INTERNATIONAL CONFERENCE ON SOCIAL RESEARCH AND INNOVATION

"Synergies of Discovery: Igniting Solutions for the Future"

DAY 2- 11 SEPTEMBER 2025 (THURSDAY)

TIME	MAIN ITEM	DESCRIPTION / PRESENTER	VENUE	VENUE
8:00 - 8:50	REFRESHMENTS			WW002
09:00 - 09:30	**KEYNOTE 2**			**HALL**
	"Harnessing Coral Reef Island Dynamics for Coastal Management and Adaptation"	**Professor Paul Kench** *Professor of Tropical Coastal Change* *National University of Singapore*		
09:30 - 10:20	**PANEL DISCUSSION 3**			**HALL**
	https://meet.google.com/tpr-xbfx-egh		Meeting ID: tpr-xbfx-egh	
	Panel 3: Decentralisation by Design: Synergising Local Knowledge and National Policy Hosted by Insitute for Research and Innovation and Faculty of Shariah and Law	SDG 11 - Sustainable Cities and Communities SDG 16 – Peace, Justice and Strong Institutions SDG 17 - Partnerships for the Goals	**Moderator:** Mr Amish Abdullah **Panelists:** Mr. Aiman Rasheed Mr. Shammoon Adam Mr. Mohamed Basheer Ms. Aminath Shauna	
10:30 - 11:00	**IMPACT ROOM SESSION 5**			**EW102**
	From Cell to Community: Harnessing Family Systems for Social Protection	SDG 3: Good Health and Well-being SDG 4: Quality Education SDG 10: Reduced Inequalities SDG 16: Peace, Justice, and Strong Institutions	**Moderator:** Dr Aishath Nasheeda **Speakers:** Ms Mariyam Shazly	
11:15 - 11:45	**IMPACT ROOM SESSION 6**			**EW102**
	Beyond Connectivity: Shaping a Human-Centered AI and Digital Future for Island Nations	SDG 4: Quality Education SDG 9: Industry, Innovation and Infrastructure SDG 10: Reduced Inequalities SDG 16: Peace, Justice, and Strong Institutions	**Moderator:** Dr Ibrahim Latheef **Speakers:** Dr. Mohamed Kinaanath Dr Ahmed Naufal Abdul Hadee	
10:30 - 11:50	**PAPER PRESENTATION: DAY TWO - MORNING SESSION**	**PRESENTER**	**CHAIRS/EVALUATORS**	**VENUE**
	BREAKOUT SESSION 11 (HALL) **TRACK 4: RESILIENT LEARNING SYSTEMS AND FUTURE SKILLS**			
	https://meet.google.com/zuz-hqsx-wdn		Meeting ID: zuz-hqsx-wdn	HALL
10:30 - 10:50	Strengthening Mathematics Education in the Maldives: A Needs Analysis for Training of Trainers (ToT) SDG 4, 17	**Abdullah Zakariyya** **Dr Mamdooha Ismail** [Physical]	**Session Chairs:** Ms Visama Hassan Ms Fathimath Shaheedha **Evaluators:** Ms Fathimath Saeed Ms Mariyam Nihaadh	
10:50 - 11:10	Identifying Professional Development Needs of In-Service Science Teachers in the Maldives to Improve Teaching Practices and Student Learning SDG 4	**Dr Ibrahim Mohamed** **Dr Aishath Selna** [Physical]		
11:10 - 11:30	Perceived and Observed Knowledge of Differentiated Instruction, Self-Reported Implementation, Challenges, and Readiness in Maldivian Secondary Mathematics Classrooms: A Descriptive Study Based on the Secondary Mathematics Training of Trainers Programme SDG 4	**Dr Mariyam Shahuneeza Naseer** [Physical]		**HALL**
11:30 - 11:50	Transforming Mathematics Pedagogy through ICT: Insights from a National Teacher Development Programme in the Maldives SDG 4	**Dr Ahmeema Luthfee** [Physical]		
	BREAKOUT SESSION 12 (WW101) **TRACK 7: COMMUNITY WELLBEING AND SOCIAL SUPPORT SYSTEMS**			
	https://meet.google.com/pbd-zqex-pzj		Meeting ID: pbd-zqex-pzj	WW101
10:30 - 10:50	Bottled, Filtered, or Rainwater? Local Trust in Drinking Water Choices in Meemu Atoll, Maldives SDG 6, 13, 17	**Ms Asifa Luthfee** [Physical]	**Session Chairs:** Professor Assela Pathirana Mr Mohamed Rasheed **Evaluators:** Mr Moosa Mohamed Manik Mr Abdul Wahid Ibrahim	
10:50 - 11:10	Exploring Determinants of Water Source Choice Among Residents of M. Muli, M. Mulak, and M. Kolhufushi SDG 3. 6. 17	**Ms Saniyya Faheem** [Physical]		
11:10 - 11:30	Customers' Perception of Utility Water Service Delivery: The Case of ADh. Mahibadhoo, Maldives SDG 6, 11, 17	**Ms Hawwa Arushee** [Online]		**WW101**
11:30 - 11:50	Groundwater at Risk: Community Perceptions and Public Health Impacts of Sanitation Transitions in the Maldives SDG 6, 12, 17	**Ms Tharika Fernando** [Online]		
	BREAKOUT SESSION 13 (WW103) **TRACK 3: BUSINESS AND SOCIAL ENTREPRENEURSHIP DRIVING EQUITY**			
	https://meet.google.com/wpo-gwtz-tkd		Meeting ID: wpo-gwtz-tkd	WW103

10:30 - 10:50	A Paradigm Shift from Risk Sharing to Risk Transfer: A Review of Islamic Home Financing Portfolios in Malaysia and the Way Forward SDG 8, 11, 16	**Assistant Professor Mohamed Noordeen Mohamed Imtiyaz** [Physical]	**Session Chairs:** Mr. Mohammed Ali Sharafuddin Dr. Ashlin Nimo J.R. **Evaluators:** Dr Ahsan Ahmed Jaleel Dr Shahnawaz Ali	**WW103**
10:50 - 11:10	Analyzing Cognitive, Environmental, and Behavioral Factors Affecting Entrepreneurial Selection of Maldivian Youth SDG 4, 8	**Ms Mariyam Waseema** [Physical]		
11:10 - 11:30	Applicability and Feasibility of Salam-Based Agricultural Financing in the Maldives: A Qualitative Inquiry SDG 8, 12	**Assistant Professor Mohamed Noordeen Mohamed Imtiyaz** [Physical]		
11:30 - 11:50	Financial Empowerment of Women in the Maldives: Awareness, Practices, and Sustainability SDG 4	**Ms Shabistan Zaidi** **Mr Lokesh Singh** [Physical]		
BREAKOUT SESSION 14 (WW201) TRACK 5: RESPONSIVE LAW AND GOVERNANCE				
	https://meet.google.com/chv-pzkm-xxy		Meeting ID: chv-pzkm-xxy	WW201
10:30 - 10:50	Examining Maldivian Tax Behaviour: A Quantitative Study on Influencing Factors and Policy Implications SDG 9, 16	**Dr Mir Hasan Naqvi** [Physical]	**Session Chairs:** Mr Mohd Arsh Shery Ms Mariyam Leeza **Evaluators:** Dr Kommu Pradeep Dr Mohammad Shekaib Alam	**WW201**
10:50 - 11:10	Towards a Shariah-Compliant Regulatory Framework for Cryptocurrencies: A Comparative Legal Analysis SDG 16, 17	**Ustaza Alaika Adhnan** **Amish Abdullah** **Shekaib Alam** [Physical]		
11:10 - 11:30	Too Late for Law? Rising Waters and the Urgency of Recognising Ecocide in the Maldives SDG 13, 14, 16	**Assistant Professor Dr. Nfor N. Nde Nyambi** [Physical]		
11:30 - 11:50	Human Rights-Based Approach to Climate Change Adaptation in Small-Scale Fisheries: The Maldivian Context SDG 13, 14, 16	**Dr Tajudeen Sanni** [Physical]		
BREAKOUT SESSION 15 (WW203) TRACK 4: RESILIENT LEARNING SYSTEMS AND FUTURE SKILLS				
	https://meet.google.com/oob-tzyh-jjt		Meeting ID: oob-tzyh-jjt	WW203
10:30 - 10:50	A Cross-Cultural Pilot Study on Adjustment in Indian and Maldivian College Students: An Exploration of Moderating Factors SDG 3, 4, 17	**Ms Aminath Rishmee** [Physical]	**Session Chairs:** Dr Fathimath Muna Ms Mariyam Shazna **Evaluators:** Dr Ahmed Ali Didi Dr. Monica Arora	**WW203**
10:50 - 11:10	Emotional Intelligence Training as a Buffer Against Educator Burnout: A Review of Evidence-Based Interventions SDG 3, 4	**Ms Aminath Nahudha Mauroof** **Ms Fathimath Shimana** [Physical]		
11:10 - 11:30	Exploring Students' Preference for Google Over Library Resources at Villa College: Factors, Challenges, and Strategies for Improvement SDG 4, 9, 17	**Ms Hawwa Faseel** **Ms Fathimath Anoosha** [Physical]		
12:00 - 13:00	LUNCH + PRAYER			**WW102**
13:00 - 13:30	**KEYNOTE 3**			**HALL**
	"Empowering Impact: Future-Ready Research and Entrepreneurship for an Equitable World"	**Professor Dr. Mohammed Falahat** *Professor, Director of Strategic Research Institute (SRI)* *Asia Pacific University of Technology & Innovation (APU), Malaysia*		
13:30 - 14.00	**IMPACT ROOM SESSION 7**			**EW102**
	Unleashing the Power of Digital Technology, and Digital Work in Islands	SDG 7: Affordable and Clean Energy SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 13: Climate Action	**Moderator:** Dr Ibrahim Latheef **Speakers:** Mr Mohamed Basheer	
14:15 - 14.45	**IMPACT ROOM SESSION 8**			**EW102**
	Dhivehi Bas: Gaumiyyath	SDG 4: Quality Education SDG 9: Industry, Innovation and Infrastructure SDG 11: Sustainable Cities and Communities SDG 17: Partnerships for the Goals	**Moderator:** **Speakers:**	
13:30 - 14:50	**PAPER PRESENTATION: DAY TWO – AFTERNOON SESSION**	**PRESENTER**	**CHAIRS/EVALUATORS**	**VENUE**
BREAKOUT SESSION 16 (HALL) TRACK 8: URBANISATION, MOBILITY, AND SUSTAINABLE CITIES				
	https://meet.google.com/rsr-jnvz-zvd		Meeting ID: rsr-jnvz-zvd	HALL
13:30 - 13:50	Exploring the Determinants of Population Consolidation in the Maldives SDG 9, 11	**Mr Abdullah Rasheed** [Physical]	**Session Chairs:** Mr Mohamed Aiman Naseer Mr Salavutheen Noortheen **Evaluators:** Dr. Sivakumar Thankara Ambujam Mr Abdul Wahid Ibrahim	**HALL**
13:50 - 14:10	Logistics Performance and Trade in Small Island Developing States: A Regional Fixed Effects Analysis of Digital and Economic Drivers SDG 10, 11	**Mr Mohammed Ali Sharafuddin** [Physical]		

14:10 - 14:30	Evaluating the Impact of India's Smart City Mission on Inclusive and Sustainable Urban Development: A Stakeholder-Centric Approach SDG 9, 17	**Dr Oshma Rosette Pinto** [Online]		
BREAKOUT SESSION 17 (WW101) TRACK 4: RESILIENT LEARNING SYSTEMS AND FUTURE SKILLS				
	https://meet.google.com/dgy-vqxe-djg		Meeting ID: dgy-vqxe-djg	WW101
13:30 - 13:50	Exploring school-related factors of student frequent absenteeism in the Maldives: Insights from a Qualitative Inquiry SDG 3, 4	**Dr Aminath Shafiya** [Physical]	**Session Chairs:** Ms Shuhudha Rizwan Ms, Aminath Suha **Evaluators:** Dr Ahmed Ali Didi Ms Fathimath Saeed	**WW101**
13:50 - 14:10	From Silence to Voice: A Critical Framework for Empowering Visually Impaired Graduates SDG 4, 10, 16	**Ms Visama Hassan** [Physical]		
14:10 - 14:30	Improving Academic Writing: The Effect of Structured Paragraph Instruction on ESL Undergraduates SDG 4	**Ms Fathimath Warda** [Physical]		
BREAKOUT SESSION 18 (WW103) TRACK 5: RESPONSIVE LAW AND GOVERNANCE				
	https://meet.google.com/mjc-cpsu-okx		Meeting ID: mjc-cpsu-okx	WW103
13:30 - 13:50	A Case Study on Medical Negligence and Malpractice in the Maldives: Lessons from Ihsan v. State SDG 3, 16	**Ms Aminath Haifa** [Physical]	**Session Chairs:** Dr Tajudeen Sanni Uza.Aishath Khaleela Abdul Sattar **Evaluators:** Dr Mohammad Shekaib Alam Mr Nikhil Vimala Muraleedharan	**WW103**
13:50 - 14:10	Impact of Transfer Pricing Practices on Economic Sustainability in Small Island Nations: The Case of the Maldives SDG 8, 16, 17	**Ahmed Rizwan Assistant Professor Dr. Damith Gangodawilage** [Physical]		
14:10 - 14:30	Reimagining Criminal Liability in Maldives: Legal Dilemmas and Future Prospects in the Age of AI and Virtual Tools SDG 9, 16, 17	**Dr Nazia Akhtar** [Online]		
14:30 - 14:50	Bridging Islands and Subcontinent: Legal Readiness for Smart Health Data in the Maldives and India SDG 3, 9, 16	**Assistant Professor Raneeta Pal** [Online]		
BREAKOUT SESSION 19 (WW201) TRACK 1: DIGITAL TRANSFORMATION AND SMART SOLUTIONS				
	https://meet.google.com/gbi-hkbm-wxr		Meeting ID: gbi-hkbm-wxr	WW201
13:30 - 13:50	Enhancing ESL Learners' Academic Vocabulary Through Google Chrome-Based Synonym Browsing in Sri Lanka SDG 4	**Ms K. Wathsala M. Jayatissa** [Physical]	**Session Chairs:** Dr Suneena Rasheed Ms Maryam Thawfeega **Evaluators:** Mr Moosa Mohamed Manik Mr Abdul Wahid Ibrahim	**WW201**
13:50 - 14:10	Leveraging Moodle for Personalised E-Learning: A Framework-Based Analysis of Tools, Resources, and Plugins SDG 4, 9	**Mr Ibrahim Adam** [Physical]		
14:10 - 14:30	Towards Understanding the Quantum AI Paradigm: A Thematic Review for Early-Stage Researchers SDG 4, 9	**Dr Babur Hayat Malik** [Physical]		
15:00 - 15:50	**PANEL DISCUSSION 4**			**HALL**
	https://meet.google.com/hwt-bdrt-uec		Meeting ID: hwt-bdrt-uec	HALL
	Panel 4: Curriculum in the Age of Intelligence: Educating for a Complex, AI-Connected World Hosted by Faculty of Educational Studies, Villa College	SDG 4: Quality Education SDG 8: Decent Work and Economic Growth SDG 9: Industry, Innovation and Infrastructure SDG 17 – Partnerships for the Goals	**Session Chair:** Ms. Fathmath Samaahath **Panelists:** Dr Ali Shameem Dr Abdul Latheef Mohamed Mr. Mohamed Jailam Ms. Shuhudha Rizwan	
16:00 - 16:15	COFFEE BREAK			**WW002**
16:30 - 17:35	**CONFERENCE CLOSING CEREMONY**			**HALL**
	https://us06web.zoom.us/j/84430786730?pwd=2mZ3C7rmR5brCrep1XH3RStoDTLhg8.1		Webinar ID: 844 3078 6730 Passcode: 639459	HALL
16:30 - 16:32	Recitation of Holy Qur'an	Mohamed Shaihaan 11-M Villa International High School		
16:32 - 16:50	Reflection on the conference	Dr. Ali Najeeb Vice Rector of Villa College		
16:50 - 17:00	Remarks from the Evaluation Panel and Awarding of 'Best Presentation Awards'	Ms Fathimath Saeed Member of the Evaluation Committee		
17:00 - 17:05	Remarks from the Editor and Awarding of 'Best Paper Award'	Dr. Sheema Saeed Editor, International Journal of Social Research & Innovation (IJSRI)		

17:05 - 17:15	Certificate of Appreciation to Conference Sponsors and Partners	Special Invitee	
17:15 - 17:25	Certificate of Appreciation to Conference Endorsers	Dr. Mohamed Adil Deputy Vice Rector Research and Innovation, Villa College	
17:25 - 17:30	Closing remarks	Dr. Fazeela Ibrahim Dean of Research Institute for Research and Innovation Villa College	
17:20 - 17:35	Group Photo		
17:35 - 18:00	REFRESHMENTS		**WW002**
END OF ICSRI 2025			

BOTTLED, FILTERED, OR RAINWATER? UNPACKING LOCAL TRUST IN DRINKING WATER CHOICES IN MEEMU ATOLL

Authors: Ms.Asifa Luthfee, Dr.Fazeela Ibrahim

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Supported by the 3S Water Project, IHE Delft

Introduction and Problem Statement

Introduction

- Outer island residents face difficulties accessing reliable safe drinking water
- Rainwater harvesting and groundwater historically used
- Quality now declining due to climate change, pollution, and overuse (Jaleel et al., 2020)
- Major efforts in desalination plants and municipal water infrastructure

Problem Statement

- Outer island residents face challenges with drinking water quality and availability
- Governments invested in desalination plants to provide municipal tap water
- Despite these efforts, residents of Muli, Kolhufushi, and Mulah prefer bottled, filtered, and rainwater over municipal tap water for drinking, indicating a lack of trust in municipal water.

Main Objectives:

- Identify key factors influencing water preferences
- Examine how perceptions of trust and water quality impact their drinking water choices
- Develop strategies to promote sustainable municipal water use.

Literature Review

Global Context

- SDG6 emphasizes access to safe drinking water
- Perceptions of taste, odor, and safety often outweigh actual water quality (Delpla et al., 2020)

Bottled Water Trends

- Global bottled water consumption is rising
- Driven by distrust in public water and marketing of bottled water as “safe and pure”
- Leads to growing single-use plastic (SUP) waste

Island Context

- Primary water sources face risks from contamination, over-extraction, and environmental impacts like climate change and tsunamis (Deng, 2016; European Union, 2023).
- Influenced by infrastructural gaps, cultural traditions, and risk perceptions shaping choices (Latheef, 2019)

Conceptual Framework

Theory of Planned Behavior (TPB)

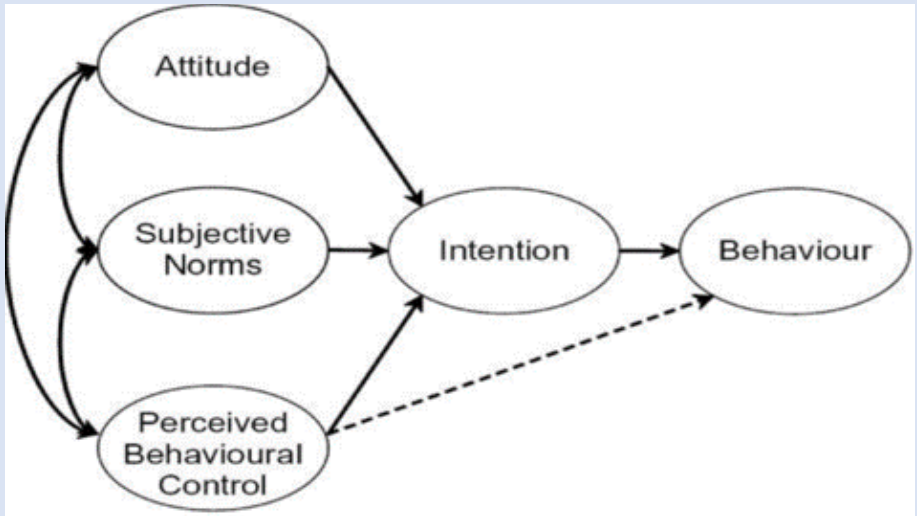


Figure 1: The Theory of Planned Behavior (TPB) Source: (Ajzen, 1991)

- Attitudes, social norms, and perceived control shape residents' water consumption choices (Ajzen, 1991)

Health Belief Model (HBM)

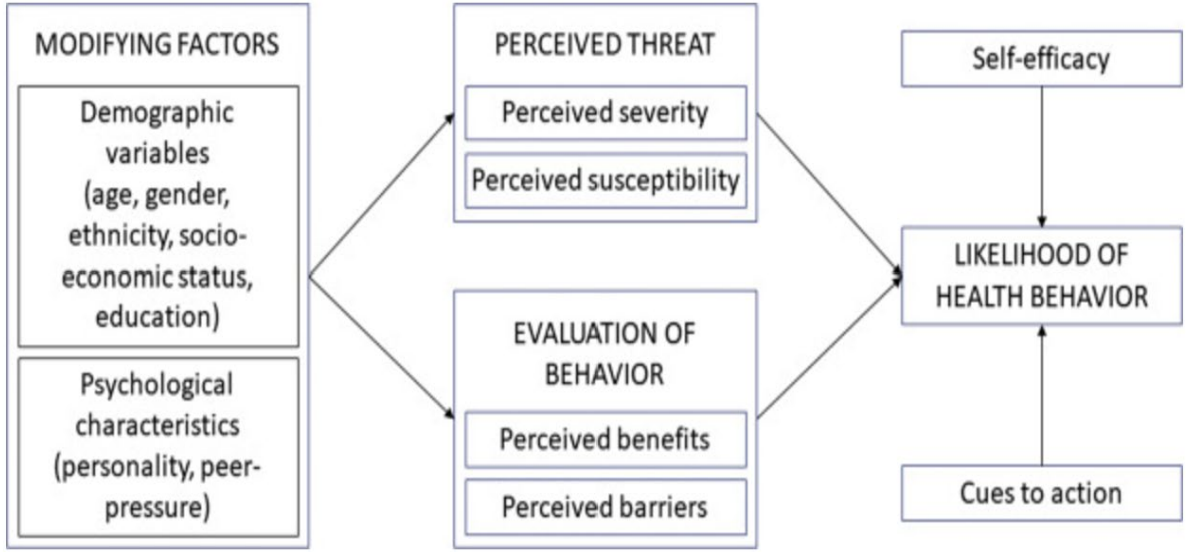


Figure 2.The Health Belief Model (HBM) Source: ScienceDirect

- Highlights how perceived susceptibility, severity, and benefits influence safe water adoption practices (Rosenstock, 1974)

Methodology

Study Design

- Pragmatic research paradigm
- Mixed-methods approach (Qualitative & Quantitative Phase)

Sample

- 30 participants (10 from each island)
- 8 Technical staff from Water Utility
- 3 FGDs (more than 5 community leaders involved in each)
- 150 Participants for Google Form Survey (50 from each island)

Data Collection

- Purposive sampling technique (for FGD) and Simple random sampling technique (for Residents') Interviews) used for the qualitative phase
- Simple random sampling technique for the quantitative phase

Data Analysis

- Qualitative Data Analysis (Thematic Analysis- Transcriptions, Open and Axial Coding using Microsoft Word and Excel
- Quantitative Data Analysis (Built-in data analysis Tools in Google form)

Results

Qualitative Findings

Theme 1: Water Preferences

Bottled water is the dominant choice for drinking in all the three islands, contributing significantly to Single-Use Plastic (SUP) waste and rainwater is secondary for cooking.

Participant SH: "Most of the people use mineral water for drinking. Only a very few among my friends also use rain water. So I can say, most use mineral water for drinking."

Theme 2: Perception of Municipal Water Trust

Low trust due to sensory issues (e.g., chlorine taste) and lack of safety communication.

Participant F: "Actually it's not that pleasant to drink this supply water without filtering. because some days the chlorine taste is stronger, and other days it's weaker."

Theme 3: Operational Challenges

Staff shortages, testing gaps, and limited public outreach hinder adoption, household plumbing and water pipeline issues leading to cross-contamination risks.

Participant AD: "Yea, we have shortage of staff and also getting some of the resources required."

Participant AA: "We check other things in the water production. Since routine testing is not done here, to ensure if the water is safe for drinking, we are asked to send samples to Male'."

Results

Qualitative Findings (continued)

Theme 4: Community Influence

- Cultural shifts and NGO programs increase bottled and filtered water use.
- CEL NGO's provision of household filtration systems in Mulah increased adoption of filtered municipal water

Participant BA: *"On this island, there are people who use both rainwater and filtered water. The CEL NGO even distributed filtration systems to households. So, many households in this island have these systems. We have a filtration system that we installed by ourselves. However, a lot of people still use rainwater as well."*

Theme 5:Cost vs. Safety

- Bottled water is costly, but safety concerns outweigh affordability.

Participant AZ*: "If they give assurance, yes. Because it will be cost effective instead of buying bottled water, isn't it? And when it's available at home, it will be convenient, we don't have to buy it and also we don't have to order."*

Theme 6:Environmental Concerns

- Awareness is growing but remains secondary to safety.

- ***Participant AZ:*** *"If they give assurance, yes. Because it will be cost effective instead of buying bottled water, isn't it? And when it's available at home, it will be convenient, we don't have to buy it and also we don't have to order."*

Results

Quantitative Findings:

Primary source of drinking water:

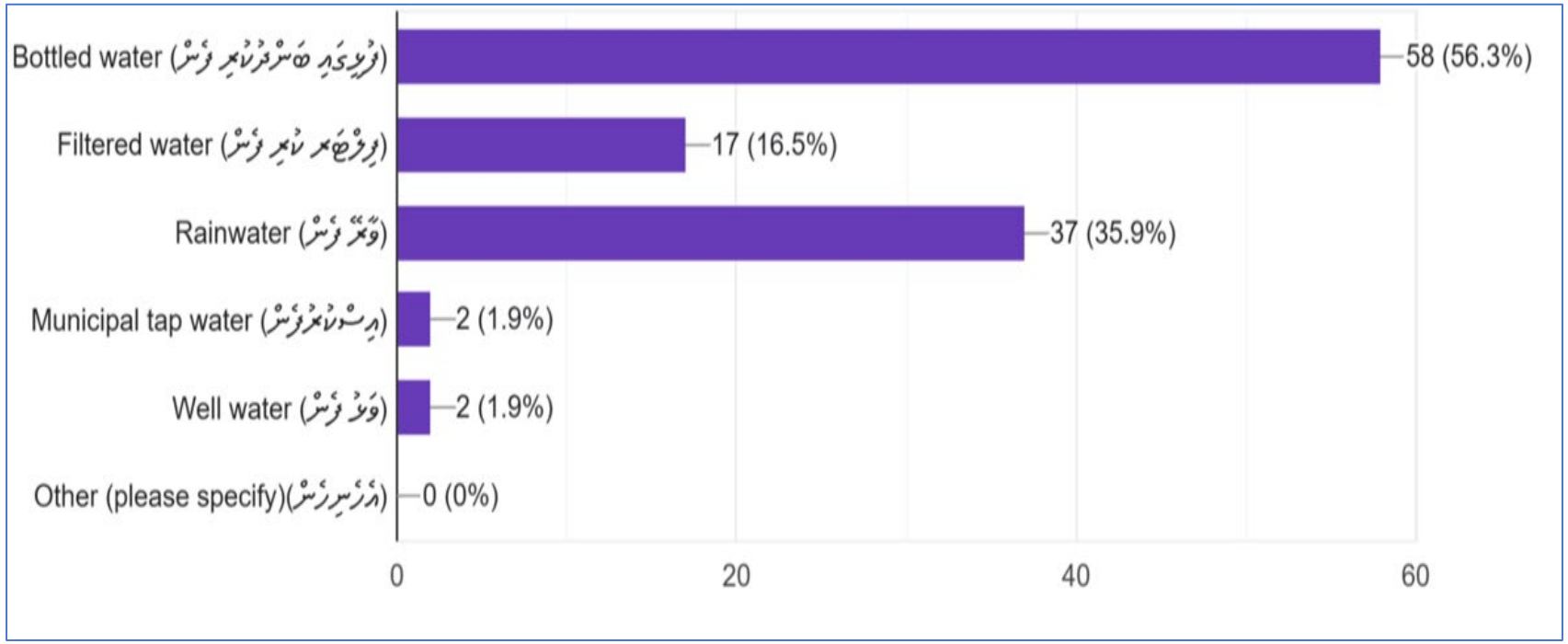
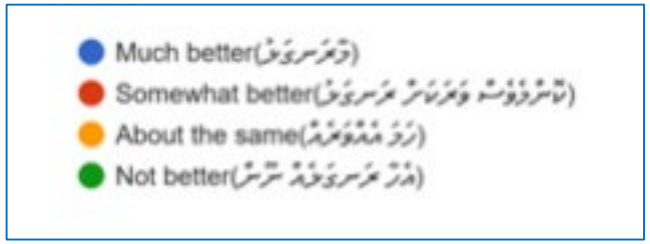


Figure 1. Primary source of drinking water (Source: Author)

Results

Quantitative Findings (Continued)

Perception on available water sources for drinking:



Municipal Water

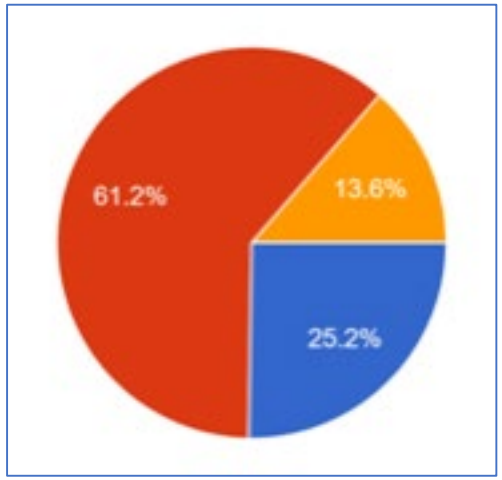


Figure 2.1: Perception on Municipal Tap water (Source: Author)

Bottled Water

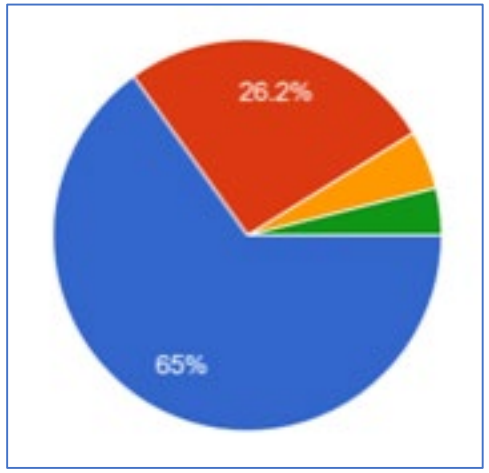


Figure 2.2: Perception on Bottled Water (Source: Author)

Rain Water

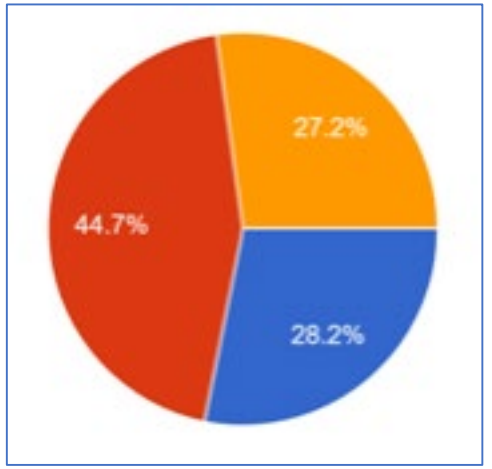


Figure 2.3: Perception on Rain Water (Source: Author)

Filtered Water

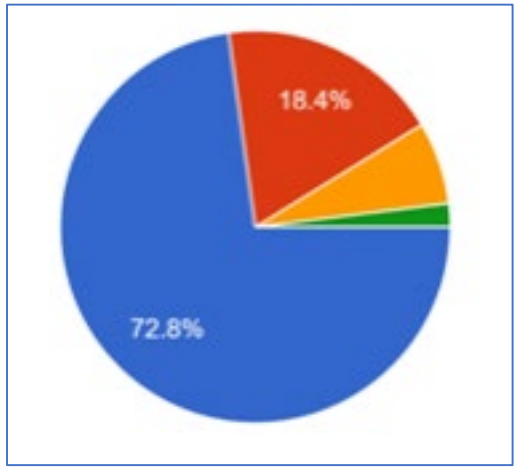


Figure 2.4: Perception on Filtered Water (Source: Author)

Results

Quantitative Findings (Continued)

Primary factors influencing preference for the choice of drinking water:

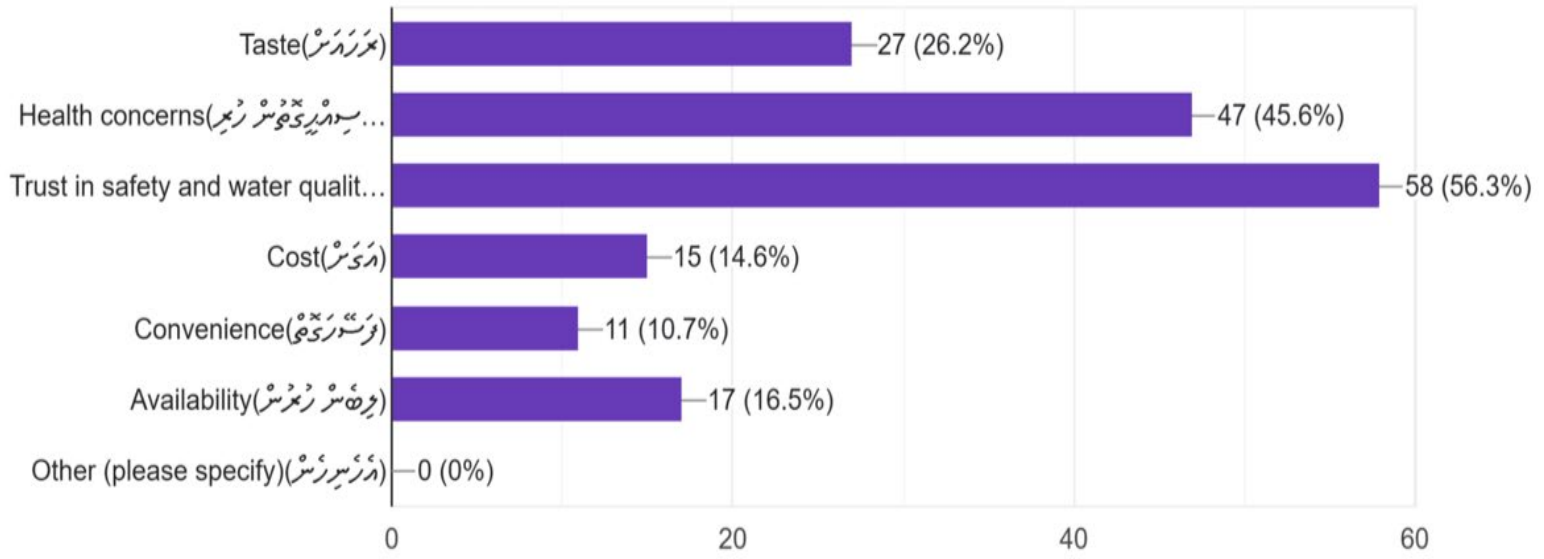


Figure 3. Primary determinants for drinking water choices (Source: Author)

Results

Quantitative Findings (Continued)

Decision-Making Factors and Strategies for improvement:

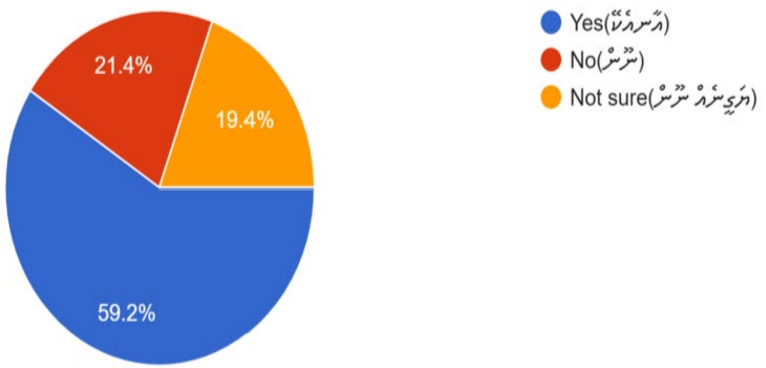


Figure 4. Respondents willing to switch to Municipal Tap Water (Source: Author)

Conclusion

Overall findings across the 3 islands:

- **Muli and Kolhufushi:** Require significant trust-building efforts through quality improvements, awareness campaigns, and support for household filtration.
- **Mulah:** Serves as a model for promoting municipal water for reducing SUP waste, with filtration programs and NGO (CEL) initiatives demonstrating higher acceptance.
- Research reveals the complexities of water usage in Muli, Kolhufushi, and Mulah.
- Trust, safety, and quality are key factors influencing water preferences; bottled water dominates despite high costs and environmental impact.
- Municipal water offers potential but faces safety, operational, and cultural challenges.

Policy and Practice Implications

Trust Building

- Foster public confidence through transparent communication and regular water quality updates.

Infrastructure Upgrades

- Enhance reliability and safety by addressing cross-connections, ensuring consistent supply, and expanding testing.
- Establishing Water Safety Plans

Awareness Campaigns

- Promote municipal water's safety, environmental, and cost benefits to drive behavioral change.
- Awareness campaigns to build trust and promote municipal water as safe and sustainable.
- Collaborations among stakeholders is essential for equitable access to clean water

Recommendations:

- Establish RO Water Plants at these islands on need-basis.
- Improve water safety by maintaining chlorine levels, enhancing clarity, strengthening public communication, and upgrading supply and testing infrastructure.
- Develop and implement household plumbing and water pipeline regulations to ensure safe water delivery and reduce cross-contamination risks.
- Research the environmental impact of bottled water and identify sustainable water management solutions.

Study Limitations:

- Geographic scope limited to 3 islands
- Self-reported data may carry bias
- Older residents struggled with online forms; responses skewed to youth/middle-aged
- Low response rate on one island despite repeated requests (103 vs. 150 target)

Future Research Directions:

- Broaden geographic and demographic scope, and conduct longitudinal studies to assess long-term impacts of water interventions
- Assess household plumbing regulations, pipeline standards, and operational effectiveness of water plants to ensure safe delivery and build public trust.
- Evaluate environmental impacts of bottled water use and explore sustainable water management solutions to reduce plastic waste.

References

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THANK YOU

“Safe water is not a privilege, it’s a right - every drop counts toward a sustainable future.”

Groundwater at Risk: Community Perceptions and Public Health Impacts of Sanitation Transitions in the Maldives

Tharika Fernando, Akosua Boakye-Ansah, Konstantina Velkushanova, Assela Pathirana

IHE Delft, Delft, The Netherlands

Introduction and Problem Statement

- Safe water and sewerage; fundamental human right (Ministry of Environment Maldives 2020)
- Black water managed through cesspits;
- **Transition** from onsite to sewered sanitation systems
- Unpleasant odour of the water coming from groundwater wells **resembling rotten egg smells**
- **Research gap** on the linkage between groundwater contamination and sanitatio systems
- Study in Mulah (1500 population) and Muli (1020 population) habitant islands in Meemu atoll; *Muli – sewer systems; Mulah – transition to sewers*
- Objective of the study to **analyze the groundwater quality** in households (e.g., shallow wells) and understands if there is groundwater contamination from different sanitation systems

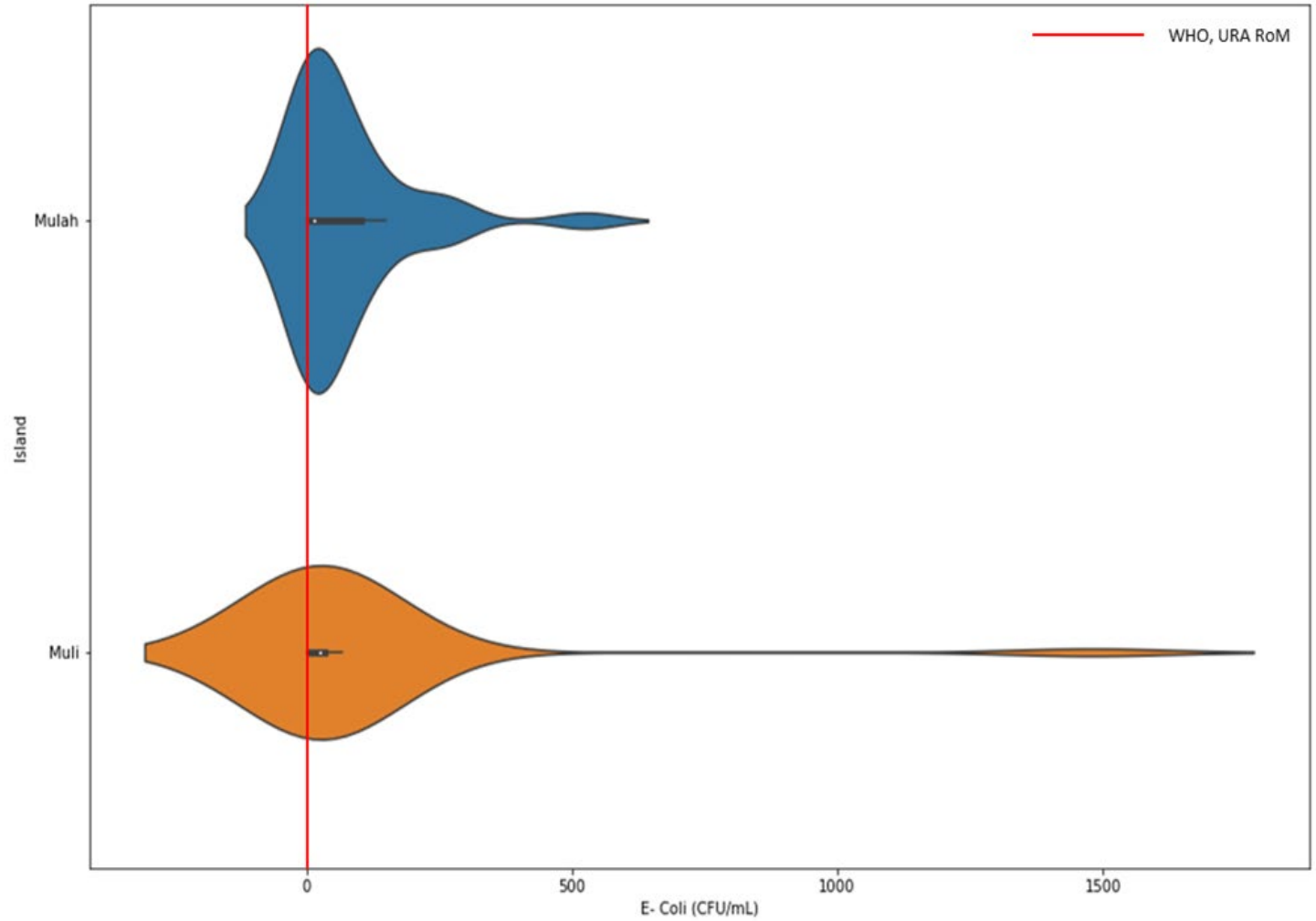
Current situation in Mulah
Source: IHE, Delft
Copyright: Assela Pathirana

Methodology

Quantitative and Qualitative Approach			
Groundwater Quality Analysis	Household Questionnaire Survey	Key Informant Interviews (KII)s	Field Observation
Quantitative Approach		Qualitative Approach	

Groundwater quality analysis (55 samples) pH, Turbidity, Dissolved Oxygen, Nitrates, Ortho–Phosphates, Total Coliform, E- Coli

Results – Microbial Contamination



Results –Comparative analysis over islands

No	Parameter	t static value	p value	Significance
1	pH	-3.528	0.0008	High
2	EC (µS)	-1.324	0.191	No
3	Temperature (℃)	0.755	0.453	No
4	DO (%)	-3.537	0.0008	High
5	Turbidity (FNU)	3.152	0.0026	High
6	Total Coliform (CFU/mL)	0.204	0.838	No
7	E coli (CFU/mL)	-0.216	0.829	No
8	Ortho Phosphates (mg/L)	0.386	0.547	No
9	Nitrates (mg/L)	0.067	0.096	No
10	Distance to shore (m)	2.328	0.023	Weakly
11	Water level (m)	2.602	0.011	Weakly

- High Significance - DO, pH and turbidity
- Weak or No Significance - Distance to shore and water level

Conclusion

- A **correlation between** odour experience and different sanitation systems
- Odour is experienced more frequently in Muli, where the sewer system is solid-free
- Groundwater is contaminated through **faecal contamination,** and it is not even permitted for islanders to use it for **cleansing and laundry purposes**
- The presence of E. coli and faecal contamination of the groundwater is likely due to **sewer leakages**
- Faecal contamination caused by solid-free sewer network systems and conventional gravity sewers is **not significantly different**
- There is a **significant difference in the materials used** in both sewer systems, maintenance of the systems, and **ageing of infrastructure** led to faecal contamination

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THANK YOU

Customers' Perception of Utility Water Service Delivery: The Case of Adh. Mahibadhoo, Maldives

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Introduction and Problem Statement

- Water scarcity is a critical issue in the Maldives, particularly on outer islands where freshwater is limited and dependent on rainwater harvesting (Ahmed, 2018; Latheef, 2019). Mahibadhoo, a highly populated island, continues to face challenges in water service delivery despite the introduction of desalinated water in 2016 (UNOPS, 2016).
- There is a significant research gap in assessing how sociodemographic factors influence customer perceptions of water service delivery in the Maldivian context and limited attention has been given to consumer perspectives, service quality, and equity in access (Ahmed, 2018).

Literature

- Service Quality Models: The SERVQUAL model is widely used to measure service quality through five dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy (Ammar and Saleh, 2023)
- Applications in Utilities: Studies in water and utility services show persistent gaps between customer expectations and perceptions, especially in reliability and responsiveness (Afroj *et al.*, 2021).
- Sociodemographic Factors: Research highlights that education, income, and household characteristics can influence how people perceive and evaluate service quality (Motho et al., 2022; Alipour *et al.*, 2023).
- Gap in Knowledge: Limited studies exist in the Maldivian context, particularly on water utility services in island communities.

Methodology

Study Design

- Descriptive cross-sectional study
- Quantitative approach

Sample Size

$$n = \frac{N \times Z^2 \times p \times (1-p)}{E^2 \times (N-1) + Z^2 \times p \times (1-p)}$$

Margin of Error (E) = 5% = 0.05

Confidence Level = 95%, so **Z** = 1.96 **Population Size (N)** = 273 households

Estimated Proportion (p) = 0.5

The minimum recommended sample size for the study is 160 households

Sampling Technique

Mixed sampling technique

Random Sampling: A total of 160 households were randomly selected from Adh. Mahibadhoo to ensure equal representation and minimize selection bias.

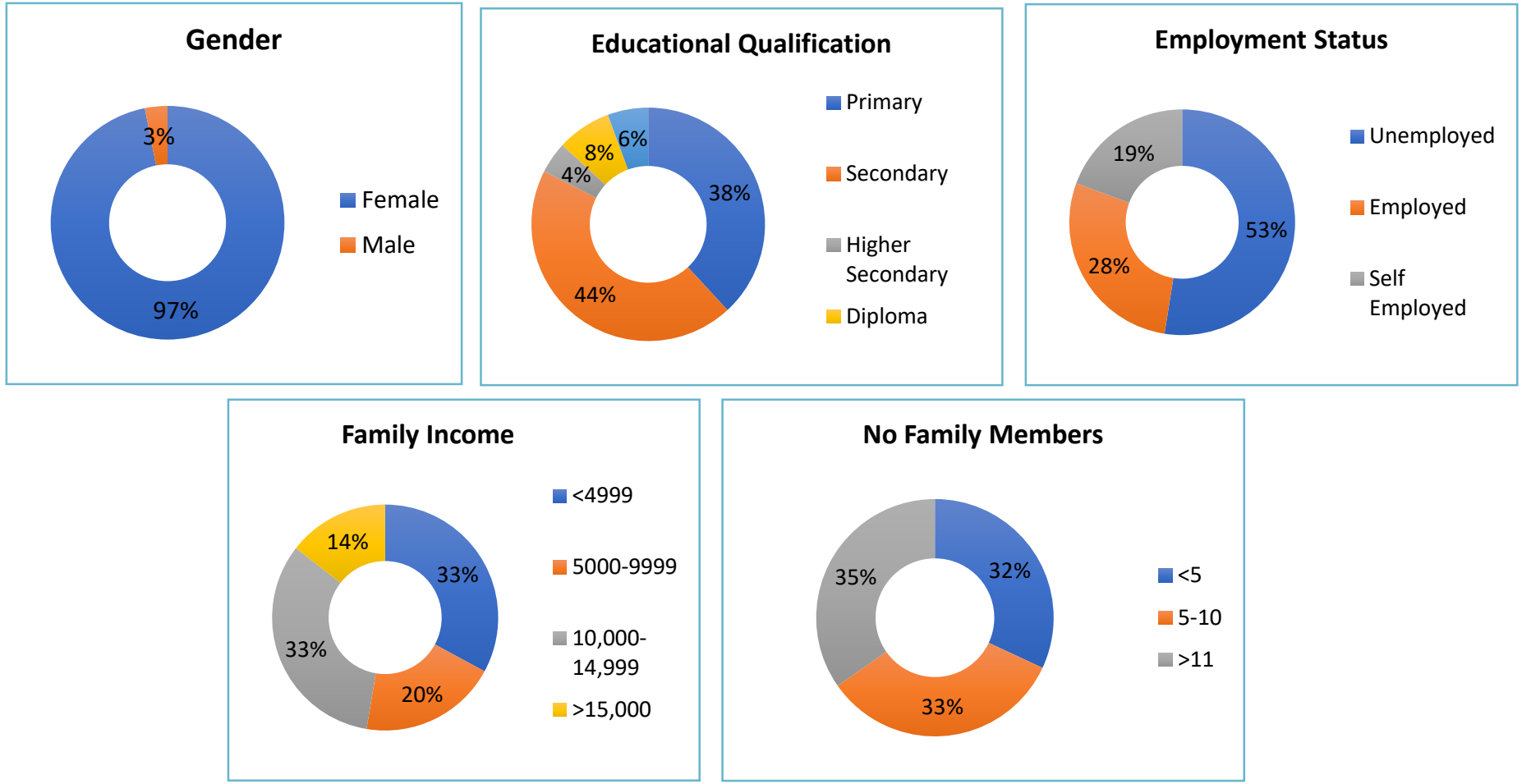
Purposive Sampling: Within each household, a purposive approach was used to select an active member familiar with household water usage to complete the survey.

Data Analysis

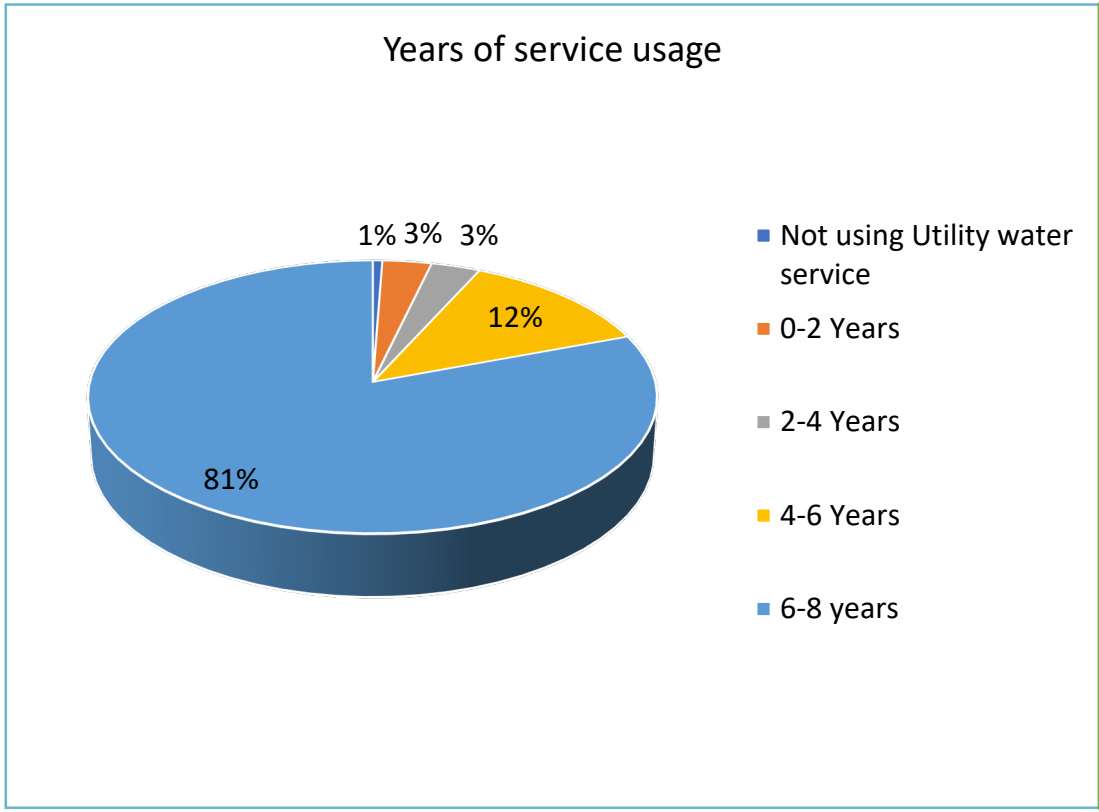
Data were gathered using researcher-administered questionnaires via the face-to-face method

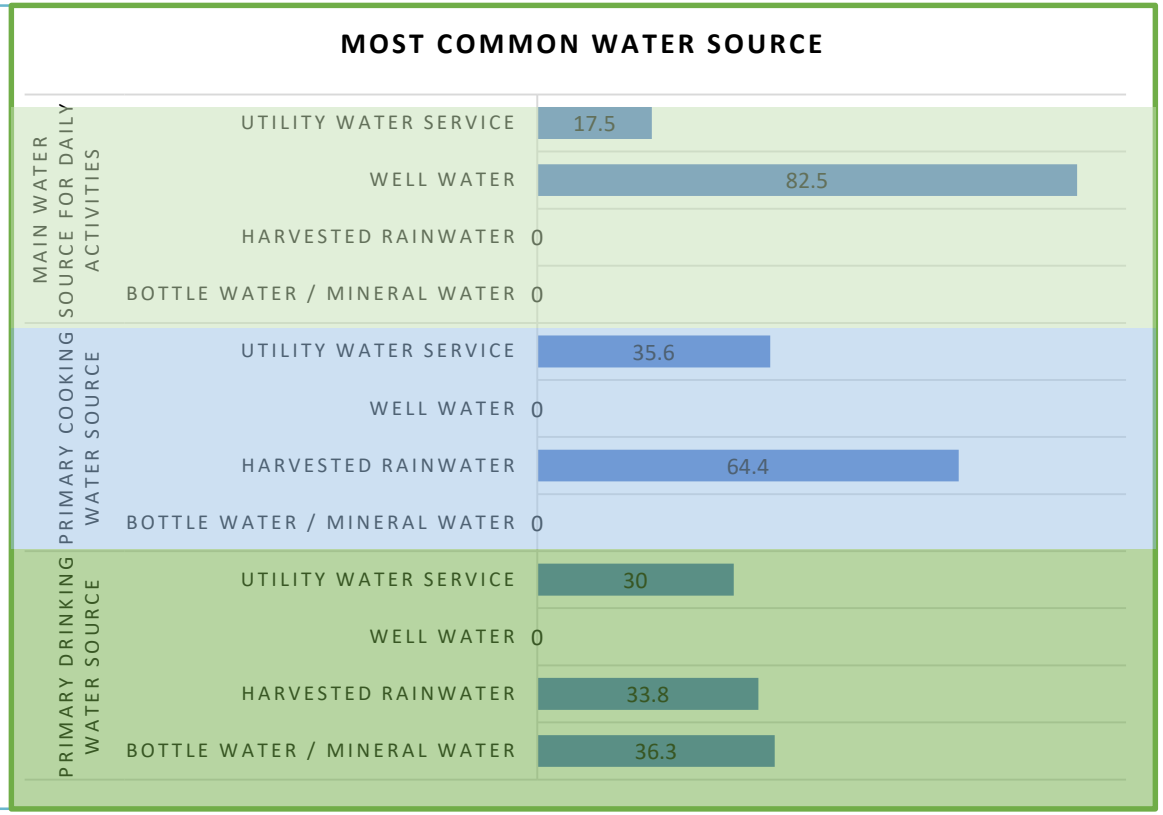
The data analysis for this research was conducted using the Statistical Package for the Social Sciences (SPSS) version 23 and Microsoft Excel 2019.

Socio-demographic Factors of the study population



Water Usage and Source Distribution





SERVQUAL dimensions and perceived service quality scores

Perceived Service Quality Scores Across SERVQUAL Statements

#	Statement	Perceived Service Quality
1	Materials associated with the service (e.g., pamphlets, website) are visually appealing	-1.03 ± 1.05
2	Employees appear neat and professional	-1.12 ± 1.05
3	Employees are courteous	-1.12 ± 1.09
4	Employees give personal attention to customers	-1.12 ± 1.49
5	Employees understand the specific needs of their customers	-1.12 ± 1.07
6	Employees are willing to help customers	-1.13 ± 1.12
7	The water utility has customers' best interests at heart	-1.13 ± 1.13
8	The water utility gives customers individual attention	-1.14 ± 1.08
9	Employees have the knowledge to do their job well	-1.16 ± 1.03
10	Employees are knowledgeable and able to answer customer questions	-1.21 ± 1.10
11	The water utility has modern-looking equipment and facilities	-1.22 ± 1.14
12	Employees give prompt service to customers	-1.24 ± 1.08
13	Employees are ready to respond to customer requests	-1.25 ± 1.10
14	The physical facilities are visually appealing	-1.26 ± 1.10
15	Customers feel safe in their transactions with the water utility	-1.33 ± 1.25
16	The water utility provides its services at the promised time	-1.43 ± 1.03
17	The water utility performs the service right the first time	-1.57 ± 1.00
18	The water utility shows a sincere interest in solving customers' problems	-1.63 ± 0.95
19	The water utility provides its services without any delays	-1.66 ± 0.97
20	The water utility maintains accurate records of customer transactions	-2.13 ± 1.27

Socio-demographic factors that Affect the perceived Service Quality

Factor	Impact
Education Level	Significant
Employment Status	Significant
Income	Significant
Family Size	Significant
Gender	Not Significant
Age	Not Significant

Conclusion and Recommendation

- Utility water service in ADh. Mahibadhoo does not meet customer expectations, with major gaps in reliability and responsiveness.
- Perceptions are also effected by education, income, and household size.
- Collect Community Feedback – Regular surveys and forums to identify needs.Promote Participatory Planning
- Involve residents in decision-making.
- Strengthen Staff Training – Improve responsiveness, reliability and communication.
- Raise Awareness – Use culturally sensitive campaigns to promote safe water use and conservation

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