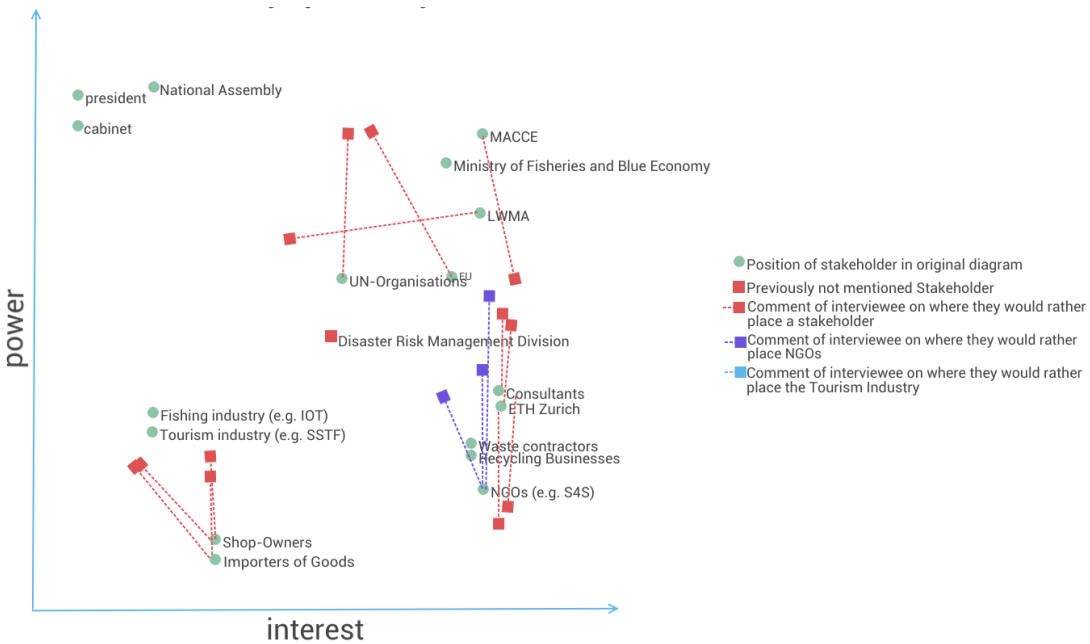


Figure 5: Answers of interviewees representing other entities than government (n=5) on the original power-vs.-interest-grid of decisions-making processes regarding solid waste management in Seychelles.

3.3.2 Transport

Only three interviewees were asked for their comments on the power-vs.-interest-grid regarding transport. Of the three, two asserted more power than originally to the car importers and two considered the EU less interested than in the original diagram (see Figure 6).

New Stakeholders named were:

- The Ministry of Finance, National Planning and Trade
- The Lands office
- University of Seychelles (UniSey)
- The World Bank

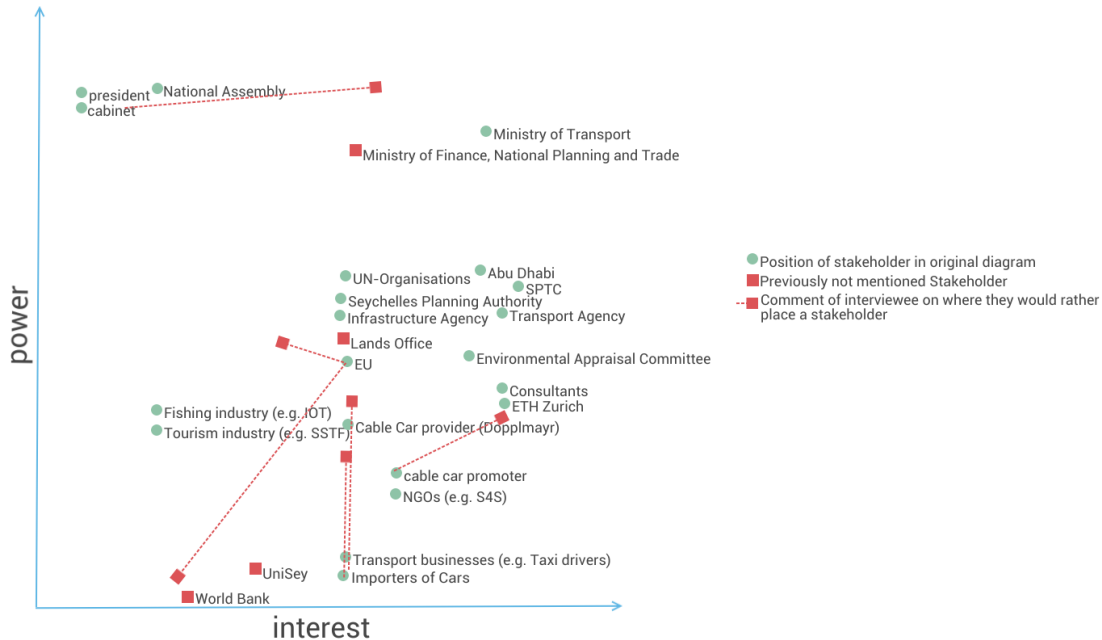


Figure 6: Answers of interviewees (n=3) on the original power-vs.-interest-grid of decisions-making processes regarding transport in Seychelles.

3.4 The SLL products & their Use

3.4.1 Suggestions & Tools provided

An overview of suggestions and tools the SLL provided on the topics of solid waste management and transport via tdCS, master theses and internship reports can be found in Appendix B. While some of these concrete suggestions were or might have been provided the first time via the tdCS and Master thesis, many of the bigger outlines of these ideas (e.g., the incineration/waste-to-energy plant) were demonstrably around before the SLL. Many of them were already mentioned in the Solid Waste Masterplan 2003 – 2010 and the Environment Management Plan 2000 -2010. They were also after the tdCS discussed in the Solid Waste Masterplan 2020 – 2035. In between there was a Solid Waste Assessment Report and an “investment plan” regarding waste, passed by cabinet in 2017, also taking up e.g. the waste-to-energy-plant. Additionally there was a study by the University of Darmstadt, to which the author had no access. (Gonzalves, 2017; Government of Seychelles, 2000; Mols et al., 2020; Wilson, 2004)

3.4.2 How the SLL products are used

The view of interviewees on what the primary goal of the collaboration between ETH and Seychelles is, differs. For some, this main goal is the experience for the students, for others it’s the provision of technical expertise to Seychelles and yet again others see it as capacity building. Regarding capacity building one interviewee critically reflects on positive effects the exchange might have on Swiss students

and would welcome the SLL to provide the same opportunity for Seychellois students to conduct work in Switzerland, as this exposure would be capacity building for Seychelles.

There is no institutionalized process of what happens to the SLL-products once they are completed. There are some incidents, where the use of the products is documented:

- The tdCS 2016 is quoted in the new National Waste Policy passed in 2018 as one of three documents it is based on (besides the Solid Waste Assessment Report and the Darmstadt study). (Government of Seychelles, 2018)
- The Solid Waste Masterplan 2020 – 2035, with the goal to implement the National Waste Policy, quotes the tdCS on four occasions (Mols et al., 2020)
- The FAO working paper “Bioenergy and food security (BEFS) assessment – Seychelles” (2022) quotes the tdCS 2018 chapter on anaerobic digestion (AD) on seven occasions, among others to choose which waste classes to investigate further for their suitability for AD. The tdCS 2016 is quoted five times, e.g., the data on the proportions of different waste streams of the total waste on Mahé. Additionally Meylan et al., (2018) is quoted twice. (FAO, 2022)
- The Nationally Determined Contribution 2021-2030 for Seychelles quotes the tdCS 2016 and 2018 as sources for the following statements (Government of Seychelles, 2021, p.45):
 - “There is a lack of robust data especially in the case of toxic (hazardous) and liquid waste” (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018; Lai A., Hensley J., Krütli P., 2016)
 - “Solid waste segregation is far from optimal and monitoring of waste disposal on the landfill” (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018)
 - “The current recycling scheme applied to domestic waste does not seem compatible with a pre-sorting of recyclable goods by households” (Lai A., Hensley J., Krütli P., 2016)

The following recommendations are mentioned specifically, with the tdCS claimed as sources:

- “Invest in solid waste segregation technology to enable managing authorities to establish a value chain of solid waste in the waste cycle” (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018)
- “Invest in companies to handle the different classes of recyclable waste separately. Invest in the allocation of specific storage on landfills” (Lai A., Hensley J., Krütli P., 2016)
- In a “Glass study” of 2018, the tdCS 2016 is referred to regarding the amount of glass going to the landfill, alongside the Darmstadt study.
- In a Bachelor thesis at the university of Northampton cites the tdCS on several occasions (Lau Tee, 2022)

An often-reoccurring way the products are used according to interviewees is as somewhat of a “library”: Information that is readily and easily accessible, available when needed, be it for internal information,

presentation of projects or application to donor-projects. The interviewees claiming that they do use the reports and theses in this way are government actors and NGOs.

Several interviewees make a distinction between the data collected and the suggestion made when asked about the quality of the reports. One interviewee points out that while the data obtained through the SLL-products is used and referred to where useful to interviewees, the suggestions are taken less seriously. The interviewee says that the suggestions made in the SLL-products are taken less seriously than ones a consultant would make. This due to the fact that they are less specifically commissioned to fit a certain purpose or program and unpaid for. The interviewee also says that the reports are taken less seriously due to their student-work nature. Also, other interviewees point to the student-work-nature of the SLL-product when asked about their opinion on the quality. One interviewee says, given the choice he would rather have senior researchers directly work on the products instead of overseeing them. Other interviewees say, that while the data and information is of quality, the suggestions are sometimes hard to implement in the local reality. Yet again other interviewees think that the work is of good quality without reservations (at least without mentioning reservations).

The fate of the SLL-work on transport is not yet clear as e.g., the tdCS on it was only published recently (2022). According to one interviewee the Ministry of Transport and the Ministry of Land Use and Housing have endorsed it. One interviewee claims that he will push for an implementation of the suggestions of the tdCS 2021. Although this interviewee points out that not all suggestions are feasible, he claims a general commitment to implement what is, based on the (financial) resources available. The interviewee says, some suggestions deemed appropriate are extracted from the tdCS 2021 and used for a “Land transport strategic plan” which is, according to the interviewee, currently presented to cabinet in several phases. According to the interviewee the Ministry of Transport tried to include traffic counters in the budget which was not accepted by the Ministry of Finance, National Planning and Trade. The traffic simulation model by Schaniel, (2022) is, according to the interviewee, being used to simulate traffic management plans. The interviewee would welcome if the SLL would assess the use and implementation of the tdCS 2021 in about two years’ time.

There is one private sector interviewee who says he used the Master thesis by Simon, (2018) as an indication to push the cable car project forward.

Further takings from the interviews regarding the SLL and its products:

- There is a tendency by interviewees to say that they themselves had read the reports, but others hadn’t (without that being an interview question, see Appendix A).
- There are private actors with an obvious strong interest in questions of sustainable waste management, as of today playing important roles in the waste system, who have never heard of the collaboration between ETH and Seychelles.
- The TdLab-Co-Director is mentioned very frequently, also when not specifically asked for.
- One interviewee said that they were “pushed” to participate in the collaboration with ETH by their superior and that while the data of the products are useful, they also mean a lot of work for people collaborating in them.

3.5 Recent developments: Solid Waste Management

Important developments on the topic of solid waste management since the SLL started to work on the topic are summarized in the list as follows.

2016: The post of a deputy chief executive officer was introduced to the LWMA with S.I. 52 of 2016 (Government of Seychelles, 2016b)

2016: New version of the Environmental Protection Act (EPA) was passed, coming into force in September. With the new EPA among other changes (Government of Seychelles, 1994, 2016a):

- The MAECC can now collect levies.
- Responsibilities were moved from the Agency to the Ministry regarding:
 - the designation of waste disposal sites and waste types that can be placed in public waste bins.
 - management of hazardous waste.
- Landowners/person responsible for land are required to keep their land waste free.

2017: Starting from July, plastic bags as well as plastic utensils and polystyrene boxes are banned, following campaigns by the youth NGO SYAH from 2015 on (SIDS Youth AIMS Hub- Seychelles, n.d.) and S4S with S.Is.37 and 38 of 2017 (Government of Seychelles, 2017a, 2017b)

2017: Consultant Cliff Gonzalves from the consulting company AAI Enterprise Pty Ltd conducted a Solid Waste Assessment Report. He provided an overview of the state of the waste management system in the Seychelles, the history of legislation, the state of implementation of the then current Solid Waste Masterplan and provided recommendations on how to proceed, as well as recommendations for changes in policy. He also provided an overview of previous work conducted on Solid Waste Management. He used some data of the tdCS 2016. His judgment was that the document contains fundamental errors “and cannot be used as a serious basis for policy. Nonetheless is an important contributor to knowledge in the sector”. (Gonzalves, 2017)

2017: The University of Darmstadt conducted a Waste Characterization Study (Mols et al., 2020) (the National Waste Management Policy speaks of a “Feasibility Study on Waste Management Concepts for Mahé Island, Seychelles” but doesn’t provide a date, hence it remains unclear if they are the same, but probably so) (Government of Seychelles, 2018)

2017: Cabinet passed an “investment plan” for solid waste management. Around that time an employee financed via the program France volontaires worked with the MACCE on waste issues. According to interviewees he presented suggestions regarding waste to cabinet. It is quite probable that this was the “investment plan”, though this could never be fully verified due to lack of access to documents. The investment plan included (Mols et al., 2020):

- Crusher Procurement
- Bio waste recycling value chain development
- Waste Sorting Platform (investment by private sector)
- Waste to Energy implementation (Explore the possibility)

- New waste classification
- Different tipping fees
- E-waste and Metal waste (Conducting studies to determine the feasibility)

2017 – 2020: There was, according to interviewees, a collaboration between the cities of Victoria and La Possession (on La Réunion) to install a waste sorting platform in Seychelles. Two employees worked on it consecutively under the program France volontaires, approximately 2017 until 2020. The project was, according to an interviewee, terminated due to a lack of suitable land, and an ongoing conflict around land with the company STAR.

2018: A new National Waste Policy 2018 – 2023 was adopted. (Government of Seychelles, 2018)

Probably 2019: A waste shredder was purchased according to interviewees.

2019: The use of plastic straws was restricted with S.I. 31 of 2019 (Government of Seychelles, 2019a)

2020: Adoption of a new Solid Waste Masterplan 2020 – 2035 (Mols et al., 2020)

2020: Fire on the landfills Providence 1 and 2 (Ernesta, 2020)

2021: Fire at the landfill Providence 2 (Gappy, 2021)

2021: New Levies on refrigerant gas and equipment were implemented with S.I. 9 of 2021 (Government of Seychelles, 2021e)

2021: New Waste Service regulations were published with S.I. 99 of 2021 (Government of Seychelles, 2021f)

2021: Balloons were prohibited with S.I. 72 of 2021 (Government of Seychelles, 2021d)

2021: A new scheme for the take-back of glass bottles started operating, like the one already existing for PET and Aluminum cans. The glass scheme only applies to bottles from alcoholic beverages. Levies were fixed in S.I. 81 of 2020. (Government of Seychelles, 2020; Joubert-Lawen, 2022; The Ocean Project, 2021)

2022: New board composition for LWMA was fixed in S.I. 22 of 2022 (Government of Seychelles, 2022a)

2022: Appeals board was established for decisions made under the Environmental Protection Act with S.I. 84 of 2022 (Government of Seychelles, 2022b)

2022: Fishing nets shipped to Europe by the company “Brikole” to be recycled. (Karapetyan, 2022)

2022: Fires on the landfill Providence 2 (Seychelles Fire and Rescue Services Agency, 2022)

2022: The company Apex was asked to sponsor two waste bins for Beau Vallon. Interviewees say it was LWMA that asked them to sponsor recycling bins instead of normal ones. The bins are constructed so that they can be easily opened to remove the contents. After some delays due to damage to the foil on the bins and a disappearance of the inside of the bins, they were inaugurated on the 20th of December 2022.

Future: There are plans to place recycling bins in the city of Victoria according to interviewees. The idea originally stemmed from members of the Waste Management Fund board, probably it was first discussed before 2019. The idea was abandoned due to the cost of the bins. Later on, it was taken up again and the EU was asked to fund the project, which, according to interviewees, they agreed to do. The bins have not been ordered as of November 2022, according to interviewees.

3.6 Pathways

In the following chapter, the pathways leading to some of the changes mentioned in chapter 3.5. will be outlined. These pathways concern developments regarding solid waste management with one exception: In chapter 3.6.13, the pathway leading to the current stage of a project for a cable car connection between Beau Vallon and Victoria is outlined. The pathways are largely based on interviewees.

3.6.1 Solid Waste Policy & Masterplan

The old Waste Management Policy became obsolete by the end of 2018, triggering the action for a new one. According to this new National Waste Policy 2018 - 2023, it was informed by the tdCS 2018, the study by the University of Darmstadt and the Waste Assessment study by Gonzalves, (2017). Cabinet approved the new policy in December 2018. A policy is not legally binding but rather the outline of a national strategy on an issue (see chapter 3.2.2). The new policy was financed under the Resource Efficiency Project, a GEF project which commenced in 2014 (UNDP, n.d.-b) and written by a consultant. (Government of Seychelles, 2014, 2018)

The Resource Efficiency Project was originally supposed to produce (among other things) a “Policy framework – including rules, mechanisms and monitoring system – in place for recycling and disposal of non-resource efficient residential appliances in compliance with international norms” (UNDP, 2014, p.38). In the original project documents a general waste policy is not mentioned. Interviewees say that usually such a change would have to be approved by the steering committee of a project. Apparently there was a working group on E-Waste at some point under this project: By 2017 the Mid-term review of the Resource Efficiency Project states this group was terminated to avoid conflict with the drafting of the Solid Waste Masterplan. (Zeman, 2017)

According to interviewees, after the policy was approved the need for a Masterplan in order to implement the policy was internally decided on. Whether that timeline really was this smooth (Policy completed → work on Masterplan commences), remains unclear. The idea of a new Masterplan seems to have been around well before the new policy. The tdCS 2016 mentions that “one objective of the 2016–2020 LWMA Strategic Plan is to develop a National Waste Management Master Plan” (Lai A., Hensley J., Krütli P., 2016, p.33). An interviewee claims that such a strategic plan was never endorsed and only drafts of a strategic plan ever existed. The tdCS 2018 cites stakeholders that the new Masterplan was in an “early phase” (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018). Interviewees were not able to provide more information on this early phase from 2018 and before.

However, probably around 2018, MACCE approached the EU for support with the Solid Waste Masterplan. EU agreed and hired the Danish consulting firm COWI A/S to compile the plan under

"Services for the Implementation of External Aid 2018" that provides technical assistance to the Government of Seychelles. The original work for the plan was conducted in 2019 according to an interviewee. According to interviewees, there was some back and forth and rework necessary before the plan could be completed. It was endorsed by cabinet in July 2021 (State House - Office of the President, 2021). The Masterplan summarizes the state of the solid waste management system and provides suggestions on how to improve it. It provides a list of suggested actions with a cost estimate amounting to around 14 million Euros of which 1'835'000 Euros are suggested for further actions carried out by consultants. (Mols et al., 2020)

Some interviewees point out that the Masterplan is not technically a plan, interviewees say there is a need to draft a short-term implementation plan based on the Masterplan to put it to action. The main responsibility for drafting this short-term implementation plan for the Masterplan lies momentarily with LWMA. It is not entirely clear, how it ended up there as interviewees don't agree about who took this decision. Several interviewees (and not only such representing LWMA) mention a tendency by the MACCE to push responsibilities to the LWMA in instances where they don't want to take care of tasks themselves. Some interviewees speak of a shared responsibility regarding the drafting of this short-term implementation plan. There was a plan to start holding bi-weekly meetings between LWMA and MACCE starting in fall 2022 to discuss the draft of the implementation plan. According to interviewees the "bi-weekly" meetings are not held regularly and with a changing composition. One interviewee says that there are plans to designate a focal point for the Masterplan within MACCE and bring the lead regarding the implementation of the Solid Waste Masterplan back to the Ministry in 2023.

3.6.2 Hazardous Waste

Beside levies on refrigerant gas and a new ozone regulation (see chapter 3.6.3), there is currently no palpable outcome to efforts regarding an improvement of the handling of hazardous waste in Seychelles. However, there have according to interviewees, been several initiatives at several points in time.

The necessity of these initiatives has been recognized for over 20 years: Already the Environment Management Plan Seychelles 2000 – 2010 (EMPS) deemed "Support or implement regional programmes for the disposal of hazardous wastes" a management priority area (Government of Seychelles, 2000, p. 97). Similarly, the "old" Masterplan defines the existence of "Appropriate treatment facilities for hazardous wastes" as a strategic objective (Wilson, 2004, p.49). One of the policy outcomes the Waste Policy 2014 – 2018 claims as its goal is then yet again the existence of a "comprehensive system for the management of hazardous wastes" (Government of Seychelles, 2014, p.11).

In 2014, UNDP and Seychelles commenced the Resource Efficiency Project managed by the PCU with one planned outcome being "Regulations in place (linked to financing schemes) for safe disposal on non-EE residential appliances" (UNDP, 2014, p.63). Instead of specific e-waste policy, the general solid waste policy was written under this project (see chapter 3.6.1.). The mid-term review of the project states that the adopted 2014-2018 Solid Waste Management Policy was not followed with actions regarding safe disposal of electronic waste. (Zeman, 2017)

This mid-term review of the project (while stating that the working group to reach the abovementioned goal was terminated) still recommends to "Facilitate with the MEECC and LWMA development of a solid

waste management policy implementation plan specifically for recycling and safe disposal of e-waste and appliances (...)" (Zeman, 2017, p.14). It further analyses that this would require significant investment for "construction of recycling and waste disposal facilities and waste collection infrastructure, as well as additional funding for operation of such waste collection, recycling and safe disposal system" and that the waste policy can hence not be implemented without significant investment (p.24). The mid-term review recommends facilitating the involvement of external funding. The review also claims that a Terms of Reference (TOR) for e-waste had been finalized, though it does not give further details on what that means. In the year of the mid-term review, 2017, cabinet passed an "investment plan" for solid waste management including a "feasibility study for creating a system for the management of e-waste" and "developing a storage or disposal facility" for hazardous waste. (Mols et al., 2020, p.33)

According to interviewees, the initiatives regarding hazardous waste/e-waste were at several points in time hampered by external funding not being granted:

- One interviewee mentioned that there was an expectation of additional funds by the Agence Française de Développement (AFD) for the development of legislation regarding e-waste. According to that interviewee these funds were not granted.
- Interviewees say that in 2015 the MACCE applied to funds for chemicals and waste under the "Special Trust Fund" of the Basel Convention. It remains unclear which exact fund Seychelles applied to, potentially the "Basel Convention Trust Fund to Assist Developing Countries and other Countries in Need of Technical Assistance" (Basel Convention, n.d.). The application was written by a consultant. The application was according to the interviewees denied by the fund.
- An interviewee says the MACCE asked the building of an e-waste storage facility to be included in the national budget, which was denied (the accounts of this event remained relatively unclear e.g. the year in which this happened. Other interviewees could not recall this event. It also remains unclear at which stage the request was denied, this might have been internally within MACCE or during the budgeting process with the Ministry of Finance, National Planning and Trade).

Apparently, a first draft of law on the labelling and classification of chemicals was developed between 2013 and 2015, but not followed up. Another interviewee says around the same time legislation regarding e-waste was being developed but never advanced to being adopted.

Probably in 2018, Seychelles was invited to participate in the GEF-project ISLANDS, standing for "Implementing Sustainable Low and Non-Chemical Development in SIDS". Several of the targeted outcomes and activities regard hazardous waste (with one of them being the development of legislation for the management of priority hazardous waste streams, among them e-waste). The project is a global one with different regional projects. (UNDP, n.d.-a)

The project should have started in May 2022 but was put on hold for Seychelles, because two rounds of hiring a project manager were not successful due to a lack of qualified applicants. The project management will be taken over temporarily by a consultant and taken up in January 2023 according to interviewees.

Further pending projects regarding hazardous waste are according to interviewees:

- MACCE is currently trying to get further funds for e-waste-management from the EU and the World Bank. Interviewees say that products of the SLL are being used in the preparation.
- There is the idea of a take-back system for car batteries. It apparently stems from the association of car importers.

A project regarding hazardous waste that has been implemented are levies on refrigerant equipment. They are discussed below because they are organizationally handled completely differently to other initiatives regarding hazardous waste.

3.6.3 Levies on Refrigerant Equipment

With the S.I. 9 of 2021 and S.I. 40 of 2021 new regulations regarding ozone respectively a new levy on refrigerant equipment were imposed (Government of Seychelles, 2021e, 2021c). The change was triggered by the Kigali Amendment to the Montreal protocol. The Montreal protocol, adopted in 1987, regulates the use of ozone-depleting substances (UNEP, n.d.). The Kigali Amendment to it was finalized in 2016 and requires the phase down of hydrofluorocarbons (HFC). In Seychelles issues regarding the Montreal protocol are dealt with by an own Ozone Unit within MACCE. Once finalized, the Kigali Amendment and the implications of an acceptance or non-acceptance were presented to the cabinet by this Ozone Unit in a cabinet paper and then to the National Assembly, according to an interviewee. Both agreed to sign the amendment and the Government of Seychelles did so in 2019. The Ozone Unit then proceeded to develop legislation to ensure compliance with support of the Revenue Commission, the Ministry of Finance, National Planning and Trade and the GIZ. At the COP of the Montreal Protocol in 2019 the then PS for Energy and Climate announced this development of legal instruments (Agricole, 2019).

In 2022 the Ozone Unit got in touch with LWMA to better ensure compliance with the rules regarding the disposal of refrigerant equipment, according to an interviewee. They did so due to an improved situation regarding staffing with a new “verification officer” being hired. This position is currently funded under the IS of the Multilateral Fund of the Montreal Protocol (see chapter 3.2.3.3) but is planned to be “absorbed” by the national budget as of 2023, an interviewee says.

The public was sensitized to the issue of refrigerant gasses through a publicity campaign. An example of such a publicity can be found in Figure 7.



Figure 7: A publicity campaign meant to ensure public sensitization for the issue of HFC in refrigerants and its effect on climate change.

3.6.4 Glass Levy Scheme

With the S.I. 81 of 2020 a levy was imposed on all alcoholic glass bottles with exception of the brands having their own levies in place. The levy took effect as of July 2020. (Government of Seychelles, 2020)

Interviewees describe that the process towards it started around the time of the first tdCS 2016, when the then active minister of MACCE deemed acting on the waste problem of Seychelles a priority. From October 2016 to October 2018 there was a person funded through France volontaires working on these possible solutions for the MACCE. Among the things this consultant worked on was a new system for glass recycling, according to the LinkedIn-page of the consultant (LinkedIn, n.d.). The work resulted in a “Glass strategy” in this case working as the cabinet memorandum and presented to cabinet in April 2018. In June of the same year an updated memorandum was presented with the suggestion to exclude non-alcoholic bottles from the scheme. The cabinet argued for this with the economic situation, interviewees say.

In May 2018, importers were (probably) briefed about the upcoming scheme (then still planned to be in place as of July 2018). It is not entirely clear why it then took until 2020 for cabinet to pass the actual law. Some interviewees describe that the time from passing on a draft to the AGs office until receiving their comments can vary greatly. In this instance, additionally a new minister was appointed to the MACCE in 2018. In 2020, this post of minister was reassigned again after the election of the new president. Thereafter in late 2020, the responsibility for recycling was by a ministerial decision

theoretically transferred from MACCE to LWMA. While formally executed, some interviewees say that in practice it is not. Interviewees speak of a delay of the glass levy system but could not specify how it came about.

Probably at some point during the first push for the glass levy somewhere between 2016 and 2018, the SeyGlass-founders heard of the government's plan and started investigating the opportunities. They contacted S4S which had previously tried to implement a glass recycling scheme (described in the tdCS 2016) (Lai A., Hensley J., Krütli P., 2016). S4S provided them with all the documents they had compiled during their own glass trial according to interviewees.

A "pre-qualification-notice for an expression of interest for the operation of a glass recycling system" was published in the second half of 2019, around a year later SeyGlass was awarded the mandate. The company was assigned land in Anse Royale upon a suggestion by LWMA. It became clear shortly after that the time was too tight for SeyGlass to order a glass-crusher and get it up and running. Apparently, interviewees in government made the link to the crusher already in the country (although not functional at that point). S4S agreed to provide the broken crusher. SeyGlass had the machine successfully fixed and moved to Anse Royale. In 2022, the new bigger crusher became operational. Apparently SeyGlass suggested to LWMA to move the smaller crusher to Praslin in spring of 2022 but never heard back on that suggestion.

In the beginning of 2021, redeem centres started accepting glass bottles and SeyGlass started crushing them after they had been briefed in the end of the previous year according to interviewees. As of October 2022, there is no actual recycling system of the crushed bottles in place. SeyGlass describes plans for a complete recycling scheme and says it is working to get it up and running.

3.6.5 The Shredder Saga

On the landfill in providence sits an (as of November 2022) unused waste shredder by the German company Hammel. Like the glass system it seems to be closely interlinked with the then MACCE-minister deciding to take action on waste and then assigning a France volontaires consultant to work on these solutions. In 2017, the "investment plan" was passed by cabinet, including a "Crusher Procurement", due to the possibility to "rapidly decrease of the volume of waste disposed at the landfill with minimal technical knowledge and outside assistance" (Mols et al., 2020, p.33). The shredder probably arrived in Seychelles in 2019.

Everything between the investment plan and the actual arrival of the machine in the country is rather ambiguous, the details of the pathway differ from interviewee to interviewee telling it. The following is, considering the different accounts, what might approximately have happened: The then minister of MACCE was convinced of the idea of the shredder. He asked the president to provide the funding for ordering such a machine and to order the Ministry of Finance, National Planning and Trade to provide the means. The shredder was probably then financed by these funds which were granted and partially by the Environment Trust Fund (ETF) within MACCE (*Environment Trust Fund Celebrates Quarter of Century*, 2019; Ministry of Agriculture Climate Change and Environment, 2020). (Another interviewee says, LWMA's budget partially funded it as well). The then MACCE-minister had seen the machine before in other countries and was hence convinced of the brand and model, he proceeded to order it.

The further responsibility was handed to LWMA. LWMA after consultation with the company producing the machine changed the order and got permission for a direct bidding. The machine was delivered. Upon delivery, the lack of appropriate land was noticed, some say the funds were lacking to prepare the land as the shredder should be placed on concrete. In 2022 it was decided to tender for the operation of the machine. An interviewee says this decision was taken due to the general obligation under the IMF reform of 2008 to strengthen the private sector. Not all interviewees agree that the outsourcing of the operation makes sense in this instance. In a first round of the tender three different companies were selected for a second round. In May 2022 a workshop on the operation of the shredder was held with the producer of the shredder, attended by the three shortlisted companies and LWMA. A picture of the workshop can be found in Figure 8. Interviewees say the shredder will be up and running by the beginning of 2023. As of December 2022 it seems to remain unclear where exactly it will be operated. Also, a second round of the tender is to be held still to determine who will be the company running it. An interviewee indicates that the land problem might be “pushed” to the company winning the tender. A picture of the shredder in its non-operational state in November 2022 can be found in Figure 9.



Figure 8: LWMA-officials and representatives of the shortlisted companies for the operation of the shredder attend a workshop explaining the shredder in May 2022. Source: Camille Mondon



Figure 9: As of November 2022, the shredder is not regularly used. Here the potential use of the shredder is explained to a school class. Source: Xenia Klaus

3.6.6 Waste-to-energy/ Incineration Plant

The idea of an incineration plant for Seychelles was already discussed in the Solid Waste Masterplan 2003 – 2010 (Wilson, 2004). The idea seems to have been floating around ever since. Mostly, the term waste-to-energy is used, making it in some instances hard to distinguish if an incineration plan or an AD system is meant by it. According to interviewees, mostly incineration is meant. From here on, incineration and waste-to-energy will be used as synonyms. The TdLab-Co-Director is favour of a waste-to-energy/incineration plant in Seychelles, a circumstance also perceived by an interviewee (personal information).

The first traceable concrete initiative regarding waste-to-energy dates back to 2010. A press release from the time connects the push to what the press release calls “the oil shock of 2008” and expected the plant to be operational by 2013 or 2014. The project seems to have made significant progress with several proposal being received and a steering committee for the decision set up. It remains unclear what stopped the process.

Some interviewees speak of several companies that offered to build and run a facility and several feasibility studies conducted over the course of the past years. According to interviewees, the capacity to assess the suggestions and the political will to take a decision was lacking. In 2013 the Clinton Foundation worked with Seychelles to assess the potential of waste, solar and biomass for energy (“Clinton Foundation to Work with Seychelles on Energy Security,” 2013). The project document of the Resource Efficiency Project in 2014 claimed that there were “various biomass and waste to energy

production systems under consideration” (UNDP, 2014, p.7). To the knowledge of the author, none of these were implemented. The author got insight into a draft document also dating to 2014 for a request for a bid for to develop an “Integrated Waste Management System”, that should have included a form of energy recovery.

In 2017 the exploration of the feasibility of a waste-to-energy-plant was included in the investment plan passed by cabinet (Mols et al., 2020). According to interviewees there was another initiative in 2018 by MACCE to tender for a waste-to-energy-plant with a presentation held to the Energy Commission (probably it was held in 2019, based on this presentation). According to interviewees, the Energy Commission advised to delay the tender, due to insufficient data.

Currently there is a new project for a feasibility study for waste-to-energy on Seychelles, to be financed by the International Finance Corporation (IFC), a member of the World Bank group (Ministry of Agriculture Climate Change and Environment - Republic of Seychelles, n.d.-a). According to interviewees waste-to-energy was brought up as a side issue when discussing another project with World Bank. The World Bank advised referring it to the IFC. As of November 2022, the agreement has been announced but not finalized and signed. According to an interviewee, it is the Ministry of Finance, National Planning and Trade that will have to sign that agreement. This is in line with a general dispersion of responsibilities regarding donor relationships described by several interviewees that entails the Ministry of Finance, National Planning and Trade as primary contact with donors organized as financial facilities (see chapter 3.2.3.3).

There is a second current project named “TWENex” («Transformation of the waste sector towards a waste-energy nexus in the Southwest Indian Ocean region”) by the Indian Ocean Commission (IOC), financed by the EU, that should commence in December 2022 (OCAPS R&I, n.d.). The interviewees from MACCE and LWMA said, that they had only heard of the project for the first time in fall of the same year and had no further information on its origins or the process leading up to it.

The idea of an AD system seems also to still be around, the installation of a waste-to-energy-plant for methane recovery is mentioned in the updated National Determined Contribution of 2021 as a measure Seychelles wants to undertake to increase the share of renewable energy in its mix (Government of Seychelles, 2021).

3.6.7 Balloon Ban

After the ban of plastic bags, utensils, and polystyrene boxes in 2017, in 2021 Seychelles moved to outlaw further single use plastics: S.I. 165 of 2020 banned the import of balloons to Seychelles per April 1st, 2021. S.I. 72 of 2021 the selling and use of balloons in Seychelles per September 1st, 2021 (Government of Seychelles, 2021b, 2021d). Like the other plastic-bans, this one was pushed for by an NGO: For the balloon ban it was The Ocean Project that started to campaign in the beginning of 2020 with the slogan “Say no to balloons” (The Ocean Project Seychelles, 2020). The NGOs are organized among themselves and support each other on their projects. The NGO representatives interviewed describe that their agenda setting is partially shaped by a yearly meeting for general direction and strongly influenced by the ideas of board members for the concrete projects tackled during the year. According to an interviewee the practical attainability of actions such as the banning of balloons and

straws is taken into account. It must be realistic for policy and practices to change. Additionally, a symbolic value of an item might be a factor.

In October 2020 Wavel Ramkalawan was elected the new president of Seychelles. In his inauguration speech he called for a cleaner Seychelles and the citizens to help clean up Victoria. Consequently, in November 2020 a clean-up activity was organized in Victoria. At that event, the president announced a balloon ban for Seychelles (Gappy, 2020a, 2020b). Interviewees say that MACCE had no knowledge of it prior to that day. As the president had announced the ban as a matter of fact, there was not much room for debate, interviewees say, and MACCE proceeded to implement the announcement. The S.I. for the import ban was probably prepared by the Ministry of Finance, National Planning and Trade, as it is signed by that minister. There was, contrary to the standard procedure, probably no cabinet memorandum announcing the ban as it was as a direct order from the president factually already decided. In June 2021 the cabinet decided to postpone the ban but then moved to approve it in August of the same year implementing a ban as of September. An interviewee says that balloon retailers approached the MACCE asking for a prolonging of the grace period until the end of the year which led to MACCE going back to cabinet and arguing for such. Cabinet refused to prolong the grace period and the ban came into effect in September 2021. The Ministry of Finance, Trade and National Planning then announced the ban to WTO according to interviewees.

3.6.8 Restrictions on Straws

S.I. 31 of 2019 prohibited plastic straws in Seychelles starting in June 2019 (Government of Seychelles, 2019a). Interviewees describe that the process was triggered by the World Environment Day in 2018 which was under the Motto “Beat plastic pollution” (World Meteorological Organization, 2018). According to interviewees, the Ministry looked for a measure – a low hanging fruit – it could announce on that day. Interviewee consultations are described as very easy and straightforward which is mainly attributed to the tourism industry being in favour of the ban. According to interviewees the tourism industry already had ongoing projects to phase out plastic straws at that point in time. Also in 2018, The Ocean Project pursued a campaign against straws, “The Last Straw” (The Ocean Project Seychelles, n.d.). The minister of MACCE announced the upcoming straw restriction on the World Environment Day in June 2018. After that, the legal office of MACCE drafted the S.I. and it was approved in cabinet in May 2019.

3.6.9 New Landfill-fees

With the S.I. 99 of 2021 new regulations of waste services including new landfill fees were brought forward (Government of Seychelles, 2021f). Interviewees describe a long and complicated process leading up to the regulation. Additionally, information from different sources don't match very well, making it difficult to compile a pathway.

According to interviewees, work on the new regulations started in 2017, with a working group within LWMA and support from the legal office of MACCE. According to interviewees the trigger was LWMA noticing shortcomings like businesses disposing their waste in public bins. In 2017, new tipping fees were also part of the investment plan (Mols et al., 2020). If the investment plan was the original trigger or the fees were in turn included therein due to the work already ongoing cannot be determined. According to an interviewee the fees were first sent to the AGs office and only then discussed with the

Ministry of Finance, National Planning and Trade. This would somewhat divert from what has been described as a standard procedure by other interviewees.

Both the AGs office and the Ministry of Finance, National Planning and Trade requested changes: The office of the Attorney general requested the possibility of a fixed penalty to be removed from the draft shared with them. The Ministry of Finance, National Planning and Trade requested major changes according to an interviewee. The interviewee claims, that LWMA did suggest different fees with separated waste being in all instances cheaper than mixed waste, but the Ministry of Finance, National Planning and Trade asked for the current version and additionally lower fees than suggested. This was complied with, according to an interviewee. Interviewees do agree that there might be push-backs to raise fees due to political reasons. Also, there is according to interviewees an obligation to justify the fees charged in accordance with the actual workload associated with the service. If a fee is to be higher to nudge people's behaviour, it would technically be a levy, an interviewee says. Whether this was the reason leading to adjustment of the landfill fees remains unclear.

The author had access to one document reflecting the process, which does not fully match what was said in interviews: According to the document, fees were presented and approved by cabinet for a first time in June 2019 (the website listing cabinet decisions yet again does not match this information (State House Seychelles - Office of the President, 2019)). Apparently, the fees were supposed to be published alongside the rest of the waste service regulations. By the time these regulations were ready to be approved, the fees had been changed yet again. They were published in the Official Gazette of Seychelles in November 2021, in the changed version without re-approval by cabinet (Government of Seychelles, 2021f). According to the cabinet memorandum it was the Ministry of Finance, National Planning and Trade that brought it to the attention of MACCE that such a re-approval was needed. The latter was probably granted February 2022. An interviewee mentioned a minor mistake that had been made and hence the regulations had to be passed through cabinet again. It remains unclear if these instances were the same, though the cabinet paper gives the impression that it was more than a minor mistake that had to pass through cabinet again. According to a cabinet memorandum, the new regulations were implemented as of April 2022.

Interviewees say the process took four years due, among other things, to a backlog at the AGs Office and an increased workload at LWMA leading to the working group for the landfill fees and waste service regulations temporarily suspending its work.

3.6.10 New LWMA Board

S.I. 22 of 2022 determines a new composition of the LWMA-Board, reducing it from seven (plus three) to four (plus three) (Government of Seychelles, 2009, 2022a). According to interviewees the reduction was due to a government policy to reduce the number of people on boards of public bodies. The change was according to interviewees, a very straightforward top-down process: The president gave the order to the minister, the minister had the legal office draft a suggestion, ran the necessary S.I. by cabinet and implemented it. Some interviewees say they heard about the change in the news.

3.6.11 Perseverance Project

The idea to use the housing estate Perseverance as the site of a pilot project for an alternative solid waste management system seems to have been around since approximately 2018/2019 with the exact outline of the project being subject to constant change ever since. The plan was probably triggered by a decision by the then CEO of LWMA.

The first core idea was according to interviewees not to sort waste but to ensure individual waste collection for households in the estate. The idea was presented to cabinet and several other stakeholders, among them the representative of the district in the National Assembly. According to an interviewee, the presentation to cabinet was voluntary in that instance. Later on, there were the ideas of a “redeem-centre-at-home” and of a community composting site added to the project on the initiative of an employee at the time funded through France volontaires, according to interviewees. First steps to implement the idea were undertaken, according to interviewees: For the individual waste collection, 900 bins were bought. Training was conducted with an association that was supposed to take the lead regarding the composting. The idea to provide additional composting bins to the households was abandoned due to cost considerations. The redeem-centre-at-home was implemented between fall and winter 2020, with a redeem centre being present locally every Saturday. The redeem-centre-at-home was stopped due to Covid-restrictions. Before any other parts of the project were implemented, the CEO of LWMA left to become the minister of MACCE. The position remained vacant for a year. A first round of recruitment remained unsuccessful. Interviewees say that with the position of CEO as well as other key positions in LWMA vacant, the Deputy CEO was overwhelmed and virtually without decision making capacity, blocking progress on the pilot project.

When a new CEO resumed the position in December 2021 (State House Seychelles - Office of the President, 2021), he decided to consider other options for the pilot project and the use of the already ordered 900 bins and he asked an employee to explore such other options, according to interviewees. There is a suggested layout of the project which would now foresee the bins being used as “recycling points” only to be used for recyclables. The current idea would foresee the points not being emptied by the waste contractors but the informal sector, according to interviewees. An interviewee mentioned reluctance towards the current project layout due to the alleged non-willingness of residents to use the bins in the foreseen way and hence fear of the project failing. One of the 900 bins has been remodelled as a prototype to serve the needs of this layout on the initiative of the employee exploring the options. This new proposal has been awaiting the further discussion with and eventual approval by the CEO of LWMA for a good half year by October 2022, according to interviewees. Before a further discussion took place, the CEO was suspended, initially for a period of one month to allow for investigation. As of the beginning of December 2022 nothing had been announced regarding the outcome of that investigation and the consequences. The ruling party LDS had promised a strong line on corruption in their election program (Linyon Demokratik Seselwa, n.d.).



Figure 10: One of the bins ordered for the pilot project in Perseverance was modified to serve as prototype for collection points for glass bottles, cans and PET-bottles, foreseen under the new outline of the project. The opening on the bottom is designed to allow informal collectors to access the contains of the bin. The picture was taken in November 2022 at the LWMA premise in Victoria. Source: Xenia Klaus

3.6.12 Brikole

In summer of 2022 the company Brikole shipped a first load of used and discarded fishing nets from Seychelles to Europe to be recycled (Karapetyan, 2022). The idea originated in a project funded through a grant by the French Fonds de Solidarité Pour les Projets Innovants (FSPI), according to interviewees. The grant financed a total of seven different projects running from 2021 to 2022. Three were handled by the Ministry of Fisheries and Blue Economy, one of them being the reuse of derelict fishing gear. This project, named “ReFish”, started in June 2021 and was managed by one of the later founders of Brikole, according to interviewees. The manager left the ministry and went on to found Brikole, receiving 7000 euros from FSPI, according to an interviewee. Brikole signed agreements with the original owners of the fishing nets and a company to recycle them in Europe during the first half of 2022. The original idea and still goal of Brikole is to recycle the nets in the country, according to the interviewee. The interviewee says that the project outlined under the FSPI grant was never fully implemented and is now taken on by S4S under the name “ReNet”, currently applying for funds under the Basel Convention to complete it.

3.6.13 Transport: Cable Cars

According to interviewees it was the Td-Lab Co-Director who approached a Seychellois entrepreneur to discuss the idea of a cable car connection between Victoria and Beau Vallon, probably around 2017. The entrepreneur says that while the Td-Lab-Director was interested in the cable cars as a possible solution for transportation, he himself was more interested in it as a tourism attraction. The Td-Lab director established the contact with the Austrian cable-car-company Dopplmayr. In 2018 an ETH student wrote a Master thesis on the sustainability of potential cable-cars in Seychelles, closely collaborating with the entrepreneur and Dopplmayr, further encouraging the entrepreneur. The entrepreneur then went on to “test the water” in 2019 inviting possible investors and authorities for an

information event. The interviewee says, investors expressed interest, encouraging him to further pursue the possibility. His main motivation he says is the opportunity of making money and the eagerness to be a pioneer similar to Elon Musk. Interviewees say, the TdLab-Co-Director took a major role in facilitating the process, especially regarding the connection between the entrepreneur and Dopplmayr.

Ever since, several workstreams have been ongoing, often in parallel, according to interviewees:

- Planning of the cable car installation, lead with Dopplmayr, starting in 2018 (probably)
- Planning of the buildings at the three stations of the cable car, lead with architect, starting 2020 (probably)
- Organizing with Seychellois authorities, lead directly with the entrepreneur.

Several authorities will take decisions allowing the project to go forward or not, according to interviewees:

- The Ministry of Land Use and Housing decides whether to lease land.
- The MACCE decides on the approval of an Environmental Impact Assessment Study (EIA).
- The Planning Authority decides on the approval for building the project.

These and several other authorities affected (e.g., the Ministry of Transport), have been engaged iteratively since the first meeting, according to interviewees, continuously updated and asked for informal approvals to provide reassurance that the project stands a good chance of approval in the future.

The workstreams are not independent from one another: Dopplmayr proposed several routes to the entrepreneur. There seems to have been some back and forth before choosing the one that is planned now, a major reason to choose this one was the circumstance that it only requires one pylon placed on privately owned land, according to interviewees, making the leasing-process easier. Also, the potential use of that one plot posed some difficulties according to an interviewee, with the owner deceased and the heirs not contactable. The interviewee says the problem has been resolved in the meantime. Dopplmayr had a video clip produced, showing a visualization of the cable car, the entrepreneur then used that for meetings with authorities, according to an interviewee.

In 2019, the government of Seychelles bought a piece of land next to the Savoy hotel in Beau Vallon, giving the entrepreneur the (informal) assurance that it could be used for an eventual cable car station. The entrepreneur says there were discussions with the authorities with regards to the position of the Victoria-station, with changing preferences. According to the entrepreneur, the president elected in 2020 is a childhood friend of his and he says he could directly approach the president to argue that the most suitable spot for the Victoria-station would be next to freedom square, which is where the station is now planned to be built.

Dopplmayr-representatives travelled to Seychelles several times to measure the terrain and join for meetings with authorities. The basic layout of the cable car installation was ready by the end of 2020, an interviewee says, ever since there was only fine tuning with that regard. The (very) detailed final route and positions of pylons was worked out after Dopplmayr was in the country again in 2022 to compile

GPS data, according to interviewees. Dopplmayr applied for a trademark registration in July 2022 (Government of Seychelles, 2022).

In 2022, another workstream was added: With the project outlined, the process of an EIA was started. Once completed, the EIA has to be presented to the public; citizens and residents of Seychelles can submit their comments, before MACCE takes a decision on giving an environmental authorization (or not) (Government of Seychelles, 1996, 2016a). According to the entrepreneur the tdCS 2021 and the thesis by Simon, (2018) are used in the preparation of the EIA. The entrepreneur is expecting the results by spring 2023. Additionally, according to the entrepreneur, work has started on a financial feasibility study to inform potential investors.

Once the EIA has passed successfully, the Ministry of Land Use and Housing can decide on the request to lease land, which they according to the entrepreneur did agree to informally, assuming a successful EIA. According to the entrepreneur the request for the lease is handed in in October 2022/November to the Ministry of Land Use and Housing.

Once the abovementioned prerequisites are met, the Planning Authority still has to approve the building project. The project was presented to the board of the Planning Authority in 2021 and it confirmed that it has no basic constraints. The Planning Authority takes decisions both formal and informal at its board after specialized committees review plans in detail, according to an interviewee. According to an interviewee, the political intervention into these decisions has significantly decreased with the approval of the “Physical Planning Act of 2021”, replacing the “Town and country planning act of 1972”, because the final approval is now taken by the Planning Authority, while before it was the minister for transport, and an appeals board was established (Government of Seychelles, 1972, 2021a). According to the entrepreneur the cabinet and the AGs office will also have to approve the project.

One interviewee says that the cable car project is mentioned in the new strategic plan of the Ministry of Transport, currently under review. According to that interviewee there existed a “tunnel project” under the old administration, with the new administration deciding to focus on the cable car instead. The strategic plan was presented to cabinet in 2022 and interviewees and the draft is currently being reviewed based on their comments, says the interviewee.

Assuming a successful EIA, leasing and application for the building permit, an interviewee estimates that the building of the cable car connection could start in 2024. Once built, the entrepreneur says he plans to base the pricing model on the considerations of the tdCS 2021.

3.7 Application of the Kaleidoscope Model

Many of the 16 determinants for policy change as defined by the KM were found in a big part of the examined pathways. If a determinant was not found, it could nevertheless have had an influence but was just not “detected” based on the interviews held. The first determinant the KM lists, a “recognized relevant problem” was present in all examined pathways, which can also be due to the way the interviews were held. The interviewees were usually asked for a “starting point” of the pathways, leading to them describing the underlying problem or problem recognition. There were seven other determinants that had an influence on nine or more of the twelve looked at pathways. Those were:

Powerful advocacy coalition: In almost all pathways it was possible to pinpoint a group (or individual, that can also be a powerful coalition according to the KM), pushing for a policy or project. The range of who that was, is rather big (see also chapter 3.8, policy entrepreneurs). The only pathway where that was not the case was the new Solid Waste Masterplan and Waste Policy. This might be due to the fact that the masterplan and policy are not concrete measures or projects but rather strategies. Additionally, both had “predecessors”, which expired and (to some extent) triggered the new ones.

Knowledge and research: The determinant “knowledge and research” is very hard to tell apart from “norms, biases and beliefs”, as usually an interviewee would depict it as “we did our research and came to the conclusion that this is the best solution”, which might also be counted as a belief but would usually not be called so by an interviewee. For the telling apart of the two the method chosen (which was not specifically screening for the determinants but instead try to understand the pathways first) might have been a limiting factor. Anyways, for many instances the interviewees do describe either doing research or using research for the decision or design of a measure. Very often the research conducted by the France volontaires consultant was mentioned. In one instance (the waste-to-energy-plant) an interviewee claimed that the determinant was insofar blocking as they describe that (allegedly) it was stated there was a lack of knowledge and research, hence no decision could be taken.

Powerful proponents & opponents: Closely related to the presence of an advocacy coalition, it was in many instances possible to determine that a pathway was influenced by proponents and/or opponents and their interplay. E.g., in case of the hazardous waste facility there seem to have been opponents of a proposed suggestion for a such a facility (though it remains unclear, who exactly that opponent was).

Cost-benefit-calculation: Some sort of cost-benefit calculation could be identified for most pathways. This can according to the KM also be a cost-benefit calculation of political nature, as mentioned by one interviewee as a (alleged) reason for the waste-to-energy-project being blocked. As described in chapter 2.2.2.1., the bar for counting a determinant as present was generally set low. This was especially true for the cost-benefit-calculation, e.g., the description of the straw ban as a “low hanging fruit” was already counted as a political cost-benefit-calculation. The pathways where no such calculation was mentioned were the “stroke of the pen” policies the balloon ban and the LWMA board composition as well as the Solid Waste Masterplan and National Waste Policy. The first two have in common that they seem to have been measures announced by the president without much consultation with the administration (according to interviewees). The masterplan and policy were both financed externally, people deciding for this financing were not among the interviewees, potentially being the reason that no cost-benefit-calculation was mentioned.

Government veto player: All of the policies and projects looked at in the pathways have to be approved by a government body at some point, mostly this was cabinet approval. In one instance (the glass levy) the approval was given but only with a change. The only instance where government veto players were not found to be present was in case of the cable car project, which is due to the early stage: As described by interviewees, also this will need the approval of (several) government veto players. In the instances where the influence by this determinant was negative, the veto player was not cabinet. While this would

need further investigation it could be a hint that when a measure does reach cabinet, it stands a good chance of approval.

Institutional capacity: The institutional capacity was very often a constraint for pathways at one or another point in time. In the original KM, the institutional capacity was assigned to the phase “implementation”. This determinant was the main reason for the decision to ignore the phases: Looking at the pathways, it is obvious that institutional capacity can play a role at all times for the cases looked at. The presence of institutional capacity could show big positive benefits rather in the beginning of the becoming of measures, e.g., in case of the France volontaires consultant working on several suggestions for the waste system. It can also hamper with it at early stages: Interviewees say that institutional capacity lacked to take a decision regarding the waste-to-energy-facility. For others like the Solid Waste Policy and Masterplan or the shredder institutional capacity has an influence on the implementation respectively operation. That institutional capacity is scarce might enhance the importance of the determinants “advocacy coalition”, “proponents and opponents” and “commitment of policy champions” as essentially, they describe the fight for attention. In case of the refrigerant levies, the institutional capacity for ozone-related measures is ensured in an institutionalized and long-term manner by the Multilateral Fund of the Montreal Protocol.

Institutional shift: Many of the initiatives taken for a policy or pathway was connected to a shift either in government or on ministerial or high-level bureaucrat position or in instance of the refrigerant levies to a shift in the international institutional setting (see also chapter 3.8., opening of policy windows).

The factors do not necessarily influence the stage they would be assigned to according to the KM. In particular the institutional capacity seems to have potential implications for all stages. Also, the policies and projects don't all neatly follow the cycle as described by the model: There might be instances where projects are reformed before ever reaching full implementation, e.g. the Perseverance pilot, another reason why the stages were ignored for the application. This ignorance on the other hand might have led to a “doubling” of some factors, respectively some factors showing a big overlap, as also described in chapter 2.2.2.1. One circumstance might lead to several of the determinants being present, e.g., where the change in government played a role, this was both a “focusing event” and an “institutional shift. The cable car project showed very few determinants to be present. This might be due to the fact that it is not yet implemented or that it is only partially placed in a “policy” making environment (so the administration) but instead largely a private initiative.

A special case among the determinant is the requisite budget that might seem to have an influence in surprisingly few of the pathways. It can be expected that a requisite budget is a sine-qua-non-condition for all projects and policies, but while the bar for counting a determinant as present was set low, it was still only considered “present” if it was at some point mentioned by interviewees. The cases the requisite budget was mentioned were mostly infrastructure projects, though also not all, as the incineration plant seems to never have made it far enough in the decision-making for this to become relevant.

An overview of the results of the analysis of the pathways for the 16 determinants of the Kaleidoscope Model can be found in Table 2. The reasoning behind the assessment for the presence and type of influence can be found in Appendix C.

Table 2: The Kaleidoscope Model (KM) was applied to the pathways regarding policies and projects for solid waste management and a cable car project in Seychelles. The pathways can be found in the columns, the determinants specified in the KM in the rows. A "+" means that the determinant was found present and to have a positive effect on the advancement of the respective pathway, a "-" means the determinant had a negative effect and a "*" that the determinant was present but had an unclear or mixed effect on the pathway. A blank field means that there was evidence of a determinant to be present in the pathway. The reasoning for the respective assessment are specified in Appendix C.

	Balloon Ban	Straw Restriction	Shredder	New LWMA- Board	Glass- levy	Hazardous Waste	Refrigerant Levies	Waste Regulations	Perseverance	Policy & Masterplan	Incineration Plant	Cable Car
1. Recognized, relevant problem	+	+	+	+	+	+	+	+	+	+	+	+
2. Focusing event	+	+		+		+	+				+	
3. (Powerful) advocacy (coalitions)	+	+	+	+	+	+	+	+	+		+	+
4. Knowledge & research	+	+	+		+	+	+		+	+	*	+
5. Norms, biases, ideology and beliefs	+		+	+	+			+	*		+	
6. Cost-benefit calculations		+	+		+	-	+	*	*		-	+
7. Powerful proponents vs. opponents	+	+	+	+	+	-	+	+	*		*	+
8. Government veto players	+	+	+	+	*	*	+	+	*	+	+	
9. Propitious timing	+	+		+								
10. Requisite budget			+			*			*	+		

11. Institutional capacity			*										
12. Implementing stage veto players	-										*		
13. Commitment of policy champions													
14. Changing information and beliefs	+	+	+	+						+			+
15. Changing material conditions			+		+	+					+		
16. Institutional Shift	+		+	+	+	+	+			*			+
implemented?	yes	yes	mixed	yes	yes	no	yes	yes	no	no	mixed	no	no

3.8 Application of the Multiple Streams Approach

The main purpose of the application of the MSA is to analyse policy windows and their use. Nevertheless, first a quick comment on the three streams regarding solid waste management.

The Policy Stream: There is abundant research and suggestions in the policy stream regarding solid waste management, among them suggestions from within government, NGOs, suggestions by ETH, commissioned reports by consultants, the waste Assessment study, the Masterplan and the investment plan.

The Problem Streams: Additionally, there seems to be a general recognition, that solid waste management is a problem, which is already strongly indicated by the fact, that the Government of Seychelles wished for ETH to conduct two solid waste management studies. In 2022 and previous years there were fires at the landfill, highlighting the problem (see chapter 3.5).

The Politics Stream: According to interviewees, the politics stream is currently in a general favour of the solid waste management as “cleaner Seychelles” was a promise made by LDS during the election campaign running up to 2020. These elections were a major change in the politics stream. International actors, be it donors or multilateral mechanisms, are part of the political landscape in Seychelles.

The policy windows, policy entrepreneurs and mechanisms of joining of the streams can be identified in the instance of the looked at pathways:

Solid Waste Management Policy & Masterplan:

Policy window: The expiration of the old policy in 2018 triggered the process towards the new one. It's not sufficiently clear what triggered the work on the new Masterplan, as the old one had already expired in 2010.

Policy entrepreneur: None deductible from timeline.

Use of policy window: Both the work on the policy and the Masterplan was funded by foreign support (GEF and EU), it seems that these funds were necessary to align the policy stream and make a product ready for approval.

Hazardous Waste:

Policy windows: The GEF-UNDP Resource Efficiency Project (for E-waste) and the ISLANDS project (for hazardous waste) were/are policy windows.

Policy entrepreneur: GEF with the focal area “chemicals and waste”, provide funding to advance the management of hazardous waste.

Use of policy window: The policy window of the Resource Efficiency project could probably not be seized due to a lack of access to funds (that would have been needed in a significant amount, according to the Mid Term Review). The commencement (and hence use of the window) of the ISLANDS project has been delayed due to difficulties to find a project manager.

Levies on refrigerant equipment:

Policy Window: The adoption of the Kigali amendment with incentives for the Seychellois government to sign it created the opportunity for new policies.

Policy entrepreneur: MACCE Ozone Unit

Use of policy window: The provision of funds and institutional capacity to find policy solutions to the highlighted problem with financial incentives for the political stream to sign the Kigali agreement allowed for a swift alignment of the streams and adoption of new regulations.

Shredder:

Policy window: A new minister decided that the problem of waste needed attention.

Policy entrepreneur: Minister & consultant

Use of policy window: The minister (probably) organized an increase to the human capacity through France volontaires, researching solutions to tie to the problem. As the minister is part of the politics stream, the access was great and the alignment, once the policy and the problem stream were ready, relatively easy. In case of the glass levy system, the politics stream did not align to the originally suggested solution but changed the solution before aligning. Additionally, in case of the glass levy system, there seems to have been a “gap” in activity, after the minister was replaced and the France volontaires consultant left. The gap cannot be sufficiently explained, it can be hypothesized that it is connected to a sudden absence of an entrepreneur actively working towards it.

Incineration/ waste-to-energy plant:

Policy window: For the incineration plant, several windows of opportunity were open in the past. A window seems to have opened around 2010, a press release connects this policy window to the oil price shock of 2008. Another window seems to have opened yet again around 2018 when a politician decided to push for it. The new collaboration with the IFC (and the TWENex project) is a new policy window that might be opening.

Policy entrepreneur: presently ETH, unclear for the past.

Use of policy window: It is unclear, why then the windows were not seized. According to interviewees, the incineration plan so far failed due to: Lack of clarity on the feasibility of an incineration plant, a lack of capacity to assess the feasibility and a lack of political will to take a decision. So far either the solutions or the politics or both seem to not have been ready to be coupled with the problem.

Balloon ban:

Policy window: The election of a president and the events following it provided a window of opportunity.

Policy entrepreneur: NGOs

Use of policy window: NGOs had worked continuously to open that window, lobbying for phase out of single use plastic and specifically balloons. The data from interviews are not sufficient to say what made the streams align and why the president announced the ban.

Straw restriction:

Policy window: The World Environment Day with the motto “Beat Plastic Pollution” worked as a focusing event, highlighting the problem of plastic pollution, and opening a window of opportunity for any measures regarding plastic products.

Policy entrepreneur: NGOs

Use of policy window: NGOs had worked continuously to couple the solution of phasing out of single use plastic with the pollution problem and preparing the politics stream. The tourism sector already phasing out plastic straws highlighted this as a feasible solution, allowing to couple it to the highlighted problem of plastic pollution. Politics aligned due to its “low hanging fruit”-character, interviewees say.

Landfill fees:

Policy window: The problem of regulations on solid waste management not being clear enough became apparent, according to interviewees.

Policy entrepreneur: LWMA-leadership

Use of policy window: There was a long process with disagreements on which policy to best join with the problem and the politics stream not aligning for what the policy stream suggested. The version for which the politics stream seems to have been ready was significantly toned down, according to interviewees. Additionally, the policy was delayed due to a lack of capacity in LWMA, here the entrepreneur.

LWMA Board:

Policy window: The change of government with a new ruling party posed a window of opportunity for any policies connected to their party program.

Policy entrepreneur: President

Use of policy window: In this case the president himself seems to have worked as a policy entrepreneur, relatively top-down commanding a new policy. Once he, with his considerable political influence, has decided a problem needs attention and that a certain policy is the appropriate one, the streams are already aligned, allowing for a relatively swift adoption of the new regulation for the LWMA board.

Perseverance Project:

Policy window: The opening might be connected to waste being made a priority of the MACCE minister, though the data collected from interviews leave this somewhat unclear. Certainly, the window of opportunity was open once a high-level official decided to approach the project to explore alternative waste collection systems. The windows closed when he left his post and opened again with a new official on the job. The window closed again with his suspension.

Policy entrepreneur: LWMA employees, LWMA leadership

Use of policy window: The first window of opportunity for the project was used: It was decided for, there was institutional capacity to suggest designs to hook to the problem (provided at some point at least partially by France volontaires), and the politics aligned, with cabinet and important figures on board. The difficulty in this case seems to have been less with the decision and more with the failure of implementation. The part of the project that was implemented was stopped due to Covid19-measures. At virtually the same time the LWMA CEO left, hampering the institutional capacity for implementation. The new policy window with the new CEO was then not used. While the new CEO seems to have agreed with the problem, he did not agree with the solution “unjoining” the streams. While there was capacity to rework the design, the capacity for decision making (and re-joining the streams) was lacking and before a decision was taken the CEO was suspended.

Cable Cars:

Policy window: There is no specific window of opportunity that can be identified for the cable car project.

Policy entrepreneur: Entrepreneur, ETH

Use of policy window: As of End of 2022 unclear.

4 Discussion

This thesis aims at giving insights into the environment the SLL is set in and its place in it, in order to allow for a further improvement of the collaboration between ETH and Seychelles, seeking to answer the research question “What mode of use of the SLL-products, governance environment and pathways led to the current state of implementation of the research on solid waste management carried out within the SLL?”

Discussing the answer has two parts. The main means to get insights into the policy environment are the pathways followed. Some of these pathways are short and straightforward. That is the case for “stroke of the pen policies” or easily implementable measures that are either enforced top-down or get pushed from outside (or both). Some pathways are long and complex, still as of today not yielding the desired results. These are infrastructure projects or projects of organizational complexity, in need of financial and human capital. If and how the SLL-products feed into the pathways is hard to determine, due to two constraints: (1) There is no mechanism in place in government on how to proceed with the SLL products once they are completed. (2) By making suggestions, ETH contributes – in terms of the MSA – to the “policy primeval soup” regarding solid waste management in Seychelles. They do so alongside many other contributions. In many instances, other stakeholders have contributed similar ideas at different points in time (among others: Government of Seychelles, 2000; Mols et al., 2020; Wilson, 2004). The mixing, mingling and recombination of ideas within the soup before coming to the agenda is also described in original work on MSA (Kingdon, 2011, p. 116 - 117). Suggested solutions might also not survive in the soup due to anticipated constraints, lack of technical feasibility or lack of value acceptability (Kingdon, 2011, p. 131 - 139). The absence of a mechanism and the similar ideas by other stakeholders make the link between the use of the SLL-products and the discussed pathways

ambiguous. That the ways of connection and uptake of science by policy are ambiguous and unclear is a circumstance also described in literature (e.g. Görg et al., 2016; Lövbrand, 2007).

Considering use of the SLL-products and the four criteria credibility, iterativity, legitimacy and salience mentioned in the introduction as important features of boundary organizations and products, a few issues arise. Interviewees say that suggestions might not be implemented because they are not feasible. That a lack of feasibility hinders implementation is in line with other research (Weichselgartner, 2011; Weichselgartner & Kaspersen, 2010) on the implementation of scientific results as well as Kingdon's criteria for survival in the policy soup (Kingdon, 2011, p. 131-139). If the suggestions are not feasible, they are not salient to policy makers. One interviewee points out that the SLL-products are not commissioned for specific problem. Hence this might be what Lövbrand, (2011) describes as the potential barrier that is the tension created by the aim of usefulness while safeguarding "the academic privilege of exploring policy alternatives" (p.234). It has been argued that these tensions do not necessarily need to be resolved but maintained to an appropriate degree while including practitioners when examining them (Bartunek & Rynes, 2014). It is a common phenomenon in policy making under ambiguity that information is requested and produced but then not used in any decisions (Feldman, 1989 as cited in Sabatier, 2007). Additionally, the fact that the products are produced by student seems to affect the credibility for some actors. It has previously been reported that the participation of well-respected scientists can increase the credibility (Sarkki et al., 2014) here the opposite effect of not well-respected scientists (students) decreasing the credibility seems to unfold. The fact that many interviewees mention one TdLab-Co-Director by name when asked for their previous experience with the SLL is a hint that the credibility and iterativity of the SLL is quite dependent on this one person.

Nevertheless, the products of the SLL (at least the ones considered here) are used in some documentable instances where they are cited, e.g., in the National Waste Policy, with this policy then informing the Solid Waste Masterplan. How useful these several policies and masterplans and informing studies really are for change to happen is yet another question. In the past (Gonzalves, 2017) they were largely not implemented. The circumstance of various documents not being implemented has also been found to be present elsewhere and called the "on-paper-no-practice syndrome" (e.g. Nwafor-Orizu et al., 2018).

According to interviewees the SLL-products are also used as a source of easily accessible information, ready when needed. The way interviewees describe it, it seems that here the data obtained is mostly used, in line with observation of an interviewee that the products are mostly considered for their data and to a lesser extent for their suggestions. In terms of the MSA the SLL-products therefore feed into the problems stream, allowing participants to demonstrate that there is a problem their preferred, or in the words of the MSA "pet solution", can work for (Kingdon, 2011, p.90). Data is useful in doing so to construct indicators, indicating that problem, "a major preoccupation of those pressing for policy change" (Kingdon, 2011, p. 93). With this ready availability of data, SLL may add to the preparedness of policy actors: While policy entrepreneurs push for change and work on the opening of policy windows, they have to be prepared, once an opportunity presents itself "their pet proposals at the ready, their special problem well-documented" (Kingdon, 2011, p.165). The easy accessibility of ETHs reports allows all policy entrepreneurs to access information and use it in the push and pull for their "pet solutions". These

don't have to be ones that would necessarily be suggested by ETH-researchers. The finding that policy makers use scientific knowledge strategically is present literature (e.g. Amara et al., 2004).

While certainly relevant to each other, the literature on criteria for knowledge-utilization and the one on the MSA are barely connected (Blum, 2018). Knaggård, (2015) introduced the additional role of a knowledge broker to the MSA with credibility being a major success factor and Kingdon, (2011) does note that persistence (having similarities with iterativity) is decisive for the success of policy entrepreneurs. When and through which mechanisms credibility, salience, legitimacy and iterativity play a role throughout the policy making process (instead of only the knowledge uptake) might be a field for future research. E.g., in the case of the SLL it seems that while the credibility/the lack thereof does play a negative role for the uptake of suggestions the same is not necessarily true for the data. In the literature on knowledge utilization, generally three types are distinguished. While different literature uses different exact terms, the three are generally speaking (1) instrumental or operational: information on policy alternatives. (2) Informational or conceptual: for a general enlightenment or learning. (3) symbolically or political–strategically: for political struggle and policy prospects (Blum, 2018). While the SLL-products seem not to be used for (1) probably due to issues with credibility and salience, they are used for (3) (no statement can be made about (2) based on the data of this thesis). Hence it seems that different requirements regarding credibility and salience seem to apply for the different types of knowledge utilization. As in case of the symbolical-political utilization the information is used to “legitimate predetermined positions” (Beyer, 1997), it does make intuitive sense that the requirements one has before using knowledge are lower. This is also in line with Schrecker, (2001) (as cited in Kasperson & Berberian, 2011) finding that not the best science is used to support decisions but the science driving the political agenda.

Coming to the second part of this discussion, policy entrepreneurs or advocates and their “pet solution” are also an important feature of the pathways discussed: For almost all pathways looked at it is possible to identify a group or person that advocated and pushed for it – an advocacy coalition in terms of the KM, a policy entrepreneur in the MSA. This is also in line with Kingdon's original work that found that in researching case study it is in most cases possible to pinpoint policy entrepreneurs (Kingdon, 2011, p. 180), similarly when originally testing the kaleidoscope model, it was possible in 100% of cases to identify an advocacy coalition (Resnick et al., 2018). In case of the pathway's government officials, an entrepreneur, NGOs, to a certain extent donors and also ETH act as such advocates/entrepreneur. The stakeholder analysis and interviews allow us to assume that economic actors also hold some power to act politically. While considered normal, too close of a relationship between the state and important industries can be problematic for transitions to more sustainability. Transitioning means a change of the status quo, which can be hard to achieve when the state – while it should safeguard that transition – is intertwined with the status quo (Geels, 2014; Johnstone & Newell, 2018; Newell & Paterson, 1998). When testing the KM Resnick et al., (2018) write they encountered quasi-veto power of certain non-government private actors. Whether the influence goes this far in Seychelles can't be said based on the data of this thesis but would be an interesting field for further research.

For many pathways it is possible to identify the opening of a policy window. There are instances of it opening both in the political and the problems stream triggered by several different factors and reasons.

For many of the pathways the opening was connected to some type of institutional shift. Not all windows were successfully used, even if it was attempted, which is in line with Ridde, (2009) finding that the occurrence and seizing of opportunities to find solutions to problems is a necessary, although insufficient, condition for successful implementation. A decisive factor for the seizing of these opportunities seems to be the availability of human resources with the lack of institutional capacity often being a constraining or delaying factor to the implementation of pathways. This is in line, among others, with the MIP of the European Commission for Seychelles and the “Independent Country Evaluation” by the UNDP (European Commission, 2022; IEO - UNDP, 2020). The tdCS 2018 provides a list of barriers for the Government of Seychelles to attracting qualified personnel, among them low salaries (Krütli P., Nef, D., Zumwald, M., Haupt, M., Harlay, J, 2018). Interviewees also mention that salaries are not consistent for similar positions throughout the government, leading to people jumping ship when they can. The hence resulting turnover interferes with institutional memory and capacity.

The scarcity of human resources is conceived by interviewees themselves as a big constraint regarding the implementation of measures. Several interviewees in leadership position mention the low density of people with university degrees. All the while, the resources which are available seem not used optimally: The pathways show several instances where people with a motivation to contribute (with or without university degrees) make suggestions but don't hear back on them, which might in a vicious circle yet again be connected to scarce human resources within the administration though this would have to be investigated further.

As human capacity is scarce, the provision of it can be an important measure to make the streams coupleable. In the instance of both the glass levy scheme and the shredder the decisive window was a politician “deciding to undertake some sort of initiative on a particular subject and cast about for ideas, putting themselves on the market for proposals and hence creating a window” (Kingdon, 2011, p.174). He used the human capacity made available through France volontaires to couple solutions to this problem and then worked as policy entrepreneur for some of the solutions proposed.

While in the above mentioned instance the window would probably also have been open for an incineration/waste-to-energy plant, the participants were discouraged from pursuing it, probably not believing it would stand a chance, a situation also described by Kingdon as participants moving some items ahead of others due to considerations regarding their respective chances of enactment (Kingdon, 2011, p.167) or in more general terms “people often need to be convinced that there is something that can be done about a problem before they will participate” (Bryson, 2004, p. 25). A further reason for participants to turn away from problems might be due to them being too complex, here maybe this mechanism worked on the solution, with incineration possibly deemed too complex, so actors turned to others (Kingdon, 2011).

In case of the incineration/waste-to-energy plant, interviewees claim that other interviewees did not want to take the decision. The accusation of interviewees that other interviewees are fearful to take a decision also came up in other instances: One interviewee thought interviewees are fearful due to the history of Seychelles with the same party in power almost from independence until 2020 and the fact that it was

unclear who could take what decisions and who would be “punished”. A lower-ranking interviewee in turn thought higher ranking officials to be fearful due to political considerations.

Similar to the human resources, financial resources can be a decisive factor both for the implementation or the non-implementation of policies and projects. The pathways have shown, for anything that is not a stroke-of-the-pen-policy, funding is crucial, sometimes hard to obtain and accordingly hard to plan for. Funding opportunities can be in themselves policy windows opening. The importance of funding also determines the important role the Ministry of Finance, National Planning and Trade seems to play for projects according to interviewees. This is in line with Weichselgartner and Kasperson, (2010, p. 273), who describe this as a conflict between science and policy making: “While science is based on facts, decision making – especially in traditional risk management – is more cost–benefit-oriented, determined by risk–benefit analyses, and often ends up in the domain of finance departments.”

The scarcity of human and financial resources means that international organizations and funds do have a significant influence on the pathways via the provision of these scarce resources. The influence of donors is also in line with the original paper on the KM, where the authors point out that in testing their hypothesis they encountered the decisive role of donors in shaping policies (Resnick et al., 2018). There are instances where this involvement is not obvious but might only be visible on second sight, e.g., the glass levy scheme. Discussing these external factors within the MSA is somewhat tricky as the MSA is methodically nationalist and not designed to consider the role of external influences such as the multilevel governance structure (Garcia Hernandez & Bolwig, 2021). According to Hernandez and Bolwig, (2021), donors can generally contribute to all three streams and act as policy entrepreneurs, a finding in line with how they interact with the pathways of this thesis. Ridde, (2009) suggests that the role of donors enhance the frequency of windows of opportunities. The seizing of these donor opportunities can sometimes happen in what some interviewees describe as a quite hectic and uncoordinated manner. There seems to be an initiative from the side of the PDCS to better coordinate and align the seizing of project opportunities with goals or priorities of the MACCE.

Though the SLL is not a donor in the classical sense it is nevertheless part of this landscape of entities that want to “support” Seychelles. How and with what effects actors of this landscapes work and interact with one another and the Government of Seychelles could be an area of further research, as these interactions and effects are quite probably highly complex and, in many cases, rather “hidden”. For example: The budget process is relevant for the implementation of policies and projects, as outlined above. It seems that the way budgeting is organized is connected to a World Bank project and the IMF reform (Government of Seychelles, 2019b; World Bank, 2019). Or as another example: One interviewee mentions the IMF reform as reason to outsource the operation of the waste shredder. It has also been stated that donors might not only have the intended effects on solid waste management. Bjerkli (2013) for example observed, that the “good governance” policies requested by international donors – while formally implemented – did not have the desired effect in the solid waste management of Addis Ababa but were instead used to cement existing power structures. This topic would merit more attention in the case of Seychelles.

Besides financial and human also further type of resources play a role for the pathways: There is an instance where a project came to a halt due to the lack of land. The scarcity of various resources as a challenge for solid waste management on SIDS is in line with other literature (Kowlessar, 2020; Mata-Lima et al., 2021; Mohee et al., 2015; Morrison & Munro, 1999) and leads to a governance environment of uncertainty regarding which projects can be implemented.

Reflecting on the application of the KM and the MSA: It worked well for all but the cable car project, where they did not fit optimally. Probably the cable car project (1) has too big of a share not unfolding in a policy environment (2) is not yet far enough to allow for the analysis of the whole decision-making process.

5 Further considerations: Outlook, North-South Collaborations, Self-Reflection

Having discussed the environment, the SLL is set in and its current role in it, the question will be how to proceed. The SLL is a boundary organization between science and mainly policy makers. That per se does not say anything about its exact role. A guideline to find such an exact or more exact definition could be seven rules compiled by Mostert and Raadgever, (2008) for researchers looking to increase their impact on the policy process. They are formulated in such a general way that they seem applicable also when the goal is not necessarily an increased impact on policy: (1) Reflect on the nature and possible roles of science and expertise, (2) Analyse the stakeholders and issues at stake, (3) Choose whom and what to serve, (4) Decide on your strategy, (5) Design the process to implement your strategy, (6) Communicate!, (7) Consider your possibilities and limitations.

The outcomes of these reflections are especially delicate because, and should not be made without acknowledging, that the SLL is not only a boundary organization but also a so called “north-south” collaboration, entailing a set of specific considerations and challenges on its own. Seychelles is a sovereign state and democracy and to my knowledge there is nobody involved in the SLL from ETHs side that is currently a citizen or resident of that sovereign state. As mentioned in the introduction, collaborative or transdisciplinary projects can entail power-asymmetries calling for constant reflection on challenges and possibilities to improve. There are examples in the scientific literature of what such critical self-reflection can look like (e.g. Dannecker, 2022). Though it was not the focus of this thesis, and it might be an area of future work, some first reflections can be offered here. These are based on limited overview of all work done within SLL and all the consequences and effects it has and are considered mere suggestions of areas that could be given further thought and might potentially pose areas of improvement which I deem important as outlined above. As these reflections are supposed to be somewhat critical, they naturally focus on “negatives”. That does not in any way mean that there are not a lot of “positives”, they are simply not the focus here. That being said, several issues identified from literature which can hamper an equitable collaboration or are indications of inequity are present within the SLL.

- Some characteristics of parachute science are present: Data is collected in Seychelles, students from ETH Zurich go to Seychelles for either three weeks in case of the tdCS or about

three months in case of Master theses, collect data in collaboration with Seychellois, then return to Switzerland to finalize the work. (personal Information, de Vos, 2022; Genda et al., 2022). My thesis did largely follow this scheme: I collected data in Seychelles (with the support of Seychellois), the analysis of the data and writing was conducted in Switzerland.

- Funding provided by the northern partner and asymmetric accessibility of funds in favour of northern partner (Ishengoma, 2016; Kotze & Dymitrow, 2022).
- Peer reviewed publications resulting from the partnership are authored by the northern partner (Asare et al., 2022; Kotze & Dymitrow, 2022; Krütli et al., 2018; Meylan et al., 2018).
- Unequal agenda setting power (Ishengoma 2016, Bradley 2008): Though it seems that the topic for other SLL-products were set by partners together, this was not the case for this Master thesis: Its topic was worked out in Switzerland with Seychellois partners involved later for the organization of the field phase.
- Possibility to improve the capacity building element for the southern partner ((Genda et al., 2022; Ishengoma, 2016): There are elements in the SLL (over which the author does, as mentioned before, not have full overview) that can be deemed capacity building for Seychellois. Nevertheless, it seems important to me to acknowledge that the above-described modality of Swiss students going to Seychelles is mainly enormously capacity (and CV) building for ETH students. At least that's how I perceive my experience in Seychelles: Besides the benefit that having been there allows me to complete my master's I also learned a lot from the exposure to the work modalities in a foreign country. While the data collected within the SLL is according to interviewees useful, it is not necessarily capacity building for Seychelles. While the reports are "for free" nominally, they are supported with office space and work hours by Seychellois residents (in my case, among others: many interview hours, hours of showing me around, hours discussing with me, hours setting up my computer for the internet connection, hours taking care of a "Gainful Occupation Permit" for me, hours printing things for me because my computer refused to connect to the printer). While there have been visits of Seychellois officials to Switzerland, they were to the knowledge of the author a lot less frequent and the vice-versa exchange of Seychellois students to Switzerland has to the knowledge of the author not taken place.

All of these and further possible effects would have to be given more thorough thought and analysis, like mentioned above I don't have an overview over all the work conducted in the SLL. I think this would be important as it might be timely to have a result-open discussion on the future positioning of the SLL, addressing issues of role of scientists in the policy making process and the role of researchers in a foreign country. Co-production of knowledge has its costs and downsides (Fransman & Newman, 2019; Oliver et al., 2019; Pettigrew, 2003). The discussion should hence include a cost-benefit analysis for all partners. This discussion could be a possibility to thoroughly discuss the issues of credibility and salience and the current reliance of the SLL on the TdLab-Co-Director.

A potential field of future investigation might be the interconnectivity between questions of an equitable north-south collaborations and questions of credibility, legitimacy, salience and iterativity.

6 Limitations

The interviewees provided the substance of this thesis, for which the author is sincerely grateful. Nevertheless, the reliance on interviews poses some challenges and limitations:

The 27 interviews constitute a limited sample. Choosing another sample might possibly have led to other results which is a severe limitation to the results as they currently present themselves.

During the interviews, the author gained the impression that some interviewees felt pressure to say that they use the products of the collaboration with ETH. The author tried – wherever that feeling arose – to take off that pressure and reassure that all answers are equally “right”. It’s beyond the authors judgment whether that worked and if all interviewees described their use of the SLL-products truthfully.

That also goes for the timelines. Some of the steps are a long time ago and it is probable that not everything was remembered correctly. In some points different interviewees remembered things differently, where that was the case, it was pointed out. This challenge was exacerbated due to the fact that the access to documents to verify or clarify the accounts of interviewees was a challenge throughout the process of this thesis and this frequent lack of access is a severe limitation to the results.

The results as they present themselves were additionally shaped by the method chosen. These chosen methods are purely qualitative without statistical analysis to confirm the findings. The Kaleidoscope Model and the Multiple Streams Approach chosen for the analysis of the pathways were originally designed for policy processes but were here applied also to other projects. This bending of the purpose of the models might have led to less accuracy. This seems to be the case for the cable car project, there the bending probably went too far, and the insights offered by the models are limited. The method of screening for the elements relevant for the two models was insofar special as it was “indirect”: The questions for the interviews were chosen to try to understand the timelines and mechanisms of the pathways in as much detail as possible. Only later were these pathways screened for the presence of these determinants. Another approach could have been to specifically design the questions regarding presence determinants/elements of the models. This approach might have led to significantly different results, which is a further limitation of the work presented here.

7 Conclusion

The SLL-products on solid waste management are used mostly for the data, not greatly for the suggestions provided. This might be connected to issues regarding the perceived credibility and salience of the work. It is difficult to separate the suggestions made by SLL from similar suggestions made at other points in time and/or other actors regarding their pathways to implementation. There is also no defined institutionalized process for how to proceed with completed SLL-products. It is hence impossible to determine if anything is implemented causally because of the SLL.

The pathways the SLL-products (might) feed into are characterized by advocates pushing for them and trying to seize windows of opportunity. Funds and human resources are decisive factors for the advancement of these pathways with the absence of human resources/ institutional capacity being a big constraining factor. Overall, the governance environment for solid waste management in Seychelles is

characterized by uncertainties regarding various types of resources. The pathways are furthermore often – even if not obvious on first sight – characterized by the presence of donors providing some type of resource.

The author suggests a result-open and honest debate to concretely define the role and strategy of the SLL and the position and expectations of the actors within it. The author suggests that concerns are taken seriously, and limitations discussed honestly.

8 References

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Appendix A: Interview guideline for semi-structures Interviewee Interviews

Please note that in the following we will refer to the term 'Sustainability Learning Lab'. You may not have heard this term before. It refers to a learning and activity platform for students, teachers, researchers and actors from local government, the private sector and civil society. The teaching and research activities of ETH Zurich in collaboration with local partners such as the MACCE (Ministry of Agriculture Climate Change and Environment) and the Ministry of Transport / Planning Authority are the main activities that have been carried out within this platform since 2015. Therefore, you can refer to these (ETH) activities.

Public interviewees – inside Seychelles:

- What is your current position and what are your responsibilities in this position?
- Have you previously been involved in the collaboration between ETH and Seychelles?
- Can you name some of the products of the collaboration between ETH and Seychelles?
- What do you think is the goal of the collaboration between Seychelles and ETH Zurich?
- What do you think is the use of the collaboration between Seychelles and ETH Zurich for the Seychelles?
- What happens with the products of the ETH collaboration (i.e., the reports), once they are completed/ how are they "processed"/ what are they used for?
- Can you describe the process of how you decide which measures to implement regarding waste/transport?
- Whom do you consult with before or during deciding for the implementation of projects/policies?
- Are there external influences on the decisions of your unit? (e.g. Consultants, foreign governments, private stakeholders)
 - If yes, by whom and in what ways?
- Can you describe the process leading to the current stage of the waste-energy-plant-project?
- Can you describe the process leading to the implementation of the balloon ban?
- Can you describe the process leading to the implementation of straws-restriction?
- Can you describe the process leading to the new levy-scheme for refrigerant gas?
- Can you describe the process leading to the new levies on vehicles?
- Can you describe the process leading to the inclusion of waste in the fair trading act?
- Can you describe the process leading to the implementation of the glass recycling project?
- Can you describe the process leading to the current stage of the Perseverance pilot project (waste separation & compost) that was stopped?
- Can you describe the process leading to the new landfilling fees?
- Can you describe the process leading to the new waste policy?
 - How is the implementation of the new waste policy ensured?
- Can you describe the process leading to the solid waste masterplan?

- How is the implementation ensured?
- Maybe: Can you describe the process to the appointment of the new board for LWMA?
- What happened regarding Hazardous Waste since the start of the collaboration with ETH?
- Can you describe the process leading to the current stage of the circular economy project under the UN grant?
 - Why is it in the fisheries ministry (who's decision was that)?
 - Is there a connection to the fishing-net-recycling-project?
- Can you describe the process leading to the current stage of the cable-car-project?
- When do you hire a consultant for a project? How is the internal process to do so?
- Why did you choose to have ETHs Case Study, the Assessment study, the Study of the University of Darmstadt, the Masterplan and the new policy?
- Where do you see the ETH-reports within this structure of reports and policies?
 - Do you trust the ETH-reports/ do you think they are of good quality?
- How urgent do you think is the topic of waste/transport for the Seychelles?
- Interviewee Diagramm

Private Interviewees & NGOs

- What were the steps so far taken to the implementation of the project you're involved with?
- Do you talk to or otherwise interact with government actors?
- Do you feel listened to by government actors?
- Are you financially or otherwise supported by the government in this project?
- Do you feel like you can influence decisions by actors of the government?
- Are you aware of the collaboration between ETH and Seychelles?
 - Have you ever used a product of the collaboration?

Public Interviewees – outside Seychelles

- Why do you finance projects in the Seychelles?
- Can you describe the process leading to you financing a project in the Seychelles?
- Why exactly did you decide to finance [project interviewee financed]?
- Who decides on which consultants to use, you or the Seychellois government?
- Are there any requirements tied to the money?
- Is there a supervision-scheme? Are you in regular contact with the Seychellois government regarding the project?
- Do you feel like you can influence the Seychellois government?

Consultants

- Can you describe the process to being hired as consultant for the project you worked on?
- Who hired you for the project you worked on?
- Why do you think they hired you?

- Did you use the products of the ETH-Seychelles-Collaboration when drafting your consultation paper?
- Do you feel like an influence on the Seychellois government?

Appendix B: List of suggestions provided

Item	Document	Chapter	Type (suggestion, tool)
Establishing clear tasks and allocated responsibilities to enforce framework	tdCS 2016	1	suggestion
Turn LWMA into a category 2 agency	tdCS 2016	1	suggestion
Clarify fining responsibilities between Waste, Enforcement & Permits Division (of MACCE) and LWMA	tdCS 2016	1	suggestion
State responsibilities of MEECC and LWMA clearly in new EPA	tdCS 2016	1	suggestion
Establish performance indicators for LWMA	tdCS 2016	1	suggestion
Include objectives of international convention in SSDS and solid waste management policy	tdCS 2016	1	suggestion
Clearly state terms of contract with contractors and assign responsible person for overseeing them	tdCS 2016	1	suggestion
Allow MACCE to introduce financial measures without approval by ministry of finance	tdCS 2016	1	suggestion
Allow tax from SWM to flow directly into SWM	tdCS 2016	1	suggestion
Introduce procedure for crosschecking EPA with SSDS	tdCS 2016	1	suggestion
Introduce incentives for stakeholders (contractors) to participate in waste reduction	tdCS 2016	1	suggestion
Financial assistance for future recycling projects	tdCS 2016	2	suggestion
Provide bins for recycling	tdCS 2016	2	suggestion
Provide functioning collection system for recycling together with Redeem Centres, recycling businesses or contract companies	tdCS 2016	2	suggestion
Consider levy for glass, PET oil bottles, more aluminium, other plastics	tdCS 2016	2	suggestion
Consumer-Education to partake in recycling	tdCS 2016	2	suggestion
Pilot project at estate community with fully developed infrastructure plan	tdCS 2016	2	suggestion

When agreed on collection: cost estimate for using crushed glass as concrete aggregate	tdCS 2016	2	suggestion
Support for Navins Recycled Paper Company; legal or financial advantage; bans import taxes or subsidies; provision of collection services, electricity, land or other infrastructure or promotion	tdCS 2016	2	suggestion
Support for other recycling businesses besides Navins; legal or financial advantage; bans import taxes or subsidies; provision of collection services, electricity, land or other infrastructure or promotion	tdCS 2016	2	suggestion
Financial plan with consistent sources of revenue for government to contribute to recycling market	tdCS 2016	2	suggestion
Work with Seybrew to include other glass products in their refund scheme	tdCS 2016	3	suggestion
Increase upcycled paper products in form of handicrafts	tdCS 2016	3	suggestion
Introduce products with longer life span	tdCS 2016	3	suggestion
Provide more opportunities to consumers to repair	tdCS 2016	3	suggestion
Introduce landfill tax on scrap metal	tdCS 2016	3	suggestion
Collect data regarding imported products	tdCS 2016	3	suggestion
Collect data at scrapyards	tdCS 2016	3	suggestion
Separate metal waste and shelter it or collect and treat resulting leachate	tdCS 2016	4	suggestion
Measures for leachate treatment (2016 pre-treatment plant was broken)	tdCS 2016	4	suggestion
Provide appropriate protective clothing to worker	tdCS 2016	4	suggestion
Ensure products which enter the Seychelles are of good quality	tdCS 2016	5	suggestion
Implementation of polluter pays principle	tdCS 2016	5	suggestion
Further investigate the potential of a biogas plant in a more detailed study, incorporating financial costs and specific suppliers and customers to assess the overall economic feasibility	tdCS 2016	6	suggestion
Cost estimate for cost of implementation of different waste reduction strategies	tdCS 2016	7	suggestion
More long term planning of policies	tdCS 2016	Section III	suggestion
Distributing responsibilities more optimally (measures making sure that qualified people take them on)	tdCS 2016	Section III	suggestion
Closer collaboration ministries of environment & finance to expedite approval of new strategies	tdCS 2016	Section III	suggestion

Levies collected from PET and cans should be considered fees instead of tax so it goes back to SWM	tdCS 2016	Section III	suggestion
Introduce better infrastructure for collection in form of decentralised collection points	tdCS 2016	Section III	suggestion
Tax breaks, subsidies or loan schemes for new projects or investments	tdCS 2016	Section III	suggestion
Better data collection practices at Weighbridge Providence and levy system	tdCS 2016	Section III	suggestion
Long-term monitoring of environmental parameters related to the landfill e.g., through environmental impact assessment)	tdCS 2016	Section III	suggestion
Tool to assess the potential of new recycling options	tdCS 2018	2	tool
Recycling for cardboard boxes	tdCS 2018	2	suggestion
Improve scrap metal recycling	tdCS 2018	2	suggestion
Improve waste identification and classification at the landfill	tdCS 2018	3	suggestion
Establish clear guidelines for handling hazardous wastes e.g., lithium-ion battery or radioactive parts of medical equipment	tdCS 2018	3	suggestion
Establish adequate disposal solution of ammonia tainted oils coming from fish industry	tdCS 2018	3	suggestion
Establish system for disposal of chemical laboratory waste	tdCS 2018	3	suggestion
Establish central storage facility for chemical waste, safe and leak proof stockpile	tdCS 2018	3	suggestion
Find system for feeing of incineration of clinical and pharmaceutical waste	tdCS 2018	3	suggestion
Update permit form or proper instructions on when to use it	tdCS 2018	3	suggestion
Better communication between MECC and LWMA regarding hazardous waste and use of permits	tdCS 2018	3	suggestion
Better communication between stakeholders of hazardous waste	tdCS 2018	3	suggestion
Better monitoring and enforcement mechanisms for hazardous waste	tdCS 2018	3	suggestion
Clear assignment of responsibilities regarding hazardous waste	tdCS 2018	3	suggestion
Look into possibility of AD plant	tdCS 2018	4	suggestion
Look into possibility of incineration plant	tdCS 2018	5	suggestion
Thorough monitoring of the money flows for solid waste management	tdCS 2018	6	suggestion
Correct planning ensuring match of budget and real payments	tdCS 2018	6	suggestion
Better organization and accountability of money streams	tdCS 2018	6	suggestion
Improve communication between WMF and SRC	tdCS 2018	6	suggestion

Improve communication between LWMA and licensing authorities	tdCS 2018	6	suggestion
Implement financial incentives to waste sorting (for contractor, at the time STAR)	tdCS 2018	6	suggestion
Avoid or make public conflicts of interests	tdCS 2018	6	suggestion
Disclosure requirements where companies' shareholders state if they have first or second-degree relatives in the government	tdCS 2018	6	suggestion
Economic incentives for sorting waste for households	tdCS 2018	6	suggestion
Charge trucks bringing mixed more than when bringing sorted waste	tdCS 2018	6	suggestion
Put a pay as you throw in place in combination with recycling and organic bins	tdCS 2018	6	suggestion
Put an extended importer responsibility system in place	tdCS 2018	6	suggestion
Subsidies, import taxes, guarantees to make recycling attractive	tdCS 2018	7	suggestion
Education in schools about 3Rs (reduce, reuse, recycle and waste in general	tdCS 2018	7	suggestion
Take people to landfills to show them the problem	tdCS 2018	7	suggestion
Polluter-pays scheme	tdCS 2018	7	suggestion
Bring people together to overcome barriers	tdCS 2018	7	suggestion
More active lobbying of civil society	tdCS 2018	7	suggestion
Putting monitoring and reporting system in place and fixed regulating formats of reporting and communicating	tdCS 2018	7	suggestion
Regularly check and revise contracts and set tasks with deadlines	tdCS 2018	7	suggestion
Implementation of a definition of e-waste	Rajković, 2018	4	suggestion
Establishment of a clear legal framework regarding e-waste	Rajković, 2018	4	suggestion
Investigate the resources available to the PCU under the project about energy efficiency	Rajković, 2018	4	suggestion
Evaluation and adoption of standards regarding the quality and hazardous components of EEE and the classification and treatment of e-waste	Rajković, 2018	4	suggestion
Develop a pilot project for the collection, sorting and export of e-waste	Rajković, 2018	4	suggestion
Roundtable/workshop with stakeholders to discuss potential and acceptance of different sets of policy instruments	Rajković, 2018	4	suggestion

Adopt standards for e-waste align the waste management system in Seychelles with international standards	Rajković, 2018	4	suggestion
Incentives for the general collection and treatment of e-waste	Rajković, 2018	4	suggestion
Expand existing waste collection processes and infrastructure to e-waste	Rapold 2019	3	suggestion
Develop procedures in place for HW to include precise instructions about how to handle hazardous e-waste	Rapold 2019	3	suggestion
Adoption of an official legal definition and classification of e-waste in a provision to the EPA (including not yet discarded e-waste, distinction between hazardous and non-hazardous among others)	Rapold 2019	3	suggestion
No longer generally classify e-waste as hazardous	Rapold 2019	3	suggestion
Apply phased approach to e-waste-system introduction, start with ict devices (computers, laptops, mobile phones)	Rapold 2019	3	suggestion
Oblige waste collectors to bring collected bulky e-waste to designated location in new MSW collection contracts	Rapold 2019	3	suggestion
(Maybe) collect and store cooling and freezing equipment	Rapold 2019	3	suggestion
Choose government-led-system for future e-waste-management	Rapold 2019	3	suggestion
Implementation of a household tax or fee for general waste management, make it income dependent	Rapold 2019	3	suggestion
Start e-waste collection with government and commercial sector	Rapold 2019	3	suggestion
Expand redeem centres for PET bottles and cans to act as public drop-off for e-waste	Rapold 2019	3	suggestion
Determine storage location for e-waste	Rapold 2019	3	suggestion
Final storage location as a drop-off point	Rapold 2019	3	suggestion
Supplement collection channels with drop-off events	Rapold 2019	3	suggestion
Pilot project to try out whether drop-off containers could act as a means to collect e-waste	Rapold 2019	3	suggestion
Possibly implement door-to-door collection service, retailer drop-off system	Rapold 2019	3	suggestion
Disposal ban for e-waste once collection channels are made available	Rapold 2019	3	suggestion
Provision of financial incentives via a deposit-refund system for e-waste	Rapold 2019	3	suggestion
Consider if informal sector should be included in a deposit-refund system for e-waste	Rapold 2019	3	suggestion
Pilot project with one-for-one retailer system for e-waste	Rapold 2019	3	suggestion

Work towards producer take-back scheme	Rapold 2019	3	suggestion
Take steps towards planning of treatment facility	Rapold 2019	3	suggestion
Possible ways of support for operator of treatment facility: financial, VAT-exemptions, tax exemptions, visa facilitations for foreign workers, provision of financial support for initial investment needs	Rapold 2019	3	suggestion
Collaborate with international interviewees having relevant experience in the field of e-waste management	Rapold 2019	4	suggestion
Increase data collection efforts regarding e-waste	Rapold 2019	4	suggestion
Conduct extensive survey to assess stock of electrical and electronic equipment	Rapold 2019	4	suggestion
Organize e-waste-collection from commercial stakeholders	Rapold 2019	4	suggestion
Initiate pilot projects for e-waste collection	Rapold 2019	4	suggestion
Obtain information about how to run a treatment facility from international e-waste recyclers	Rapold 2019	4	suggestion
Obtain information in place for transboundary shipments	Rapold 2019	4	suggestion
Measure how much of what e-waste fits into a shipping container	Rapold 2019	4	suggestion
Conduct dismantling exercise	Rapold 2019	4	suggestion
Implement import tax on electronic goods	Williams 2020	5	suggestion
Establish a separate e-waste bin at community drop-off locations	Williams 2020	5	suggestion
Hold e-waste collection events	Williams 2020	5	suggestion
Offer door to door collection of e-waste on designated day	Williams 2020	5	suggestion
Conduct research on the implementation of a deposit scheme	Williams 2020	5	suggestion
Establish the e-waste management system in the strategic plan of the MEECC	Williams 2020	5	suggestion
Contract the collection and dismantling out to a local company	Williams 2020	5	suggestion
Implement a system to collect data following the flow of waste of electrical and electronic waste through the e-waste management system, implement simultaneously with the e-waste management collection system	Williams 2020	5	suggestion
Collect and evaluate opinions from a wide range of public during planning, implementation and monitoring stages	tdCS 2021	1	suggestion
New safety measures in the bus system	tdCS 2021	2	suggestion

Comfort measures in the bus system	tdCS 2021	2	suggestion
Improve maintenance of buses	tdCS 2021	2	suggestion
Provide seat belts, grab rails... in new bus fleet	tdCS 2021	2	suggestion
Improve driving style of bus drivers	tdCS 2021	2	suggestion
Improve cleanliness of busses	tdCS 2021	2	suggestion
improve punctuality: measures against driver shortage, lack of buses, miscommunication of driver duty	tdCS 2021	2	suggestion
Specify departure times on timetables at all bus stops	tdCS 2021	2	suggestion
Improve availability of real time information: use media channels (app under development	tdCS 2021	2	suggestion
Extend operating hours of busses	tdCS 2021	2	suggestion
Extend frequency of busses	tdCS 2021	2	suggestion
Cycling route from Ile Perseverance to the city centre and to Roche Caiman	tdCS 2021	3	suggestion
Pedestrian zone along Market Street and Huteau Lane (was already decided upon but not enforced in 2021)	tdCS 2021	3	suggestion
Extend pedestrian zone, e.g., including marine charter area and former Jardin des enfants	tdCS 2021	3	suggestion
Open pedestrian zones for cyclists	tdCS 2021	3	suggestion
Second step: slowly connects corridors	tdCS 2021	3	suggestion
Improvements of weak point Connector to Bois de Rose Avenue	tdCS 2021	3	suggestion
Improvement of weak point Albert Street	tdCS 2021	3	suggestion
Improvement of Weak point Intersection Liberation Road and Mont Fleuri Road	tdCS 2021	3	suggestion
Pedestrian crossings in 20 weak points missing pedestrian crossings	tdCS 2021	3	suggestion
Improve pavements of 18 weak points with inadequate pavement	tdCS 2021	3	suggestion
Placement of new pedestrian crossings close or next to the intersections	tdCS 2021	3	suggestion
Segregated cycling lane along Bois de rose Avenue splitting into 5th June avenue and flamboyant avenue	tdCS 2021	3	suggestion
Segregated cycling lane along Francis Rachel and Albert St.	tdCS 2021	3	suggestion
Cycling lane at Independence Avenue	tdCS 2021	3	suggestion
Cycling lane along Market Street and Huteau Lane	tdCS 2021	3	suggestion
Cycling lane along Mont Fleuri	tdCS 2021	3	suggestion
Cycling lane along Castor St.	tdCS 2021	3	suggestion
Promote bike sharing in greater Victoria area	tdCS 2021	3	suggestion

Organize structured and transparent round table for exploring option regarding freight transport	tdCS 2021	4	suggestion
Establish comprehensive database on current and projected freight movement and costs	tdCS 2021	4	suggestion
Transparent collaboration between government and the private sector should be set up regarding freight	tdCS 2021	4	suggestion
Comprehensive freight masterplan	tdCS 2021	4	suggestion
Integrate cable cars within existing transport system with bus stops and parking	tdCS 2021	5	suggestion
Introduce unified travel card for bus and cable car	tdCS 2021	5	suggestion
Revise bus schedule between Victoria and Beau Vallon	tdCS 2021	5	suggestion
Communicate cable car projects clearly and concisely to residents	tdCS 2021	5	suggestion
Negative incentives to using car: e.g., limit amount of cars imported	tdCS 2021	5	suggestion
Plan to implement biodiversity restoration methods after building of cable cars	tdCS 2021	5	suggestion
Hasten transition to cleaner sources of energy	tdCS 2021	5	suggestion
Raise awareness do alternative transportation solutions	tdCS 2021	6	suggestion
Restoration at potential cable car station near Creve Coeur	tdCS 2021	7	suggestion
Restore native forest near cable car station	tdCS 2021	7	suggestion
On-site production of fruits, spices, medical herbs near cable car station	tdCS 2021	7	suggestion
Establishment of an educational biodiversity awareness centre at potential cable car station	tdCS 2021	7	suggestion
Restoration maintenance activities involving volunteers at cable car station	tdCS 2021	7	suggestion
Greening improvements to Freedom square	tdCS 2021	7	suggestion
Greening improvements to Peace Park: e.g. river bank restoration	tdCS 2021	7	suggestion
Tear down collapsing buildings at waterfront, renovate balustrades and bridges, add trees for shading	tdCS 2021	7	suggestion
Plant robust fruit trees and edible shrubs at Perseverance	tdCS 2021	7	suggestion
Apply for international funding for restoration of mangroves at Peace park	tdCS 2021	7	suggestion
Documentary series about transport on Mahé	tdCS 2021	8	tool
Broadcast documentary series on local news channels through SBC	tdCS 2021	8	suggestion
Upload documentary series on YouTube	tdCS 2021	8	suggestion
Use documentary series as part of roundtable discussions	tdCS 2021	8	suggestion

Implementation of cross-sectoral taskforce with representatives from variety of ministries private sector, civil society, science. Lean with a clear mandate, equipped with necessary resources	tdCS 2021	outlook	suggestion
Complement existing database with new data. Traffic count and origin-destination pattern	tdCS 2021	outlook	suggestion
Develop scenarios for evolvement of transport system based on strategic land use and development plan 2040	tdCS 2021	outlook	suggestion
Model scenarios of interest	tdCS 2021	outlook	suggestion
Translate favourite scenarios into concrete measures	tdCS 2021	outlook	suggestion
Check favourite measures against economic viability and political feasibility	tdCS 2021	outlook	suggestion
Phased implementation	tdCS 2021	outlook	suggestion
Involvement of public	tdCS 2021	outlook	suggestion
Traffic Model Mahé	Schaniel 2022		tool

Appendix C: Details of Application of Kaleidoscope Model

	Balloon Ban	Straw restriction	Shredder	New LWMA-Board	Glass-levy	Hazardous Waste	Refrigerant Levies	Waste regulations	Perseverance	Policy & Masterplan	Incineration plant	Cable car project
1. Recognized, relevant problem	According to stakeholder "balloon pollution" visible to people	"Symbolic" item, picture of turtle over social media	Waste problem recognized by then MACCE minister	Liberal party programme of LDS: efficient public service	Waste problem recognized by then MACCE minister	Problem has been outlined in documents repeatedly	International recognition of HFCs climate effect	LWMA being aware of problems with then existing system	LWMA recognizes shortcomings in current waste collection scheme	Old policy outdated; concrete plan needed	Landfill problem recognized	For some transport problem, for others problem of not enough tourism activities
2. Focusing event	Election of new president	World Environment Day 2018 with according to motto		Election of new president		Resource Efficiency Project, ISLANDS project	Kigali Amendment to Montreal Protocol				Oil price shock of 2008, potentially: landfill fires	
3. (Powerful) advocacy coalitions	NGOs	NGOs	Then MACCE minister	New administration	Then MACCE minister	GEF-UNDP	Ozone Unit	LWMA	CEO and staff of LWMA		ETH	Cable Car Promotor and TdLab-Co-Director

4. Knowledge & research	NGO campaign cites research	NGO campaign cites research	France volontaires consultant worked on it (probably)		France volontaires consultant working on it	A lot of work within SLL, especially on E-waste	Knowledge & research on HFCs in refrigerant equipment used to design law		LWMA researches possible alternatives (at several points in time)	According to policy informed by tdCS 2016 & Darmstadt study	Research by MACCE & several sources, claim by Energy commission that not enough	Studies etc. conducted by Dopplmayr, entrepreneur, SLL
5. Norms, biases, ideology and beliefs	Directly linked to the notion of the importance of a "cleaner Seychelles"		Minister believed in it	Directly connected to party programme	Minister believed in it			Belief that mixed waste should be more expensive than separated	Changing outline tied to changing beliefs, non-approval probably also due to beliefs about human nature		Directional decision: different opinions on whether it should be adopted	
6. Cost-benefit calculations		Description of straws as "low hanging fruits"	Description of big benefit for relatively little investment		Detailed "actual" cost-benefit calculations	Notion of MTR of Resource Efficiency that significant funds would be needed	Non-compliance would have influence on funding	Political considerations for not allowing to raise fees too much	Non-provision of organic waste bins due to cost		Suspicion that no decision taken due to political considerations	Detailed cost-benefit consideration

7. Powerful proponents vs. opponents	President in favour	Tourism Sector on board: potential powerful opponent, MACCE on board	MACCE minister in favour	President in favour	MACCE minister in favour	According to MACCE, failure to include in budget ("opponent" probably Ministry of Finance, NP and Trade)	Ozone Unit in favour	LWMA in favour	Mixed opinions within LWMA on design		Mixed opinions, e.g., energy commission asking to go back and do more research	Connection of entrepreneur to president
8. Government veto players	Approval by cabinet	Approval by cabinet	Approved via investment plan	Approval by cabinet (probably)	Amendment on levy by cabinet, then approval	Mixed: household budget for plant not granted (but mentioned in the investment plan)	Approval by cabinet and NA for Kigali Amendment, cabinet for new S.I.	Approval by cabinet	Cabinet approved the project, here the LWMA CEO is practically a veto player, once approved, then disapproved, now waiting for re-approval	Cabinet approved	Cabinet approved with "investment plan" to look into feasibility, not clear if at other stages involved	
9. Propitious timing	Timing: Elections	Timing: World Environment Day		Timing: Election								

10. Requisite budget

<p>Granted</p>		<p>Household budget not granted; Basel convention funds not granted. ISLANDs & Resource Efficiency funds present (but more for Design... than for actual implementation)</p>			<p>Budget to buy bins: approved. Bins for organic: not approved</p>	<p>Budget for policy from resource efficiency project, budget for masterplan from EU</p>	
<p>Capacity to get it up and running seems to lack. Provision of capacity through France volontaire</p>	<p>Capacity by France volontaires</p>	<p>Delay of ISLANDs due to problems finding a project manager</p>	<p>Strong capacity with ozone unit</p>	<p>Struggle to get it adopted. not fully implemented according to stakeholder</p>	<p>Capacity provision via France volontaires & later LWMA itself. Lack of capacity to decide.</p>	<p>Struggle to implement masterplan, problems having regular meetings</p>	<p>According to interviews no capacity to take decision</p>

11. Institutional capacity



15. Changing material conditions			Strongly connected to the provision of funds			Resource Efficiency Project, ISLANDS project	Funds by Montreal Protocol fund tied to compliance			Resource Efficiency Project & EU Funding	Potentially IFC- and TWEnex-Project (unclear as of November 2022)	
16. Institutional Shift	Directly linked to election of new president		New MACCE-Minister with motivation to do something about waste (in 2015/16), France volontaires consultant worked on it (probably)	Directly linked to election of new president	New MACCE-Minister with motivation to do something about waste (in 2015/16), France volontaires consultant working on it	Resource Efficiency Project, ISLANDS project	Changing international setting with Kigali amendment	Tipping fees in Investment plan, hint that France volontaires consultant might have worked on it, unclear		Change of LWMA CEO changing, influence on outline	New MACCE-Minister with motivation to do something about waste (in 2015/16)	
Implemented?	yes	yes	mixed	yes	yes	no	yes	yes	no	mixed	no	no