

study of nationally recognized good practices of

WASTE MANAGEMENT

Case-study of AA.Ukulhas and B.Maalhos



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Prepared by: Aisha Niyaz

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INTRODUCTION

Maldives is an island nation with roughly 1190 coralline islands scattered across the Indian Ocean. The geographical characteristics of the islands such as small size and low-lying (over 80% less than just a meter above mean sea level) together with the population of approximately 400,000 dispersed across 187 islands¹, leads to enormous development challenges. Though the economy of the nation – primarily tourism and fisheries as well as livelihood of the people are heavily reliant on the coral reef ecosystem, malpractice in waste management has been threatening the health of the fragile coral reef ecosystem. With the impact of the Indian Ocean tsunami in 2004, the problem of waste became more prominent which led to a number of post-tsunami rehabilitation work focused on establishing waste management centers in local islands that facilitated waste segregation. It is only in recent years that the government together with support from international agencies like the United Nations (UN), World Bank and Asian Development Bank (ADB) as well as local NGOs, initiated projects to tackle waste management as a priority.

The Mangroves for the Future (MFF), a unique partner-led initiative to promote investment in coastal ecosystem conservation through its work in the Maldives, recognised that at present, local islands with acceptable functional waste management systems are as low as six and it is now the focus of the national programmes and other institutions to upscale and replicate these “good waste management practices”. As the mission of MFF is to promote healthy coastal ecosystems through a partnership-based, people-focused, policy-relevant and investment-oriented approaches, the National Coordination Body of MFF recognises the need to identify the existing challenges, gaps and issues in the model of these six islands considered as “good practice” before the model is replicated or up-scaled.

Accordingly, this study is prepared for MFF to understand the challenges faced by local communities implementing the nationally accepted “good waste management practice”. As specified in the Terms of Reference (Annex 1), the study is qualitative, using a case-study approach of two islands; Ukulhas (Alifu Alifu Atoll) and Maalhos (Baa Atoll).

AIM OF THE STUDY

The aim of the study is to identify the gaps, challenges and issues related to waste management in AA.Ukulhas and B.Maalhos (two island communities that have been nationally recognized for implementing “goodwaste

¹ National Bureau of Statistics, 2016, “Statistical Pocketbook of Maldives 2016”, Republic of Maldives.

management practices”) and put forward recommendations to bridge any gaps and inform future policy decisions.

OBJECTIVES OF THE STUDY

The following summarizes the objectives of the study as specified in the TOR (Annex 1):

- ❖ Study of the existing waste management system and practices in AA.Ukulhas and B.Maalhos and evaluation of the system to identify the factors that are contributing to its effectiveness;
- ❖ Identification of the current waste management approaches being promoted and the legal framework in place;
- ❖ Evaluation of the gaps and challenges within the nationally recognized “good waste management practices”;
- ❖ Based on the findings of the study, proposing recommendations for way forward on improving the existing situation of waste management in island communities.

LIMITATIONS OF THE STUDY

- ❖ Time Constraints
 - » 30-day period is not enough to conduct an in-depth analysis of the issues by doing facility audits and full-fledged literature review while doing thorough stakeholder consultations. Though a wide range of literature is available on the issue of waste management, due to time constraints, the literature review focused on the legal framework within the country specific to waste management.
- ❖ Weather
 - » Unpredictable weather, especially stormy weather with heavy downpour during the study period hindered the stakeholder consultations resulting in a delay of the overall project period.
- ❖ Study Scope
 - » Waste management being a huge issue, stakeholder expectations to explore various aspects such as waste audits, cost-benefit analysis and studying other islands, were beyond the scope of this study.

METHODOLOGY

The methodology of this study was predefined in the TOR (Annex 1) as a qualitative study, using a case-study approach whereby, two islands to conduct the case-study was selected by the National Coordination Body of MFF.

Due to the time and budget constraints for the study, conducting a SWOT (Strengths, Weaknesses, Opportunities & Threats) Analysis of both AA.Ukulhas and B.Maalhos was proposed as the method of

conducting the case-study. Accordingly, the SWOT analysis was conducted on the local council of these two islands as the waste management services is provided by the local council. In a SWOT analysis, strengths and weaknesses corresponds to internal aspects thereby internal aspects of the local council for effectively implementing their waste management service. In contrast, opportunities and threats are external aspects thereby, opportunities for the council and threats faced by the council in effectively implementing their waste management service. Identification of the strengths, weaknesses, opportunities and threats were through analysis of all the data collected (all stakeholder consultations and literature review).

The following steps were discussed and finalised in the inception report upon commencement of the study.

- ❖ Identification of key stakeholders for one-to-one consultations and focus group discussions (Annex 2). Key stakeholders were identified into three groups.
 - » The *first group* are the primary stakeholders of the case-study, which are the local councils of both study sites (AA.Ukulhas and B.Maalhos).
 - » The *second group* are key community stakeholders in both those island communities such as households, cafe'/guesthouse owners, community based organisations (CBOs), Health Center, School, Powerhouse... etc.
 - » The *third group* of stakeholders are the external key stakeholders including Environmental Protection Agency, Waste Department of the Ministry of Environment and Energy, Local Government Authority, Ministry of Tourism, UNDP, Health Protection Agency, Secure Bag...etc.
- ❖ Literature review focusing on the national legal framework on waste management, particularly review of key policies and regulations.
- ❖ Identification of key questions for each of the three stakeholder groups (Annex 3). During inception, it was agreed that, stakeholder consultations would be carried out in a conversation style with the questionnaires as a set of guiding questions.
- ❖ Stakeholder Consultations (third group of stakeholders).
- ❖ Site Visit to AA. Ukulhas and B. Maalhos (stakeholder consultations with first and second group of stakeholders).
- ❖ SWOT analysis for Maalhos and Ukulhas based on all collected data which means all stakeholder consultations (three groups) as well as the literature reviewed particularly the legal framework (laws, regulations, policies...etc.) in place.
- ❖ Compilation of findings with recommendations for improving the current model of waste management.
- ❖ Validation of findings with key stakeholders by presenting at a validation workshop (participants of the workshop attached in Annex 4).
- ❖ Incorporation of comments from the validation workshop and submitting of draft report
- ❖ Comments for draft report by the MFF National Coordination Body.
- ❖ Incorporation of comments and finalising of report.

KEY STAKEHOLDERS

Key stakeholders were identified and finalized in discussion with members of the MFF National Coordination Body. Some local NGOs and community based organisations (CBOs) though involved in waste management, were omitted due to limitations in time and scope of the Study.

Below is a list of the final stakeholders consulted. Annex 2 will provide a detailed list with names of personnel from key institutions/agencies. A minimum of 10% of each core group of community stakeholders (second group) were consulted in both Ukulhas and Maalhos. However, names of community stakeholders particularly of households are kept anonymous on ethical grounds.

- ❖ Environmental Protection Authority (EPA)
- ❖ Ministry of Environment and Energy (MEE) – Waste Department
- ❖ Health Protection Agency (HPA)
- ❖ Waste Management Corporation (WAMCO)
- ❖ Local Government Authority (LGA)
- ❖ AA. Ukulhas Council
- ❖ B. Maalhos Council
- ❖ Community stakeholders of both Ukulhas and Maalhos:
 - » Households
 - » Businesses
 - » Health Center
 - » School
 - » Fenaka/Stelco
 - » Active leaders'/Youth groups/Womens groups/NGOs/CBOs
- ❖ Maldives Red Crescent
- ❖ UNDP
- ❖ Ministry of Tourism
- ❖ BEAM/Parley
- ❖ Secure Bag
- ❖ Red Production

REVIEW OF THE LEGAL FRAMEWORK ON WASTE MANAGEMENT

Maldives is a Small Island Developing State (SIDS) and similar to other SIDS is geographically isolated with scarcity in land, limited natural resources, heavy dependence on international markets and faced with the challenge of dealing with rapidly increasing waste generation². According to the *National Waste Management Policy 2015*, it is estimated that waste generation per capita is increasing annually at 4% and at present waste management is the biggest development challenge in the Maldives. The economy of Maldives is heavily reliant on tourism which is dependent on the state of the environment and the health of coral reef ecosystem. As per the Ministry of Tourism, the annual growth rate of tourist arrivals to the Maldives is also estimated as 4%. In 2016, the total number of tourists that visited Maldives was over 1.2 million³ - a figure thrice the amount of the total population of the country. While on one hand increase in tourist arrivals is beneficial, when it comes to waste management it becomes a huge challenge. It is estimated that the amount of waste generated per guest night in tourist resorts is 3.5kg in comparison to the estimated waste generated per person living in a typical island which is 0.8kg per day⁴.

The Maldives Environmental Protection and Preservation Act enacted in 1993 stipulates that it is prohibited to dispose waste in a way that is harmful to the environment. It also states that if waste needs to be disposed, it needs to be done in a safe manner at government designated sites in a way that does not cause negative health impacts for the people. *The Regulation on the Protection and Conservation of the Environment in the Tourism Industry 2006* also specifically stipulates practice on waste management. According to this Regulation, it is mandatory for all tourist facilities to place labelled bins with lids for waste segregation at several sites of the facility and stipulates that waste should be disposed in a manner with least impact to the environment. Open burning of waste is prohibited on all operational tourist facilities. The Regulation states that incinerators, compactors and bottle crushers should be placed and in use, in all operational tourist resorts and specifies that items that may cause emission of noxious gases into the atmosphere such as plastic should not be burnt and such items should be collected and delivered to a designated waste management site. In the absence of a designated site, it needs to be disposed in a manner that is least harmful to the environment. As per the Regulation, it is illegal to dispose of waste into the ocean except food waste and biodegradable waste, which is also only permitted in the absence of a designated site. The Regulation specifies that if food waste and biodegradable waste needs to be disposed into the ocean, it should be done outside of the atoll, taking into consideration movement of wind and the ocean currents so that such waste disposed, does not get washed onto the shores of the islands. The Regulation also states that if waste from any tourist facility needs to be transported for disposal outside of the facility, information regarding the waste disposal trip including

² Mohee R, Mauthoor S, Bundhoo ZM, Somaroo G, Soobhany N and Gunasee S (2015) Current status of solid waste management in small island developing states: a review. *Waste Management* 43: 539–549.

³ Ministry of Tourism, "Total number of Tourist Arrivals in 2016", published on 17th January 2017, www.tourism.gov.mv

⁴ National Waste Management Policy 2015

information on the vessel and the quantity of waste being transported needs to be submitted to the Ministry of Tourism. According to the Regulation, Ministry of Tourism has the authority to impose fines and suspend operating license on those who breach the Regulation.

The Decentralisation Act was enacted in 2010 in line with the political reform and amendment of the *Constitution* in 2008. According to the *Decentralisation Act*, waste management within local islands falls under the jurisdiction of the island council. Accordingly, the island councils are responsible for ensuring cleanliness of the island and managing waste generated from their island in a safe manner that does not cause nuisance to their island community. As per the *Decentralisation Act*, the Local Government Authority (LGA) is the regulatory agency that needs to play a key role in managing the relationship between local councils and the central government. This includes monitoring the work and activities of the councils to ensure that they are functioning in accordance with the *Constitution* and laws and regulations of the country. The local councils are to be elected by the local population of each island for a tenure of 3 years. At the time of this study, the number of council members for island communities with population less than 3000 is 5 however, with the amendment to the Act (6th Amendment) on 3rd December 2015, from the next round of elections (scheduled for early 2017) for populations less than 3000, the total number of council members shall be 3.

The National Waste Management Policy 2015, promotes the 3R – Reduce, Reuse and Recycle and defines the roles and responsibilities of individuals, island councils and the government in waste management. It further promotes the “Polluter Pay Principal” as well as the “Extended Producer Responsibility” and stipulates several strategic action points for implementation within the period 2015 – 2020. These include capacity-building initiatives for building technical capacity of island councils for managing waste as well as development of regional waste centers and continuous research on best practice of waste management. It also states the periodic review of laws, regulations and guidelines to bridge gaps and rectify any contradictions within the legal system. According to the Policy, a national forum will be held annually for sharing of experiences and facilitate discussions amongst key stakeholders in striving towards sustainable waste management.

The Constitution of the Maldives 2008 is enshrined with the right of every Maldivian to live in a healthy environment. As per *Article 22* – “The State has a fundamental duty to protect and preserve the natural environment, biodiversity, resources and beauty of the country for the benefit of present and future generations”. The *Waste Management Regulation 2013* was formulated under this Article and the *Environmental Protection and Preservation Act 1993*. The *Waste Management Regulation 2013* stipulates details of how waste needs to be managed and states the roles and responsibilities of key stakeholders including individuals, the Environment Protection Agency (EPA), Local Councils and the Ministry of Environment and Energy. Accordingly, the implementation body of the Regulation is the EPA and specific roles of waste management on the islands compliments the *Decentralisation Act 2010*. The Regulation encourages utility service providers to manage waste as a service under an agreement with the local councils. *The National*

Waste Management Policy 2015 also promotes and encourages utility service providers to provide the service of waste management in island communities.

The Waste Management Regulation 2013 stipulates the templates for waste management plans and minimal standards for handling of waste and minimal standards for waste management centers. For example, it specifically states that transportation of waste should be done in an enclosed manner to prevent any spillage. Disposal of waste to places other than the designated waste disposal sites approved by the EPA, is prohibited. It particularly states that it is illegal to litter and dispose waste onto beaches, mangroves, wetlands, areas of vegetation protecting the shoreline, parks, harbours, lagoons and reefs. It also states that those responsible for managing waste on an island should place labelled bins in communal areas to prevent littering. As per the Regulation, a minimal of two bins to enable segregation of organic/biodegradable waste and reusable waste should be in place. Furthermore, it states that burning of waste is prohibited unless absolutely necessary where burning is only allowed for biodegradable waste. If and when burning is needed, fire safety and first aid facilities should be in place and burning should be done on top of an air circulating structure that is 1 foot above ground level. Moreover, the Regulation states that waste generated from tourist resorts should be managed as per the regulations and guidelines specified by the Ministry of Tourism. The Regulation also stipulates fines for breaching the Regulation. Though activities/actions are stated with a fine range, the Regulation stipulates that exact amount of fine will be determined by the Ministry of Environment and Energy depending on the severity of the action and states that fines need to be paid to local council where it is the responsibility of the council to keep records. Details of how records should be kept are also specified in the Regulation. As per this Regulation, the overall aim of the Regulation is to facilitate the *National Waste Management Policy* in order to preserve and conserve the natural environment of Maldives and prevent people from negative health impacts.

The National Healthcare Waste Management Policy 2016 was enacted under the *Public Health Protection Act 2012* with the vision of ensuring that all waste generated within the health sector is managed safely without adverse effects on human health and environment in an integrated manner that is environmentally and economically sustainable. This Policy although not as comprehensive as the *National Waste Management Policy 2015*, aligns with it and also stipulates the roles and responsibilities of key stakeholders such as Ministry of Health, Ministry of Environment and Energy, Environmental Protection Agency, Waste Management Corporation, Local Councils and Public and Private Healthcare Facilities. It specifies priorities of action which includes amongst other things, procedures for waste handling, capacity building initiatives, promotion of public health and occupational safety as well providing an effective legislative framework that aligns with international conventions for healthcare waste management. The Policy states that it will be reviewed every 2 years.

Review of these legal documents regarding waste management in the Maldives, highlights the lack of a systematic waste management system currently in place. However, recent policies and regulations including the *National Waste Management Policy 2015* demonstrates the national commitment in paper for an effective and sustainable waste management system across the nation.

CASE-STUDY FINDINGS

UKULHAS – CASE-STUDY 1

OVERVIEW



Figure 1 - Aerial photo of AA.Ukulhas (source: <https://www.facebook.com/pg/saafuukulhas/>)

Ukulhas is situated in North Ari Atoll/Alifu Alifu Atoll with a total resident population of 1005, as per the most recent census conducted in 2014. According to the local council, total number of households is 162, with 4 registered Café/Restaurants, 8 shops and 13 guesthouses operational around the island. The main economic activity of Ukulhas is fishing and local tourism.

Total Population	1005	No. of Guest Houses	13
Total No. of Household	162	No. of Café/Restaurants	4
Main Economic Activities	Fishing, Local Tourism	No. of Shops	8

Table 1 - Overview of AA.Ukulhas

THE ESTABLISHED WASTE MANAGEMENT MODEL OF AA.UKULHAS

Governance Structure

The Waste Management Center (WMC) of Ukulhas is staffed with six expatriate workers which include two designated drivers to collect waste (via two 1500kg pick-ups) on a daily basis. Two council members (out of 5) are designated to oversee and manage day-to-day operations of the waste management system.

A daily waste collection system based on a monthly fee is established by the Local Council under the *Ukulhas Waste Management Regulation*. According to the Ukulhas Council, the Regulation and its respective agreements were enacted after consultations with the local community. All fee categories are specified in the agreement (between the council and the respective party) that needs to be signed prior



Figure 2 - Waste collection at AA.Ukulhas by the staff of WMC

commencement of service (Table 2). According to Ukulhas Council, 100% of households and other entities are now registered for the service. As per the agreement, a fine of MVR10 is charged if monthly payment is not paid by the 10th of each calendar month.

Household	100/-	Other businesses	150/-
Guest House (1 – 6 rooms)	150/-	Ferry Service Vessel	100/-
Guest House (7 – 12 rooms)	250/-	Community Building	250/-
Guest House (13 or more rooms)	500/-	Government Institution	250/-
Shop (Imported Goods)	200/-	Other Waste (Pickup Service)	80/-
Café/Restaurant	250/-	Boatshed	300/-

Table 2 - Fee Categories of AA.Ukulhas

The Waste Management Center (WMC)

The existing WMC is situated on the north-western side of the island, adjacent to the only community school on the island. The total area of the WMC is 4620 square feet and the boundary is fenced with two entrances, one near the back of the school and the other entrance towards the shore.



Figure 3 - Temporary entrance (back of the school)



Figure 4 - Main entrance (shore side)

According to the council, the entrance near the back of the school is a temporary entrance that had to be opened due to severe erosion that made it impossible to enter the WMC site from the entrance near the shore. The area effected from severe erosion was reclaimed in mid-2016 and according to the council, the temporary entrance will be closed when they receive sufficient funds. The wall of the room that stored equipment and machinery under the roofed area of the WMC was also collapsed during severe erosion. Though this wall has been rebuilt, when the wall collapsed, electricity wiring for the machinery was damaged and according to the council it has been over 2 years since they have been unable to use the machinery that needs electricity due to lack of funds for rewiring the building. In addition, the council stated that the equipment and machinery they received from the central government does not meet their needs. For example, the glass crusher they have can only crush one bottle at a time thus is not practical for dealing with waste generated from a population of over 1000 people and the rapidly increasing local tourism on the island.



Figure 5 - Equipment and machinery

The WMC has been designed for waste segregation and composting. The open area has concrete flooring of 1200 square feet for composting and consists of two metal structures for open burning of waste. The structures are designed as per the waste Regulation with a minimum of 1 foot above ground level and in a way that will

enable air circulation. At the time of the site visit, open burning of mixed waste was done on the metal structures designed for open burning as well as on the ground of the open area of the WMC. Mixed waste that was burnt consisted of plastic, nappies, sanitary napkins, electronic waste, paper as well as all the waste disposed from the health center. According to the health center, they separate the infectious waste with general waste but all are sent to the WMC and they do not have an auto-clave to de-infect items before it is disposed. According to the council and STELCO (electricity service provider), discarded/waste oil from the powerhouse is used for burning of waste at the WMC. Thus, burning of such mixed waste using such oil has the potential of serious irreversible damage – environmentally as well as on human health.



Figure 6 - Burning tray



Figure 7 - Open burning of mixed waste on the ground

Although the WMC was designed for composting, composting was not done at the time of the site visit. According to the council, they stop composting activities during rainy weather to prevent spread of diseases. Instead of composting, a small dinghy was hired by the council to dispose the food waste into the sea on a daily basis. It should be noted that since collected waste is not properly segregated, food waste bins consist of plastic bags and other non-biodegradable items which has the potential for causing significant negative impacts on the coral reef ecosystem when disposed into the sea.

The roofed area of the WMC has compartments for storing recyclable waste such as metal cans and glass. These compartments are accessible from the shore side and are designed with lockable doors. According to the council, once the compartments are full, they arrange a regular dhoni to transport it to Thilafushi, the designated waste management island by the central government. Initially when they began the current system of operation in 2012, Secure Bag (a private company that exports recyclable waste) did collect the recyclables however as per the council, it has been 2 years since Secure Bag has stopped the service of collecting recyclables from Ukulhas. According to Secure Bag, the market price for recyclables has dropped in recent years resulting in them being unable to collect it from Ukulhas or other islands as it is not financially viable for them anymore. Ukulhas Council also stated that it is not financially viable for them to send it to Thilafushi.

Even though they can still sell the recyclables to Secure Bag at Thilafushi, in their most recent experience, they had to hire a boat for MVR7000 to transport the recyclables from Ukulhas to Thilafushi and they received only MVR3000 for sales resulting in a net loss.



Figure 8 - Recyclable waste storage



Figure 9 - Recyclable waste

The WMC of Ukulhas is open from 8am to 12pm and from 2pm-5pm every day, according to the council. Information about the opening times is not visible at the WMC. Also it was not clear on where or how to dispose of the waste at the WMC.

Occupational Health and Safety

It was observed that occupational health and safety standards were poorly met in the WMC and waste collection process. During handling of waste, minimal safety standards such as wearing of masks, gloves and safety shoes were not met. Drinking water was not available at the WMC and basic fire safety and first aid facilities were not visible. According to the council members, the workers are given masks and gloves but they prefer not wearing them.



Figure 10 - Waste handling without any precautionary measures

Since the health center dispose untreated medical waste in normal plastic bags, collection and handling of such waste on a daily basis places the staff of WMC at high risk. Furthermore, as mixed waste are openly burnt, inhalation of toxic fumes has the potential for significant negative health impacts. Hence, staff of the

WMC involved in day-to-day collection, handling and burning of waste are in a high risk situation putting their life at stake.

Operational costs and established financial mechanisms

The following figures indicates the average monthly expenses for operation of the waste management center and income generated from the established financial mechanisms. Figure 11 shows the breakdown of monthly expenses. Monthly expenses include; staff salary (inclusive of visa, medicals, accommodation and food allowance), maintenance, vehicle fuel, utility bills, sea dumping (since it is done on a regular monthly basis as per the council) and other miscellaneous expenses. As the Figure shows, majority of expenditure is on staff salary and maintenance.

As per Figure 12, income sources include waste collection fee, resort waste management, pickup service, compost sales (inclusive of compost delivery charges), fines and “bombi kundi” sales. Primary income source is through waste collection fee and resort waste management service contributes a significant amount considering other income sources such as pickup service and sales of compost. According to the council, agreement with nearby resorts to manage their non-compostable waste, particularly “burnable waste” on a monthly payment basis has been arranged to compensate for the financial losses of the operation of the WMC and its service. However, looking at the summary of expenses and income in Figure 13, resort waste management service does not contribute enough to make the overall operation of the WMC and its service sustainable in the long run.

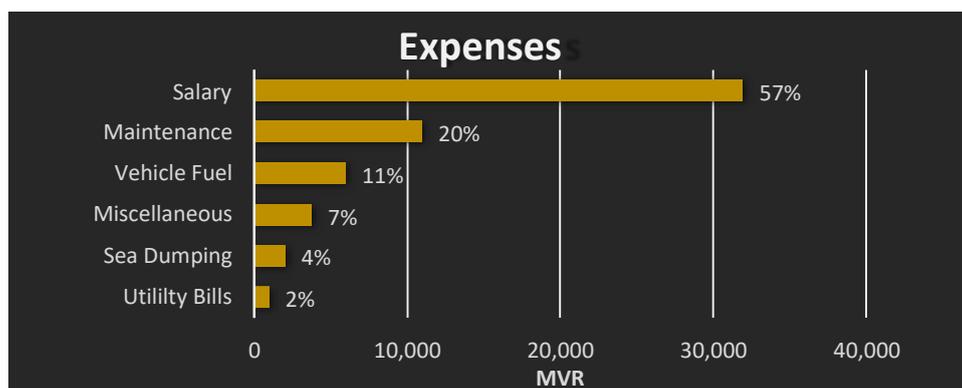


Figure 11 - Average monthly expenses of AA.Ukulhas

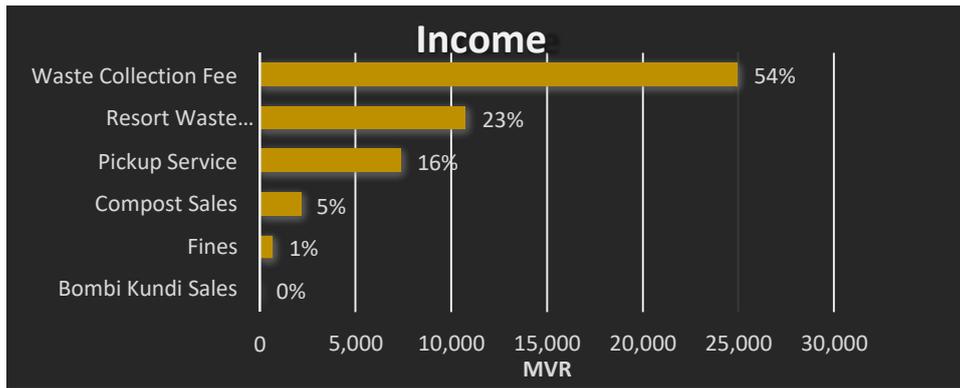


Figure 12 - Average monthly income of AA.Ukulhas



Figure 13 - Summary of average monthly expenditure and income of AA.Ukulhas

Community Engagement and Awareness

According to Ukulhas Council, before they rolled out the model of fee collection system, they established a committee in 2011 consisting of members from key institutions of the island as well as local leaders. *The Ukulhas Waste Management Regulation* was enacted in 2012 after consultations with the local community through community meetings and door-to-door consultations. According to the council members, the waste management committee only operated till the Regulation came into force in 2012. Since then, Ukulhas Council organized an annual community clean-up initiative on every 1st of January under the “Clean Ukulhas/Saafu Ukulhas” slogan. The whole community – young and old as well as government institutions, businesses, guesthouses and visitors to the island including tourists are involved in the clean-up on this day. In addition, the council collaborates with the school and conduct awareness sessions and poster competitions for the school children. Winning posters are made into billboards and posted on the main roads of the island. Furthermore, council arranges meetings for the local community throughout the year and advises members of the households on waste segregation.



Figure 14 - Student posters displayed and dustbin on main road



Figure 15 - Student poster displayed on council wall

According to the community stakeholders, council does conduct awareness sessions and calls for meetings which are useful, but more needs to be done for the overall community to get into the habit of waste segregation and litter prevention. The consultations with the community revealed that there was unanimous support for the waste collection system currently established in Ukuhas. Many acknowledged the cleanliness of the island in comparison to the period before the system was established in 2012. Consultations revealed that, waste was dumped everywhere on the island before 2012 and stakeholders highlighted that back then it was impossible to swim and enjoy the beach of the island as it was polluted with waste. Health Center officials particularly highlighted the drop in cases of diarrhea and dengue since 2012. Though all the community members consulted, understand the importance of waste segregation, and believe they have a responsibility for segregating waste, some acknowledged their own carelessness. While some community members were proactive and innovated mechanisms such as installing a separate door at their houses for waste collection, majority of consultations suggested that waste management has become less of a priority for the local council in comparison to when it was commenced in 2012 which has led to community members also being careless and not being as diligent on waste segregation as they initially were in the first few years. All stakeholders consulted, raised the concern of the WMC being located near the only school in the island particularly in reference to the smoke generated from burning of waste.



Figure 16 - Household food waste bin with non-biodegradable items



Figure 17 - Separate door for waste collection



Figure 18 - Food waste collection bin by WMC staff

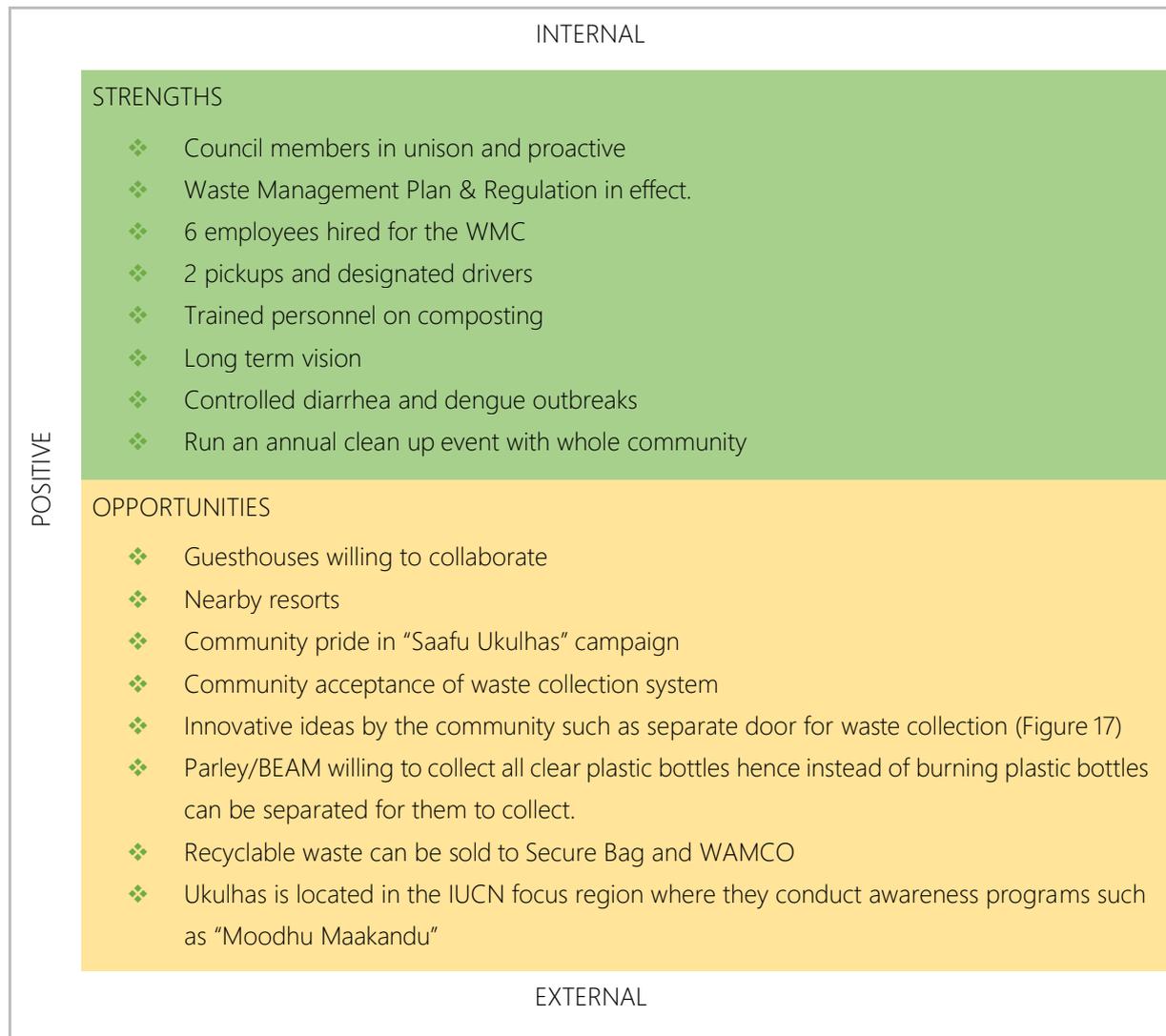
Another significant issue highlighted by the community stakeholders during the consultations was the issue of snail outbreak since the council started bringing in waste from nearby resorts. This has been a major concern and burden for the community as the snails are damaging their crops and home gardens.



Figure 19 - Snail outbreak in Ukulhas

SWOT ANALYSIS

The SWOT Analysis is conducted for Ukulhas Council as they are the driving force behind the waste management system of the island. Strengths and Weaknesses are the internal aspects, while Opportunities and Threats are external aspects. The aspects were analysed from the data collected through all stakeholder consultations and literature review. Detailed list of all stakeholders consulted are in Annex 2.



INTERNAL

WEAKNESSES

- ❖ Limited technical capacity in overall environmental management and sustainable development
 - » Food waste bins that includes non-biodegradable items are disposed into sea – “out of sight out of mind”
 - » Burning of mixed waste resulting in toxic smoke released into the atmosphere on a daily basis
 - » Lack of SOPs for handling hazardous, medical & special waste
 - » Lack of protocols for ensuring occupational health and safety for staff of WMC
- ❖ Limited funds for sustainable operation of an effective waste management system

THREATS

- ❖ Resorts taking advantage by making arrangements with the local council to dispose their waste
- ❖ Introduction of invasive species such as snails damaging home gardens and crops
- ❖ Untreated medical waste disposed from the Health Center
- ❖ Long term health impacts for the community from toxic smoke released from burning of mixed waste and significant negative health impacts for those working at the WMC
- ❖ Visitors littering
- ❖ WMC location being in close proximity to the only school on the island
- ❖ Introduction of Green Tax as according to the council, the commitment given by guesthouses on the island to contribute \$1 per guest for waste management was dissolved with the introduction of Green Tax

NEGATIVE

EXTERNAL

MAALHOS – CASE STUDY 2

OVERVIEW



Figure 20 - Aerial photo of B. Maalhos (source: <https://www.facebook.com/B.maalhos/>)

Maalhos is located in Baa Atoll, with total resident population of 484, as per the 2014 census. According to the local council, the total number of households is 90, with 3 registered Café/Restaurants, 8 shops and 3 Guesthouses. The majority of the male population are employed in tourist resorts, while the female population are involved in thatch weaving as the main source of income generation.

Total Population	484	No. of Guesthouses	3
Total No. of Household	90	No. of Café/Restaurants	3
Main Economic Activities	Employed in Resort, Thatch Weaving	No. of Shops	8

Table 3 - Overview of B. Maalhos

THE ESTABLISHED WASTE MANAGEMENT MODEL OF B. MAALHOS

Governance Structure

The Waste Management Center (WMC) of Maalhos is staffed with four expatriate workers that collect waste (via a 350kg pick-up) on a daily basis (except Fridays). All five council members are involved in supervision of the WMC and are involved in daily waste collection on a rotational basis as vehicle drivers. Unlike Ukulhas,

Maalhos does not have a designated driver. However, similar to Ukulhas, the Maalhos Council also collects waste from households, government institutions (health center, school...etc.) and businesses (shops, guesthouses, cafés...etc.) after signing an agreement on monthly fee collection basis, made under the *Maalhos Waste Management Regulation*. All fee categories are specified in the agreement (between the council and the respective party) that needs to be signed prior commencement of service (Table 4).



Figure 21 - Maalhos waste collection

According to the Maalhos Council, the Regulation and its respective agreements were enacted after consultations with the local community. Unlike Ukulhas, Maalhos agreement does not specify a fine for late payments.

Household (inhabited)	100/-	Carpentry	100/-
Household (uninhabited)	50/-	Government Institution	130/-
Office of CBO/NGO	50/-	Boatshed	100/-
Small Business	100/-	Corporations (Fenaka, Dhiraagu, Ooredoo)	130/-
Café/Restaurant/Guesthouse	120/-		

Table 4 - Fee categories of B.Maalhos

The Waste Management Center (WMC)

The existing WMC is situated on the western side of the island in close proximity to inhabited households. The total area of the WMC is 4000 square feet and the boundary is fenced with a lockable gate at the entrance. The WMC is designed for segregating waste, with an open area with concrete flooring of total area 600 square feet for composting, and a roofed area with compartments for storing recyclable waste as well as equipment and machinery.



Figure 22 - Roofed area of WMC



Figure 23 - Compositing area

According to Maalhos Council members, they are satisfied with the equipment and machinery such as can compactor they have. However, they feel that the vehicle/pick-up they have is insufficient for their current needs of waste collection on a daily basis and highlighted that having only one vehicle is risky as they do not have any back-up options in the situation where the vehicle may not be operational. It was observed that although the vehicle was fairly new and waste collection bins were in good condition, the equipment used for composting such as rakes and brooms utilised to keep the WMC clean, were in very poor condition.



Figure 24 - Condition of composting rake



Figure 25 - Condition of broom – handle missing

The WMC was well kept and the staff were making compost piles with the food waste they collected on a daily basis (except Fridays). At the time of the site visit, compost piles were made on the ground instead of the concrete flooring. According to the council, this was done to prevent the foul smell generated when done on the concrete flooring due to a faulty design of the leachate pit connecting the concrete flooring. The council stated that they have informed the EPA and relevant authorities but have not been able to remedy the issue.

Though there was no burning activity at the WMC, mixed waste was burnt at a site nearby the WMC which was also close to the shore. It was observed that nappies and sanitary napkins were separated and kept in reusable sacks. As per the council, a private party takes these sacks to Thilafushi and disposes it to Thilafushi on a regular basis as a community deed. Unlike Ukulhas, the health center of Maalhos burns their infectious waste on site at the health center in a home-made incinerator made from a discarded oil barrel. The health center utilizes fully functional auto-claves so risk of infectious waste is low in comparison to Ukulhas. However, similar to Ukulhas, the health center also disposes of their general waste at the WMC under the collection system established on the island. This together with all other waste collected from the island is disposed and openly-burnt on the ground. Mixed waste includes plastic, expired medicines, books, rubber, batteries and several that can be classified as hazardous waste. According to the council and Fenaka (electricity service provider), the discarded/waste oil from the power-house is used for burning the waste. Thus, such burning practices has the potential for releasing toxic fumes into the atmosphere on a daily basis. In addition, since it is burnt on the ground, it has the potential for contaminating the ground water. Furthermore, being so close to the shore, it has the potential for causing irreversible damage to the coral reef and species dependent on it.



Figure 26 - Nappies and sanitary napkins



Figure 27 - Homemade incinerator at health center



Figure 28 - Open burning of mixed waste on the ground

The WMC of Maalhos is open from 7am to 3pm every day, according to the council office. Similar to Ukulhas, information about the opening times is not visible at the WMC. Likewise, it was not clear on where or how to dispose of the waste at the WMC.

Occupational Health and Safety

The occupational health and safety standards were comparatively better in the Maalhos WMC as the staff wore waterproof gloves and boots during compost making and handling of waste. However, when asked why they were not wearing masks they stated that they had run out of masks and that they were told that council does not have budget for masks. It was observed that the staff were handling waste and making compost piles under the sun in the intense heat during midday without wearing any hats. Drinking water was not available on site. Such working conditions are strenuous and have the potential for heat stroke. Furthermore, manual lifting of heavy bins may have long term impacts on



Figure 29 - WMC staff making the compost pile

physical health. Similar to Ukulhas, open burning of mixed waste consisting of plastic, batteries were common practice on a daily basis and basic fire safety and first aid box was not visible on site. Though comparatively better than Ukulhas, staff of the WMC involved in day-to-day collection, handling and burning of waste are in a high risk situation putting their life at stake on a daily basis.

Operational costs and established financial mechanisms

The following figures indicates the average monthly expenses for operation of the WMC and income generated from the established financial mechanisms. Figure 30 show the breakdown of the monthly expenses. Accordingly, the bulk of the monthly expenses goes for staff salary which includes the visa fees, medicals, accommodation and food allowances for expatriates. Unlike Ukulhas, maintenance cost is significantly low in Maalhos. This may be due to lack of sufficient funds for undertaking maintenance work as it was observed at the site visit where basic equipment like rakes needs to be replaced or fixed.

Looking at the income generating sources at Maalhos as per the Figure 31, similar to Ukulhas waste collection fee is the primary source. However, unlike Ukulhas, Maalhos generates a significant income from compost sales and considerably a less amount from pickup service fees in comparison to Ukulhas. Despite this, Figure 32 indicates that operation of the WMC and its services is currently at a loss and needs additional income sources or cut down on expenses in order to ensure its long term sustainability.

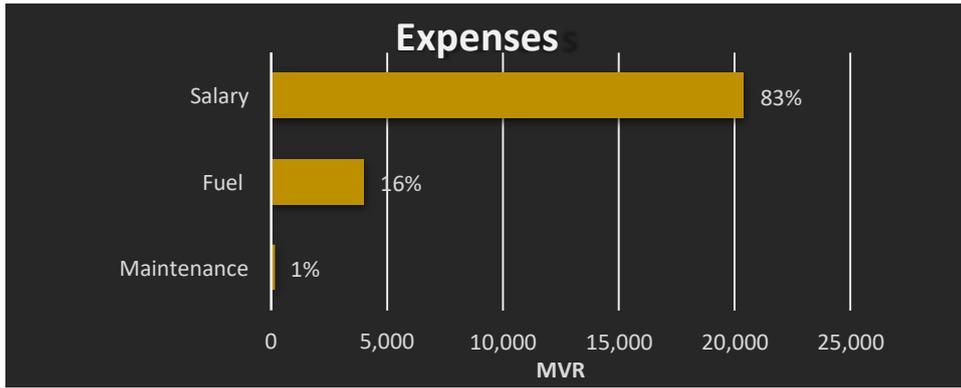


Figure 30 - Average monthly expenses of B. Maalhos

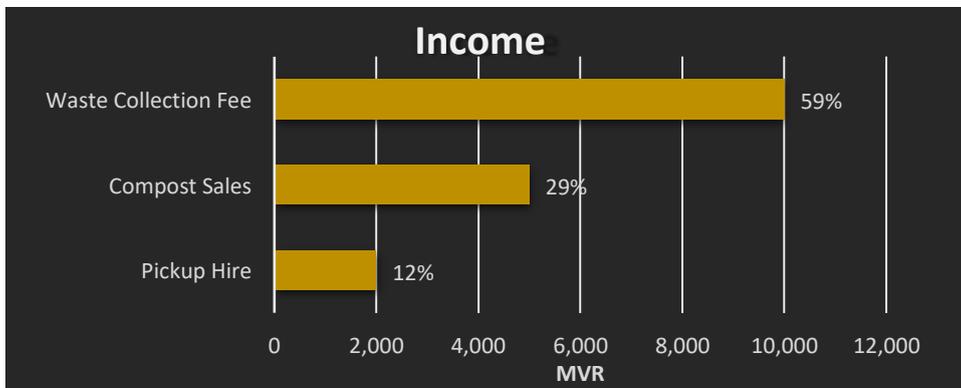


Figure 31 - Average monthly income of B. Maalhos



Figure 32 - Summary of average monthly expenditure and income of B. Maalhos

Community Engagement and Awareness

According to Maalhos Council, they conducted community meetings before enactment of the *Maalhos Waste Management Regulation* in 2015 but have not been able to conduct ongoing awareness sessions. According to the community stakeholders, households, businesses (shops, café, guesthouses...etc.) and government institutions (school, health center...etc.) are advised on waste segregation during signing of the agreement. Maalhos Council proudly stated that at present 100% of households and other entities have registered for the waste collection system. Though unanimously all community stakeholders greatly appreciate the efforts by the council members for waste collection system, feedback suggests they would like to see more dustbins in place for waste segregation in common areas like harbor and beach and raised the concern of the composting area being too close to households. The school principal acknowledged that the school can play an active role in building awareness particularly in litter prevention and waste segregation. All stakeholders consulted, unanimously agreed that waste management on the island was a community effort and believed that each individual has a responsibility to segregate waste in the way the council has told them to do so as per the agreement. They also acknowledged the carelessness on their part on improper waste segregation and littering habits.



Figure 33 - Littering in harbor area



Figure 34 - Household food waste bin with non-biodegradable items



Figure 35 - Burying waste including plastic after sweeping the beach

SWOT ANALYSIS

The SWOT Analysis is conducted for Maalhos Council as they are the driving force behind the waste management system of the island. Strengths and Weaknesses are the internal aspects, while Opportunities and Threats are external aspects for the council. The aspects were analysed from the data collected through all stakeholder consultations and literature review. Detailed list of all stakeholders consulted are in Annex 2.

	INTERNAL
POSITIVE	<p>STRENGTHS</p> <ul style="list-style-type: none"> ❖ Council members in unison & proactive ❖ Waste Management Plan & Regulation in effect. ❖ 4 employees hired for the WMC ❖ All council members have driver's license ❖ Trained personnel on composting ❖ Continuing to compost all food waste despite challenges
	<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> ❖ Nearby resorts willing to support ❖ Community support for the waste collection system ❖ NGO and Health Center working together in island clean ups – mosquito eradication ❖ Private vessels helping to transfer waste to Thilafushi ❖ Parley/BEAM willing to collect all clear plastic bottles ❖ Part of the Vandhoo Regional waste management ❖ Recyclable waste can be sold to Securebag, WAMCO ❖ Part of the UNESCO Biosphere Reserve hence accessibility to the Baa Atoll Conservation Fund. ❖ Nappies and sanitary napkins transported to Thilafushi by a private party
	EXTERNAL

INTERNAL

WEAKNESSES

- ❖ Limited technical capacity on environmental management/sustainable development
 - » waste collection service not provided for the women sweeping common areas resulting in them either burying the waste on the beach or pushing it towards the roadside
 - » burning of mixed waste resulting in toxic smoke released into the atmosphere on a daily basis and contamination of the groundwater and sea (as it is done near the shore).
- ❖ Lack of SOPs for hazardous, medical & special waste
- ❖ Lack of protocols for ensuring occupational health and safety for the staff of WMC
- ❖ Lack of Funds
- ❖ Only one pickup
- ❖ No designated driver
- ❖ Equipment needs to be replaced/fixed
- ❖ Need bags for compost sales
 - » Model functionality heavily reliant on existing council members

THREATS

- ❖ Long term health impacts for the community and environmental damage from mismanagement of hazardous waste and open burning
- ❖ Groundwater contamination due to design fault of WMC composting pad
- ❖ Groundwater contamination from open-burning of mixed waste on the ground
- ❖ Negative impacts to the coral reef and life dependent on it as mixed waste burning site is in close proximity to the shore
- ❖ WMC location being in close proximity to households is of great concern due to the foul smell generated from composting which is a nuisance for the nearby households
- ❖ Reduced number of Council Members (5 to 3) in the upcoming election will impact the functionality of the model as it is heavily reliant on the existing 5 council members.

NEGATIVE

EXTERNAL

KEY FINDINGS

This section summarises the key findings from the case-studies of both Ukulhas and Maalhos. Similar to SWOT Analysis the factors for effectiveness, gaps and challenges were primarily derived from analysis of data collected from stakeholder consultations, literature review and observations. All these results were presented at the validation workshop to proof check and verify the information so that any misunderstandings or misinterpretations can be rectified. Overall, the validation workshop was well received, with positive comments and constructive discussions on addressing the issue of waste management. List of participants of the validation workshop are attached in Annex 4. The comments gathered at the validation workshop was then compiled and submitted as a draft report to the MFF national coordination body. As waste management is a huge issue of concern, as expected, some of the comments received were beyond the scope of the study. Accordingly, comments within the scope of this study has been incorporated in this final report. The verification process of finalizing this report minimizes subjectivity and researcher bias given the qualitative nature of the overall study.

FACTORS FOR EFFECTIVENESS

Following are the key factors identified as contributing towards the effectiveness of the model established in both islands:

- ❖ Proactive Council Members
 - » The willingness of council members in both Ukulhas and Maalhos in addressing the issue of waste and being physically involved in waste management is a key factor for the effectiveness of the established system in both islands.
- ❖ Council members in unison
 - » In both Ukulhas and Maalhos, all the council members were from the same political party with the same mind-set, willing to work together on addressing the issue of waste management. This greatly contributes to the effectiveness of the established system in both islands.
- ❖ Service continuity since commencement
 - » In both islands, the community stakeholders have placed trust in the established system due to the continuity of the waste collection on a daily basis since the commencement of the service.
- ❖ Community support
 - » In both communities' unanimous support was there for the daily collection system as it has been a huge convenience for households especially for women who would normally be responsible for disposal of household waste generated. Furthermore, both communities recognises and understands the health benefits of proper waste management in a designated site and appreciates the aesthetics of clean island especially clean beaches and swim area.
- ❖ National recognition
 - » Both communities take pride in that they have been nationally recognised for their waste management initiatives and particularly in keeping the island clean.

CHALLENGES

Following are the key challenges identified:

- ❖ Geographical nature of the islands
 - » The scattered nature of the islands significantly increases the transport costs. Therefore, transporting non-biodegradable waste to the designated waste disposal sites as per the *Waste Management Regulation 2013* are a huge financial burden for local councils.
- ❖ Lack of Human Resource capacity in key institutions to effectively manage waste such as the Environmental Protection Agency, Ministry of Tourism, Health Protection Agency, Local Government Authority and the Local Councils.
- ❖ Overlapping mandates within institutions and unclear roles and responsibilities regarding waste management. For example, the officials of Ministry of Tourism stated that monitoring aspects of waste management should be the responsibility of EPA when technical staff of EPA feels that any aspect regarding Tourist Resorts are now beyond their scope after revisions from a Presidential decree in 2015. The *Regulation on the Protection and Conservation of the Environment in the Tourism Industry 2006* also states that it is the responsibility of the Ministry of Tourism. However, when officials of these key institutions points their finger at each other instead of taking action to remedy the situation, it suggests that roles and responsibilities of these key institutions regarding waste management should be more clearly defined for effectively addressing the issue and enforcing the law by taking action on those breaching the regulations.
- ❖ Functionality of the model in Ukulhas and Maalhos heavily depend on the council members/individual people. If council members change, concern over functionality of the model. While this is a strength in the effectiveness of the model currently established in both islands, it is a challenge when considering long-term sustainability of the system in place.
- ❖ Lack of facilities to check quality/valuation of compost. While composting is encouraged at island level waste management, lack of mechanisms to check the quality of compost being made is a concern. Some home-gardeners of both Ukulhas and Maalhos who used the compost made in their respective islands stated that their plants died after using that compost. Thus, lack of mechanisms for checking quality of the compost is a barrier for placing trust in the commodity.
- ❖ Current model of waste management established in both Ukulhas and Maalhos is immensely labour intensive and reliant on cheap migrant labour. Both island councils stated that they were unable to recruit locals for the job.
- ❖ Weak enforcement of law:
 - » police not stationed in small islands
 - » Lack of funds/HR capacity in EPA – the agreement between Ukulhas council and the resorts for managing the resorts' "burnable" waste is illegal as per the *Waste Management Regulation 2013*. Furthermore, the resort needs to inform the Ministry of Tourism if such an arrangement is made as per the *Regulation on the Protection and Conservation of the Environment in the Tourism Industry 2006*.
- ❖ Limitation for Local Councils to access Loan Schemes
- ❖ Vulnerability to Climate Change and predicted adverse impacts from extreme weather have not been factored in the design of WMCs. For example, in the case of Ukulhas, they are unable to do

composting during rainy days and according to locals, in recent years they have been experiencing unpredictable and unusual rain.

GAPS

The following are the key gaps identified:

- ❖ Lack of monitoring mechanisms for ensuring effective implementation of policies and regulations.
- ❖ Lack of Standard of Procedures (SOPs) particularly for:
 - » Occupational health and safety
 - » Migrant workers' rights
 - » Safe disposal of waste – particularly hazardous, special and medical waste
- ❖ Peoples mindsets particularly the "out of sight out of mind" attitude.
- ❖ Lack of funds to manage waste particularly at island level:
 - » Councils given mandate but lack of budget allocation – similarly health centers mandated to safely dispose their medical waste but lack of budget allocation.
 - » Lack of essential equipment e.g.: compost thermometer for council and autoclave for health center in the case of Ukulhas.
 - » Malpractice (e.g.: dumping into sea, open burning of mixed waste...etc.) due to environmentally sound practices of disposing waste needing sufficient funds.
- ❖ Costs associated with irreversible environmental damage are not considered.
- ❖ Costs associated with health impacts for the community from toxic fume inhalation are not considered.
- ❖ Costs associated with ensuring occupational health and safety standards are not considered.
- ❖ Lack of Waste Audits and Needs Assessments prior to resource allocation by Central Government/Donors. Key stakeholders highlighted the fact that they are forced to tailor projects for funds rather than attaining funds on needs basis (at all levels for example MEE when applying for grants or councils applying for grants facilitated from UNDP...etc). This results in resource allocation not matching community needs, inefficiencies, and unsustainable results.
- ❖ Lack of human resources capacity in key institutions – EPA, MEE, MoT, HPA and Local Councils
- ❖ Top-down decision making with lack of meaningful community engagement leading to issues such as design faults eg: Maalhos composting area leachate pit – the foul smell from the area is due to faulty design of the leachate pit and composting pad. According to the council, this was an issue raised in the initial design stages however it was not addressed leading to serious consequences such as contamination of ground water. Maalhos council is still in urgent need for remediating the situation.

DISCUSSIONS

It is apparent that the existing “good practices in waste management” in both Ukulhas and Maalhos are not able to adequately preserve the environment neither protect the health of the community. As revealed from both case-studies, open-burning of mixed waste on a daily basis and “out of sight out of mind” attitude in tackling with waste is still common practice. Although such practices are illegal as per the *Waste Management Regulation 2013*, officials of the Waste Management and Pollution Control Department of Environment and Energy (MEE) stated that they are unable to strictly enforce the law as there are no alternative environmentally sound solutions that they can currently recommend. The authorities (EPA, Ministry of Tourism, Health Protection Agency...etc.) are aware of the malpractice such as ocean dumping of mixed waste and mishandling of medical/hazardous waste which has serious negative consequences with potential of irreversible damage⁵. Such irreversible damage is not only for the environment. Any damage to the island ecosystems will also impact the economy as it is heavily reliant on tourism. Also, degradation of the environment increases the vulnerability of Maldives to climate change. Furthermore, several studies show that inhalation of toxic fumes that are released from open burning of mixed waste significantly harms human health. People exposed to such toxic smoke are at risk of respiratory problems, lung function impairment, skin infections, gastrointestinal diseases and brain damage⁶.

Even though the *Constitution* of the Maldives states that a healthy environment is a fundamental right and there are laws and regulations in place to ensure that people have that right, consultations with the technical officials in the relevant government institutions revealed that they feel like their hands are tied to enforce the law. While the officials of the Environmental Protection Agency, Health Protection Agency and Ministry of Tourism stated that the predominant challenges for them in enforcing the law are limited technical human resources and lack of funds, the officials of the Waste Management and Pollution Control Department of MEE stated that at present funding is not an issue and they do have adequate human resource capacity for tackling the waste management across Maldives. According to them, the issue of waste management will be addressed in the near future with the implementation of the large scale regional waste management projects currently in the planning phase whereby the Waste Management Corporation (WAMCO) revived in July 2015 has been given exclusive rights for waste management at national level. Since WAMCO was revived after the *Waste Management Regulation 2013* came into force, the need for clearing out roles and responsibilities of key stakeholders in dealing with and managing waste is urgent if Maldives strives to attain sustainable development.

⁵ Hossain, M.S, Santhanam, A, Norulaini, N.A.N, Omar, A.K.M., 2011, “Clinical solid waste management practices and its impacts on human health and environment – a review”, *Waste Management*, 31, 754-766.

⁶ Ray, M.R, Roychoudhury, S, Mukherjee, G, Roy, S, Lahiri, T., 2005, “Respiratory and general health impairments of workers employed in a municipal solid waste disposal at an open landfill site in Delhi”, *International Journal of Hygiene and Environmental Health*, 208, 255-262.

RECOMMENDATIONS

The following are the recommendations for the way forward:

- ❖ Waste management is a cross-cutting issue, hence, collaborative effort is needed for attaining sustainable results. Accordingly, it is recommended to urgently clarify roles and responsibilities of different government agencies/entities particularly with respect to WAMCO having exclusive rights for waste management at national level according to the Ministry of Environment and Energy. Roles and responsibilities of private sector, civil society and individuals also needs to be clearly defined. This can be done at the annual waste forum as per the *National Waste Management Policy 2015*. It is important to generate dialogue and avoid duplication of efforts and improve efficiency and effectiveness and ensure that different waste sectors (Tourism, Health...etc) and key stakeholders complement each other rather than competing.
- ❖ Strong monitoring mechanisms with sufficient budget allocation for effective implementation of laws and regulations needs to be in place. If resorts are making agreements with local islands to manage their waste, it should be done legally without any burden and negative impacts to the community. It is highly recommended that relevant authorities look into the case of Ukulhas where resorts are disposing of their waste illegally and take the necessary action.
- ❖ It is evident from the case-study of Ukulhas that composting is not a sustainable solution for every island. Though Ukulhas was the first island that commenced the waste management system by doing composting, in recent years they have been unable to continue their composting initiatives. Hence, it is recommended to explore innovative, sustainable solutions to manage organic waste at island level.
- ❖ It is evident that there is an urgent need for shifting mindsets of people due to the existing culture of “out of sight out of mind attitude”. Therefore, it is highly recommended to secure sufficient funds for capacity building and awareness creation in environmental and health consciousness/behavioral change. It should be noted that behavioral change and shifting mindsets will take time hence short term strategies should also go in parallel to long term capacity building initiatives. These may include developing materials like billboards (in Dhivehi, English and Bangladeshi) and placing these in the work site as well as prominent places in the islands to mitigate the “out of site out of mind” habits.
- ❖ With the government plans for regional waste management centers, it is highly recommended to prioritise funding for efficient baling press machines for islands so that they can reduce the volume of the recyclable waste that needs to be stored at the WMC on the island and also will be cost-effective when transporting to the nearest regional waste management center.
- ❖ It is highly recommended to invest in climate-proofing of existing WMCs to mitigate adverse impacts from extreme weather events. Already unusual rain has been effecting the composting initiatives of Ukulhas and Maalhos. In Ukulhas, severe erosion caused the collapsing of the wall of the WMC resulting in damaging the electrical wires putting extra burden on the council when they are already struggling with finances. Accordingly, emphasis should be given to all pipeline projects and any future projects to incorporate building resilience to the changing climate. In addition to adaptation aspects such projects should also ensure phasing out of fossil fuel dependence and moving towards renewable energy/energy independence.

- ❖ As evident from the case-studies, handling of waste and the day-to-day operations of the Waste Management Centers/Systems are heavily reliant on migrant workers which has the potential for exploitation of their fundamental human rights. They need to be respected and treated with dignity hence it is highly recommended to ensure SOPs are in place for meeting occupational health and safety standards for all staff working at WMCs and ensure that these standards are followed and implemented.
- ❖ It is also evident from the case-studies that current practice of resource allocation and top-down decision making has led to inefficiencies and unsustainable results. Therefore, it is highly recommended to conduct waste audits, needs assessment, cost-benefit-analysis and explore cost recovery mechanisms prior to mobilizing/allocation of resources to local communities. Furthermore, it is strongly recommended to meaningfully engage key stakeholders including local community at all stages of decision-making process.
- ❖ Case-study of both Ukulhas and Maalhos revealed that handling of hazardous waste is taken very lightly and neither the councils nor the community stakeholders are aware of the serious negative consequences of mishandling such waste e.g. burning. Hence, it is highly recommended to give urgent attention and accelerate efforts on raising awareness on handling hazardous waste.
- ❖ It is highly recommended to ensure transparency and accountability of the Green Tax whereby objectives of the Green Tax and the activities on which the Green Tax money will be spent are clearly defined. Since tourists generate more waste than locals, the "Polluter Pay Principal" should be applied whereby priority of the Green Tax should be given for waste management.



REFERENCES

Constitution of the Republic of Maldives, 2008.

Decentralisation Act 2010

Hossain, M.S, Santhanam, A, Norulaini, N.A.N, Omar, A.K.M., 2011, "Clinical solid waste management practices and its impacts on human health and environment – a review", *Waste Management*, 31, 754-766.

Maldives Environmental Protection and Preservation Act 1993

Ministry of Tourism, "Total number of Tourist Arrivals in 2016", published on 17th January 2017, www.tourism.gov.mv

Mohee R, Mauthoor S, Bundhoo ZM, Somaroo G, Soobhany N and Gunasee S (2015) Current status of solid waste management in small island developing states: a review. *Waste Management* 43: 539–549.

National Bureau of Statistics, 2015, "Census 2014", Republic of Maldives.

National Bureau of Statistics, 2016, "Statistical Pocketbook of Maldives 2016", Republic of Maldives

National Healthcare Waste Management Policy 2016

National Waste Management Policy 2015

Ray, M.R, Roychoudhury, S, Mukherjee, G, Roy, S, Lahiri, T., 2005, "Respiratory and general health impairments of workers employed in a municipal solid waste disposal at an open landfill site in Delhi", *International Journal of Hygiene and Environmental Health*, 208, 255-262.

Regulation on the Protection and Conservation of the Environment in the Tourism Industry 2006

Waste Management Regulation 2013

ANNEX 1 – DETAILED LIST OF STAKEHOLDERS CONSULTED

- ❖ Environmental Protection Authority (EPA)
 - » Mariyam Rifga – Assistant Director
 - » Riffath Naeem – Senior Environmental Analyst
- ❖ Ministry of Environment and Energy (MEE) – Waste Department
 - » Ahmed Muruthaza – Director General
 - » Mohamed Hamdhan – Assistant Project Officer
 - » Eyman Ismail – Assistant Project Officer
 - » Fathimath Shafaath Ibrahim – Civil Engineer
- ❖ Health Protection Agency (HPA)
 - » Moosa Haneef – Senior Public Health Programme Officer
- ❖ Waste Management Corporation (WAMCO)
 - » Ismail Ubaid – Facilities Manager
 - » Aakifa Abdulla – Legal Officer
 - » Mohamed Iqbal – Business Development Manager
- ❖ Local Government Authority (LGA)
 - » Shammoom Adam – Director General Planning and Monitoring
 - » Azhath – Director of Planning
- ❖ AA. Ukulhas Council
 - » Shaukath - President
 - » Abdulla Firaq – Vice President
 - » Mohamed Husnee – Council Member
 - » Ali Waheed - Council Member
 - » Ali Zameer – Council Member
 - » Shamila Hassan – Assistant Planning Officer
- ❖ AA. Ukulhas Health Center
 - » Azra Amir – Community Health Officer
 - » Athifa Ali – Administrative Officer
 - » Sharumeela Haneed – Family Officer
 - » Agleema Waleed - Midwife
- ❖ AA. Ukulhas STELCO Branch
 - » Hussein Shivaz – Assistant Operations Manager
 - » Asim Ahmed – Technician
- ❖ AA. Ukulhas School
 - » Abdulla Ziyad – School Principal
- ❖ B. Maalhos Council
 - » Abdulla Shujau – President
 - » Abdul Matheen Solih – Council Member
 - » Aboobakuru Abdulla – Council Member
 - » Adam Yusuf – Council Member

- ❖ B. Maalhos School
 - » Abbas – School Principal
- ❖ B. Maalhos Health Center
 - » Yoonus Hameed – Translator/Temporary in-charge
- ❖ B. Maalhos FENAKA Brance
 - » Yoosuf Abdul Rahmaan – Assistant Manager
- ❖ Community stakeholders of both Ukulhas and Maalhos:
 - » Households
 - » Businesses
 - » Active leaders/Youth groups/Womens groups/NGOs/CBOs
- ❖ Maldives Red Crescent
 - » Khadeeja Naseem – Head of Programmes and Services
 - » Sonath Abdul Sattar – Disaster Management Officer
- ❖ UNDP
 - » Aishath Rizna – Assistant Residential Representative - Governance
 - » Nasheeth Thoha – Assistant Residential Representative - SPPPM
 - » Abdulla Adam– National Coordinator - MFF
 - » Shaha Shakeeb – Programme Associate – GEF, SGP and MFF
 - » Fathimath Saeedha – National Coordinator, GEF Small Grants
 - » Aminath Shaliny – Project Officer Waste Management
 - » Aishath Azfa Riza – Programme Manager LECRED
 - » Ahmed Mohamed Shihab – Project Officer LECRED
 - » Mizy Musthafa – Innovation and Partnership Building Associate
 - » Makhdhooma Nazim – Business and Product Development Officer
- ❖ Ministry of Tourism
 - » Aishath Ali – Director General
 - » Ibrahim Fikry – Assistant Director Environment Department
- ❖ BEAM/Parley - Shahina Ali
- ❖ Secure Bag - Ibrahim Shareef
- ❖ Red Production - Abdulla Fahthah

ANNEX 2 - KEY QUESTIONS

Questions for Local Council of Ukulhas and Maalhos

1. What is the current practice? Does the present practice result in reduced waste generation?
2. Is it important to reduce waste generation?
3. Has there been any programmes or focus on reduction of waste? Eg: bottled water plastic bags. Has it yielded positive results? Do you think this is adequate?
4. How do you go about waste collection? What are the challenges you face? Is there a plan for this?
5. What is the established governance mechanisms around waste management? Have you formulated any committees? Is the mechanism in place working? What are its challenges?
6. How would you rate the severity of different types of waste on the island community and environment (eg: kitchen waste, pet bottle, agricultural waste, industrial waste, hospital waste, electronic waste, plastic bottles, plastic bags...etc)
7. How would you rate the level of importance given in the current waste management practiced in the island to the types of waste regarded as severe in the above question?
8. How have you involved the community? (Extent of enhancing their awareness, what tools did you give them? eg. dustbin, how was the fee decided? The need for refresher trainings/ Sequence followed; Lobbying done?)
9. How is waste segregated?
10. Do you feel that the community is aware on waste segregation?
11. Which sector generates the bulk of waste? eg. households, cafés, guesthouses...etc?
12. Do you keep records? Waste audits? - If not what are the challenges (eg: Know how, trained people etc) If done how is it maintained? Are statistics on waste collected and processed available for public or on request? Do you share this with public and community members?
13. What is the current % of waste composted?
14. What is the composting procedure? How much time is invested in composting? (identify its effectiveness)
15. Are you aware of a period where composting does not take place? Are all kitchen and green waste composted? What is done to the rest?
16. Do you believe that composting is the right method of addressing biodegradable waste? Is it feasible?
17. What do you do to tackle the issue of flies and other pests?
18. What do you do when it rains and floods?
19. Has unpredictable weather effected the waste management practice?
20. Are there measures in place to minimize negative impact from bad weather?
21. What do you do with the finished compost? If it is sold, what is the mechanism? Are records kept?
22. Do you feel that the current practice of composting is sustainable? Why?
23. Have you explored other composting mechanisms?
24. What is done to the non-compostable waste? – ask Maalhos about the link to regional waste management center?
25. In your opinion is there a permanent solution to the non-biodegradable components of waste?
26. Why do you have to burn waste?

27. What percentage of waste is burnt on the trays?
28. Do you believe burning is a good practice?
29. What are the safety measures in place? Overall safety/occupational health and safety?
30. What do you do with plastic waste? Are you aware of BEAM/Parley?
31. What do you do with medical waste?
32. What do you do with nappies and sanitary napkins?
33. What do you do with electronic waste?
34. What do you do with other hazardous waste eg chemicals?
35. What do you do with metal waste? Are you aware of Secure Bag? If you have contacted them, are they willing to ship? Are the costs they offer reasonable etc?
36. What do you do with construction waste? Demolished buildings?
37. Do you feel that the current practice of waste management is sustainable? Why? (identify if they think their model is successful)
38. Do you see any room for improvement in the setup of the WM center? Is the infrastructure adequate?
39. Is the infrastructure designed appropriately? Did you have to change anything? Are there any changes you would like to make? If so what are they and why?
40. Are the machines provided functional? Do you think they are the most appropriate?
41. What do you do with anything which cannot be stored or composted? What kind of stuff is it and what percentage does it make up of all the waste collected?
42. How much revenue do you generate from the waste management centre? Is it enough to cover operational and recurrent costs?
43. How is the money generated from waste management utilized? How do you track the finances?
44. Has any grants/funds/external support facilitated the functioning of the current waste management system?
45. Is the waste center self-sustaining now?
46. What have been the main challenges?
47. What are the limitations?
48. How can the current practice be improved?
49. What is your vision? Dream? Wish? How do you see/envision an effective waste management system functioning?
50. Any additional things they wish to share?

Questions for Key Stakeholders in Ukulhas and Maalhos

1. How do you feel about the current waste management system?
2. What is good about it?
3. What is bad about it?
4. How do you feel about waste segregation?
5. Is waste segregation important?
6. What is 3R? (if they don't know explain) Do you believe 3R is important?
7. Has there been any programmes or focus on reduction of waste? Eg: bottled water plastic bags. Has it yielded positive results? Do you think this is adequate?
8. Is it important to reduce waste generation?
9. Does the present system of waste management in the island result in reduced waste generation?
10. How do you think that waste generation can be reduced in your island?
11. What is the role of the council?
12. Does the council provide bins? Are they enough?
13. Do they take a fee for waste management? If yes, how much? Are you happy with the fee?
14. Do you feel you need to pay for waste management? Why?
15. How do you feel about composting?
16. Are you aware of the presence of burning trays on the islands? What percentage of waste do you think is burnt on these islands?
17. What do you think are the current challenges faced by the council in managing waste?
18. What do you think are the limitations of the council in effectively managing waste?
19. Do you feel that the current practice of waste management is sustainable? Why? (identify if they think their model is successful)
20. Do you see any room for improvement in the setup of the WM center? Is the infrastructure adequate?
21. Do you feel that the infrastructure of the WMC is designed appropriately? Are there any changes you would like to see? If so what are they and why?
22. Are there any other parties that has facilitated the existing waste management system? eg. resort providing bins, clean up events, study tours...etc
23. Do you believe that an effective waste management system is necessary? Why? (identify whether they understand the health implications and other impacts from mismanagement of waste)
24. How do you think the existing waste management system can be improved?
25. What is your vision of an effective waste management system?
26. Do you believe that you have a role in waste management?
27. What can you do?
28. Any additional things they wish to share?

Questions for Other Key Stakeholders

1. What is your role in waste management?
2. Why do you think the Ukulhas and Maalhos model are considered as successful?
3. Do you feel that the broader community of both those islands are aware on waste segregation and 3R?
4. Are you aware about the financial mechanisms in Ukulhas and Maalhos?
5. Do you believe that the financial mechanism in Ukulhas and Maalhos will ensure its sustainability?
6. Do you believe that the model in Ukulhas and Maalhos are ideal models that can be replicated in other islands? Why?
7. What is good about it?
8. What is bad about it?
9. Do you feel that the current composting model in Ukulhas and Maalhos is effective? Why?
10. Have you explored other methods for composting? If yes, is it better than the current model? Why?
11. What do you think are the current challenges faced by the council in managing waste?
12. What do you think are the limitations of the council in effectively managing waste?
13. How do you feel about utility companies taking over waste management in local islands? What would be the role of the council in that situation?
14. Do you believe that climate change/extreme weather is a challenge for waste management? Why?
15. How do you think the existing waste management system can be improved?
16. What should be in place for long term sustainability of an effective waste management system in an island?
17. Would you recommend a better model than Ukulhas and Maalhos for upscaling and replicating across Maldives?
18. What is your vision of an effective waste management system?
19. What can you do?
20. Any additional things they wish to share?