WORKSHOP REPORT

Stakeholder Workshop – Project *adjust*

Research on Sea-Level Rise Impacts in Seychelles

October 30, 2024

On October 30, 2024, the research project *adjust* – based at Kiel University in Germany – conducted their second workshop in Seychelles together with MACCE and S4S. The Kiel research team presented their modelling results on potential future sea-level rise impacts in Seychelles, including scenarios on different adaptation options. It is important to note that the models did not examine the compounding effects of coastal flooding from heavy rains but only coastal flooding due to sea-level rise (see Box 1 below). The modelling results and adaptation options were discussed within the context of group exercises. This report summarises the workshop's key activities and outcomes. Please find all workshop presentations here.

SUMMARY (full report below)

Rising sea levels increasingly pose threats to coastal regions. Future changes in extreme coastal water levels combined with possible changes in wave characteristics will significantly increase coastal flooding and erosion. As large parts of the infrastructure and population in Seychelles is located in the coastal area below 3 m of elevation, Seychelles is especially susceptible to coastal flooding. Therefore, adaptation in low-lying coastal areas is urgently needed. In October 2024, the research project *adjust* conducted their second workshop in Seychelles to discuss their findings on sea-level rise and adaptation options with Seychellois stakeholders.

In the first part of the workshop, the *adjust* team presented their analysis of sea-level rise impacts in Seychelles. The analysis consists of projecting flood impacts for the case of an extreme water level event until 2100 for three different sea-level rise scenarios. The analysis for the intermediate scenario shows that an extreme water level event in 2050 leads to elevated water levels in river mouths and wetlands. This is especially visible in Port Launay and Cap Ternay. However, flooding also occurs in large areas of Victoria, such as the Fishing Port and at Bois de Rose Avenue and Mont Fleuri Road. Impacts in these areas can already lead to severe disruptions in traffic and economic production. For 2100, model results show severe flooding in almost all bays of Mahé, except for Beau Vallon. A comparison of the three islands in terms of flood extent and length of roads exposed shows that flood extent and impacts are generally significantly higher in Mahé than on Praslin and La Digue in all scenarios. While this is expected due to the larger area and population on the main island, it is striking that coastal flood exposure in Mahé already starts to increase within the next decade, while it remains very low on Praslin and La Digue. Stakeholders mostly confirmed that the model's predictions were generally accurate. However, they also reported some potential issues. For example, they expect flooding to occur earlier or more intensely than the model suggests, e.g. in the case of La Digue or the international airport on Mahé. Further to the presentation of the results, the *adjust* team and the stakeholders engaged in fruitful discussions regarding the underlying assumptions of the flood models, such as the extreme water level event scenario and the population development scenarios.

In the second part of the workshop, the *adjust* team presented additional model results that include hard coastal protection measures as an adaptation strategy to sea-level rise. The modelling shows that even under

a high-end sea-level rise scenario in 2025, a coastal protective barrier of 1 m could significantly reduce flood impacts in several places. A protective barrier of 1.73 m (which corresponds to the height of an extreme water level with a return period of around 100 years plus 50 cm) could even completely prevent coastal flooding at this stage. In 2100, however, even hard protection at 1.73 m does not significantly protect from coastal flooding due to the higher sea levels. In general, hard coastal protection measures become less and less effective with rising sea levels until the end of the century.

While model results can provide relevant information, deciding under which circumstances an adaptation measure becomes insufficiently effective is a matter to be evaluated by the exposed people. In order to facilitate discussions about adaptation planning and priorities, the second part of the workshop consisted of group work. Three groups were asked to discuss important steps towards so-called adaptation pathways. Adaptation pathways are a method for developing long-term adaptation plans. They are supposed to account for stakeholders' preferences for adaptation priorities and measures. Accordingly, the group work started with discussions about which infrastructure units are particularly important to protect and which adaptation measures are deemed effective to provide this protection. Moreover, in developing the adaptation pathways, stakeholders discussed the time-horizons in which different measures would be relevant (e.g. nature-based solutions for long-term benefits or hard protection measures for short-term protection if needed). The plenary discussion on adaptation pathways also revealed some criteria that stakeholders deem relevant when evaluating adaptation options, such as how expensive or effective a measure is considered or whether it is perceived as disrupting the natural environment.

BACKGROUND

The research project *adjust* investigates the distribution of finance to support adaptation to climate change in the Global South. The project includes a case study on coastal vulnerability to sea-level rise in Seychelles. In collaboration with MACCE and S4S the *adjust* team conducted a two-day workshop in March 2022 in order to learn about stakeholders' views on Seychelles' vulnerability to sea-level rise and to specify research priorities for the analysis of future impacts from sea-level rise. In this first workshop, participants discussed sea-level rise impacts already visible in Seychelles, what adaptation measures are being implemented and are considered relevant in the future, how they feel about current coastal development and what positive and negative future developments they can envision. The first workshop advanced the project significantly and provided both research team and participants with a better understanding of challenges regarding adaptation to sea-level rise. In October 2024, a second workshop was conducted together with MACCE and S4S to follow up on the first workshop and share the research outcomes obtained in the meantime.

OBJECTIVES AND PARTICIPANTS

This second workshop had two main objectives. First, to inform participants about the modelling results on potential sea-level rise impacts in Seychelles and to evaluate results in order to better understand model performance and accuracy. The input of local stakeholders for this purpose is especially valuable since data for validation are lacking. Second, the workshop aimed at gaining a deeper understanding of which coastal adaptation measures are deemed feasible and desirable in Seychelles. This includes which areas or infrastructure units constitute priorities for protection according to the stakeholders, and why. A related aim was to identify incremental adaptation options, using the example of Mahé.

The workshop was attended by 77 stakeholders which mainly represented government organisations, environment consultants, and nature conservation organisations (see Annex A).

ACTIVITIES AND OUTCOMES

1. Introductory Presentations

The workshop was opened by Denis Matatiken, the Principal Secretary of the Ministry of Agriculture, Climate Change and Environment. He highlighted Seychelles active climate change plan that covers adaptation in different sectors and the many stakeholders working on research to help better prepare for the climate change impacts, but he also stressed the need for further research. Next, Christian Baatz, head of the *adjust* team, introduced the project and case study on vulnerability to sea-level rise in Seychelles, summarised the results of the previous stakeholder workshop in Seychelles in 2022 (see here for workshop report) and pointed to a research paper from Clara Gurresø, *adjust*, on the allocation of adaptation finance in Seychelles that just got published (Clara's full Ph.D. thesis on how decision-makers perceive vulnerability and consider it in funding and planning decisions is available here).

2. Sea-Level-Rise Impacts in Seychelles

Prof. Nassos Vafeidis introduced the topic by presenting current knowledge on global sea-level rise and its future projections for the IPCC scenarios, which are openly available through the NASA Sea Level Projection Tool (see here), and elaborated on the risks of enhanced coastal flooding due to sea-level rise (see Box 1).

Box 1: Coastal flooding, pluvial flooding and nuisance flooding

The term "coastal flooding" describes inundation that is caused by extreme sea levels e.g. during very high tides or storm surges. The term is sometimes also used to describe inundation that occurs at the coastline, but originates from other drivers, e.g. heavy rainfalls. We term these types of inundation caused by rain water as "pluvial flooding". In Seychelles' main islands, the two phenomena often coincide and can therefore lead to increased flooding and associated impacts. The combination of multiple flood drivers is called "compound flooding".

One of the implications of sea-level rise is an enhanced frequency of so-called "nuisance flooding" or "sunny-day flooding", which describes low levels of inundation that do not cause significant damage, but can disrupt day-to-day activities and put added strain on infrastructure systems (Moftakhari et al., 2018). Nuisance flooding is already observed in Seychelles, e.g. through frequent wave overtopping that can disrupt traffic on coastal roads.

According to the IPCC, future changes in wave characteristics combined with sea-level rise will significantly increase coastal flooding and erosion (IPCC, 2022). Therefore, adaptation in low-lying coastal areas is urgently needed. Potential adaptation options include hard protection (e.g. seawalls, rock armouring), accommodation (e.g. houses on stilts), ecosystem-based measures (e.g. mangrove restoration, wetlands), or planned retreat from the coastline.

2.1 Impact Analysis

Next, Dorothee Fehling presented modelling results on potential sea-level rise impacts in Seychelles. This analysis focused on Mahé, Praslin and La Digue, since they are most accessible in terms of data that provide a suitable level of detail to be used for coastal flood modelling; but also because exposure of population and assets is largest on those islands. Large parts of the infrastructure and population in Seychelles is located in the coastal area below 3 m of elevation. These are especially susceptible to coastal flooding. This also includes the Port of Victoria and the international airport, which are particularly critical infrastructure units since Seychelles' economy strongly depends on them.

Methods

The analysis of sea-level rise impacts in Seychelles is based on hydrodynamic modelling using a model called "LISFLOOD-FP". Hydrodynamic models use mathematical equations that describe the flow of water in various environments. The environmental conditions in this model are defined by input data that represent, among others, the land elevation and topography, the surface roughness (determined by land cover), and the water level time series (hydrograph).

For the so-called "baseline scenario" (results without accounting for sea-level rise), an extreme water-level event was used. Such events are the most relevant for coastal management because they often result in the highest impacts and are used to define protection standards. Such an event occurred in November 1997 and reached 1.23 m (adjusted for mean sea level), representing the highest observed water level in the 40-year time series available.

Box 2: Shared Socioeconomic Pathways (SSPs)

The Shared Socioeconomic Pathways scenarios (SSPs) is the new scenario family employed in the latest IPCC report and used in climate vulnerability and impact assessments (IPCC, 2021). In short, the SSPs represent different storylines of socioeconomic development (O'Neill et al., 2014). SSP1 represents a world with high sustainable development, low inequalities and rapid technological change towards environmentally friendly processes. Thus, SSP1 corresponds to the low-end scenario, including an overall population decline until 2100. In the SSP3 scenario, on the other hand, which corresponds to the intermediate scenario and a world with high greenhouse gas emissions and high inequalities, the population is strongly growing and reaches more than 130,000 people in Seychelles by 2100. Lastly, the high-end scenario is represented in SSP5, where economic growth is very high, driven by high usage of fossil-fuel based energy. However, inequalities are relatively low due to high investments in human capital. Population growth in SSP5 is very low and population declines over the century. It must be noted that the SSP population projections and the associated quantifications are developed in accordance with the United Nations population projections (and largely by the same scientific team), but they account for a larger range of uncertainty in socioeconomic development.

The analysis was conducted involved extensive preprocessing of data and high computational effort, since the research team investigated flood impacts for three different sea-level rise scenarios: low-end (SSP1-2.6), intermediate (SSP3-7.0), high-end (SSP5-8.5), and eight incremental timesteps (2030 to 2100), each for the three main islands. This amounts to about 120 model runs. Overall, including also the adaptation scenarios, more than 300 model runs were performed and analysed.

Results

The analysis for the intermediate scenario shows that an extreme water level event in 2050 leads to elevated water levels in river mouths and wetlands. This is especially visible in Port Launay and Cap Ternay. However, flooding also occurs in large areas of Victoria, such as the Fishing Port and at Bois de Rose Avenue and Mont Fleuri Road. Impacts in these areas can already lead to severe disruptions in traffic and economic production. For 2100, model results show severe flooding in almost all bays of Mahé, except for Beau Vallon. Moreover, large parts of Victoria city centre and the commercial port are affected by flooding, while the international airport remains largely unaffected. This is because the elevation of the port is generally lower than that of the airport (see Figure 1). As the runway as well as other locations around the airport are higher in elevation they partly protect the low-lying areas behind the airport from coastal flooding. Impacts on Praslin are mostly limited to river outlets and wetlands, but also affect small built-up areas around wetlands and river outlets, especially at Cap Samy. On La Digue, flooding in 2100 extends beyond the wetlands around La Mare Soupape and affects large parts of the settlements close to the coastline.

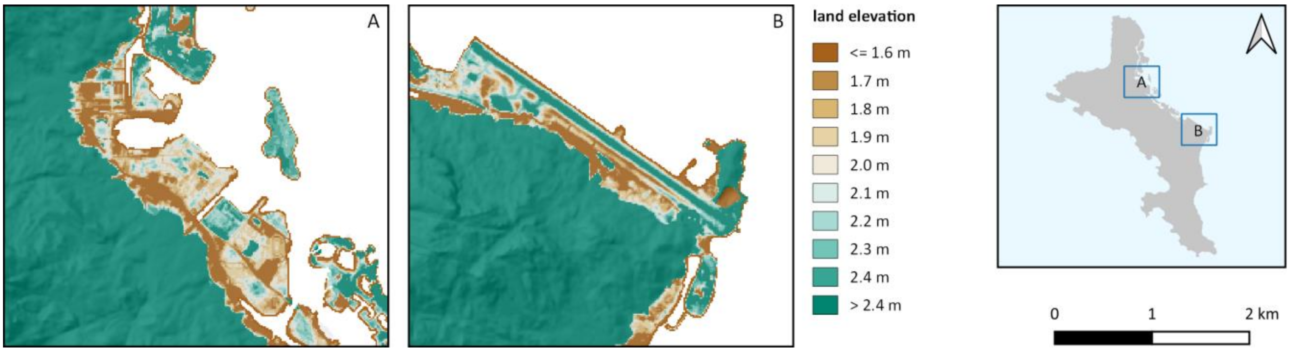

Figure 1: Overview of land elevation at the Port of Victoria and the International Airport.

The results for the high-end scenario suggest similar patterns. However, inundation depth and flood extent in this scenario increase faster than in the intermediate scenario.

A comparison of the three islands in terms of flood extent and length of roads exposed shows that flood extent and impacts are generally significantly higher in Mahé than on Praslin and La Digue in all scenarios. While this is expected due to the larger area and population on the main island, it is striking that coastal flood impacts on Mahé already start to increase within the next decade, while they are still very low on Praslin and La Digue. The latter will start to experience these impacts about 50 years later, by 2070/2080. Moreover, flood extent and road exposure on Mahé will reach very high numbers by the end of the century, even in the low-end scenario. On the two smaller islands, impacts in the low-end scenario remain extremely low throughout the whole century.

The analysis additionally includes an analysis of population exposure. Therefore, not only scenarios of sea-level rise were included, but also three different scenarios of potential population development. These were derived from the SSP projections (see Box 2 above). The results for population exposure generally follow a pattern similar to the flood extent and road exposure. While sea-level rise and flood extent are highest in the high-end scenario, population declines. This leads to a lower number of people in the floodplain than in the intermediate scenario, where population grows and shows that socioeconomic development can be a major driver of impacts.

2.2 Model Validation Exercise

Although inundation models are based on mathematical equations that describe physical processes, their accuracy also depends on factors such as the local environmental conditions and input data. The estimation of model accuracy requires validation of its outputs. This often is hampered by the unavailability of additional data and researchers then rely on other information such as photos and videos of flooding events as well as local knowledge. Therefore, the research team engaged in discussions with the local experts in order to get a deeper understanding of how accurately the model represented coastal flooding in Seychelles' main islands. These discussions were based on flood maps that were put up at the walls. Stakeholders were invited to indicate, by the use of sticky points on the maps, where they thought that model predictions are correct and incorrect (see Annex B). Although the maps showed flood predictions of the high-end scenario in 2070, participants frequently indicated that they already experience (sea-level induced) coastal flooding in many of the predicted areas. Nevertheless, it was not always clear whether this flooding originated solely from coastal drivers or was rather of pluvial or fluvial origin (or a combination of multiple drivers).

2.3 Key Discussion Points

In the open discussions that followed the presentations, workshop participants shared their thoughts on the methods, results, research gaps and contributed their knowledge on flooding in Seychelles. Many of the questions that were raised could be resolved by the research team or by other participants. Others were more difficult to address on the spot, yet they were valuable input for the ongoing work of the *adjust* team. The following recaps a few crucial discussion points.

Firstly, several participants raised questions concerning the scenarios for population development that underlie the assessments of the population exposure (see Box 2 above). The population development scenarios corresponding to the SSPs were contrasted by some participants with their own perception of the current demographic development in Seychelles, such as the median age that has been increasing over the last decades. However, despite currently observable demographic trends in Seychelles, the discussion pointed to the fact that population development is hard to predict and depends on numerous factors. Basing the assessment of population exposure on the SSPs accounts for this unpredictability and the uncertainty by operating with different scenarios that cover a range of potential developments.

Secondly, participants wondered whether using an 'everyday' average scenario makes more sense, as it is more representative compared to an extreme level event as the baseline scenario. The discussion showed that while choosing a baseline scenario is indeed an important decision in setting up models, there are good reasons to use an extreme water level event, as done by *adjust*. Adaptation planning is a form of long-term risk management. Given that adaptation measures are often supposed to provide protection for decades, a key objective of adaptation planning is establishing protective measures not only for a 'statistically average day' but for statistical outliers – which will become more regular due to climate change. In the rare event of an extreme water level, the impacts could be devastating without appropriate adaptation measures.

Thirdly, when it came to the model validation exercise, participants mostly confirmed the general places that the model predicts flooding for. In addition to potential small-scale errors and inaccuracies, some doubts were raised regarding the model's accuracy on a larger scale. For example, some participants suggested that in La Digue substantial flooding will occur earlier than predicted by the model (this concern was reiterated in a separate meeting with Barbera Barallon (La Digue D.A.) and staff). Many participants also doubted the model's prediction according to which the international airport on Mahé would not be significantly flooded within this century (but note that the elevation of the airport is generally higher than that of the port and surrounding area as explained above). In this context, Prof. Vafeidis emphasised that the model results can generally be seen as an underestimation because they only account for sea-level rise, without including for example the effects of flooding from other drivers, such as rainfall, or the effects of waves and wave overtopping. This is due to time limitations as well as to data availability. For example, although wave processes have been accounted for in a previous assessment (Cuban Report), their inclusion could introduce further uncertainties in the analysis as information on waves is only available for offshore locations and wave propagation to the coast of Seychelles is not represented. Nevertheless, including waves in the analysis when data become available would significantly improve the results (but would probably not influence the long-term trends of flood characteristics).

3. Adaptation to Sea-Level Rise

3.1 Adaptation Options in Seychelles

Prof. Vafeidis started the second workshop part by presenting examples of different coastal adaptation options and explaining why it is necessary to develop comprehensive long-term adaptation strategies. He introduced the concept of adaptation pathways, which is widely implemented in climate-change adaptation planning at the moment. Adaptation pathways provide long-term adaptation plans consisting of chains of adaptation options that are meant to be implemented sequentially. These pathways help deal with uncertainties related to the total amount of sea-level rise, helping to avoid measures that may be expensive in terms of construction and maintenance expenses and that may be proven unnecessary in the long term (e.g. construction of tidal barrages).

Afterwards, Dorothee Fehling presented additional model results that include hard coastal protection measures as an adaptation strategy to sea-level rise. Comparing the flood extent without any coastal protection measure in the high-end scenario in 2050 to the flood extent with a coastal protective barrier of 1 m (e.g. seawall/rock armouring/dike) around inhabited areas shows that protection could significantly reduce the flood extent and inundation depth. Implementing a hard defences of 1.73 m height could completely protect from coastal flooding at this stage. In 2100 even the higher barrier does not significantly protect from coastal flooding anymore due to the higher sea levels. This means that at some point between 2050 and 2100, the 1.73 m barrier exceeds the tipping point at which it is no longer effective and the adaptation strategy needs to be modified or updated.

To identify the time when the adaptation strategy should be updated, it needs to be defined how often flooding of a certain location or infrastructure unit can be accepted. Dorothee Fehling used the example of Bois de Rose Avenue to illustrate this mechanism: This road gets blocked by coastal flooding when the water level at the tide gauge reaches 1.59 m, which happens first in 2060 in the high-end scenario. With rising sea level, blockage of this road will occur more frequently, e.g. four times per year in 2070, 15 times per year in 2080, 36 times in 2090 and 93 times in 2100. If a blockage of this road could only be accepted e.g. 15 times per year, the "point of strategy change" is reached by 2080, which is when a protection measure needs to be in place to prevent more frequent flooding. This also means that planning of this measure has to start before the point of strategy change is reached.

3.2 Group work

Following this presentation and a quick discussion, stakeholders were invited to develop potential adaptation strategies in a group work. The three groups were asked to first identify and discuss relevant options for adaptation to sea-level rise. Relevant adaptation measures can generally be grouped into soft solutions, e.g. Nature-based Solutions (NbS), accommodation, and hard protection measures. NbS use the benefits of ecosystem services to buffer the impacts of sea-level rise. Typical examples are the restoration or implementation of wetlands and coral reefs, which can dissipate wave energy and buffer the impacts of coastal flooding. In contrast, hard protection measures are hard structures usually made of concrete and rocks to secure the coastline from erosion or flooding.

The group discussions revealed a differentiated and pragmatic view on adaptation measures. While some stakeholders generally indicated preferences for some types of measures over others, they also acknowledged that only few measures should be excluded categorically, and that almost everything should be at least considered because it may become necessary in some scenarios. For example, groups generally favoured NbS as a set of measures with co-benefits and high priority that should be the basis for any adaptation strategy. The main reasons they cited were the relatively simple and straightforward implementation, aesthetic considerations, and high cost-effectiveness. One group was more skeptical about hard protection measures such as seawalls mainly because they would not fit into the natural environment and would therefore represent a disruptive element with potentially negative effects on tourism. Still, all groups agreed that such hard protection measures will most likely be necessary in order to provide protection for some locations when soft solutions are not effective anymore or when they take more time to become effective. Related to this, one group acknowledged that in some cases there might be no effective protective measures. Hence, for such cases, they saw setback as an 'unavoidable' option. Another group considered an elevation of the port and main roads on Mahé's east coast as an important long-term measure. In addition to discussing these measures, concerns were raised that new infrastructure will continue to be built in designated risk areas that further increase the need for hard adaptation measures. Participants also pointed out that, at this point, there is little to no insurance coverage for flooding events.

In a next step, the groups discussed which infrastructure units are particularly important to protect and why. Here, stakeholders emphasized that some units should be prioritized because they are necessary to operate other units. For example, it was agreed that while it is important to protect hospitals and schools, adaptation should always start with protecting main roads to access key places and buildings. Accordingly, the stakeholders stated that the tipping point at which roads are flooded so regularly that it becomes intolerable is lower as opposed to other infrastructure. Moreover, groups stressed the importance of protecting places that are relevant economically (airport, port, esp. petrol tanks) and for social and political life, such as the district administration offices, that are often local points of contact for people to share their concerns, court house and parliament building. Lastly, many stakeholders highlighted the importance of protecting and conserving natural beaches as they are both important to the Seychellois' way of life and as attractions for tourists.

Finally, stakeholders discussed potential adaptation pathways, which are supposed to represent the stakeholders' preferences and priorities for adaptation measures and critical infrastructure. The main challenge of creating these pathways is to identify a rough time plan for adaptation for the next decades. In this context, participants indicated a preference for a progression in time from nature-based solutions to accommodation (e.g. building houses on stilts or elevating roads) and to hard protection later in the century (in combination with accommodation), when measures become ineffective. Ultimately, planned retreat seemed to also be considered, albeit to a limited extent and only as a last option. It should be noted that the groups only had limited time to discuss and develop their pathways. The group work should be seen as an exercise to facilitate discussions about adaptation strategies and to get some first impressions about when stakeholders want to implement which measures. In this context, stakeholders identified sets of measures and discussed for which time-horizons such measures would be relevant.

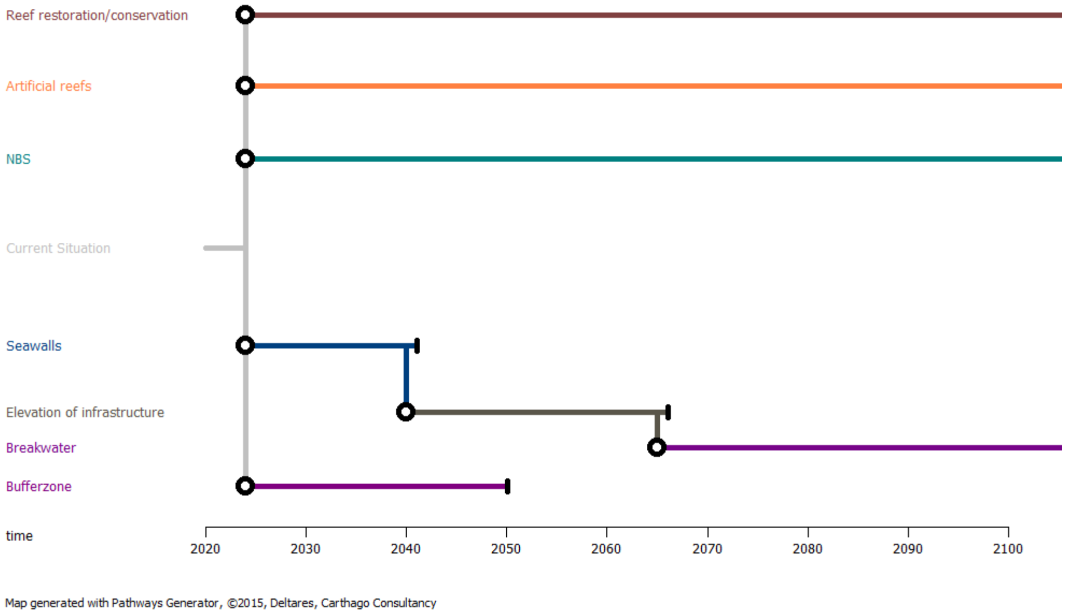

Figure 2: Example of an adaptation pathway

Figure 2 shows the adaptation pathway developed by the group that highlighted the need to start implementing NbS now. Specifically, participants suggest to start restoring and conserving reefs as well as building artificial reefs. Moreover, the pathway reflects the group's view that hard protection measures need to be considered because the soft solutions take time to show effects. In particular, the pathway suggests to build seawalls now and also start planning to elevate some infrastructure such as roads, although this will take more time. The group included breakwater in their pathway, although they were skeptical of this measure and see it as a last resort if all other measures stop working. In general, the pathway reflects the group's view that these hard protection measures have limits in their effectiveness. Finally, the pathway suggests working with buffer zones at least until the mid of the century because it takes some time to implement both soft and hard protection measures.

Other groups focused on identifying categories and types of measures that they considered relevant and appropriate for implementation; and discussing the potential timeframes (and associated rises in sea level) for which these measures would be effective. Designing pathways with these measures was not achieved during the group work due to lack of time but also due to uncertainties regarding the effectiveness and tipping points of the measures; as well as due to extended discussions related to preferences in their implementation.

KEY MESSAGES AND PARTICIPANTS' FEEDBACK

Key insights from the modelling of sea-level rise impacts are as follows:

- largest proportion of impacts are expected in Mahé
- impacts in Mahé are expected to be felt in the coming years already, Praslin and La Digue will likely experience impacts in the coming decades
- wetlands appear to buffer flood impacts and should be preserved
- socioeconomic development can be a major driver of impacts

Key insights from the modelling of hard coastal protection measures are as follows:

- infrastructure in Mahe experiences flooding already in 2050 (or earlier, depending on the scenario); considering the lee time for the implementation of adaptation measures, adaptation planning needs to start as soon as possible
- hard protection in built-up areas reduces impacts significantly but reaches its limits around 2070, depending on the design characteristics
- waves, which have not been considered in our analysis due to lack of data, may substantially aggravate flood impacts
- beach nourishment does not seem to reduce flooding significantly (but could have an influence on reducing wave height)
- combinations of adaptation measures (e.g. hard and soft protection or nature based solutions) could be considered along several locations
- other measures, e.g. at the household level, can be important in reducing impacts
- adaptation measures such as managed retreat or land reclamation/elevation also need to be considered

Summary of participants' feedback

Overall, the second workshop was perceived as "enriching and eye-opening" by the participants. They particularly appreciated discussing and learning about results of the hydrodynamic model/impact analysis, the rate of sea-level rise and the need for adaptive planning. Many of the attendees valued the "collaborative" and "interactive" nature of the workshop with discussions and presentations, "enhancing knowledge on risks from sea-level rise" while having the opportunity to "network for future collaborations" with "a diverse range of participants". Furthermore, attendees appreciated that "model runs were applied to local contexts of Mahé, Praslin and La Digue" while suggesting "to extend research to include other islands" and to allocate more time for group work on adaptation pathways, e.g. by extending the workshop to 1.5 days. Also, a few participants recommended "to include more reliable data sources", "integrate local stakeholders implications to the presentation" and "establish tailored training for Seychellois people". In terms of un-addressed but relevant future steps, participants wished to "organize workshops on Praslin and La Digue", among others". Also, to further build on the second workshop, many participants suggested integrating data on waves and pluvial flooding into models. Essentially, participants expressed optimism that the workshop and its discussions will inform effective coastal planning and long-term solutions for coastal flooding from sea-level rise in Seychelles (see Annex C for a summary of all answers).

OUTLOOK

The *adjust* group will edit the results presented at the workshop and summarised in this report for a "policy brief" addressed to policy makers in Seychelles. They will also submit a research paper on sea-level rise impacts in Seychelles to an academic journal over the coming weeks and will share this version with interested stakeholders upon request. Another research paper on adaptation and adaptation pathways will be finalised and submitted by the end of 2025. For this work, the *adjust* group might conduct an online mini-workshop to further discuss the development of possible pathways. While the scheduled end of *adjust* is May 2025, the group will request an extension of their project for one year. If granted, the group will seek to conduct further work on modelling "pluvial flooding" (see Box 1), and to account for this process when modelling flooding from extreme sea levels. This would allow responding to stakeholders' suggestions to consider heavy rainfall as another important driver for flooding at the coast. Of course, the *adjust* group will continue updating stakeholders on further developments and findings.

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ANNEX A: WORKSHOP PARTICIPANTS

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Catherina Bonnelame	Disaster Risk Management Division
Miguel Malbrook	Disaster Risk Management Division
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Cinthia Harriyba	District Administrator Anse Royale District
Sabrina Assary	District Administrator Au Cap District
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Sylvie Ah-Time	District Administrator Bel Air District
Tahiri Laurencine	District Administrator Bel Ombre District
Beguita Melanie	District Administrator Cascade District
Jancy Volcere	District Administrator English River District

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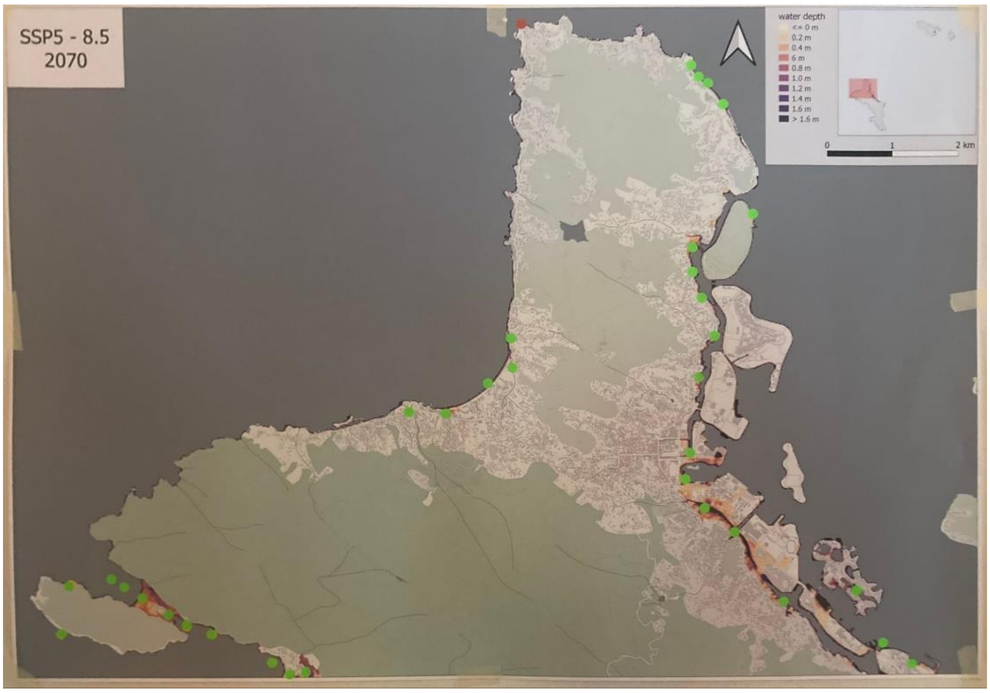
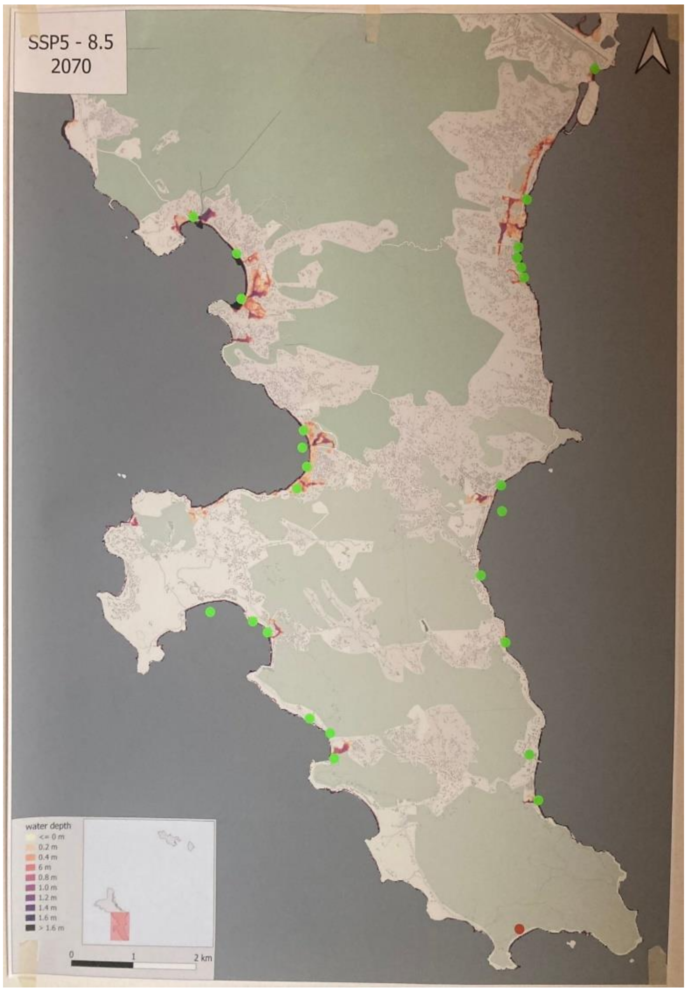
Dr. Nirmal Shah	Nature Seychelles
Jules Hoareau	NGO - ARID
Jean-Luc Mondon	Petro Seychelles
Patrick Samson	Petro Seychelles
Laurent Sam	Private Consultant
Theodore Marguerite	Private Consultant
Benjamin Vel	Red Cross Society of Seychelles Representative
Jean-Ives Joseph	Red Cross Society of Seychelles Representative
Marie-Therese Purvis	S4S
Michele Martin	S4S
Sheril De Comarmond	Save Our Seas
Kevin Sophola	Seychelles Planning Authority
Rajelle Barbe	Seychelles Port Authority
Tira Vidot	Seychelles Port Authority

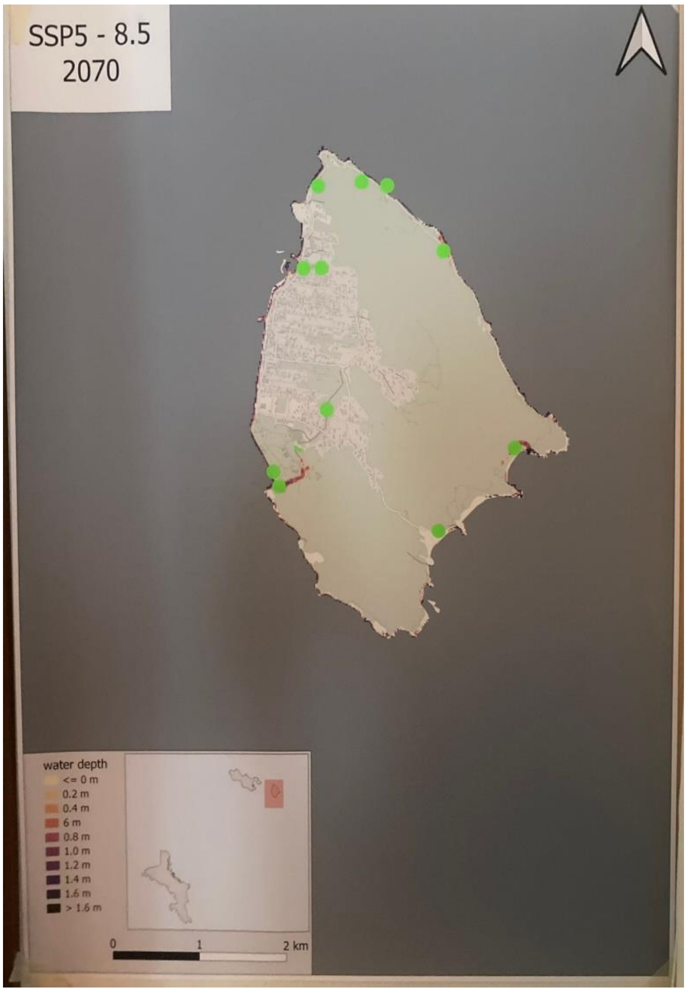
Annabelle Constance	SIF
Frauke Fleischer-Dogley	SIF
Alvania Lawen	SYAH Seychelles
Helena Sims	The Nature Conservancy
Dr. Rishi Basak	UNDP Consultant
Katrin Perchat	YES Consulting
Jeanette Larue	

ANNEX B: DISCUSSION AND GROUP WORK RESULTS

B1: Discussion of model results

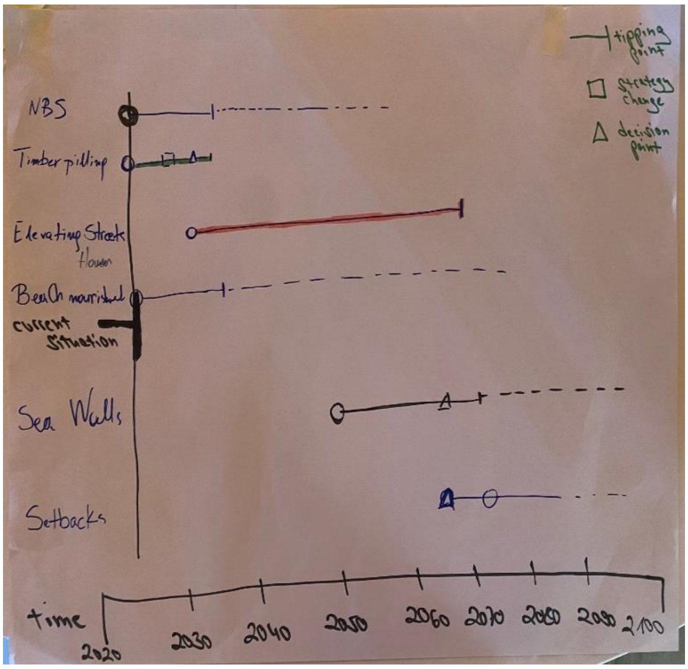


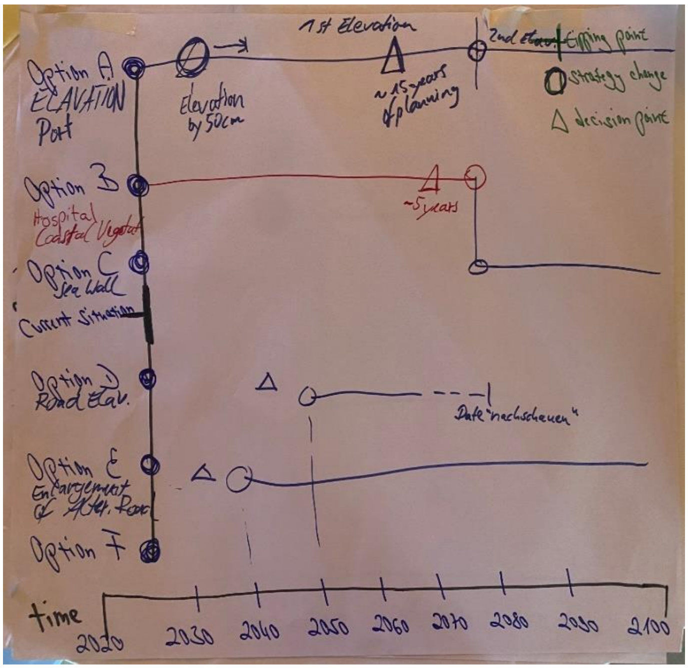

SSP5 - 8.5
2070
water depth
<= 0 m
0.2 m
0.4 m
6 m
0.8 m
1.0 m
1.2 m
1.4 m
1.6 m
> 1.6 m
0
1
2 km

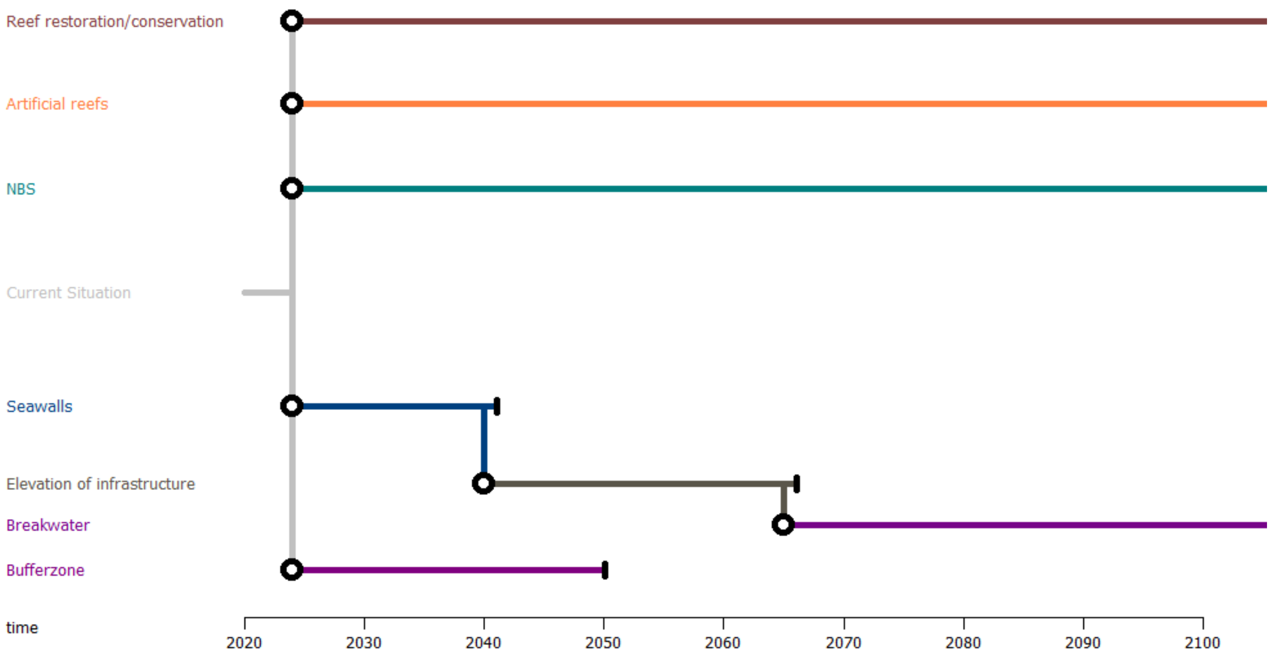

SSP5 - 8.5
2070
water depth
<= 0 m
0.2 m
0.4 m
6 m
0.8 m
1.0 m
1.2 m
1.4 m
1.6 m
> 1.6 m
0
1
2 km


SP5 - 8.5
2070
0
1
2 km

B2: Adaptation Pathways







Map generated with Pathways Generator, ©2015, Deltares, Carthago Consultancy

ANNEX C: WORKSHOP EVALUATION

1. Name one new thing you learned during the workshop

- That there was a study being done on coastal flooding in Seychelles
- Climate change is happening and it is very alarming
- On adaptation:
    - Adaptation pathways have to be flexible in order to adapt in time
    - New graphical method to present planning timelines
    - Nature-based solutions, beach nourishment, hard protection
    - How to conduct adaptation pathways
    - The use of dikes
    - Using the adaptation pathways generator
- On sea-level rise:
    - Learned about SLR in Seychelles
    - Rate of sea-level rise in Seychelles
    - Need to start adaptation planning
    - Sea level will keep on rising no matter what
- Method of flood modelling
    - Inputs taken in to account
    - How adaptation measures can be implemented into the model to see how effective they are
- Learned about model results:
    - Victoria flooded by 2050
    - Results on Mahé, Praslin, La Digue
- Land reclamations can have negative effects in the long term

2. What did you like about the workshop?

- Group work
- Discussions
- Non-static Presentations
- Networking for future collaborations
- Interactive and dynamic workshop
- Enhanced knowledge on risk of sea-level rise
- Diversity of participants
- Seeing the model results

3. What could we do better?

- More time needed for group work on adaptation pathways
- The workshop could have been longer (1.5 days)
- Put implications of local stakeholders in the presentation on climate change and adaptation
- Use more reliable sources/data
- There could be more training with the people from Seychelles
- It was too crowded
- Expand research to at least one outer island
- 2050 and 2100 seem far away. Explain how it is something to be concerned about now.
- Snacks & food
- Encouraged debates and feedback of methodologies chosen
- A leaflet with main points to avoid confusion
- Larger font in presentation for readability in the back
- More lively participation/engagement

- More info on how everything discussed will be implemented
- Discussions could have been more informative with more concrete examples/case studies with pictures and videos
- More in-depth explanations of adaptive measures
- Venue closer to the city, logistics
- Involve more data and feedback received today in models

4. Suggestions for next steps

- Recommendations for adaptation
- Workshops on Praslin and La Digue
- Collaboration with UniSey students
- Virtual meeting to reduce carbon footprints
- Session on new development
- More sessions
- Add wave data and compound flooding to modelling
- Establish lasting connections for future collaborations & data presentation
- More workshops and trainings with targeted stakeholder groups for local capacity building
- Involvement of met office
- Plan, develop and implement measures
- Obtain final results of the research