

# Motivations for Voluntary Migration to Hulhumalé in the Context of Climate Change

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**NEW!**

**Paper:**

# **Motivations for Voluntary Migration to Hulhumalé in the Context of Climate Change**

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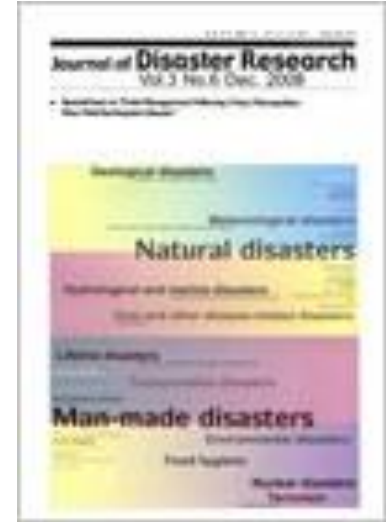
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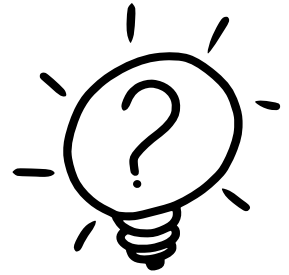
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# Background

- The Maldives is one of the four atoll countries, [at higher risk of climate change such as sea level rise](#), with an average elevation of 1.5 meters above sea level.
- In 1997, the Maldivian government decided to construct [an artificial island Hulhumalé](#) to address severe congestion in Malé, and taking into account the projected SLR, it was reclaimed to 2 meters above sea level.
- According to the 2022 census in the Maldives, [the population growth in Hulhumalé was one of the highest in the country](#), at 17%, mainly because of the social housing provided by the government.

# Objectives

The objective of this study was to **examine the perceptions and expectations of Hulhumalé by residents in atolls outside the Greater Malé region** by including survey questions on various aspects of life satisfaction, including access to education, health services, employment opportunities, and a good environment. To **compare (a) the evaluations of Hulhumalé by the residents of Hulhumalé who had already migrated to Hulhumalé from outside Malé with (b) the expectations of livelihoods in Hulhumalé of those living outside Malé and Hulhumalé.**



# Methodology

- **Research Location and Number of Samples:**

The four atolls where MNU campuses are located,  
Kulhudhufushi (population: 10,541 in 2022)

Gan (2,809 in 2014)

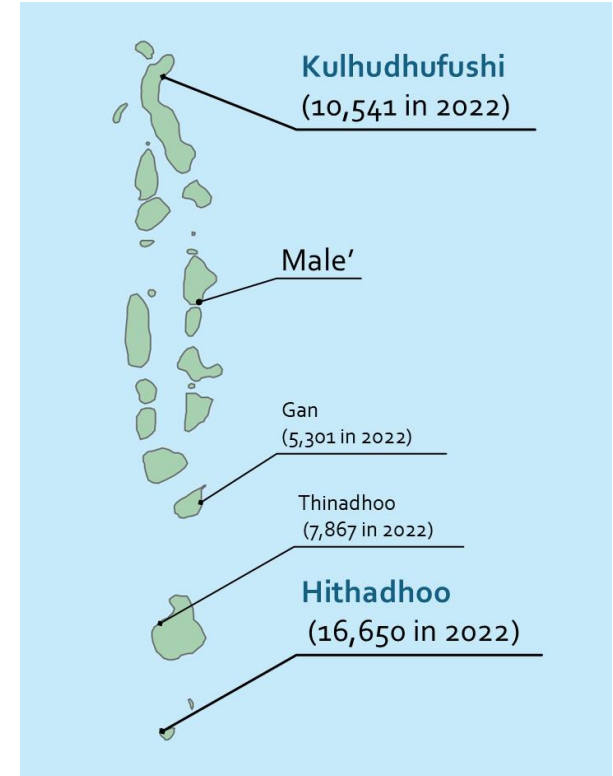
Hithadhoo (16,650 in 2022)

Thinadhoo (7,867 in 2022)

The number of samples in each region was  
allocated according to population. The number of  
responses were 398 in total.

- **Implementation of the Questionnaire Survey:**

December 2023-January 2023



# Methodology

- MNU conducted the survey in person by enumerators.
- R was used as the statistical software for the analysis. The “dfSummary” function in R’s summary tools package was used to develop tables.
- The Wilcoxon-Mann-Whitney test was used to determine whether the differences between the two groups presented in the paper were statistically significant. R’s “wilcox.test” function was used.







- Contents of the Questionnaire

**Questions 1 to 7** relate to the attributes of the respondents.

**Questions 8, 9, and 10**, related specifically to the perceived impacts of climate change.

**Questions 11–40** asked respondents about their perceptions of Hulhumalé and what their lives would be like there if they migrated to this location. *Opportunities for high-paying jobs? Quality of higher education? Good neighbourly relations, etc.*

**Question 41** concerned the respondents' desires and intentions to migrate to Hulhumalé.

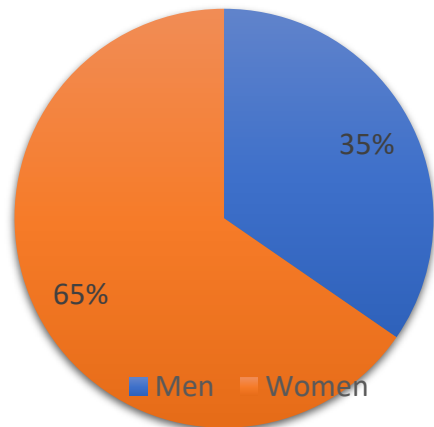
We asked the respondents to rate these questions (given as statements) on a Likert scale. They were asked to select one of the following options: “Strongly agree” (5 points), “Agree” (4 points), “Neutral or Neither Agree nor Disagree” (3 points), “Disagree” (2 points) and “Strongly disagree” (1 points).



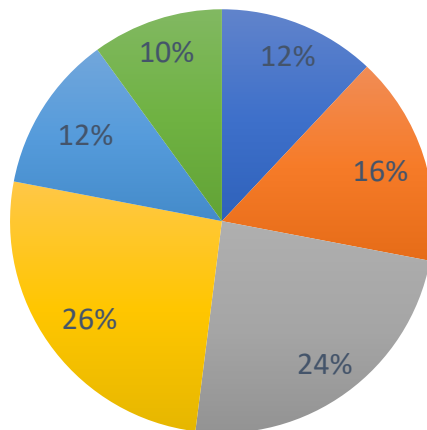
# Attributes of respondents



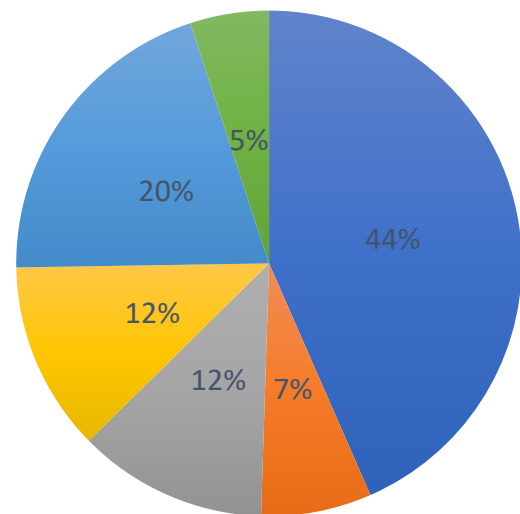
## Gender



## Age



## Education



■ 18-19 yrs old    ■ 20-29 yrs old    ■ 30-39 yrs old  
■ 40-49 yrs old    ■ 50-59 yrs old    ■ 60 yrs and above

■ O level  
■ A level  
■ academic/vocational certificate/diploma  
■ first degree and above  
■ Other

# Highly rated aspects

**x14 Wide choice of dining shopping etc.**



**x17 Many sports facilities and parks.**

x14 [integer]	<div>Mean (sd) : 4.2 (1.1)</div> <div>min ≤ med ≤ max: 1 ≤ 5 ≤ 5</div> <div>IQR (CV) : 1 (0.3)</div>	1 : 19 ( 4.8%) 2 : 14 ( 3.5%) 3 : 38 ( 9.6%) 4 : 111 (28.0%) 5 : 215 (54.2%)		397 (99.7%)	1 (0.3%)
x17 [integer]	<div>Mean (sd) : 4.2 (1.1)</div> <div>min ≤ med ≤ max: 1 ≤ 5 ≤ 5</div> <div>IQR (CV) : 1 (0.3)</div>	1 : 19 ( 4.8%) 2 : 12 ( 3.0%) 3 : 53 (13.4%) 4 : 111 (28.0%) 5 : 202 (50.9%)		397 (99.7%)	1 (0.3%)

# Low rated aspects

**x13 Cost of living is low.**

**x18 Rent or house acquisition cost is low.**

<p>x13 [integer]</p>	<p>Mean (sd) : 1.9 (1.3) min ≤ med ≤ max: 1 ≤ 1 ≤ 5 IQR (CV) : 2 (0.7)</p>	<p>1 : 226 ( 56.9%) 2 : 70 ( 17.6%) 3 : 38 ( 9.6%) 4 : 24 ( 6.0%) 5 : 39 ( 9.8%)</p>		<p>397 (99.7%)</p>	<p>1 (0.3%)</p>
<p>x18 [integer]</p>	<p>Mean (sd) : 2 (1.3) min ≤ med ≤ max: 1 ≤ 1 ≤ 5 IQR (CV) : 2 (0.7)</p>	<p>1 : 209 ( 52.6%) 2 : 79 ( 19.9%) 3 : 51 ( 12.8%) 4 : 21 ( 5.3%) 5 : 37 ( 9.3%)</p>		<p>397 (99.7%)</p>	<p>1 (0.3%)</p>

## Aspects related to education

## x20 Quality of primary education.

## x21 Quality of higher education.

x20 [integer]	<div>Mean (sd) : 4.1 (1.1)</div> <div>min ≤ med ≤ max: 1 ≤ 4 ≤ 5</div> <div>IQR (CV) : 2 (0.3)</div>	1: 21 ( 5.3%) 2: 9 ( 2.3%) 3: 76 ( 19.1%) 4: 105 (26.4%) 5: 187 ( 47.0%)		398 (100.0%)	0 (0.0%)
x21 [integer]	<div>Mean (sd) : 4.1 (1.1)</div> <div>min ≤ med ≤ max: 1 ≤ 5 ≤ 5</div> <div>IQR (CV) : 2 (0.3)</div>	1: 19 ( 4.8%) 2: 13 ( 3.3%) 3: 83 (20.9%) 4: 83 (20.9%) 5: 199 ( 50.1%)		397 (99.7%)	1 (0.3%)

# Aspects related to medical care

**x15** The large number of hospitals makes it easy for people to access medical care when they fall ill.

**x16** A high level of medical care is available (e.g., for serious illnesses such as cancer).

x15 [integer]	<div>Mean (sd) : 3.9 (1.2)</div> <div>min ≤ med ≤ max: 1 ≤ 4 ≤ 5</div> <div>IQR (CV) : 2 (0.3)</div>	1 : 27 ( 6.8%) 2 : 28 ( 7.0%) 3 : 57 (14.3%) 4 : 113 (28.4%) 5 : 173 (43.5%)		398 (100.0%)	0 (0.0%)
x16 [integer]	<div>Mean (sd) : 3.9 (1.3)</div> <div>min ≤ med ≤ max: 1 ≤ 4 ≤ 5</div> <div>IQR (CV) : 2 (0.3)</div>	1 : 30 ( 7.5%) 2 : 31 ( 7.8%) 3 : 66 (16.6%) 4 : 94 (23.6%) 5 : 177 (44.5%)		398 (100.0%)	0 (0.0%)

# Aspects related to neighborhood and culture

**x26 Good neighbourly relations.**

**x27 Great effort to preserve local and traditional culture.**

<p>x26</p> <p>[integer]</p>	<p>Mean (sd) : 3.2 (1.3)</p> <p>min ≤ med ≤ max:</p> <p>1 ≤ 3 ≤ 5</p> <p>IQR (CV) : 2 (0.4)</p>	<p>1: 55 ( 13.9%)</p> <p>2: 68 ( 17.1%)</p> <p>3: 104 (26.2%)</p> <p>4: 76 ( 19.1%)</p> <p>5: 94 (23.7%)</p>		<p>397</p> <p>(99.7%)</p>	<p>1</p> <p>(0.3%)</p>
<p>x27</p> <p>[integer]</p>	<p>Mean (sd) : 2.8 (1.4)</p> <p>min ≤ med ≤ max:</p> <p>1 ≤ 3 ≤ 5</p> <p>IQR (CV) : 2 (0.5)</p>	<p>1: 99 (24.9%)</p> <p>2: 80 (20.2%)</p> <p>3: 78 (19.6%)</p> <p>4: 69 (17.4%)</p> <p>5: 71 (17.9%)</p>		<p>397</p> <p>(99.7%)</p>	<p>1</p> <p>(0.3%)</p>



# Aspects related to disaster and climate change

**x31 Resilient to natural disasters.**

**x32 Safe against sea level rise due to climate change.**

<p>x31 [integer]</p>	<p>Mean (sd) : 2.8 (1.4)</p> <p>min ≤ med ≤ max: 1 ≤ 3 ≤ 5</p> <p>IQR (CV) : 3 (0.5)</p>	<p>1 : 107 ( 27.0%)</p> <p>2 : 50 ( 12.6%)</p> <p>3 : 120 ( 30.2%)</p> <p>4 : 54 ( 13.6%)</p> <p>5 : 66 ( 16.6%)</p>		<p>397 (99.7%)</p>	<p>1 (0.3%)</p>
<p>x32 [integer]</p>	<p>Mean (sd) : 2.7 (1.4)</p> <p>min ≤ med ≤ max: 1 ≤ 3 ≤ 5</p> <p>IQR (CV) : 3 (0.5)</p>	<p>1 : 115 ( 29.0%)</p> <p>2 : 48 ( 12.1%)</p> <p>3 : 123 ( 31.1%)</p> <p>4 : 51 ( 12.9%)</p> <p>5 : 59 ( 14.9%)</p>		<p>396 (99.5%)</p>	<p>2 (0.5%)</p>

# What are the impacts of sea level rise that you observe in your environment?

## 1. Salinization of ground water

Area	Yes (%)		No (%)	
Hithadhoo	42	26.1%	119	73.9%
Kulhudhuffushi	8	6.7%	112	93.3%

## 2. Unusually high surge waves caused by strong winds

Area	Yes (%)		No (%)	
Hithadhoo	48	29.8%	113	70.2%
Kulhudhuffushi	4	3.3%	116	96.7%

### **3. King tides and floods**

<b>Area</b>	<b>Yes (%)</b>		<b>No (%)</b>	
<b>Hithadhoo</b>	<b>46</b>	<b>28.6%</b>	<b>115</b>	<b>71.4%</b>
<b>Kulhudhuffushi</b>	<b>6</b>	<b>5.0%</b>	<b>114</b>	<b>95.0%</b>

### **4. Beach and coastal erosion**

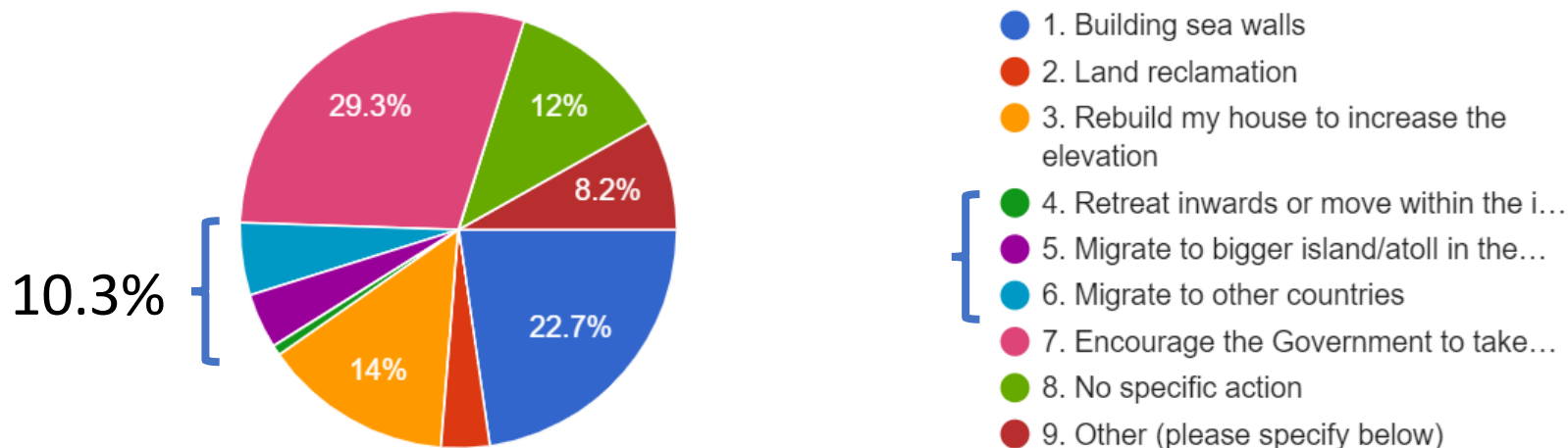
<b>Area</b>	<b>Yes (%)</b>		<b>No (%)</b>	
<b>Hithadhoo</b>	<b>104</b>	<b>64.6%</b>	<b>57</b>	<b>35.4%</b>
<b>Kulhudhuffushi</b>	<b>23</b>	<b>19.2%</b>	<b>97</b>	<b>80.8%</b>

# Intention to Migrate

10 What do you think is the best way to avoid your personal risk of sea level rise?

(Single answer)

392 件の回答



# Discussions

- Comparing the study by Sasaki et al. (2022), the expectations and perceptions of residents in areas outside the GMR and the level of actual life satisfaction of the people already residing in Hulhumalé seem to match in most respects. However, overall expectations were generally rated higher than the real-life assessments by residents in Hulhumalé. Some stark gaps were observed in some respects, such as high expectations regarding “opportunities for high-paying jobs” (mean score: 4.0) against the least appreciated aspects of life in Hulhumalé (mean score: 2.4)
- Although the expectations of the environment being “without air and water pollution” was neutral (mean score: 3.2), the environment of Hulhumalé was generally valued for its natural beauty and air and water quality (mean score: 3.5), which is a merit for the residents, to be appreciated and enhanced.
- Expectations of utility services, well-connected transportation, and good quality administrative services, were relatively high, and the evaluations were also high. The expectations of “sports facilities and parks” were high, which was also one of the highly appreciated aspects of Hulhumalé (mean score: 3.4)
- Despite the urban lifestyle in Hulhumalé, the residents seem to value a clean and beautiful environment; therefore, it is important to maintain this merit.
- It is also important to invest in the atolls outside of the GMR and improve access to high-quality education and health services, especially in the hubs and center cities and towns within the atolls. In the health sector, there is a need to decentralize and create a “Healthy City” concept on the islands, as well as in Greater Malé, for better health outcomes and to prevent overpopulation in the Greater Malé region.

# Conclusion

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- Good facilities including dining, shopping, sports and parks are highly rated aspects for migration, at the costs of high living expenses, rent and housing.
- Relative highly rated aspects were: quality of primary education and higher education, access to medical care, including the high level of medical care.
- The aspects related to “resilience to natural disasters and safety against sea level rise due to climate change” were rated relatively low.
- Men and younger people tended to be more open to the idea of migrating to Hulhumalé. Men may prioritize aspects related to the cost of living, rent/housing costs, and community ties when evaluating the prospect of moving to Hulhumalé.
- Social connections and community relationships may be perceived as stronger or more accessible by men; however, they are regarded as important factors in migration.
- Different impacts of climate change have been observed in the studied areas. The public behavior and the manners of residents in the four locations targeted by the survey might also differ, which could be the subject of further study.