CLIMATE RISK SURVEY OF GUESTHOUSES IN MALDIVES

Small Island Geographic Society (SIGS)

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This document was produced for review by the United States Agency for International Development. It was prepared by Small Island Geographic Society (SIGS) for the Climate Risk Survey of Guesthouses in Maldives for the project Resilient Retreats: Enhancing Sustainable Climate Adaptation PracticEs (ESCAPE).

Contents

1. INTRODUCTION

The USAID Climate Adaptation Project is a five-year project designed to enhance the adaptive capacities of the public and private sectors and local communities in the Maldives to climate change impacts in ways that contribute to sustained, inclusive market-based growth. The Climate Adaptation Project focuses on addressing challenges in the following three objectives.

- Objective 1: Identify and scale up innovative solutions to adaptively manage climate-related risks through market-driven private sector and community engagement.
- Objective 2: Strengthen central and/or local governance to address climate-related risks; and
- Objective 3: Improve availability and access to high-quality information for decision-making to reduce vulnerability to climate change.

"Resilient Retreats: Enhancing Sustainable Climate Adaptation PracticEs (ESCAPE)" is a project implemented by the Small Islands Geographic Society (SIGS) under a grant from USAID's Climate Adaptation Project. The ESCAPE project is focused on building resilience of local guesthouses to climate change and natural hazards through development of climate resilient designs and draft guidelines that developers can implement. Tourism guesthouses and related infrastructure are big investments that are under risk from climate change impacts such as erosion and inundation, extreme winds and storm events, salinization of groundwater, water scarcity among others. The main objective of the grant is to provide information to guesthouse developers on climate resilient design.

The initial activities of the ESCAPE project focus on understanding the current situation regarding climate risks faced by guesthouses in the Maldives as well as understanding current guesthouse designs. SIGS has conducted a survey of over 100 guesthouses in the Maldives and this report provides the findings of this survey conducted from 17th August to 14th September 2023. The findings will be utilized in developing climate resilient designs and guidelines for guesthouses.

2. BACKGROUND

The Maldives is an archipelago of 26 low-lying coral atolls consisting of 1,192 small tropical islands. About 358 islands are used for economic activities and human settlement of which 198 islands are residential (Ministry of Environment and Energy, 2016). Maldives is one of the smallest and lowest countries in the world, with 80% of the total land area is less than 1 meter above mean sea level. More than 70% of the islands have an area of less than 10 ha and of these 34% are less than 1 ha[1] . This means that a large portion of the dwellings, industries and infrastructure are primarily located within 100m of the coastline (Ministry of Environment and Energy, 2015), making them vulnerable to climate change risks like beach erosion, flooding from swells and rain, and extreme storm events. Prolonged dry spells have also affected availability of fresh water (Ministry of Environment and Energy, 2016). In addition, the Maldives' economy is highly dependent on the natural environment. The tourism sector, which directly and indirectly contribute to local livelihoods and economy, is one sector which is very vulnerable to climate risks.

Following the development of the Maldives Guesthouse Regulation under the Tourism Law (2/99) in 2010, tourism establishments were allowed on local islands. According to the Ministry of Tourism (2022) the Maldives had 797 registered guest houses with a total bed capacity of 13,410 by end of 2021. Tourism guesthouses and related infrastructure are big investments that are at risk from climate impacts such as erosion, inundation, extreme winds, storm events, salinization of groundwater, and water scarcity. Currently, the extent that guesthouses are impacted by climate risks, and the adoption of risk reduction and adaptation strategies is unknown. While designs consider the local climate, the extent to which climate change impacts is considered in design is not visible in current guesthouse designs. Currently, there are no guidelines in the Maldives to help local guesthouse developers to consider climate resilient designs, or comprehensive information on climate impacts and risk reduction solutions. The ESCAPE project addresses the need to in the tourism industry to develop more climate resilient guesthouses.

Investment in climate-resilient infrastructures today will benefit developers and investors in the future to reduce costs to address damages from climate risks as well as in obtaining better insurance. Maldives is highly vulnerable to climate impacts such as flooding and there are some studies demonstrating that investing in adaptation measures in the tourism sector is beneficial compared to the cost of adaptation (Hosterman & Smith, 2015). However, there is no literature on individual guesthouses. Similarly bulk of global literature focus on an areas-based approach as opposed to individual buildings. One such study shows that long-term damages can be significantly high and investing in adaptation measures can significantly reduce flood impact costs (Han & Mozumder, 2021).

[1] Based on data available from OneMap (https://onemap.mv/) by the Maldives Land and Survey Authority

2.1 Review on Existing Regulations and Guidelines

As part of the ESCAPE, a desk review of existing regulations and guidelines pertaining to guesthouse development was conducted. A total of 17 relevant documents were analyzed for the desk review. This includes 9 documents which were tourism related, 7 related to planning and building infrastructure and 1 related to groundwater usage. A list of the documents reviewed are provided in Appendix A. The review shows that current tourism or building related regulations and guidelines do not adequately address impacts of climate risks on building design. The tourism sector has been increasingly recognizing the importance of protecting tourism infrastructure from climate risks and natural hazards. The latest tourism masterplan (5th Master Plan) and Climate Action Plan for the Tourism sector released in 2023, both identify the importance of building climate resilience of tourism infrastructure, though it does specifically talk of guesthouses. Adaptation actions are more geared towards coastal protection, sharing information about climate risks and climate financing insurance. The proposed climate resilient guesthouse design and recommendations of the ESCAPE project can contribute to activities under the 5th Tourism Master Plan and Climate Action Plan.

Review of legislation under the planning and building also shows that there is a need to include guidelines for the tourism sector. Though there is a current planning regulation and building code, the review found that preparedness for climate risks and natural disasters is a gap that needs addressing. The current focus of building code is on setting maximum height of buildings, and in general maintaining safety features and good ventilation and sunlight for improved health of occupants. The desk review provides further evidence of the need for the activities proposed under the ESCAPE project.

3. METHOD

3.1 Survey Design

A quantitative survey method was utilized to gain an understanding of the impact of climate risks and what is currently being done by guesthouses to address these risks. Local tourism is a rapidly developing industry in the Maldives, and as of July 2023, 838 guesthouses are registered. Based on a list given by the Ministry of Tourism (MoT), there are 785 guesthouses which are in operation. In order to create a sampling frame, SIGS called the listed numbers to check if guesthouses were operating and it was found that 23 guesthouses were not in operation. Further during visits and calls to islands 8 guesthouses not included in the list were identified and added. Hence the sampling frame consisted of 770 operating guesthouses. *Figure 1* shows a spatial distribution of the 770 guesthouses across the Maldives. As can be seen in the Figure, guesthouse tourism is concentrated in the central part of the country near the capital.

For calculating the sample size to use in the survey, the formula[2] in *Figure 2* was used and calculated using an online sample size calculator.

$$n = \frac{X^2 * N * P * (1-P)}{(ME^2 * (N-1)) + (X^2 * P * (1-P))}$$

Where:

n = sample size

X^2 = Chi – square for the specified confidence level at 1 degree of freedom

N = Population Size

P = population proportion (.50 in this table)

ME = desired Margin of Error (expressed as a proportion)

FIGURE 2. FORMULA FOR CALCULATING SAMPLE SIZE

Keeping within a margin of error of 0.05, we estimated that a sample size of 200 and 257 respectively will be required at confidence intervals of 90% and 95% (*Table 1*). We invited all operational guesthouses to participate and targeted to reach 30% of operational guesthouses, which is 231 and is within the calculated sample size range in *Table 1*. A convenience sampling method was used to reach and recruit participants.

FIGURE 1. DISTRIBUTION OF GUESTHOUSES OPERATING IN THE MALDIVES IN 2023

TABLE 1. SAMPLE SIZE AND CONFIDENCE INTERVAL

Confidence Interval	Margin of error	Target sample size	No. of participants	Response rate
90	0.05	200	114	57
95	0.05	257	114	44

The survey instrument used was an online questionnaire using Google form. The questionnaire was prepared in English and translated into the local language Dhivehi. The survey was administered in both languages with participants choosing their preferred language. This was important as there were both local and foreign guesthouse owners and operators. The sections included in the questionnaire are given below.

[2] Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities.

A pilot survey was conducted, after which the questionnaire was finalized. The finalized questionnaire can be found in Appendix A.

- Section A: Guesthouse demographics – To understand the location and basic information on the guesthouse.
- Section B: Guesthouse structure – To understand the size of the guesthouse and the material and methods used to build the structure.
- Section C: Water and electricity usage – To find out the energy consumption, and the type of water utilized for various uses.
- Section D: Climate risks and how they are addressed – To identify the climate risks experienced by guesthouses, what is currently being done to address this and the costs incurred.
- Section E: Climate risks and guesthouse design – To understand if climate risks were considered when designing the guesthouse.
- Section F: Climate risks and insurance – To identify if guesthouses are insured and if this insurance covers climate risks.

3.2 Validity and Reliability

Several measures were taken to ensure the reliability and validity of the survey instrument for dependable survey results. For face validity initial questionnaire developed by the SIGS team was initially reviewed by SIGS experts involved in the area in Maldives. After revisions, the questionnaire was reviewed by the USAID Climate Adaptation Project team. A pilot testing of the questionnaire was conducted by the SIGS team for 5 guesthouses in K. Dhiffushi. The questionnaire was further revised based on the pilot and reviewed by the Technical Advisory Committee (TAC), including a representative from MoT, Ministry of Environment, Climate Change and Technology (MoECCT), an architect, and a construction expert. Additional measures to ensure validity and reliability included:

- Training of enumerators prior to survey including explanation of questions and clarification of any uncertainty on the questions, conducting training interviews and demonstrations.
- Pilot testing of survey by enumerators and revising the questionnaire based on feedback.

3.3 Survey Administration

The survey was carried out as in-person interviews and phone surveys administered by enumerators as well as an online survey that can be self-administered by owners and operators. A total of 117 responses were captured after 114 were included in analysis after cleaning for incomplete surveys. This represents 44% and 57% response rate for confidence intervals of 95 and 90, respectively[3]. *Figure 3* shows the spatial distribution of participating guesthouses across the Maldives.

The administering of the survey was carried out from 17th August to 14th September 2023. All guesthouses were emailed the survey form, along with a project brief. Enumerators called all the guesthouses to follow up and remind them about the survey that was emailed, and to provide the option of conducting the survey via phone. A challenge that was experienced during this was the survey data collection coinciding with the 2023 Presidential elections period and many guesthouses were busy and not

[3] A meta-analysis of online survey response rates by Wu et al. (2022) report that on-line surveys on average have a response rate of 44.1% and is often lower by 11% compared to modes of surveys.

available. Hence, multiple methods were used to reach as many guesthouses as possible. People were also not very responsive to phone calls as they were hesitant to answer calls from unknown numbers as it may be from a campaign office. Hence, contact was made through gate keepers who connected SIGS with guesthouses.

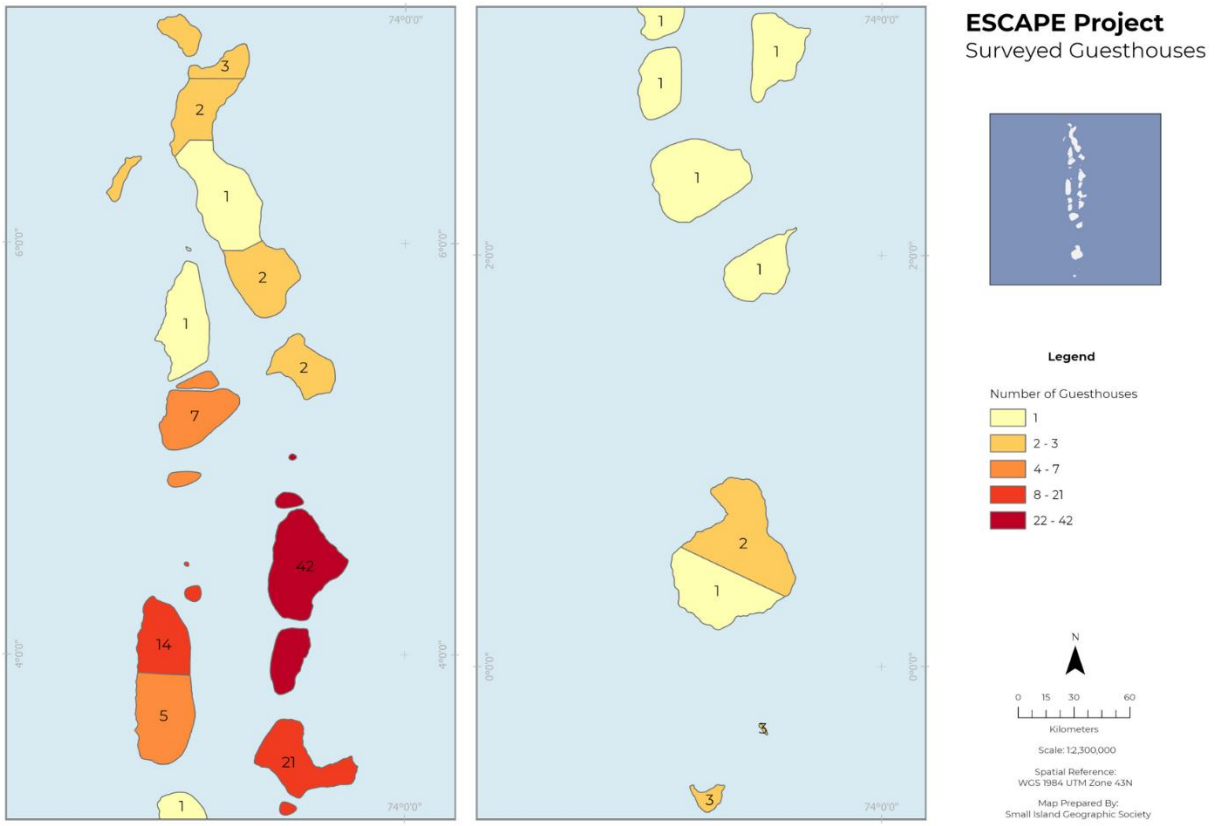

FIGURE 3. SPATIAL DISTRIBUTION OF GUESTHOUSES SURVEYED FOR THE ESCAPE PROJECT

In-person interviews were carried out to ensure more participation and also to better understand the responses. The in-person interviews were carried out in a total of 10 islands in Kaafu and Vaavu atoll from 17 – 29 August 2023. The SIGS team visited the islands given below to conduct the interviews:

- K. Guraidhoo
- K. Gulhi
- K. Himmafushi
- K. Huraa
- K. Thulusdhoo
- K. Maafushi
- K. Hulhumale'
- V. Fulidhoo
- V. Thinadhoo
- V. Keyodhoo

Despite anticipating challenges of in-person visits due to the close timing of the upcoming presidential elections, the enumerators did not face any hostility or challenges. However, some challenge occurred in meeting the owner or manager who could answer the questions (about 9% of guesthouses visited). In this case, we got a contact for the manager/owner from the staff so that we can conduct a phone survey at a later date.

3.4 Data Analysis

The responses from the two survey forms (English and Dhivehi) were downloaded in Microsoft Excel files and these were combined to form a single sheet containing the 114 responses. The data was checked for missing data and one response was removed from analysis due to incomplete information. Therefore, 113 responses were prepared for analysis. This includes renaming the titles in each column into variable names as the exported excel files had each question as the title in the column. The values of each variable were also defined. For example, in responses which required a 'Yes' or 'No' response the "Yes' was coded as a 1 and 'No' was coded as a 0. Variables which allowed multiple responses were recoded so that each response is defined as a new binary variable (0=the variable is not selected and 1= the variable is selected). An example of a multiple response variable recoding is given in *Table 2*.

TABLE 2. EXAMPLE OF MULTIPLE RESPONSE VARIABLE RECODING

A	B	C	D	E	F
ID	Water_drinking	Water_drinking1	Water_drinking2	Water_drinking3	Water_drinking4
101	4	0	0	0	1
102	3,4	0	0	1	1
103	3	0	0	1	0
104	3	0	0	1	0
105	1,2	1	1	0	0
106	2,4	0	1	0	1
107	3	0	0	1	0

This example is for the question 'What type is water is used for drinking in the guesthouse?'. The responses are given in Column B and as can be seen some respondents have chosen more than 1 option. The available responses (1= ground water, 2= rainwater, 3=bottled water and 4= supplied desalinated water) are recoded as a binary variable with option 1 (used) or 0 (not used) in columns C to E. As can be seen in the example Respondent with ID 102 has chosen 3 (bottled water) and 4 (supplied desalinated water). Hence, for that respondent Columns E and F have 1 while the other columns are 0.

Once the data was prepared for analysing this was imported into IBM Statistical Package for the Social Sciences (SPSS) 26. Both descriptive statistics and analytical statistics were used in the analysis. Frequencies and percentages were used to describe responses while further analysis was done on some variables to compare frequencies of these variables. These include:

- comparing groundwater use between guesthouses in islands with and without RO supply,
- comparison of electricity consumption based on bed capacity

For these comparisons, the means of the two groups were compared for significance in differences using the independent t-test. Further correlations of climate risks were also done with distance from shoreline using bivariate correlation analysis.

4. FINDINGS

There were 113 responses which were analysed in the survey. The findings indicate that the guesthouses surveyed were in operation for on average, 4 years. The surveyed guesthouses had on average 12 beds. The average size of the land plot was 3000 square feet, with a built area of 83% of the land on average. The majority of guesthouses (57%), were purpose-built structures, rather than an existing building converted to a guesthouse.

4.1 Current guesthouse design features

The survey findings show that 40.7% of guesthouses were designed by a licensed architect, 18.7% were designed by the owner, 17.1% were designed by a draftsperson, and 16.3% by a designer (*Table 3*). When designing, 60% of guesthouses reported considering climate risks and have also included features to reduce climate risks. A total of 44% reported discussing climate risks with their designers and only 38% stated that the designer has discussed climate risks with them. Based on responses and discussions held during in-person interviews, many operators tend to think of flooding from rain or swell surges and stormy weather and events as climate risks, Hence, examples of such discussion on climate risks that were provided included flood risks and elevation and avoiding strong winds during the southwest monsoon.

TABLE 3. DESIGNER OF GUESTHOUSE

Designer	Percent
A licensed architect	40.7
A designer	16.3
A draftsperson	17.1
Owner	18.7
Other	4.1
Not sure	3.3

4.1.1 Structure and Exterior

With regards to the building foundations, 51% of guesthouses used raft foundation and 33% used pad footing (*Table 4*). The majority of guesthouses have put a good foundation with depths varying from less than 1 meter (28.7%), between 1-2 meters (29.6%) and deeper than 2 meters (16.6%) (*Figure 5*). Most guesthouses (83%) did not have to repair an air leak during construction. Close to 60% reported using solid bricks and 33% reported using hollow bricks for the exterior walls.

TABLE 4. TYPE OF FOUNDATION USED IN GUESTHOUSES

Type of Foundation	Percent
Raft	51.4
Pad footing	33
Other	1.8
Not sure	13.8

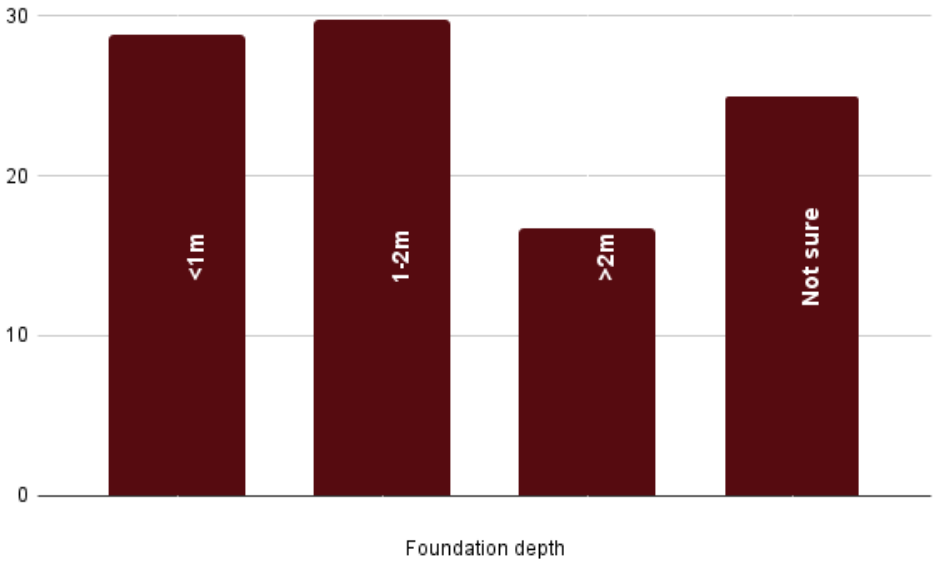

FIGURE 4. BUILDING FOUNDATION DEPTH

4.1.2 Ventilation and Cooling

Nearly half (45.9%) of guesthouses buildings are not insulated, 43.2% reported that the building is insulated, while 10.8% were not sure. Specifically for roof insultation, 51% reported that it is insulated. Most (68%) did not report any special designs for the roof. The roofing material used by guesthouses is mainly metal sheets (77%), followed by concrete slabs (13%), and 10% used other materials. Most guesthouses (82%) were oriented to make most of natural daylight and passive solar heating, and 54% also used shading and overhangs to reduce excessive sun exposure.

The vast majority of guesthouses (95%) have their heating, ventilation and air-conditioning (HVAC) system properly sized for the building's needs, and 92% regularly maintain it to ensure optimal efficiency. Only 18% of guesthouses use programmable thermostats or smart controls to regulate temperature and energy use. A minority of guesthouses (26%) use motion sensors or automated controls to turn off lights when not in use.

4.2 Water and Electricity Use

The types of water utilized for various purposes at guesthouses were assessed (*Figure 5*). The main type of water used for drinking was bottled/mineral water (67.9%) and desalinated supply water/RO supply water (34.9%). For cooking, desalinated supply water (45.2%) was the main source but rainwater and bottled water was also used to some extent (22.2% each). Groundwater usage was high and was the main source for laundry (51.3%), bathrooms (50.4%), flushing toilets (75.9%) and used in gardening (68.9%). For each of these the next common type of water used was desalinated water supply. It is interesting to note that rainwater usage is low. Only 44% of guesthouses collect rainwater on their premises.

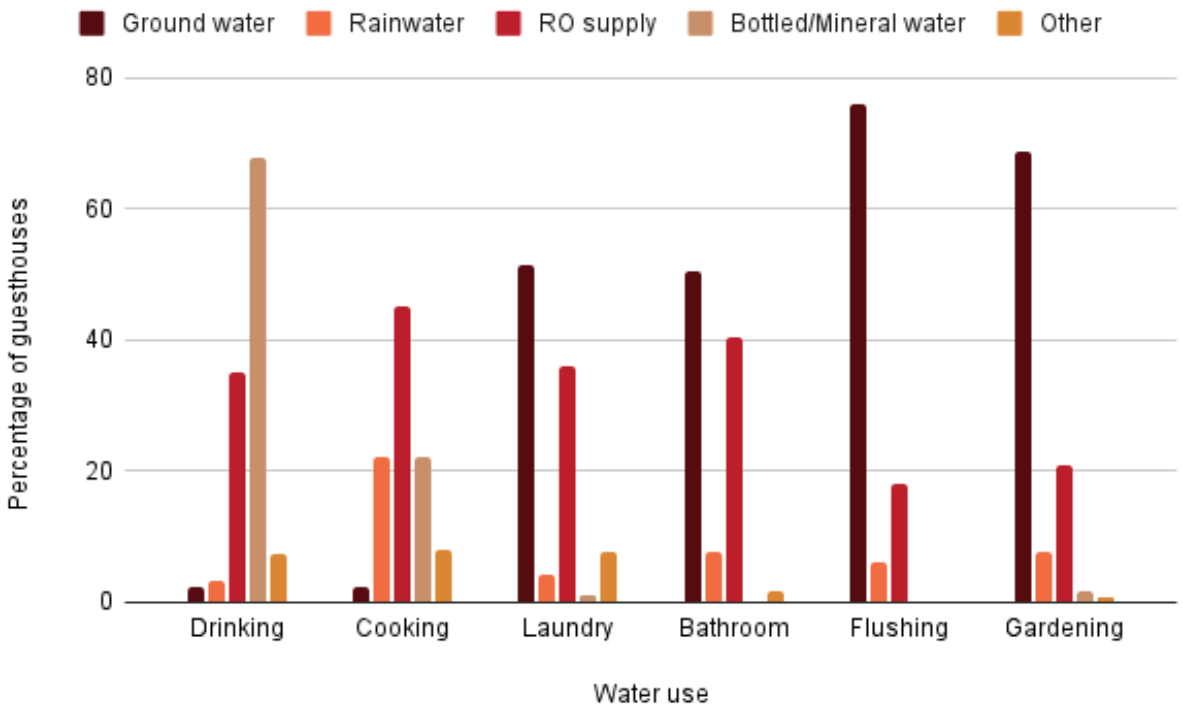

FIGURE 5. TYPE OF WATER UTILIZED FOR VARIOUS PURPOSES IN GUESTHOUSES

Noting the high use of groundwater in guesthouses, an analysis was conducted to compare groundwater usage in islands with and without desalinated water supply. From the respondents, 37 guesthouses were in islands without a desalinated water supply and 76 guesthouses were from islands that had a supply of desalinated water. *Figure 6* shows percentages of groundwater use by type and it can be seen that the use of groundwater is higher in islands without a desalinated supply for drinking, laundry, bathroom and flushing and gardening. A further analysis of means using the independent t-test was carried out to find out if the difference in usage was significant or due to the sample. *Table 5* shows the results of t-tests done and the results so that the higher usage of groundwater for bathroom, flushing and gardening in islands without a desalinated water supply is very strongly statistically significant ($p=0.000$)[4]. This means the difference in groundwater can be attributed to a lack of desalinated water supply. However, there is no

[4] A p value <0.001 is very strongly significant while a $0.01<p<05$ is moderately significant.

significance for cooking (p=0.936) and the use for laundry and cooking has a moderate significance as 0.01<p<0.05.

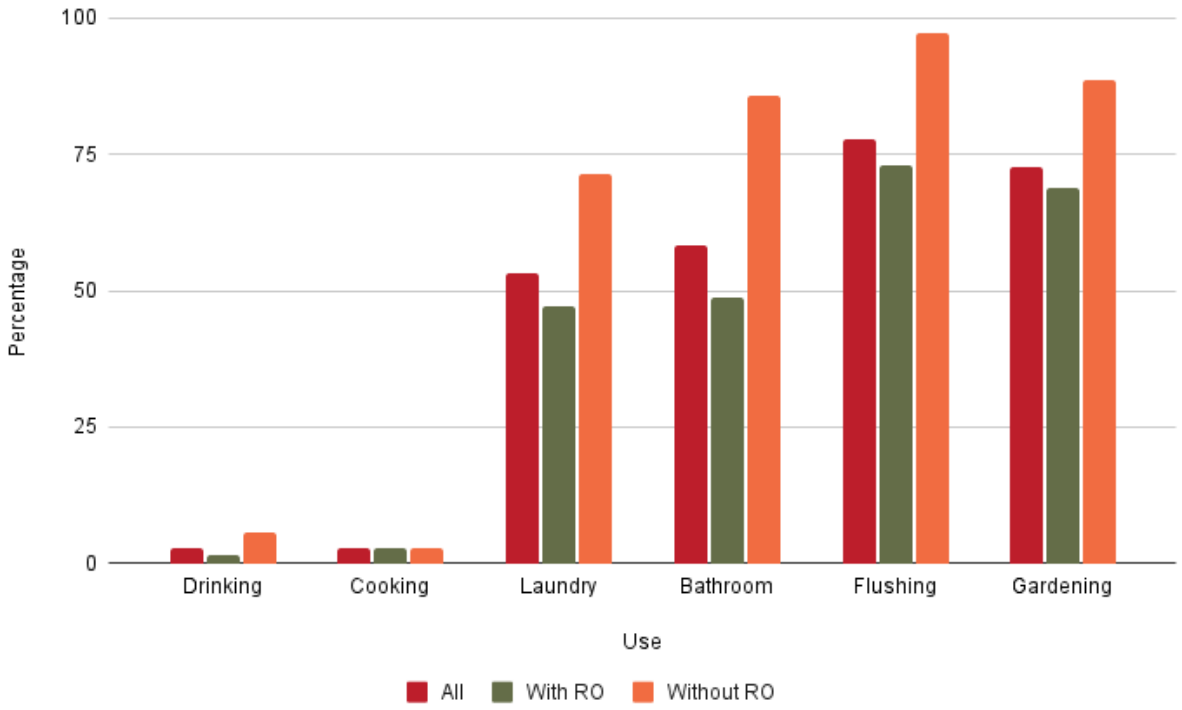

FIGURE 6. COMPARISON OF GROUNDWATER USAGE IN ISLANDS WITH AND WITHOUT A DESALINATED WATER SUPPLY

TABLE 5. COMPARISON OF MEANS USING INDEPENDENT T-TEST FOR USE OF GROUNDWATER

Ground Water Use	t	p-value	Mean difference
Drinking	1.298	0.044	0.011
Cooking	0.8	0.936	0.003
Laundry	2.487	0.015	0.241
Bathroom	4.066	.000	0.383
Flushing	4.374	.000	0.261
Gardening	4.614	.000	0.289

Inquiring on conservation of water, nearly 50% of guesthouses use water efficient fixtures and most guesthouses (68%) have guidelines or policies in place to encourage water conservation behaviours among occupants and staff.

Information on energy consumption was also collected. A comparison of monthly electricity bills of guesthouses is provided in *Figure 7*. Guesthouses were categorized to small (12 rooms or less), medium (13 to 25 rooms) and large (more than 25 rooms). Per month, the average electricity bill costs between MVR10,000 to 15,000 for both small and medium guesthouses. All large guesthouses had bills greater than MVR 25,000. Most guesthouses use energy efficient lights in the building (80%) and energy efficient appliances as well (68%). Only 12% of respondents have an energy monitoring system to track energy consumption. The vast majority of guesthouses (96%) do not have a backup generator. Many guesthouses (73%) reported that they have guidelines or policies in place to encourage energy saving behaviours among occupants and staff.

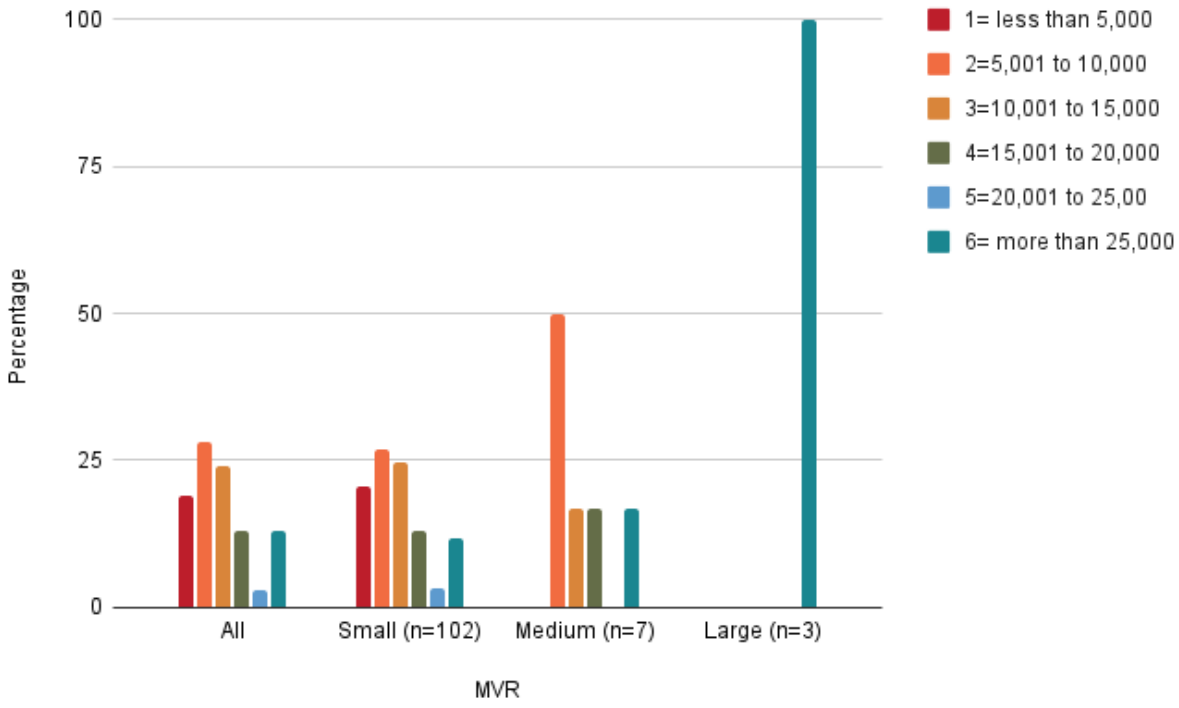

FIGURE 7. COMPARISON OF MONTHLY ELECTRICITY BILL BY SIZE OF GUESTHOUSES

The majority of guesthouses (74.5%) considered to use renewable resources such as solar power. Some had considered this during the design and some after operations due to high electricity costs. As seen in *Figure 8*, the main barrier for using renewable resources was high cost (45%). The government regulations allowing only 30% of solar PV in islands[5] was identified as a limiting factor by 23.3% of guesthouses. Many mentioned that guesthouses consume high amounts of energy they require larger sizes. Other barriers identified included low availability of technology ich in turn makes it expensive (6.7), lack of information (5%), more construction on guesthouse is planned[6] (5%), and high maintenance issues (3.3%).

[5] They are referring to the Net metering regulations.

[6] Increase more floors and hence cannot install solar PV on roof.

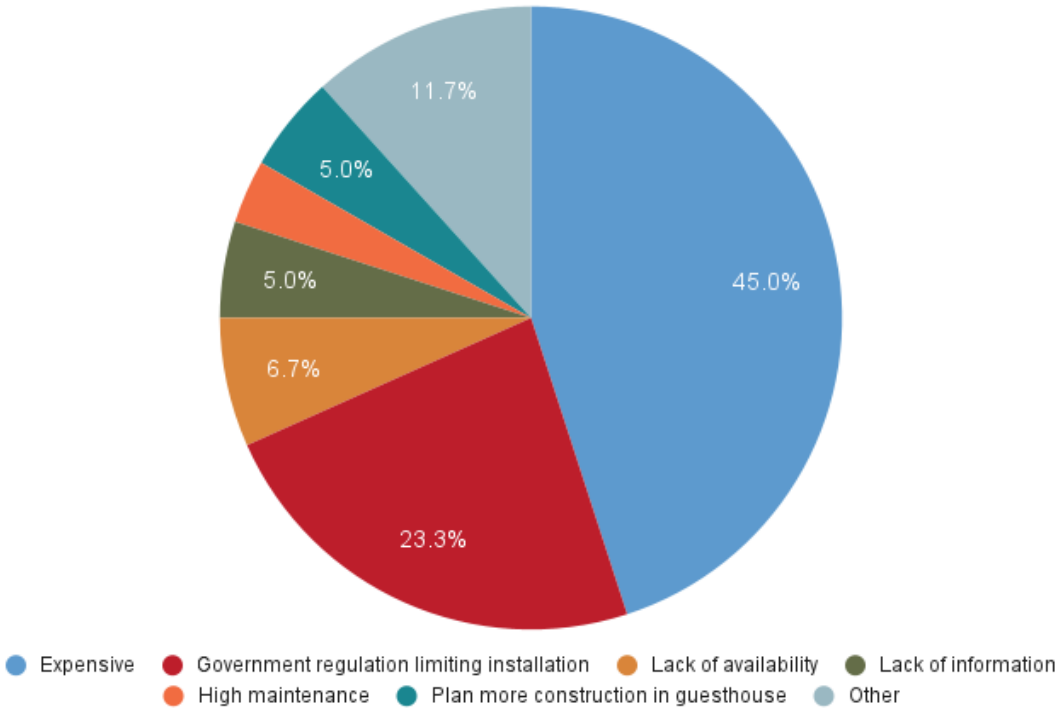

FIGURE 8. BARRIERS TO USING RENEWABLE ENERGY

4.3 Impact of Climate Risks and How It Was Addressed

Information on the impact of climate risks on guesthouse structure was obtained in the survey. Participants were asked about 6 climate risks: *1) extreme heat, 2) flooding from rain, 3) Stormy weather, 4) Swells and surges (Udha), 5) erosion, and 6) drought.* Though participants were asked of any other risks, none reported. *Figure 9* shows the percent of guesthouses that have experienced these risks.

Nearly half of guesthouses were impacted by extreme heat (48.2%), while 29.5% was impacted drought, 25.9% impacted by stormy weather, 19.5% impacted by flooding from rain, 6.3% impacted by swell surges and erosion. A correlation analysis was done on occurrence of the risks and the distance of the guesthouse from the shoreline. The correlation analysis findings are given in Appendix D. There was no strong correlation between guesthouses being impacted by any risks or the number of incidences based on the distance from the shoreline. A moderate correlation is shown for number of incidences from flooding by rain (r=-0.406), and moderate to weak correlations were identified for stormy weather (r=-0.322) and erosion (r=-0.336). All correlation coefficients were negative implying an increase in incidences the closer the guesthouse was to the shore. Analysis of p-values showed that none of these were statistically significant correlations. The sections below give more details on the damages to the guesthouse due to these climate risks, the costs incurred in addressing the damage and how this affects the business operations.

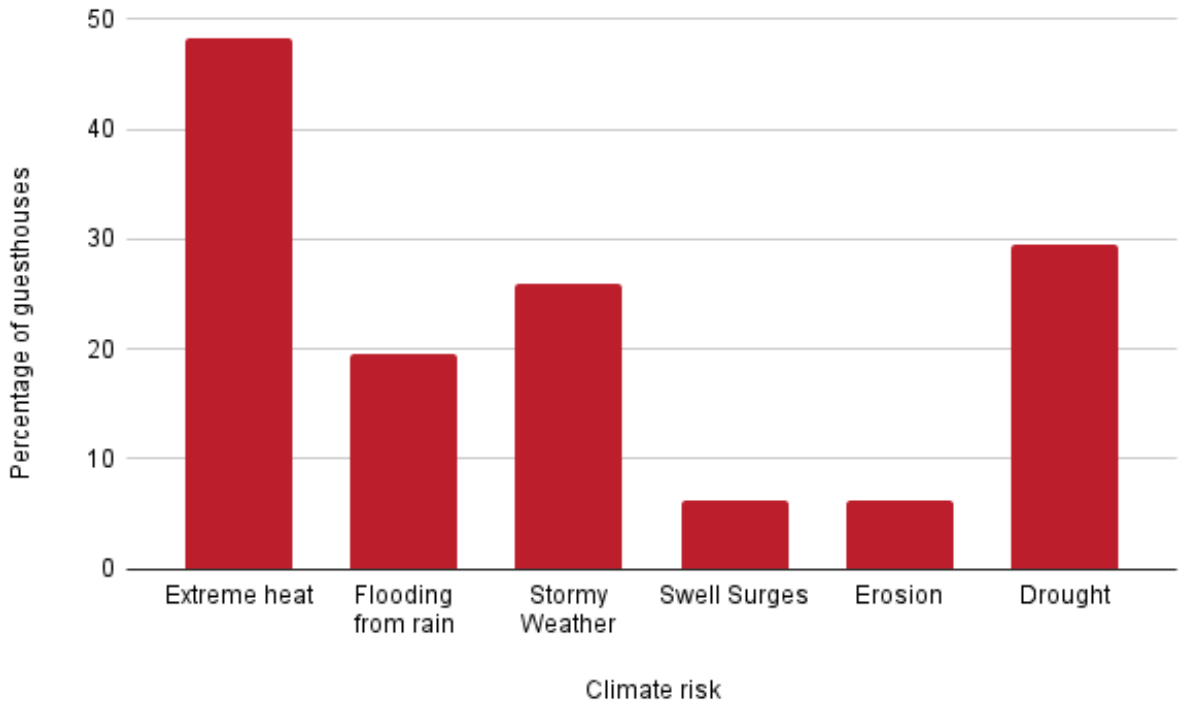

FIGURE 9. CLIMATE RISKS FACED BY GUESTHOUSES IN THE MALDIVES

4.3.1 Extreme heat

About 48% of guesthouses experienced extreme heat impacts. The mean frequency of guesthouse impacts due to extreme heat was once a year. Looking into the seasons when this occurs, 41.2% reported that it was during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May), 39.7% during Iruvai monsoon (November to March), 16.2% during Hulhan'gu monsoon (January to November), and 2.9% during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November).

Figure 10 shows the types of damage reported from extreme heat. Wall cracks (43.5%), paint peeling and fading (10.6%) and high energy use (10.6%) were most frequent. Others include damage to furniture and equipment (8.2%), damage to wooden structures (5.9%), tile damage (5.9%), damage to terrace and ceilings (5.9%) and water leaks (4.7%). Impacts under 'Other' include high water use and damage to glass. The majority of guesthouses reported sealing cracks (51.5%) and painting (23.5%) to address the damages (Table 4). The mean cost incurred in repairing these damages were between MVR 5001 – 10,000. The majority of participants (72%) believe this damage could be reduced by bringing structural changes.

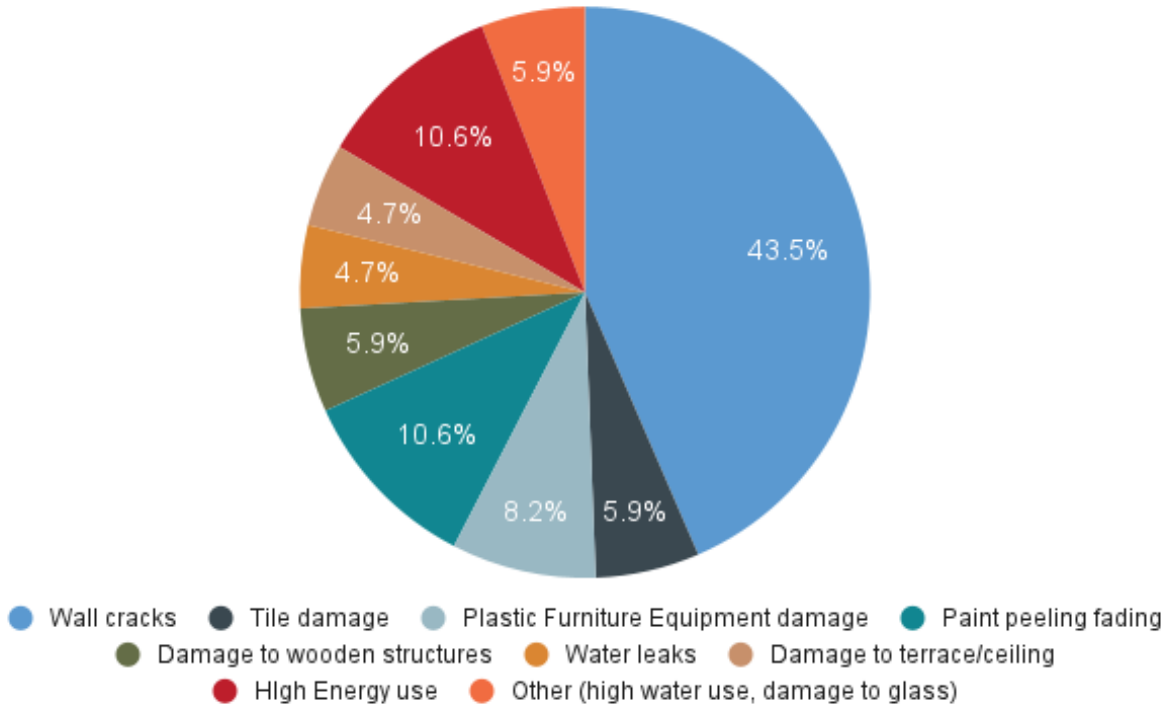

FIGURE 10. REPORTED INFRASTRUCTURE DAMAGE FROM EXTREME HEAT

TABLE 6. MEASURES TAKEN TO ADDRESS IMPACTS OF EXTREME HEAT

Measures to address damage	Percentage of guesthouses
Seal cracks	51.5
Paint	23.5
Replace tiles ceiling	5.9
Renovate	7.4
Not addressed	11.8

4.3.2 Flooding from rain

About 20% of guesthouses experienced flooding from rain. The mean frequency of impacts due to flooding from rain was once a year. As for the seasons when this occurs, 72.7% responded that it was during Hulhan'gu monsoon (January to November), 13.6% during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November), 9.1% during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May) and 4.5% during Iruvai monsoon (November to March).

Figure 11 shows the types of damage reported from flooding. The main damages include water leakage (31.4%), furniture and door damage (28.6%), wall peeling (20%) and mould (14.3%). Other issues (5.8%) such as blocking toilets and electricity issues. To address this damage, 45.8% conduct repairs and maintenance, 29.2% replace damaged goods, 16.7% cover the leakages and 8.3% use sandbags. The average cost incurred in this is MVR 10,001to 15,000. Most participants (90%) reported that this damage could be minimized by bringing structural changes to the guesthouse.

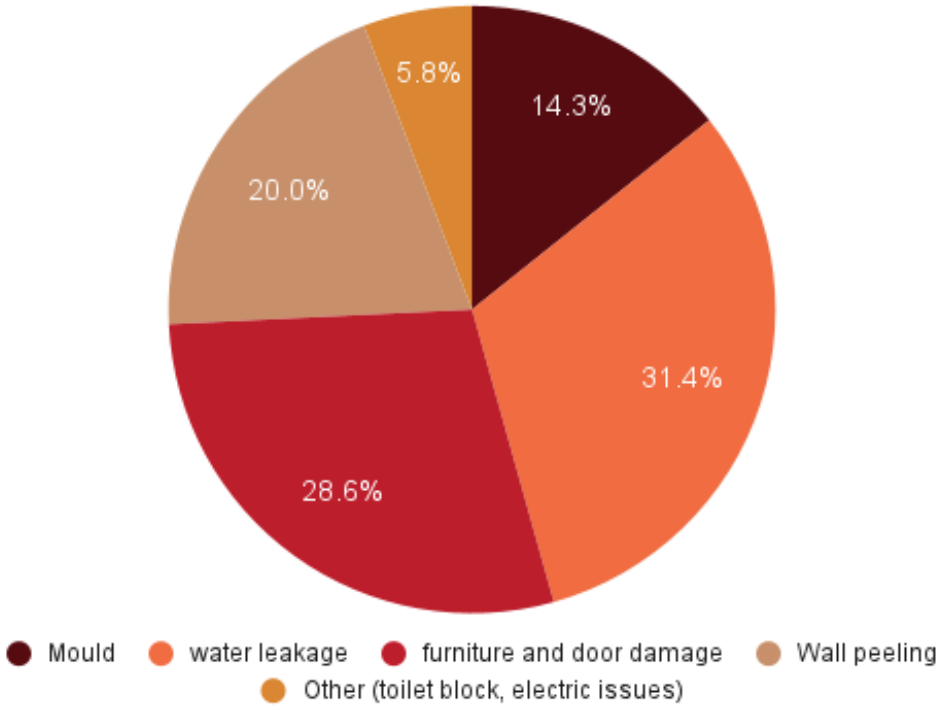

FIGURE 11. REPORTED IMPACTS FROM FLOODING DUE TO RAIN

4.3.3 Stormy weather / extreme winds

About 26% of guesthouses experienced impacts of stormy weather. The mean frequency of impacts due to stormy weather was every one to two years. While most (66.7%) reported this occurs during Hulhan'gu monsoon (January to November), 20.8% respondents reported this during Iruvai monsoon (November to March), 8.3% during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May), and 4.2% during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November).

Figure 12 shows the types of damage reported from stormy weather and extreme winds. Damages to doors (25%), roof/ceiling (17.3%) and furniture (15.4%) were among the highest. Other impacts include water leaks (9.6%), exterior wall damage (7.7%), plants/trees falling (7.7%), and rusting (5.8%). 'Other' category (11.5%) damages include glass shattering, and floor damage. To address this damage, 31% repaired the damage, 24.1% replaced damaged items (*Table 7*). The average cost incurred in this is MVR 5,001 to 10,000. A majority of participants (82%) believe this damage could be minimized by bringing structural changes to the guesthouse.

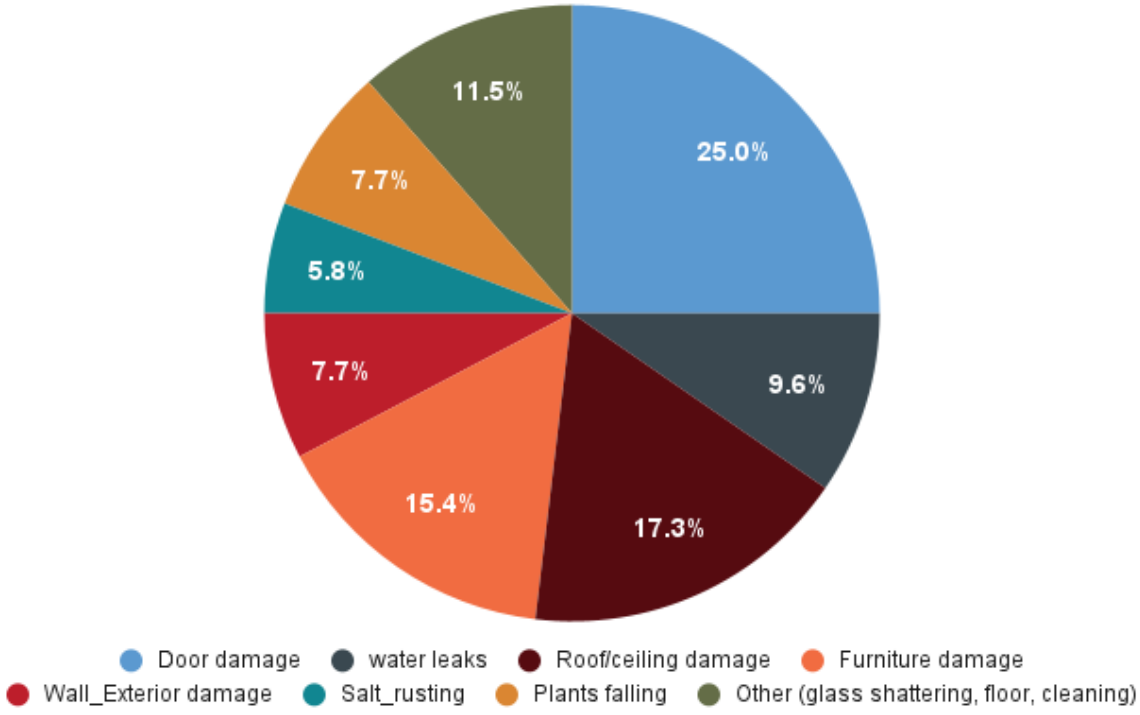

FIGURE 12. REPORTED DAMAGES FROM STORM EVENTS

TABLE 7. MEASURES TO ADDRESS IMPACTS FROM STORM EVENTS

Measures to address damage	Percentage of guesthouses
Repair	31
Replace	24.
Put sandbags	6.9
Keep things out of wind	13.8
Design stronger	3.4
Soak towel for floors	6.9
Rust proof paint	3.4
Cut trees	6.9
Not addressed	3.4

4.3.4 Swell and surge (Udha)

Only about 6% of guesthouses reported experiencing swells and surges. The mean frequency of impacts due to stormy weather was once a year. Findings indicate half of the participants reported this occurring in Hulhan'gu monsoon (January to November), equally (20%) in Iruvai monsoon (November to March) and during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May), and the least (10%) during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November).

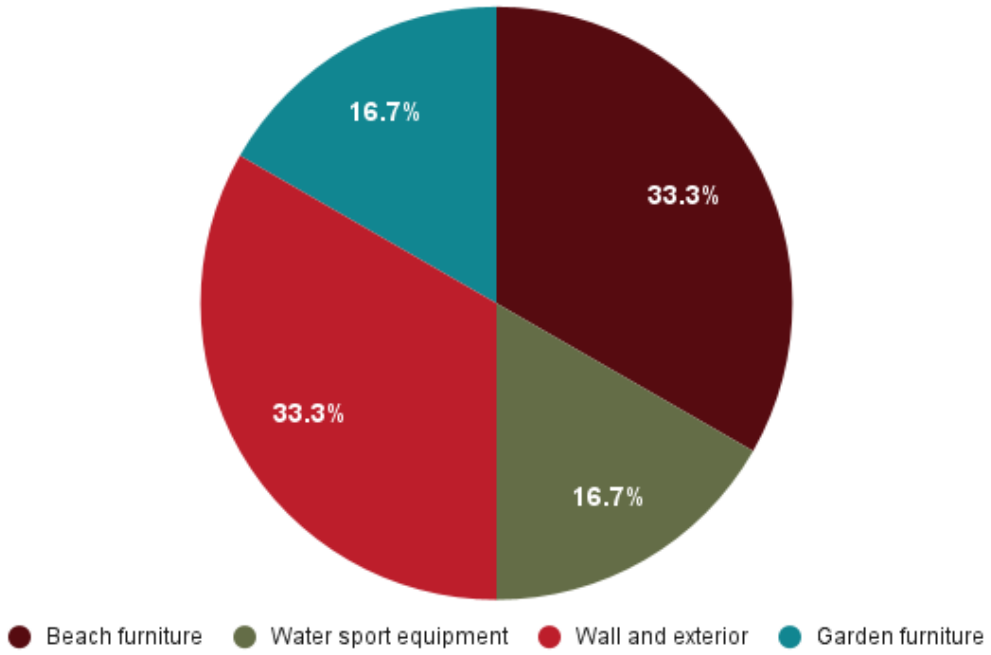

FIGURE 13. REPORTED IMPACTS FROM SWELLS AND SURGES

Figure 13 shows the impacts from swells and surges. Beach furniture and wall and exterior damage (33.3%) is the most while damage to garden furniture damage to water sport equipment is reported by 16.7% of guesthouses each. Sandbags (42.9%) were mainly used to address this risk. Other measures beach nourishment and infrastructure, replacing damaged/missing goods were reported by 14.3% each. The same number reported that they did not address the damage. The average cost to address this damage was more than MVR 15,000. Half of the respondents believe this damage could be minimized by bringing structural changes to the guesthouse.

4.3.5 Erosion

Only about 6% of guesthouses reported experiencing erosion. The mean frequency of impacts due to stormy weather was every one to two years. This mostly (55.6%) happens during Hulhan'gu monsoon (January to November), and 22.2% during in Iruvai monsoon (November to March), and 11.1% during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May) and during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November).

The damages that occurred due to erosion include damage to plants and outdoor items (42.9%), the building (28.6%), guesthouse launch (14.3%), and furniture (14.3%). This damage was addressed by putting sandbags (50%), and other (33.4%) methods, including help from Government, and replacement of goods, while 16.7% did not address damages. The cost to address this damage, on average, was between MVR 10,001 to 15,000. Only 33.3% of participants believe this damage can be minimized by bringing structural changes to the guesthouse.

4.3.6 Drought

Drought impacts were experienced by about 30% of guesthouses. The mean frequency of impacts due to stormy weather was once a year. The results show that this mainly (64%) occurs during Iruvai monsoon (November to March), 20% during the period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May), 12% during Hulhan'gu monsoon (January to November), and 4% during the period when Hulhan'gu monsoon changes to Iruvai monsoon (October, November).

Figure 14 shows reported impacts from drought. The damages that happen due to drought include salinization of groundwater (44.2%), smelliness of groundwater (27.9%), water scarcity (11.6%), and dustiness (9.3%), with other (7%) damages include plants dying and high usage of water. Steps taken to address this damage include using rainwater (17.9%), using RO supply water (10.7%), using oxygen pump (10.7%), using filtration systems (10.7%), using infiltrated ground water (3.6%) and other (32.1%) measures. The cost to address this damage was an average of MVR 5,001 to 10,000. Almost half (52%) of participants believe this damage can be minimized by bringing structural changes to the guesthouse.

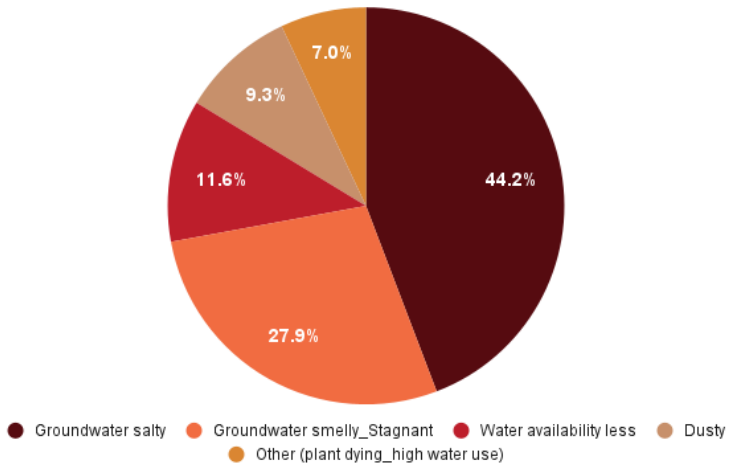

FIGURE 14. REPORTED IMPACTS FROM DROUGHT

4.4 Impact on business

Due to the damages experienced by guesthouses from climate risks, the guesthouse business operations were affected as well. *Figure 15* shows the impact of climate risks on their businesses. A majority of guesthouses reported no impacts from extreme heat (78.9%), flooding from rain (41.2%), storm events (5%) and erosion (50%). However bad reviews and cancellations or low levels of guests and complaints from guests were reported as impacting the business. Cancellations and bad reviews were significant in swells and surge impacts. Complaints from guests were significant in stormy events and drought.

Table 8 gives the mean loss in revenue due to impacts of climate risks. Though less guesthouses were impacted by swell and surges, they bear the highest loss in revenue with estimates of more than MVR 15,000. Flooding from rain and erosion losses are each on average between MVR 10,001 to 15,000. Extreme heat and drought had the lowest loss in revenue with average losses between MVR 5,001 to 10,000.

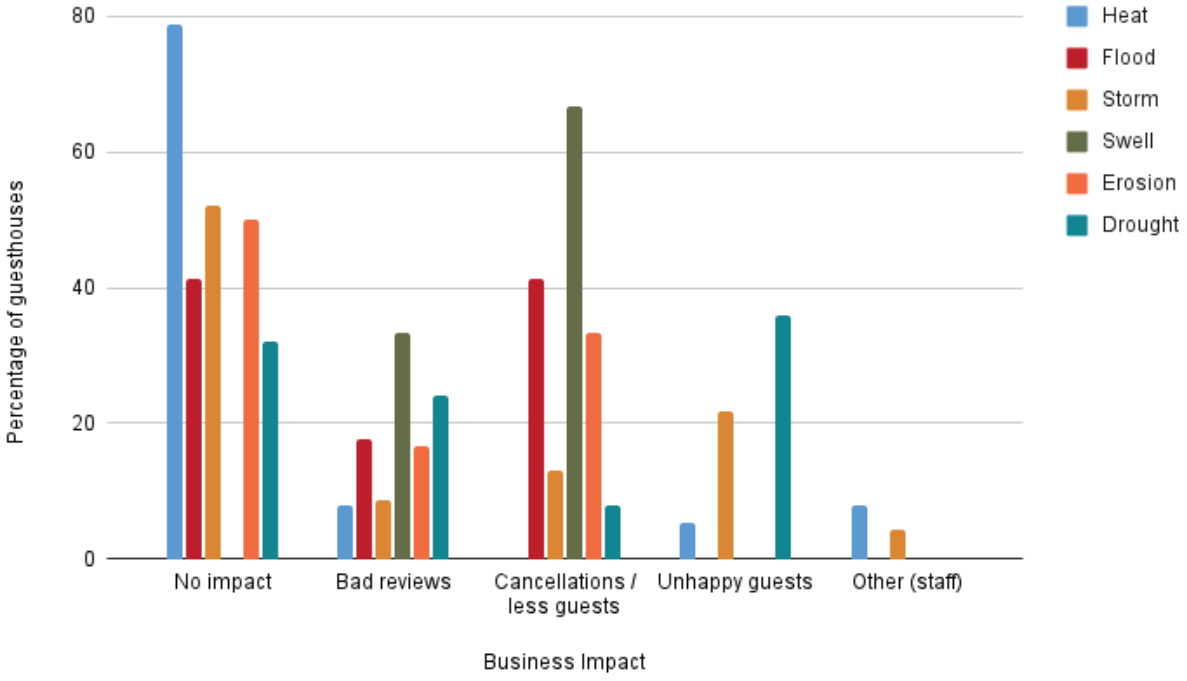

FIGURE 15. IMPACT ON BUSINESS DUE TO CLIMATE RISKS

TABLE 8. MEAN LOSS IN REVENUE FROM CLIMATE RISK IMPACTS (MVR)

Climate Risk	Mean loss in revenue (MVR)
Extreme heat	Between 5,001 to 10,000
Flooding from rain	Between 10,001 to 15,000
Stormy weather and extreme winds	Between 5,001 to 10,000
Swells and surges	More than 15,000
Erosion	Between 10,000 to 15,000
Drought	Between 5,000 to 10,000

The survey also inquired whether guesthouses had insurance and 92% of guesthouses reported having insurance and about 78% reported that climate risks were covered in the insurance. The majority of guesthouses (80%) reported that it was difficult to obtain climate insurance.

4.5 Perceptions on Climate resilient designs

As can be seen in *Figure 16*, about 90% believe it is important or very important to consider climate risks in design. While 38.5% of owners reported using own knowledge and experience of climate risks in incorporating designs to address the risks, about 40% reported looking for information from other sources (*Figure 16*). About 21% reported that they did not look for climate risk information.

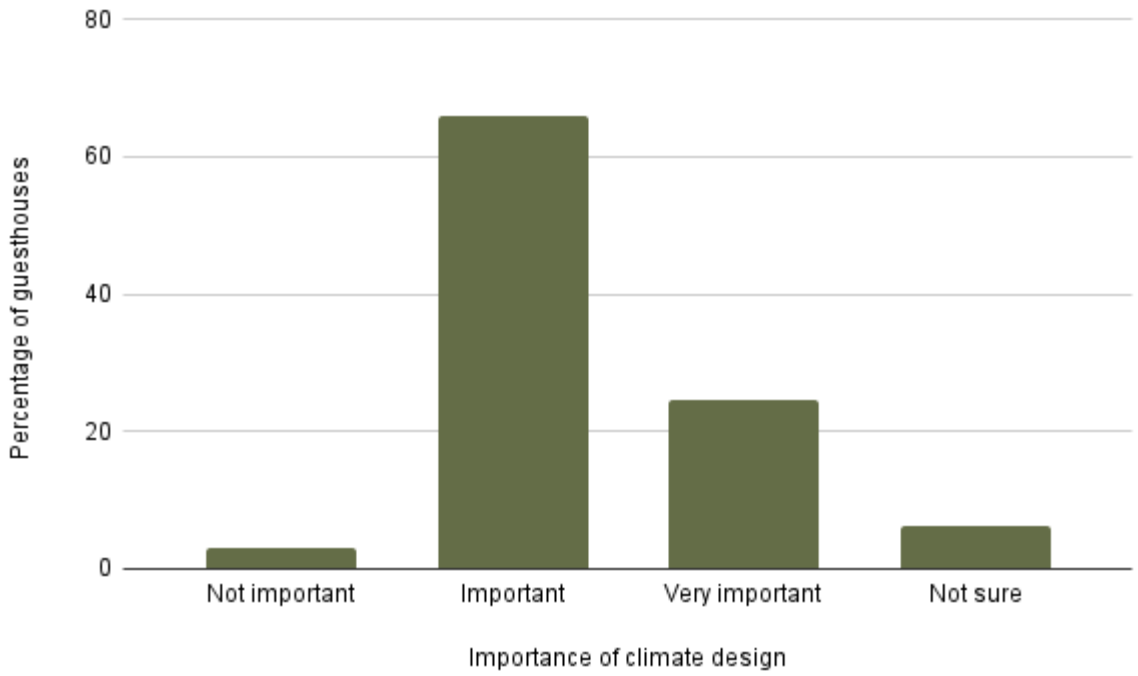

FIGURE 16. OPINION ON IMPORTANCE OF INCORPORATING CLIMATE RISKS INTO DESIGN

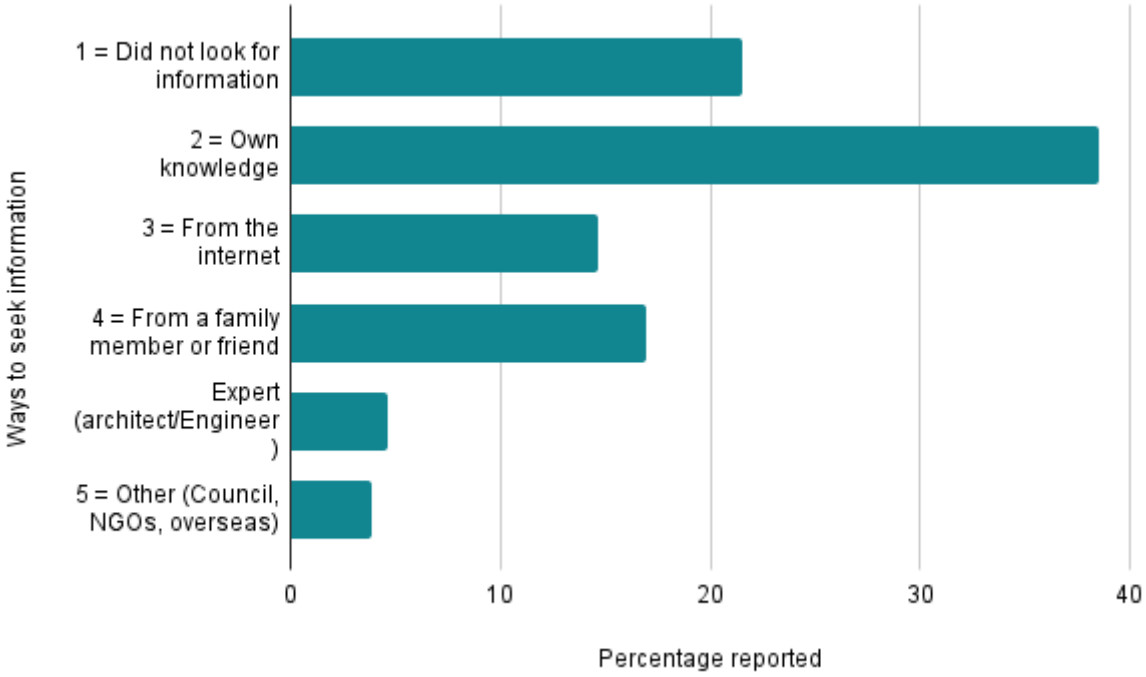

FIGURE 17. REPORTED WAYS TO SEEK INFORMATION ON CLIMATE RISKS

About 60% of guesthouses reported including climate resilient features in their design. Reported features are given in *Table 9*. In design feature is elevation of building (30.3%) and about 15% reported including safety measures such as emergency exits, safety information. As reported by those who have not included climate resilient designs, the main reasons were not having information (3%) and as the guesthouses were not at risk due to location in island (25%) (*Figure 18*). As seen in *Figure 19* the main way to encourage people to use climate resilient designs was identified as sharing information and creating awareness (62%). Showing financial benefit (24.5%) and informing of potential losses (6%) were also considered important.

TABLE 9. REPORTED FEATURES IN DESIGN TO ADDRESS CLIMATE RISKS

Included design features	Percentage reported
Elevation	30.3
Ventilation	6.6
Design material of doors and windows	7.9
Roof design	9.2
Foundation	5.3
Orientation	7.9
Drainage	1.3
Plant trees	3.9
Solar PV	5.3
Energy saving devices	5.3
Safety measures	14.5
Other	26

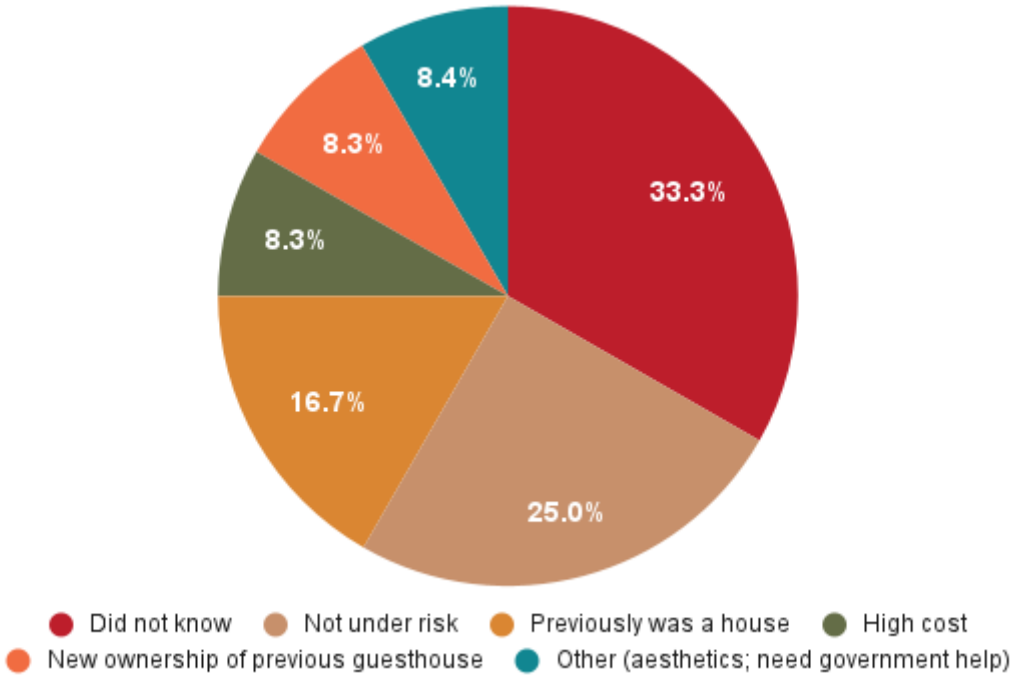

FIGURE 18. REASONS FOR INCLUDING CLIMATE RESILIENT DESIGNS

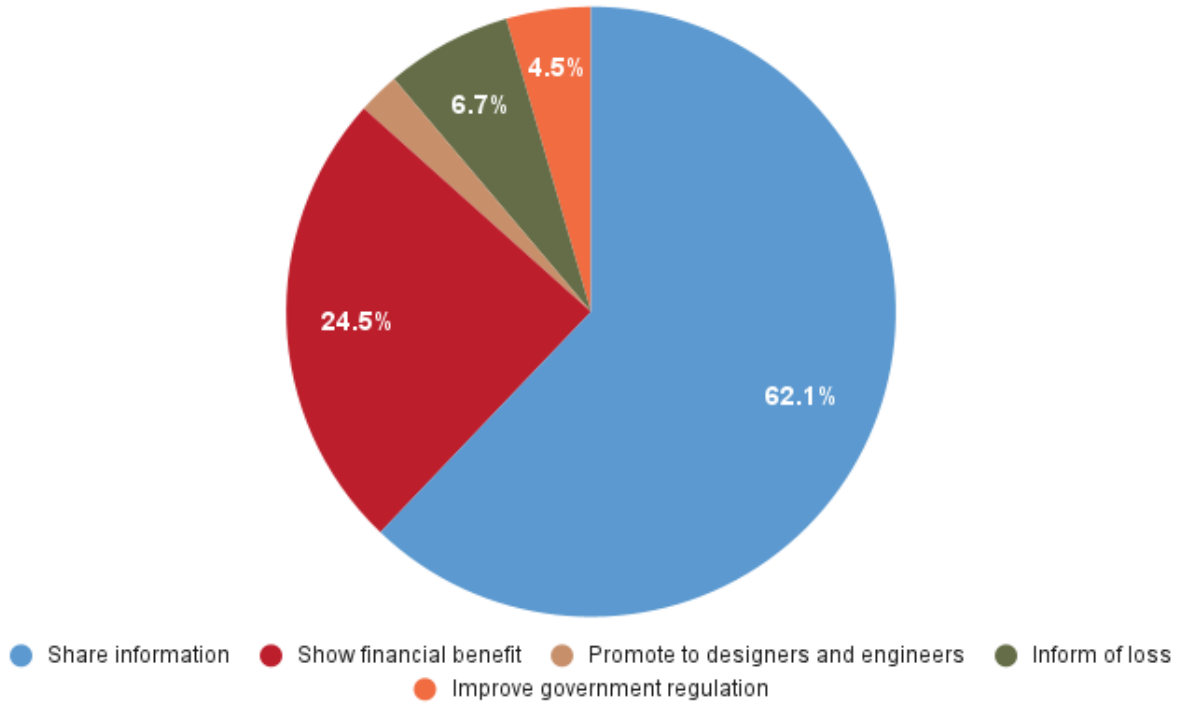

FIGURE 19. WAYS TO ENCOURAGE CLIMATE RESILIENT DESIGNS

5. CONCLUSION

Most of the participating guesthouses have been in operation in the last 4 years and on average had 12 beds with about 60% being built as a guesthouse. Over 40% were designed by a licensed architect and 60% have considered impacts from climate risks when designing their guesthouses. Some of these considerations included elevation, ensuring good ventilation and orientation to allow for maximum lighting and shade. Some also considered using natural features such as plants and trees for cooling. Cooling would be a major contributor to electricity consumption and about 75% considered using solar PV. The biggest barriers to installing renewable energy were the high cost and limitations on allowed capacity in island from government net metering regulations. With regards to water consumption, bottled water and desalinated supply water are in high use. At the same time, it is concerning to note the high use of ground water, which is the most common type used for laundry, bathrooms and toilet flushing and gardening. With a rise in guesthouse establishments in residential islands, this high use of ground water needs to be considered and regulations put in place to avoid overextraction. Furthermore, quantitative assessments of ground water use should be conducted.

The survey showed that the most common climate risks were experienced by guesthouses to some extent. The majority of guesthouses experienced impacts of extreme heat followed by drought, stormy weather and flooding from as the next highest respectively. The analysis showed no significant correlation between impacts from climate risks and the distance from shoreline of the structures. Except for flooding, it is estimated that addressing damages from these events are in the range of MVR 5, 001 to 10,000. Flood damages were reported to have higher damage costs of about MVR 10,001 to 15,000. Such incidences reported causing damages such as wall cracks, paint peeling and damage to furniture causing regular maintenance and replacing of items. While swells and surges may be having fewer incidences such incidences reported damage costs of over MVR 15,000. Such damage was reported to affect the operation of businesses with effects such as cancellation, bad reviews, and complaints from guests. Loss of revenue attributed to climate risks ranged from MVR 5,0001 to 10,000 except for erosion (MVR 10,001 to 15,000) and swells and surges (more than MVR 15,000). The majority of guesthouses believed it is important to consider climate risks in designing guesthouses and that the biggest challenge was lack of information. Sharing more information about the risks, available design features, financial benefits and potential loss was identified as ways to encourage more people to consider these risks when designing.

The findings of this survey have helped gain insights on current status of guesthouses in the climate risks faced and considerations for climate resilient designs. As identified, there is a need to disseminate more the risks and benefits of resilient designing. This affirms the need for the identified activities of the ESCAPE project. In addition to disseminating findings of the survey with stakeholders, the findings will be used in developing some climate resilient designs and design guidelines for guesthouses.

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APPENDICES

Appendix A: Documents Analysed for Desk Review

#	Published date	Name of Document	Issued by
Tourism related			
1	16/05/99	The Maldives Tourism Act (2/99) - Unofficial translation	Ministry of Tourism
2	5/07/07	Third Tourism Master Plan	Ministry of Tourism
3	20/12/09	Guesthouse regulation	Ministry of Tourism
4	01/09/13	Fourth Tourism Master Plan - Volume 2	Ministry of Tourism
5	03/08/15	EIA regulation for the development of tourist resorts, guesthouses and hotel and yacht marinas in the Maldives (2015/R-157)	Ministry of Tourism
6	21/06/17	Amendment 1 to EIA regulation for the development of tourist resorts, guesthouses and hotel and yacht marinas in the Maldives (2017/R-48)	Ministry of Tourism
7	18/12/17	Guideline on Beach Nourishment	Ministry of Tourism
8	24/05/23	Maldives Fifth Tourism Master Plan 2023 - 2027	Ministry of Tourism
9	30/08/23	Maldives Tourism Climate Action Plan: Strategic Pathways for Climate Resiliency in Tourism	Ministry of Tourism/USAID
Planning & Building related			
10	30/05/05	Binaaveshi Planning gavaaidhu (with Annex 1 & Annex 2)	Ministry of Housing and Urban Development
11	1501/13	Hulhumale planning and building regulation (2013/R-3)	Housing Development Corporation Ltd
12	20/05/15	Male Planning Regulation ((2015/R-140)	Ministry of Housing and Infrastructure
13	23/04/2017	Construction Act (4/2017)	Ministry of Housing and Infrastructure
14	August 2020	Managing Risks for a Safer Built Environment in the Maldives. Building Regulatory Capacity Assessment.	The World Bank Group
15	02/11/21	Building Code	Ministry of National Planning and Infrastructure
16	Draft	Maldives Energy Efficiency Guidelines for Buildings	Ministry of Environment
Other relevant			
17	03/02/21	Ground water usage regulation (2021/R-20)	Ministry of Environment

Appendix B: Survey Instrument (English)

Guesthouse Survey: Impacts of Climate Risks

This is a survey conducted by Small Island Geographic Society (SIGS) under the "ESCAPE" project funded by USAID. The aim of this project is to understand how to make guesthouses more resilient to the impacts of climate risks. The purpose of this survey is to identify the climate risks experienced by guesthouses in the Maldives and how they are coping with such risks. Participating in this survey would be very helpful for the work we are doing regarding this issue.

You can answer this survey based on your understanding and knowledge. There are no incorrect answers. You may skip any questions you do not wish to answer, and you may withdraw from this survey at any point. The data collected from this survey will be used to develop a report which will be shared to relevant stakeholders. Any information that can lead to personal identification will be kept confidential.

For more information regarding the project, please email the project coordinator, Dr. Mizna Mohamed (pm@sigsmaldives.org).

1. I consent to participating in this survey.

- Yes
- No

Section 2: Demographic Information

2. Name of participant
3. Designation
4. Contact number
5. Name of guesthouse
6. Location of guesthouse (atoll/island)
7. When was the guesthouse in operation?
8. Number of beds in the guesthouse
9. Number of staff

Section 3: Guesthouse Structure

10. Size of guesthouse land plot (in square feet)
11. Size of guesthouse built area (in square feet)
12. What is the estimated height of the building and how many storeys are there in the building?

13. Was this structure purpose built as a guesthouse, or was this structure pre-built and was converted to a guesthouse?

- Built to be used as a guesthouse
- Was pre-built and converted to a guesthouse

14. Who designed the guesthouse?

- A licensed architect
- A designer
- A draftsperson
- Other

15. What is the foundation type of the guesthouse?

- Raft (concrete sheet)
- Pad footing (isolated slabs)
- Not sure
- Other

16. How much is the depth of the foundation from ground level?

- Less than 1 meter
- 1.1 to 2 meters
- More than 2 meters
- Not sure
- Other

Building exterior:

17. Is the insulation in the walls, roof and floors designed to maximize cooling?

- Yes
- No
- Not sure

18. What type of windows and doors are installed? (tick all that apply)

- Energy efficient
- Double glazes
- Low-e coated
- Not sure

- Other

19. Are there any air leaks or drafts that have been addressed during construction?

- Yes

- No

HVAC System

20. What type of ventilation and air-conditioning system is used in the building?

21. Is the HVAC system properly sized for the building's needs?

- Yes

- No

22. Are there programmable thermostats or smart controls in place to regulate temperature and energy use?

- Yes

- No

23. Has the HVAC system been regularly maintained to ensure optimal efficiency?

- Yes

- No

Lighting

24. Are there motion sensors or automated controls to turn off lights when not in use?

- Yes

- No

25. Was the building's orientation optimized to make the most of natural daylight and passive solar heating?

- Yes

- No

26. Were shading devices or overhangs used to block excessive sun exposure and heat gain?

- Yes

- No

Super structure

27. What kind of material was used for roofing? (Tick all that apply)

- Metal sheets
- Concrete slab
- Other

28. Was roof insulation used under the roof?

- Yes
- No

29. Was there any special design for the roof structure?

- Yes
- No

30. What kind of bricks were used for the exterior wall?

- Hollow blocks
- Solid blocks
- Other

31. How many layers of plastering were used to exterior wall?

Section 4: Water and Electricity Usage

Water usage (tick all that apply)

32. What type of water is used for drinking?

- Well water
- Rainwater
- RO supply water
- Bottled water/mineral water
- Other

33. What type of water is used for cooking?

- Well water
- Rainwater
- RO supply water

- Bottled water/mineral water
- Other

34. What type of water is used for laundry/washing?

- Well water
- Rainwater
- RO supply water
- Bottled water/mineral water
- Other

35. What type of water is used in the bathrooms?

- Well water
- Rainwater
- RO supply water
- Bottled water/mineral water
- Other

36. What type of water is used for flushing?

- Well water
- Rainwater
- RO supply water
- Bottled water/mineral water
- Other

37. What type of water is used for gardening?

- Well water
- Rainwater
- RO supply water
- Bottled water/mineral water
- Other

38. Are there water-efficient fixtures such as low-flow toilets and faucets installed in the building?

- Yes
- No

39. Are there guidelines or policies in place to encourage water conservation behaviors among occupants and staff?

- Yes
- No

Electricity usage

40. Approximately, how much is the monthly electricity bill for the guesthouse?

41. Are you willing to share the electricity bills over the past year to understand your energy consumption?

- Yes
- No

42. Are energy-efficient lights used in the building?

- Yes
- No

43. Are energy-efficient appliances and equipment, such as Energy Star-rated products, used in the building?

- Yes
- No

44. Is there an energy monitoring system in place to track energy consumption and identify areas for improvement?

- Yes
- No

45. Do you have a back-up generator?

- Yes
- No

46. Are there guidelines or policies in place to encourage energy-efficient behaviors among occupants and staff?

- Yes
- No

47. Have you considered using renewable energy sources (e.g. solar PV)?

- Yes
- No

Section 5: If no to considering using renewable energy sources:

48. If no, what are the barriers to using renewable energy sources?

Section 6: Extreme Heat

49. Has the guesthouse structure been impacted or damaged by extreme heat? (Eg: high energy consumption, cracks on walls, heat damage to tiles)

- Yes
- No

Section 7: Damages from extreme heat and how it was addressed:

50. Approximately how many such incidents have you faced since you started operation of the guesthouse?

51. What time of the year do you experience extreme heat the most?

(tick all that apply)

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

52. What is the damage to the guesthouse from extreme heat? (example: cracks on walls)

53. How was the business affected by the impacts from extreme heat? (Example: cancellations; bad reviews from guests)

54. What is the estimated financial loss (business revenue) due to an extreme heat event? (in rufiyaa)

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

55. What do you do to address the impacts by extreme heat? (Example: sealing cracks on walls)

56. What is the estimated cost to address the impacts of extreme heat (e.g. fix damage, put mitigation measures)? (in rufiyaa)

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

57. Do you think that these can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 8: Climate Risks: Flooding (due to rain)

58. Has the guesthouse structure been impacted or damaged by flooding due to rain? (Eg: water damage to doors due to flooding, mould, peeling walls)

- Yes
- No

Section 9: Damages from flooding due to rain and how it was addressed

59. Approximately how many such incidents have you faced since you started operation of the guesthouses?

60. What time of the year do you experience flooding due to rain the most?

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

61. What is the damage to the guesthouse from flooding due to rain? (Example: damage to furniture, mold)

62. How was the business affected by the impacts from flooding due to rain? (Example: cancellations; bad reviews from guests)

63. What is the estimated financial loss (business revenue) due to a flooding event? (in rufiyaa)?

- Less than 5000

- 5001-10,000
- 10,001-15000
- More than 15000

64. What do you do to address the impacts by flooding (due to rain)? (Example: using sandbags)

65. What is the estimated cost to address the impacts from flooding due to rain? (e.g. fix damage, put mitigation measures) ? (in rufiyaa)

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

66. Do you think that these can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 10: Climate Risks: Stormy weather/extreme winds

67. Has the guesthouse structure been impacted or damaged by stormy weather/extreme winds? (Shattering of windows, blowing away of furniture)

- Yes
- No

Section 11: Damages from stormy weather/extreme winds and how it was addressed

68. Approximately how many such incidents have you faced since you started operation of the guesthouses?

69. What time of the year do you experience stormy weather/extreme winds the most?

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

70. What is the damage to the guesthouse by stormy weather/extreme winds? (Example: damage to furniture)

71. How was the business affected by the impacts from flooding due to rain? (Example: cancellations; bad reviews from guests)

72. What is the estimated financial loss (business revenue) due to a stormy weather/extreme winds event (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

73. What do you do to address the impacts by stormy weather/extreme winds? (Example: using sandbags)

74. What is the estimated cost to address the impacts from stormy weather/extreme winds (e.g. fix damage, put in mitigation measures)? (in rufiyaa)

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

75. Do you think that these impacts can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 12: Climate Risks: Swell surges (udha)

76. Has the guesthouse structure been impacted or damaged by swell surges (udha)? (Salt damage to structure, damage to furniture due to flooding)

- Yes
- No

Section 13: Damages from swell surges/udha and how it was addressed:

77. Approximately how many such incidents have you faced since you started operation of the guesthouses?

78. What time of the year do you experience swells/surges (udha) the most?

- Iruvai monsoon (November to March)

- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

79. What is the damage to the guesthouse by swell surges (udha)? (Example: damage to furniture, mold)

80. How was the business affected by the impacts from swell surges (udha)? (Example: cancellations; bad reviews from guests)

81. What is the estimated financial loss (business revenue) due to a swell surge (udha) event (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

82. What do you do to address the impacts by swell surges (udha)? (Example: using sandbags)

83. What is the estimated cost to address the impacts from swell surges/udha (e.g. fix damage, put mitigation measures)? (in rufiyaa)

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

84. Do you think that these impacts can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 14: Climate Risks: Erosion

85. Has the guesthouse structure been impacted or damaged by erosion? (Uprooting of trees in the premises, damage to furniture)

- Yes
- No

Section 15: Damages from erosion and how it was addressed

86. Approximately how many such incidents have you faced since you started operation of the guesthouses?

87. What time of the year do you experience erosion the most?

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

88. What is the damage to the guesthouse from erosion? (Example: damage to building, damage to furniture)

89. How was the business affected by erosion? (Example: bad reviews from guests)

90. What is the estimated financial loss (business revenue) due to erosion (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

91. What do you do to address the impacts from erosion? (Example: building decks, adding sandbags)

92. What is the estimated cost to address the impacts from erosion (in rufiyaa) (e.g. fix damage, put mitigation measures)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

93. Do you think that these impacts can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 16: Climate Risks: Drought (Long periods with no rain)

94. Has the guesthouse structure been impacted or damaged by drought (long periods with no rain)? (Ground water getting smelly due to salinity, run out of rainwater)

- Yes
- No

Section 17: Damages from drought (long periods with no rain) and how it was addressed

95. Approximately how many such incidents have you faced since you started operation of the guesthouses?

96. What time of the year do you experience drought (long periods without rain) the most?

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

97. What is the damage/loss to the guesthouse from drought (long periods without rain)? (Example: run out of rainwater)

98. How was the business affected by drought (long periods without rain)? (Example: bad reviews from guests)

99. What is the estimated financial loss (business revenue) due to a drought (long periods without rain) event (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

100. What do you do to address the impacts by drought (long periods with no rain)? (Example: harvesting rainwater)

101. What is the estimated cost to address the impacts from drought (long periods with no rain) (e.g. fix damage, put mitigation measures)? (in rufiyaa)

-Less than 5000

- 5001-10,000
- 10,001-15000
- More than 15000

102. Do you think that these impacts can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 18: other climate risks

103. Has the guesthouse structure been impacted or damaged by other climate risks?

- Yes
- No

Section 19: Damages from other climate risks and how it was addressed:

104. Approximately how many such incidents have you faced since you started operation of the guesthouses?

105. What are these risks?

106. What time of the year do you experience this risk the most?

- Iruvai monsoon (November to March)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (April, May)
- Hulhan'gu monsoon (January to November)
- Period when Iruvai monsoon changes to Hulhan'gu monsoon (October, November)

107. What is the damage to the guesthouse from these climate risks? (Example: damage to furniture, mold)

108. How was the business affected by these climate risks? (Example: cancellations; bad reviews from guests)

109. What is the estimated financial loss (business revenue) due to such a climate risk (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

110. What do you do to address the impacts of this climate risk? (Example: using sandbags)

111. What is the estimated cost to address the impacts from this climate risk (e.g. fix damage, put mitigation measures) (in rufiyaa)?

- Less than 5000
- 5001-10,000
- 10,001-15000
- More than 15000

112. Do you think that these impacts can be reduced by bringing changes to the structure of the guesthouse?

- Yes
- No

Section 20: Climate risks and guesthouse design

113. Did you think of ways to reduce climate risks when designing this guesthouse?

- Yes
- No

114. When designing the guesthouse, did you discuss with your designer on reducing climate risks?

- Yes
- No

115. When designing the guesthouse, did the designer discuss with you on reducing climate risks?

- Yes
- No

116. While designing your guesthouse, where did you gather information on how to reduce climate risks?

- Did not look for information
- Own knowledge
- From the internet
- From a family member or friend
- Other

117. What is your opinion on designing guesthouses with features to reduce climate risks?

118. What can be done to encourage guesthouse owners to incorporate climate resilient designs for guesthouses?

119. Have you included any features in the design of your guesthouse to reduce climate risks?

- Yes
- No

Section 21: Design to reduce climate risks – Yes

120. What kind of design features have you included in your guesthouse to reduce climate risks?

Section 22: Design to reduce climate risks – No

121. Why were features not included in your guesthouse design to reduce climate risks?

Section 23: Climate Risks and Insurance

122. Do you have any kind of insurance for your guesthouse business?

- Yes
- No

Section 24: Insurance Information

123. What insurance policy do you currently have?

124. Does this insurance cover climate risks?

- Yes
- No

125. Did you find it difficult to get insurance cover for climate risks?

- Yes
- No

Appendix C: Survey Instrument (Dhivehi)

ގެނައުމުގެ ކަންތައް: ފުރިހަމަ ކުރެވިފައިވާ ސްކޫލް ގެ ނަންބަރ

1. ފަރާތްތަކުގެ ދާއިރާގައި ބަލާ ބަދަލުގައި ހުންނަ ބަދަލު

- ހުންނެވި

- ނުހުންނެވި

2 ވަގު ބަދަލު: ގެނައުމުގެ ކަންތައް ދާއިރާގައި

2. ދަތުރުކުރާ ގަރާޖުގެ ނަންބަ

3. ދަތުރެ

4. ކާންޖެހުމުގެ ނަންބަ

5. ގެނައުމުގެ ނަންބ

6. ގެނައުމުގެ ފަންނަން (ބަދަލުގައި ބަލާ)

7. ގެނައުމުގެ ދުވަހުގެ ކާންދެ ބަލާ ބަދަލުގައި ކާ ބަދަލުގައި ހުންނާނެ؟

8. ގެނައުމުގެ ކާދަށުގެ ބަދަ

9. ގެނައުމުގެ ދަނޑުވެރިކަމުގެ ފަދަ

3 ވަގު ބަދަލު: ގެނައުމުގެ ތިމާގެ ގެނައުމުގެ ދާއިރާ

10. ގެނައުމުގެ ގެއަށް ދާ ދުވަ

11. ގެނައުމުގެ ތިމާގެ ގެއަށް ދާ ދުވ

12. ގެނައުމުގެ ތިމާގެ ގެއަށް ދާ ދުވަ ތިބި ދަނޑުވެރިކަމާ ގުޅުންހ؟

13. ދިވެހި ތިމާގެ ގެ ގެނައުމުގެ ދާއިރާ ގެ ގެ ކުރިން ގެ ގެ ތިމާގެ ގެ ތިބި ގެ ތިމާގެ ގެ ގެނައުމުގެ ދަ
ބަދަލުގައި ގެ؟

- ގެނައުމުގެ ގެ ގެ ގެ

- ގެ ގެ ގެ ތިބި ގެ ތިމާ

14. ؟ކަންތައް ތަފާތު ކުރުމަށް ބޭނުންކުރާ ގޮތް

- ދަރިވަންތަ ބިދޭސީ ދަރިފުޅު

- ތަފާތު

- ގާތްކަމާ ދުރުކަން

- ...ތަފާތު

15. ؟ކަންތައް ހިނގާފައި ހުރި ގޮތް ބަދަލުކުރާ ގޮތް

- ދާދި (ކޮންޓްރޯލް ކުރެވޭ)

- ދުވާ ފުދިގަ (ވަގުތުން ހަލާކު ވާ)

- ތަދިކަން

- ...ތަފާތު

16. ؟ކަންކަމާ ގުޅުންހުރި ގޮތް ބަލާ ފުރަތަމަ

- 1 ފިޔަވަޅު ކަނޑައެޅުން

- 1.1 ފިޔަވަޅު 2 ފިޔަވަޅު ދެމެދު

- 2 ފިޔަވަރުގެ ފުންކޮށް

- ތަދިކަން

- ...ތަފާތު

ތިމާއަށް ބޭނުންވާ ބަހުގެ ވާހަކަ:

17. ފާނަ، ފާތިހު ތަނެއް ހޯދުމަށް ތިބި ދަތުރުތަކުގައި ކަންކަން ކުރެވުނީ ކިހިނެއް؟

- ވާހަކަ

- ކިޔުން

- ތެދުވުން...

18. ތިމާއަށް ކަންތައް ކުރެވުމަށް ކައުންސިލަރ ކަމަށް ވަކާލަތު ދެއްވި (ފުރަތަމަ ފަހަރު ވަކާލަތު ދެއްވި) ފާހަގަ

- ތެދުވެރި ތަފާތުވުން

- ހަޤީގަތް ފާޅުކުރުން

- ފުރިހަމަ ކުރުން

- ތަކުރާރު ކުރުން

- ތެދުވުން...

19. ތިމާއަށް ކަންތައް ކުރުމުގައި ތެދުވެ ހުރި ދަށްދުވަސް ކަންކަން ކިތަންމެ ފަހަރަށް ހަނދާންކުރެވޭ؟

- ވާހަކަ

- ކިޔުން

ދިވެހި، ފުންވެލުމަށް ތަނެއް ތެރެއަށްވުމަށް:

20. ތިމާއަށް ފުރިހަމަ ކުރެވުނު ފުންވެލުމަށް ތަނެއް ތެރެއަށްވުމަށް ކިހާ ވަގުތެއް ދީފައި ހުންނާނެ؟

21. ދ ތެރެއަށްވުމަށް ކިހާ ވަގުތެއް ތިމާއަށް ދެއްވުން ކަށަވަރުކުރުމަށް ކޮންފަދަ ގޮތެއް ބޭނުންކުރާ؟

- ވާހަކަ

- ކިޔުން

22. ތިއުޅުމުގައި ހަނދާންކުރަންޖެހޭ ކަންކަމުގެ ތެރެއިން ކޮބައިތަ ކަށަވަރުކުރަންޖެހޭ ކަންތައް ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟

- ހާއްސަ

- ދާދި

23. ތަރައްގީ ހޯދުމަށް ދަށުންދިނުމަށް ކަންކަން ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟

- ހާއްސަ

- ދާދި

24. ތިމާގެ ވަކި ދަތުރެއްގައި ބޭނުންކުރަންޖެހޭ ގޮތަށް ތަކެތި ހޯދުމަށް ފައިސާ ހުރިތަ ނެތިތަ ބަލާ ބަލަހައްޓަން ބޭނުންވާ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟

- ހާއްސަ

- ދާދި

25. ތިމާގެ ގެއަށް ކުއްލި ދަތުރެއްގައި ދާއިރު ގެ ބަލަހައްޓަން ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟

- ހާއްސަ

- ދާދި

26. ތިމާ ވަންތަކުން ފެތުރެންދެން ތިމާއަށް ހުރިހާ ކަންކަމަށް ބަލަހައްޓަން ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟

- ހާއްސަ

- ދާދި

ހަމަ ހުރިހާ ކަމެއް.

27. ތިމާގެ ކަންކަން ބަލަހައްޓަން ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހާ ހާދަ ތަކެއްތަ؟ (ދާއިރާ ގުޅިގެން ބަދަލުކުރަން)

- ހިނި

- ކަނޑައެޅި ހުންނަ

- ތެރެއަށް...

28. ފުރާނަ ވަޒަ ތިމަންވެދިނީ ކިހާ ދުވަހަށްތޯ؟

- ދެ ދުވަހުގެ

- ތިން ދުވަހުގެ

29. ފުރާނަވަޒަ ވަކި ހާލަތެއްގައި ދިގަ ތިމަންދާ ގޮތް ކިހިނެއްތޯ؟

- ދެ ދުވަހުގެ

- ތިން ދުވަހުގެ

30. ފުރާ ދާދި ވަގުތެއްގައި ދާނެ ގޮތަކީ ކިހިނެއްތޯ؟ (ފުރާ ހިނދު ބަލައިގަނެ ފުރަތަމަ)

- ދަށް (ތެރެއިން ހިނގާ)

- ސައިފް (ތެރެއިންގައި ހިނގާ)

- ތެރެއަށް...

31. ފުރާގައި ތިބާގެ ކާބޯ ދާދި ވަގުތުގައި ދަރަނި ކިހާ؟

4 ވަގަ ތަކެ: ތިއްބެ ގަނޑުގެ ދެކުނު ބަދަ ފަށާ

(ފުރާ ހިނދު ބަލައިގަނެ ފުރަތަމަ)

ތިން ދުވަހުގެ:

32. ހެ ކަލޯގަނޑުގައި ބޭކާ ދާދި ވަގުތެއްގައި ތިމަންދާ ގޮތް ކިހިނެއްތޯ؟

- ވަކި ތިން

- ފަސް ތިން

- ދަށް ގައިގައި ތިން

- ފުރިގަ ޤައުމުގެ ނަން

- ތެރޭގައި...

33. ދިވެހިރާއްޖޭގެ ކަރަންސީ ޔުނިޓުގެ ނަން ކޮބާ ހުންނަނީ؟

- ރުފިޔާ

- ޑޮލަރު

- ދަރަމް

- ރިއާލް

- ފުރިގަ ޤައުމުގެ ނަން

- ތެރޭގައި...

34. ދިވެހިރާއްޖޭގެ ތެރޭގައި ހުންނަ ކަނޑުގެ ނަން ކޮބާ ހުންނަނީ؟

- ރުފިޔާ

- ޑޮލަރު

- ދަރަމް

- ފުރިގަ ޤައުމުގެ ނަން

- ތެރޭގައި...

35. ދިވެހިރާއްޖޭގެ ފަރާތުގައި ކޮބާ ހުންނަނީ؟

- ރުފިޔާ

- ޑޮލަރު

- ދަރަމް

- ފުރިގަ ޤައުމުގެ ނަން

- ތެރެއް...

36. ލިޔުންތެރެއަށް ވަދެވުމަށް ބޭނުންކުރާ ކާޑުގެ ނަން ކޮބާ؟

- ވޯޓުލުން

- ވާދަލުން

- ބައްދަލުވުން

- ފުރިހަމަ ކުރުން

- ތިލަ ކަނޑުން

37. ލިޔުންތެރެއަށް ވަދެވުމަށް ބޭނުންކުރާ ކާޑުގެ ނަން ކޮބާ؟

- ވޯޓުލުން

- ވާދަލުން

- ބައްދަލުވުން

- ފުރިހަމަ ކުރުން

- ތިލަ ކަނޑުން

38. ލިޔުންތެރެއަށް ވާދަލުން ހަދާނީ ކޮބާ؟

- ބައެއް

- ހަމަ

39. ލުން ތިލައިގެ ކަނޑިން ހަރުކުރާ ކަލާ ލުއިގަސް ލުން ކަނޑައެޅުމަށް ބޭނުންކުރާ ތަކެއް ކޮބާ؟

- ބައެއް

- ހަމަ

40. ގެސްޓްހައުސަށް އަންނަ މީހުންނާއި ސްޓާފުންނަށް ފެން އިސްރާފުނުވާނެ އާދަތައް ގެނެސްދިނުމަށް އުސޫލުތަކާއި އިރުޝާދު ދެވިފައިވޭތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

ކަރަންޓު ބޭނުންކުރާގޮތް:

41. މަހެއްގެ މައްޗަށް ކަރަންޓު ބިލަށް އަރަނީ ގާތްގަނޑަކަށް ކިހާވަރެއްތޯ؟

42. މިދިޔަ އަހަރުގެ ކަރަންޓު ބިލުތަކުގެ މައުލޫމާތު ހިއްސާކުރުމަށް ތައްޔާރުވެފައި އޮތްތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

43. މި އިމާރާތުގައި ކަރަންޓު ހަރަދު ކުޑަކުރާ ފަދަ ބޮކި ހަރުކޮށްފައިވޭތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

44. ކަރަންޓު ބޭނުންކުރާ އެޕްލަޔަންސް ފަދަ ތަކެތި ގަތުމުގައި ކަރަންޓު ހަރަދު ކުޑަކުރާ (މިސާލަކަށް، އެނަރޖީ ސްޓާރ ރޭޓިންގ
ހުރި) ތަކެތި ހޮވަން ވިސްނެނީތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

45. ހަކަތަ ބޭނުންކުރާ މިންވަރު ބެލުމަށް، މަދުކުރުމަށްޓަކައި ދެނެގަތުމުގައި ހަކަތަ ޑޮކިއުމެންޓް ކުރާގޮތަށް ސިސްޓަމެއް އަޅުއްވާފައިވޭތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

46. މި އިމާރާތުގައި ބެކަޕް ޖެނަރޭޓަރު ހުރިތޯ؟

- އާއެކެވެ

- ﷺ

47. ﷺ

- ﷺ

- ﷺ

48. ﷺ

- ﷺ

- ﷺ

5 ﷺ

49. ﷺ

6ﷺ

50. ﷺ

- ﷺ

- ﷺ

7ﷺ

51. ﷺ

52. ﷺ

- ﷺ

- ތިބާއަށ ފޮނުވައިފި ހަގީގީ ކަލާމް (ކޮންޓެންޓް، ލިޔުން)

- ހަގީގީ ފޮނުވާ ބަންދުން ދުވަހަށ (ފްލަޓްފޯމްސް ދުވަހަށ)

- ހަގީގީ ފޮނުވައިފި ތިބާއަށ ފޮނުވި ކަލާމް (ކޮންޓެންޓް، ދުވަހަށ)

53. ފަންނުގެފުށުން ތިހާ ކަންބޮޑުވި / ތިމާގެތަކުން ލިބިގަތީ ކޮންކަން ކަންތައްތަކެއް؟ (ހިނގާ: ގޮތުގެކަށ ތަކެއްފުށ)

54. ފަންނުގެފުށުގައި ބޭވާތި ތިމާގަނޑުގައ ކަންބޮޑުވި ވިއަގުތަކުން ދުރުވާ ތަނެއްކަ ތިބެގެންވ؟ (ހިނގާ: ބޮލިވ ކަންބަލައ، ކަންބޮޑުވި ގަނޑުގައ ފ ކަންބ ތިބުނ ލިބުނ)

55. ލިޔުމުގައ ތިމާގެ ފަރާތުގައ ވިއަގުތިބ ލިޔ ބުރ ބަލައ ގުޅުގެންދ ކަންކަ ކ؟ (ތަކެއްގައ)؟

- 5000ގަ ވުރަ ގަނ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ގަ ވުރަ ތިބ

56. ފަންނުގެފުށުގައ ބޭވާތި ކަންބޮޑުވި ލިބުނ ކަންތައްތަކާ ބައިގަނ ތަކެއ؟ (ހިނގާ: ކަންތައ ބަލައ، ބަލައ ގަނ ކ ކަންތ ކ)

57. ފަންނުގެފުށުގައ ލިބުނ ކަންތައްތަކ ގަބޫލުކުރ ގުޅުގެންދ؟ (ތަކެއްގައ)؟

- 5000ގަ ވުރަ ގަނ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ގަ ވުރަ ތިބ

58. ކަންބޮޑުވި ތިމާގެތަކުން ދުރުވ ބަލައ ކަންކ ތަކެއ ކަންބޮޑުވި ތިބ ކަންބޮޑުވ ގުޅުގެންދ ކަންތ ގ؟

- ތ ކ

- ﷺ

8 ﷺ: ﷺ - ﷺ

59. ﷺ (ﷺ: ﷺ)؟

- ﷺ

- ﷺ

9 ﷺ: ﷺ ﷺ

60. ﷺ؟

61. ﷺ؟ (ﷺ)

- ﷺ (ﷺ)

- ﷺ (ﷺ)

- ﷺ (ﷺ)

- ﷺ (ﷺ)

62. ﷺ / ﷺ؟ (ﷺ: ﷺ)

63. ﷺ؟ (ﷺ: ﷺ)

64. ﷺ؟ (ﷺ)؟

- 5000ﷺ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުކުރެ ދަށުގެ ތަކެތި

65. ފާޚަލަކު ތުންފަނޑުގައި ހުންނަ ތަކެތި ތަފާތުވާ ތަނަކަށް ގެންދިއުމަށް ކުރިން ކުރަންވާނީ ކޮބާ؟ (ހަމަ ހުންނަ ތަނުގައި)

66. ފާޚަލަކު ތުންފަނޑުގައި ހުންނަ ތަކެތި ތަފާތު ތަނަކަށް ގެންދިއުމަށް ކުރިން ކުރަންވާނީ ކޮބާ (ތުންފިލި)؟

- 5000ރުކުރެ ދަށުގެ ދަރަޖަ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުކުރެ ދަށުގެ ތަކެތި

67. ތަފާތުވަންނަ ތަކެތި ތަފާތުވާ ގޮތަށް ބަހައްޓާ ކަމުގައި ކަށަވަރުކުރެވޭ ގޮތަކީ ކޮބާ؟

- ފާރުގެ

- ދޮށުގެ

10 ވަނަ ބާބު: ދާނޭ ތަނުގައި - ދާނޭގޮތް ވަކިކުރުން

68. ދާނޭގޮތް ވަކިކުރުމުގައި ތަފާތުވަންނަ ތަކެތި ތަފާތު ތަނަކަށް ގެންދިއުމުގައި ބަލަންޖެހޭ ކަންކަން ކޮބައިތަ؟ ތަފާތު ތަކެތި ތަފާތު ގޮތަކަށް ގެންދިއުން، ކުށްވެރިކުރުމުގައި ބަލަންޖެހޭ ކަންކަން)؟

- ފާރުގެ

- ދޮށުގެ

11 ވަނަ ބާބު: ދާނޭ ތަނުގައި - ދާނޭގޮތް ވަކިކުރުމުގައި ތަފާތު ތަނަކަށް ގެންދިއުމުގައި ތަކެތި ހިފަހައްޓާ ގޮތް

69. ތަފާތުވަންނަ ތަކެތި ތަފާތު ގޮތަށް ހިފަހައްޓާ ގޮތެއް ހުންނަ ކަމަށް ވިސްނާ ހެއްކެއް ކޮބާ؟

70. ޓޫރިސްޓުން ވައިގަދަވެސް ތިރީގައިވާ ދުވަސްވަރުތަކުގެ ތެރެއިން ކޮން ދުވަސްވަރެއްގައޭ؟ (ގިނަ ޖަވާބު ދެވިދާނެ)

- އިރުވައި މޫސުމުގައި (ނޮވެމްބަރުން ފެބްރުއަރީ)

- އިރުވައި މޫސުން ނިމި ހުޅަނގު މޫސުން ފެށުމާއިދެމެދު (އޭޕްރީލް، މޭއި)

- ހުޅަނގު މޫސުމުގައި (ޖޫނުން ސެޕްޓެމްބަރު)

- ހުޅަނގު މޫސުން ނިމި އިރުވައި މޫސުން ފެށުމާއިދެމެދު (އޮކްޓޫބަރު، ނޮވެމްބަރު)

71. ޓޫރިސްޓުން ވައިގަދަވެސް ބިމަ ގެސްޓްހައުސް / އިމާރާތް ބިނާކުރުމާ ކަންކަމަށް ގެއްލުންވެދާނެއޭ؟ (މިސާލު: ފަރުމާކޮށް ވެއް ދިޔުން، ކެތްތެރި ބަލައިން ދިޔުން)

72. ޓޫރިސްޓުން ވައިގަދަވުމުގެ ސަލާމަތް ބިނާކުރާތާގެ ގެސްޓްހައުސް ބިނާކުރާނެ ސަލާމަތް ކޮށްދިނުމަށް ދެވޭނީ؟ (މިސާލު: ގެސްޓްހައުސް ފަރުމާކޮށް ބޭނުން ބިމުން)

73. މިގެސްޓް ދިމާލު ހަރަކާތްތަކުގައި ބިނާކުރާ ބިމުގެ އަގު ތަރައްޤީ ގެސްޓްހައުސް ކަމަށް ވަރަށް ގެއްލުމެއް (ރުފިޔާއިން)؟

- 5000އަށް ވުރެން މަދުން

- 5001 - 10،000

- 10،001 - 15،000

- 15،000އަށް ވުރެއް ގިނައިން

74. ޓޫރިސްޓުން ވައިގަދަވުމުގެ ސަލާމަތް ގެސްޓްހައުސްއަކަށް ވީހާ ގެއްލުންވެދާނެ ކުރިމަތިވާ ހަރަދުތައް؟ (މިސާލު: ހަރުކާތުތަކަށް މަރާމާތުކުރުން)

75. ޓޫރިސްޓުން ވައިގަދަވުމުގެ ވީހާ ގެއްލުންވާނެ ކަރަދުގެ ދޮރުގަނޑު ގޮތުގައި ހޭދަކުރާ ހަރަދުކުރާނީ (ރުފިޔާއިން)؟

- 5000އަށް ވުރެން މަދުން

- 5001 - 10،000

- 10،001 - 15،000

- 15،000އަށް ވުރެއް ގިނައިން

76. ގެސްޓްހައުސަށް އިމާރާތްކޮށްފައިވާ ގޮތަށް ބަދަލުތަކެއް ގެނެސްގެން މިއަސަރު ގެސްޓްހައުސަށް ކުރާވަރު ކުޑަކުރެވިދާނެކަމަށް ގަބޫލު ކުރަންތޯ؟

- އާއެކެވެ
- ނޫނެކެވެ

12 ވަނަ ބައި: މޫސުމީ ގެއްލުން – އުދައެރުން

77. އުދައެރުމުގެ ސަބަބުން ތިޔަ ގެސްޓްހައުސްގެ އިމާރާތަށް ނުރައްކާ އަސަރެއް ކޮށް ނުވަތަ ގެއްލުމެއް ލިބިފައިވޭތޯ (މިސާލު: ފަރުނީޗަރ ހަލާކުވެ، ފޫޅުހުން)؟

- އާއެކެވެ
- ނޫނެކެވެ

13 ވަނަ ބައި: މޫސުމީ ގެއްލުން - އުދައެރުމުގެ ސަބަބުން ލިބޭ ގެއްލުންތަކަށް އަދި މިކަމާމެދު އެކި ފިޔަވަޅުތަކެއް

78. ގެސްޓްހައުސް އޮޕަރޭޝަން ފެށިއްސުރެ، މިފަދަ ހާދިސާއެއް ދިމާވި ގޮތްގަނޑެކަން ކިތައް ފަހަރު ތޯ؟

79. އުދައަރަނީ ތިރީގައިވާ ދުވަސްވަރުތަކުގެ ތެރެއިން ކޮންދުވަސްވަރެއްގަތޯ؟ (ގެސް ހަދާ ޖަވާބެއްގައި ފުރަގަލާ)

- އިރުވައިމޫސުމުގައި (ނޮވެމްބަރުން ފެށިގެން މާރިޗު)
- އިރުވައި މޫސުމުނިމި ހުޅަނގު މޫސުން ފެށުމާއިދެމެދު (އޭޕްރީލް، މެއި)
- ހުޅަނގު މޫސުމުގައި (ޖޫންފެށިގެން ނޮވެމްބަރު)
- ހުޅަނގު މޫސުމުނިމި އިރުވައި މޫސުން ފެށުމާއިދެމެދު (އޮކްޓޯބަރ، ނޮވެމްބަރ)

80. އުދައަރައިގެން ތިޔަ ގެސްޓްހައުސް / އިމާރާތަށް ލިބިފައިވަނީ ކޮންކަހަލަ ގެއްލުންތަކެއް؟ (މިސާލު: ފަރުނީޗަރ ހަލާކުވެ، ފޫޅުހުން)

81. އުދައެރުމުގެ ސަބަބުން ތިޔަފަރާތުގެ ގެސްޓްހައުސް ވިޔަފާރިއަށްނޭދެވޭ އަސަރުކޮށްފައިވޭތޯ؟ (މިސާލު: ބުކިންގް ކެންސަލްކުރުން، ގެސްޓުން ފާޑުކިޔުން ލިބުން)

82. މިގޮތަށް ދިމާވި ހާދިސާއެއްގައި ވިޔަފާރިއިން ލިބޭ އާމްދަނީއަށް ގޮތްގަނޑެކަން ކިހާ ވަރެއްގެ ގެއްލުމެއްތޯ (ރުފިޔާއިން)؟

- 5000ރުپަށް ދުނުން ހަދާ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުපයා ދުއްވާ ތަނެއް

83. ތިޔަބައިމީހަކު ގެއަށް ކުލީ ކުރުމަށް ގެދޮށް ކަނޑައެޅުމުގައި ކޮބައިކަމެއް ބަލަންވާނީ؟ (ހަމައެކަނި ތިރީގައިވާ)

84. ތިޔަބައިމީހާ ގެދޮށް ކަނޑައެޅުމަށް ތަކެތި ގަނެގެންދާ ދުވަހު ކަރަންޓް ބިލް ދައްކަންވީ ކިހާ ދުވަހުގެ (ދުވަށްތަކެއް)؟

- 5000ރުپަށް ދުނުން ހަދާ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުපයා ދުއްވާ ތަނެއް

85. ކުޑަކުދިންނަށް ތަރުބިޔަތުދޭ ގޮތުން ބައްދަލުކުރާ ކަންތައްތަކުގައި ކިތަންމެ ކުޑަ ކުދިންނަށް ކަންތައް ކުރުމަށް ދަސްކޮށްދީ ހުރިހާ ކަންތައްތަކުގައި ވެސް ކުޑަ ކުދިންނަށް ކަންތައް ކުރުމަށް ދަސްކޮށްދީ ހުރި ގޮތް ކިހިނެއް؟

- ހައިސްކޫލް

- ސެކަންޑަރީ

14 ވަނަ ބަޔަ: ދާދި ކުރިން - ތަރުބިޔަތު

86. ތަރުބިޔަތުގެ ބޭނުން ކުޑަކުދިންނަށް ތަރުބިޔަތު ދިނުމުގައި ކަނޑައެޅިފައި ހުންނަ ގޮތް ކިހިނެއް؟

- ހައިސްކޫލް

- ސެކަންޑަރީ

15 ފަސް ތާރީ: ތަންކުރުގެ ހާލަތުގައި ތިބި ފަރާތްތަކުން ދައްކަންޖެހޭ ބަދަލު ދައްކާ ތާރީޚް

87. ކުޑަކުދިންނަށް ދަރުހެއްދުމުގައި ތަކުރާރުވާ، ދެފަރާ ހިނގާފައިވާ ހާދިސާ ކިތަންމެ ގާތަށް ހިނގާ ހެއްޔެ؟

88. ތަންކުރުމަށް ތިމާގެ ފަރާތުގެ ފަރާތުވެރިކަމުގައި ތިބި ފަރާތްތަކުގެ ނަންތައް ލިޔުއްވާ؟ (ކުރިން ހިނގި ދަށްދެއްކުން ފާސްކުރާ)

- ތިމާގެ ވިއްކާ ބަދަލު (ދަށްދެއްކުން ކުރިއަށް ގެންދާ)

- ތިމާގެ ވިކުމުގެ ހަމަވުމުގައި ވިއްކާ ބަދަލު (ބެންކް، ފަދ)

- ހަގީގީ ވިކުންތެރިއަށް ދަށްދެއްކުން (ދަށްދެއްކުން ކުރިއަށް ގެންދާ)

- ހަގީގީ ވިކުންތެރިއަށް ތިމާގެ ވިއްކާ ބަދަލު (ބެންކް، ދަށްދެއްކުން)

89. ތަންކުރުމުގެ ތެރެ ކުޑަކުދިންނާ / ތިމާގެއަށް ލިބިގެންވާ ކުދިންގެ ކަންތައް ދައްކަންޖެހޭނެ؟ (ލިޔުން: ފަރިއްކަތް ހަދާފައި)

90. ތަންކުރުގެ ހާލަތުގައި ތިމާގެއަށް ކުޑަކުދިން ތިމާގެއާ ދުރުގައި ހުންނަ ވަގުތު ކުދިންނާ ގުޅުން ހުރި ގޮތް ބަޔާން ކުރުން)

91. ދިރާސާތަށް ބިދޭސީ ތިމާގެ ވިއްކާ ބަދަލު ދައްކަންޖެހޭ ގޮތް ބަލައިގަންނަ ގޮތަކަށް ކަނޑައަޅާ ފައިސާ (ކުރިން ދައްކާ)؟

- 5000ރ. ގެ ދަށުން

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރ. ގެ ތެރެއިން

92. ތަންކުރުގެ ހާލަތުގައި ކުޑަކުދިންގެ ކުރިން ތަންކުރުމަށް ބޭނުންކުރި ތަކެތި ލިޔުއްވާ؟ (ލިޔުން: ބޯހާ ފަދަ)

93. ތަންކުރުމުގެ ކުރިން ތަންކުރުމަށް ތަކެތި ގަނެގަތުމަށް ފަރާތްތަކަށް ދައްކާ ފައިސާ (ކުރިން ދައްކާ)؟

- 5000ރ. ގެ ދަށުން

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރ. ގެ ތެރެއިން

94. ގެސްޓްހައުސަށް އިމާރާތްކޮށްފައިވާ ގޮތަށް ބަލަހައްޓާއިރު ގެނެސްގެން މިއަސަރު ގެސްޓްހައުސަކީ ކުރާވަރު ކުޑަކުރުވިދާނުކަމަށް ގަބޫލު ކުރަންތޯ؟

- އާއެކޭ

- ނޫނެކޭ

16 ވަނަ ބައި: މޫސުމީ ގޮތުން - ވާރޭނުވެހި ދިގުދުވަސްވުން

95. ވާރޭނުވެހިދިގުދުވަސްވުމުގެ ސަބަބުން ތިޔަ ގެސްޓްހައުސްގެ އިމާރާތަށް ނުރައްކާ އަސަރެއް ކުރި ނުވަތަ ގެއްލުމެއް ލިބިފައިވޭތޯ (މިސާލު: ފެންލިބުން ދަތިވުން، ފެން ޚަރަދުވުން)؟

- އާއެކޭ

- ނޫނެކޭ

17 ވަނަ ބައި: ވާރޭނުވެހިދިގުދުވަސްވުމުގެ ސަބަބުން ލިބުނު ގެއްލުންތައް އަދި މިކަމާމެދު އެޅި ފިޔަވަޅުތައް

96. ގެސްޓްހައުސް ޓޫރިސްޓުން ފިއްލާފައިވާ، މިފަދަ ހާލަތްތައް ދިމާވާ ގޮތަކަށް ހިނގާފައި ކިތައް ފަހަރު ތޯ؟

97. ވާރޭނުވެހި ދިގުދުވަސްވުމަކީ ތިޔަ ގެސްޓްހައުސްގެ ކަންތައްތަކަށް ކޮންވަރަކަށް އަސަރުކުރާ ކަމެއްތޯ؟ (އެއް ހޮރަ ޖަވާބެއްގައި ފާހަގަ)

- އިތުރަށްމޫސުމުގައި (ނޯވެމްބަރުން ފެބްރުއަރީ މަހާ)

- އިރުވައި މޫސުންނިމި ހުޅަނގު މޫސުން ފެށުމާއި ދެމެދު (އޭޕްރިލް، މެއި)

- ހުޅަނގު މޫސުމުގައި (ޖޫންމަހުން ނޮވެމްބަރު)

- ހުޅަނގު މޫސުންނިމި އިރުވައި މޫސުން ފެށުމާއި ދެމެދު (އޮކްޓޫބަރު، ނޮވެމްބަރު)

98. ވާރޭނުވެހި ދިގުދުވަސްވުމުން ތިޔަ ގެސްޓްހައުސަށް ލިބިފައިވާ ކަންކަމަށް ގެއްލުންތަކެއް؟ (މިސާލު: ފެންލިބުން ދަތިވުން)

99. ވާރޭނުވެހި ދިގުދުވަސްވުމުގެ ސަބަބުން ތިޔަ ގެސްޓްހައުސްގެ ވިޔަފާރިއަށް ނުރައްކާ އަސަރުކޮށްފައިވޭތޯ؟ (މިސާލު: ގެސްޓުން ފަރާތުން ކުށް ދެވޭ ލިބުން)

100. ދިވެހިންގެ ދިރާސާއިމަދު ވިއަފާރިއިން ލިބޭ ގައުމީ ބަޖެޓުގެ ފުރިހަމަ ފައިސާ (ތަފާތުން)؟

- 5000ރުފިޔާ ވުރެ ދަށް

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުފިޔާ ވުރެ ގިނަ

101. ފާޚާނާއިރު ހިއްދެވުމުގެ ކުރިން ކައްކާ ތަށި ހިނގާ ގޮތް ބަލައިގަންނަ ގޮތް ދައްކާ ބަޔަކު ތިބެއްޖެ؟ (ހުސްވާ ތަން ތިލަދުންމަތީ ދަންނަވާ)

102. ފާޚާނާއިރު ހިއްދެވުމުގެ ކުރިން ކައްކާ ތަށި ހިނގާ ގޮތް ބަލައިގަންނަ ފަދަ ފާހަގަ ކުރެވޭ ގޮތެއް ތިބެއްޖެ؟ (ތަފާތުން)؟

- 5000ރުފިޔާ ވުރެ ދަށް

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ރުފިޔާ ވުރެ ގިނަ

103. ކައްކާ ތަށި ހިނގާ ގޮތް ބަލައިގަންނަ ފަދަ ފާހަގަ ކުރެވޭ ގޮތެއް ތިބެއްޖެ؟

- ހާއްސާ

- ނެތްކަށެވެ

18 ވަނަ ބާބު: ތިމާވެށި ފެންވަރު ކައްކާ ތަށި

104. ފިއްސާ ތިމާވެށި ފެންވަރު ކައްކާ ތަށި ހިނގާ ގޮތް ބަލައިގަންނަ ތިއްބެވި ތިމާވެށި ކައްކާ ތަށި ކަނޑައެޅިފައި ހުންނަ ގޮތް ދައްކާ ބަޔަކު ތިބެއްޖެ؟

- އާއިލާގެ

- ނޫނުލާގެ

19 ވަނަ ބައި: އިތުރު މޫސުމީ ނުރައްކަލެއް ސަރަހައްދުން ލިބުނު ގެއްލުންތައް އަދި މިކަމާމެދު އެކި ޚިޔާލުތަކެއް

105. ގެސްޓްހައުސް އޮޕަރޭޝަން ފެށިއްސުރެ، މިފަދަ ހާދިސާއެއް ދިމާވީ ގޮތުގަނޑެއްކަން ކިތައް ފަހަރު ތޯ؟

106. އެއީ ކޮންކަހަލަ ނުރައްކަލެއްތޯ؟

107. މިކަންހިގަނީ ތިރީގައިވާ ދުވަސްވަރުތަކުގެ ތެރެއިންކޮންދުވަސްވަރެއްގަތޯ؟ (ގެޔޫ ހުރިހާ ޖަވާބެއްގައި ފާހަގަލާ)

- އިރުވައިމޫސުމުގައި (ނޮވެމްބަރުން ފެށިގެން މާރޗް)

- އިރުވައި މޫސުންނިމި ހުޅަނގު މޫސުން ފެށުމާއިދެމެދު (އޭޕްރީލް، މެއި)

- ހުޅަނގު މޫސުމުގައި (ޖޫންފެށިގެން ނޮވެމްބަރު)

- ހުޅަނގު މޫސުންނިމި އިރުވައި މޫސުން ފެށުމާއިދެމެދު (އޮކްޓޫބަރު، ނޮވެމްބަރު)

108. މިކަމުން ތިޔަ ގެސްޓްހައުސް / އިމާރާތަށް ލިބިފައިވާ ކޮންކަހަލަ ގެއްލުންތަކެއް؟ (މިސާލު: ފަރުނީޗަރު ހަލާކުވެ، ފެންޖެހުން)

109. މިކަމު ސަރަހައްދުން ތިޔަފަރާތުގެ ގެސްޓްހައުސް ވިޔަފާރިއަށްޓަކައި އަސަރުކޮށްފައިވޭތޯ؟ (މިސާލު: ގެސްޓުން ފަހަރުގެން ކޯސް ބަދަލު ކުރުން)

110. މިގޮތަށް ދިމާވި ހާދިސާއެއްގައި ތިޔަފަރާތުން ލިބޭ އާމްދަނީއަށް ގޮތުގަނޑަކަށް ކިހާވަރެއްގެ ގެއްލުމެއް ލިބޭ (ރުފިޔާއިން)؟

- 5000އަށް ވުރެން މަދުން

- 5001 - 10،000

- 10،001 - 15،000

- 15،000އަށް ވުރެއް ގިނައިން

111. މިކަމުގެ ސަރަހައްދުން ގެސްޓްހައުސްއަށް ލިބުނު ގެއްލުންތަކާއި ކުރިމަތިވީ ކިހިނެއްތޯ؟ (މިސާލު: ބަސްތޮޅުމުން)

112. މިކަމުން ލިބުނު ގެއްލުންތަކުން އަރައިގަތުމަށް ގޮތުގަނޑެއްކަން ކިހާވަރެއް ހަރަދުކުރެވިފައިވޭ (ރުފިޔާއިން)؟

- 5000ދަށް ވުރެން ގަދަ

- 5001 - 10،000

- 10،001 - 15،000

- 15،000ދަށް ވުރެ ގިނަ

113. ޒުވާނުންގެ ތަރައްގީއަށް ދާދި ބޮޑު ހަގުކަމެއް ކުރެވޭ ކަމަށް ބަލަނީ ކިހާ ގިނަ ޒުވާނުންނަށް ކަމުގައި ވާނެ ކަމަށް ތިޔަ ހީވާ؟

- ދެއްކެވުން

- ދެއްކެވުން

20 ވަނަ ތާރީ: ފާސްކުރެވުނު ކުއްލި ގާނޫނުތަކުގެ ގޮތުގައި ކަންތައް ކުރެވުން

114. ފިޔަވަޅުއަޅައި ތިބެގެންވާ ފާސްކުރެވުނު ގާނޫނުތަކުގެ ތެރެއިން ކޮބައިތަކަށް ތިޔަ ގަބޫލުކުރަނީ ކީއްވެގެންތޯ؟

- ދެއްކެވުން

- ދެއްކެވުން

115. ފަރާތްތަކުގެ ކަންތައް ކުރުމުގައި ތަކުރުބާ، ފާސްކުރެވުނު ގާނޫނުތަކުގެ ތެރެއިން ކޮބައިތަކަށް ތިޔަ ގަބޫލުކުރަނީ ކީއްވެގެންތޯ؟

- ދެއްކެވުން

- ދެއްކެވުން

116. ފަރާތްތަކުގެ ކަންތައް ކުރުމުގައި ތަކުރުބާ، ފާސްކުރެވުނު ގާނޫނުތަކުގެ ކަންތައްތަކަށް ތިޔަ ގަބޫލު ކަށަވަރު ކުރެވޭ ކަމަށް ތިޔަ ހީވާ؟

- ދެއްކެވުން

- ނޫނެކެވެ

117. ގެސްޓްހައުސް ޓޫރިޒަމް ކުރަމުން ދިޔަ އިރު، ދުސްތޫރީ ނިޒާމަށް ބަދަލުވުމުގެ ކުރިން ދިވެހިރާއްޖޭގެ ރައީސް ކަމުގައި ތިއްބެވީ ކޮން ބޭފުޅެއް ތޯ؟

- ނޫރުދަން

- އަމީން އިބް މަރިޔާމް

- އިސްކަންދަރު

- އާދީ ނުވަތަ ގޮތް ބަޔާންކޮށް ފައިވާން

118. ގެސްޓްހައުސް ޓޫރިޒަމް ކުރަމުން ދާއިރު، ދުސްތޫރީ ބަދަލުކުރުމާއި އެކަށީގެންވާ ގޮތަށް ޓޫރިޒަމް ކުރިއަށްދާ ދާއިރާ ހިމެނޭތޯ؟

119. ދުސްތޫރީ ނިޒާމަށް ބަދަލުވުން ދިމާވެދާން ގެއްލުމަކާނ ބައެއްގެ ފައިދާތަކުން އެއްވެސް ޓޫރިޒަމްގެ ތަ ގެސްޓްހައުސް ޓޫރިޒަމްގައި ހިމަނާފައިވާނެތޯ؟

- އާއެކެވެ

- ނޫނެކެވެ

21 ވަނަ ބައި: ދުސްތޫރީ ނިޒާމަކަށް އެކި ޓޫރިޒަމް

120. ދުސްތޫރީ ނިޒާމަކަށް ބައެއްގެ ގޮތުގައި ކޮންކަހަލަ ޓޫރިޒަމް ޓޫރިޒަމްގެއްލުމެއްތޯ؟

22 ވަނަ ބައި: ޓޫރިޒަމްގެ ސަބަބު

121. ދުސްތޫރީ ނިޒާމަކަށް ބައެއްގެ ޓޫރިޒަމްގައި ޓޫރިޒަމްގެ ދިރިއުޅުމަށް ކުރާ ފޯރުކޮށްދިނީތޯ؟

23 ވަނަ ބަދަލު: ދާއިރާ ތެރެއިން ތިލަދުންމަތީ ގެއަށް ހިނގާ ދުވަސް ހާސިލުކުރުން

122. ފިލްމް ހެދުމަށް ބަލައި ހިންގާ ތަކެއްޗަށް ސަލާމް ދެއްކުން؟

- ހާއްސަ

- ތިން ހަތަރު

24 ވަނަ ބަދަލު: ހިންގާ ތަކެއްޗާ ގުޅިގެން

123. ކޮންމެ ފަރާތަކުން ހިންގާ ތަކެއްޗަށް ސަލާމް ދެއްކުން؟

124. ފި ހިންގާ ތަކެއްޗާ ދާއިރާ ތެރެއިން ހަދާ ތަކެއްޗަށް ހުށަހެޅުން؟

- ހާއްސަ

- ތިން ހަތަރު

125. ތިރީ ފުރަތަމަ ދާއިރާ ކެމެރާ ހިންގާ ދުވަސް ތަކަށް ބަލައި ހިންގާ ތަކެއްޗަށް ސަލާމް ދެއްކުން؟

- ހާއްސަ

- ތިން ހަތަރު

25 ވަނަ ބަދަލު: ބަލައިގެންނާ

126. ފި ހަދާ ތަކެއްޗަށް ތިރީ ފުރުމަށް ވަކި ވަގުތެއް ކަނޑައެޅިފައި ހުންނާނެ ކަމަށް ދަންނަ ބަދަލު ދެއްވާ. ތިތަކާ ގުޅިގެން ދަންނަ ކަންތައް ބުނާ؟

Appendix D: Correlation analysis of climate risks with distance from shoreline

Correlation for: guesthouses impacted by given climate risks.

Climate risk	Pearson Correlation	p-value
Extreme heat	0.036	0.707
Flooding from rain	-0.101	0.288
Stormy Weather	0.028	0.773
Swell Surges	0.115	0.228
Erosion	-0.055	0.563
Drought	0.145	0.128

Correlation with number of incidences for given climate risk.

Climate risk	Pearson Correlation	p-value
Extreme heat	0.032	0.849
Flooding from rain	-0.406	0.133
Stormy Weather	-0.322	0.155
Swell Surges	-0.13	0.835
Erosion	-0.336	0.461
Drought	-0.167	0.406