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The Issues of Solid Waste Management on Small Islands: Malapascua Island Philippines as a Case Study

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The Issues of Solid Waste Management on Small Islands:

Malapascua Island Philippines as a Case Study.

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Preface

The issues, that small islands face, regarding the disposal and management of their solid waste are serious. Although not all small islands face the same problems it is worth looking at one island in particular as a case study to get a better understanding of some of these issues. Malapascua Island in the Philippines, a small island, has over a very short time gone through a period of rapid development due to tourism. Malapascua Island's solid waste disposal infrastructure has not kept up with this rapid development. The management and disposal of solid waste has now become a serious issue that needs addressing. Malapascua current issues create a platform for the study of the causes as well as possible solutions to the issue of solid waste management. The approach taken is to describe well-developed solid waste management systems contrasted with the current problems faced on Malapascua to examine if there is any way of adapting modern systems to serve Malapascua's current and future needs.

Project Summary:

Solid waste management in today's modern cities is something that has been developed and perfected over time. Many of these modern cities have well developed infrastructures in place to deal with the appropriate collection and disposal of solid waste. The infrastructure dealing with the disposal of solid waste, once created, starts at its source. The creator of the waste, in an ideal environment, sorts the waste into its various categories and then places it out for collection. The waste is collected either by municipal government agencies or private contractors using specifically designed trucks. Once the solid waste is collected it can be disposed of in a variety of manners. In some countries the solid waste is used for generating power through its incineration. This is the case in the Netherlands.¹ Solid waste can also be recycled to be reused or repurposed. As an example some countries are now looking at the viability of repurposing plastic bottles for road construction.² Solid waste that cannot be recycled or repurposed will ultimately end up in landfills, which if managed correctly can in time be used for other purposes. Now imagine small islands with no infrastructure for the collection of solid waste, and a society that has not historically generated notable solid waste, thus has no precedent for its appropriate disposal. An island with an ever-increasing amount of solid waste caused by increasing tourist arrivals and the evolving consumer society that results. How do these small islands cope with the issue of solid waste and the effects that this solid waste can have on the livelihood and welfare of the island? To understand and explore these effects in greater detail, Malapascua Island, in the Philippines will be used as a case study to determine the relevant issues and how they can be resolved.

Waste disposal with infrastructure

The city of San Diego as an example: it will generate 325,000 tons of waste, 60,000 tons of recyclables and over 30,000 tons of yard waste this year from 289,000³ residences. That makes a total amount of waste generated of 415,000 tons. This equates to 1.43 tons of waste per residence. All of this waste is transported to the 1,500 acre Miramar landfill which is San Diego's only active landfill. This waste is transported to the Miramar landfill in trucks that have been specifically designed for this purpose. (See image of WM truck).⁴

Figure 1: Modern Waste Removal Truck



Waste in San Diego is sorted at source, by the individual households and businesses, into green waste, recyclable waste and general waste. Each type of waste is disposed of in specifically

color coded waste receptacles. Each colored receptacle designates the type of waste to be placed in that container (see image of waste disposal containers)⁵



Figure 2: Typical segregated waste disposal bins.

The waste is collected Monday through Friday between the hours of 7am and 5pm⁶. The time and day of pickup is based upon location of the individual household or business. Each individual household or business is charged for the cost of collection and disposal. This charge goes to fund the necessary infrastructure needed for the appropriate disposal of waste. Households and business are ultimately held responsible for the correct sorting of waste prior to it being collected.

San Diego, uses a landfill to dispose of its waste, but there are other means of waste disposal like incineration for example. In the Netherlands 64% of waste is recycled and most of the remaining 36% is incinerated to generate electricity.⁷ Another critical aspect of waste disposal is having the appropriate infrastructure in place to deal with the collection of solid waste. This infrastructure can be as simple as having a road network, or simply having a road that can be utilised by vehicles to collect and transport the waste to the appropriate site for

disposal. Infrastructure, can also mean having an appropriate system in place for the collection of the waste. That system includes the collection, the timing of the collection, the use of the appropriate receptacles for the particular type of waste and even who is responsible for the actual collection. This is the how, when, where and by whom.

The collection and disposal of waste in many instances is taken for granted in modern societies. Everyone contributes to the correct disposal of waste. Societies have been educated to understand what needs to be done from childhood, through the weekly family chore of putting out the garbage once a week. This ensures that the waste enters the system correctly presorted (regular waste, recyclable waste and green waste) which in turn leads to its disposal in the appropriate manner. Waste disposal is now part of everyday life so much so that individuals do not give it a second thought to how the process works. When we see these three colours, we immediately know what they mean, in relation to waste disposal. The colours may be slightly different depending on location but the principle still holds true.

Figure 3: Colour coding waste.



- Blue - regular waste.
- Green - compostable waste.
- Grey - recycle.

Waste disposal without infrastructure.

Now imagine small island or a nation state with many small islands as an example. How do these locations deal with the disposal of solid waste? These locations have limited land area. There may or may not be a working road system. There may be very little infrastructure if any. Funds for the development of an infrastructure may be non-existent or scarce. Even if the funds were available, they may not be sufficient to implement an adequate solid waste disposal system. The Maldives for example. The Maldives, is a nation comprised of 1,200 coral islands based around 26 atolls in the middle of the Indian Ocean⁸ and generated over 1 billion USD in revenue due to tourism in 2014.⁹ The Maldives, with vast financial resources at its disposal and the need to keep its reputation for pristine well-kept islands intact, should not have an issue with waste disposal. However, this is not the case. The Maldives has a dirty little secret. The Maldives has the world's biggest rubbish island. It is called Thilafushi.

Thilafushi is a reclamation project that was started in 1992 to deal with the Maldives waste problem and now grows at a rate of a square meter a day. Thilafushi has more than three dozen factories, a mosque and housing for 150 Bangladeshi migrants who sift through the rubbish. The waste is transported to the island by boat and some is incinerated, but most is destined for landfill sites. The waste is due, in part, because of the 10,000 tourists that visit the Maldives weekly¹⁰. Everything needs to be imported to satisfy the growing demand of tourism. It is an ecological nightmare, as waste is making its way into the water and with rising sea levels, due to global warming, the issue is only going to continue to get worse. Even though the situation is dire, the Maldives has the finances, an infrastructure and more importantly has a location to put its solid waste. This is not the case with many small islands that rely on tourism

as their main source of income. To fully understand the issues that small islands face in dealing with the issue of solid waste, it may be best to use one such island as a case study.

Malapascua Island Case Study.

Background:

With the increase in tourism globally and tourists traveling to further flung destinations, small islands in remote areas are now becoming accessible. Backpacker tourism has also become more popular with the publication of books such as the “Lonely Planet” series. These publications extol the virtue of trying to find locations that are far from the over crowded popular tourist destinations. Many of these backpacker tourists share their information on blog sites, detailing how to get to these remote locations, increasing the number of people that know about these isolated locations. This influx of tourists may undoubtedly have its economic benefits, but it also brings with it a series of issues that were previously non-existent. The most significant of these issues is what needs to be done with the solid waste that is generated.

Many of these small island tourist destinations were previously based on subsistence living and therefore did not generate any significant amount of solid waste. The waste that was generated would be absorbed into the local environment, either by burying what little waste there was or by burning the waste. With the introduction of tourism, there now becomes a need for a multitude of services that cater to the tourist needs. These services generate a certain level of solid waste, which increases with the amount of services being provided. The increase in tourism inherently leads to the creation of new jobs. An increase in the number of jobs also causes a shift in the economics of the island. Islanders, for the first time are finding themselves with a disposable income and greater spending power. The increase in disposable income can also be a contributing factor to the increased use of disposables. As an example: if your funds

are limited you will use reusable nappies for babies whereas if you had a greater number of funds you would use disposables. The time and effort in dealing with reusables no longer is worth it.

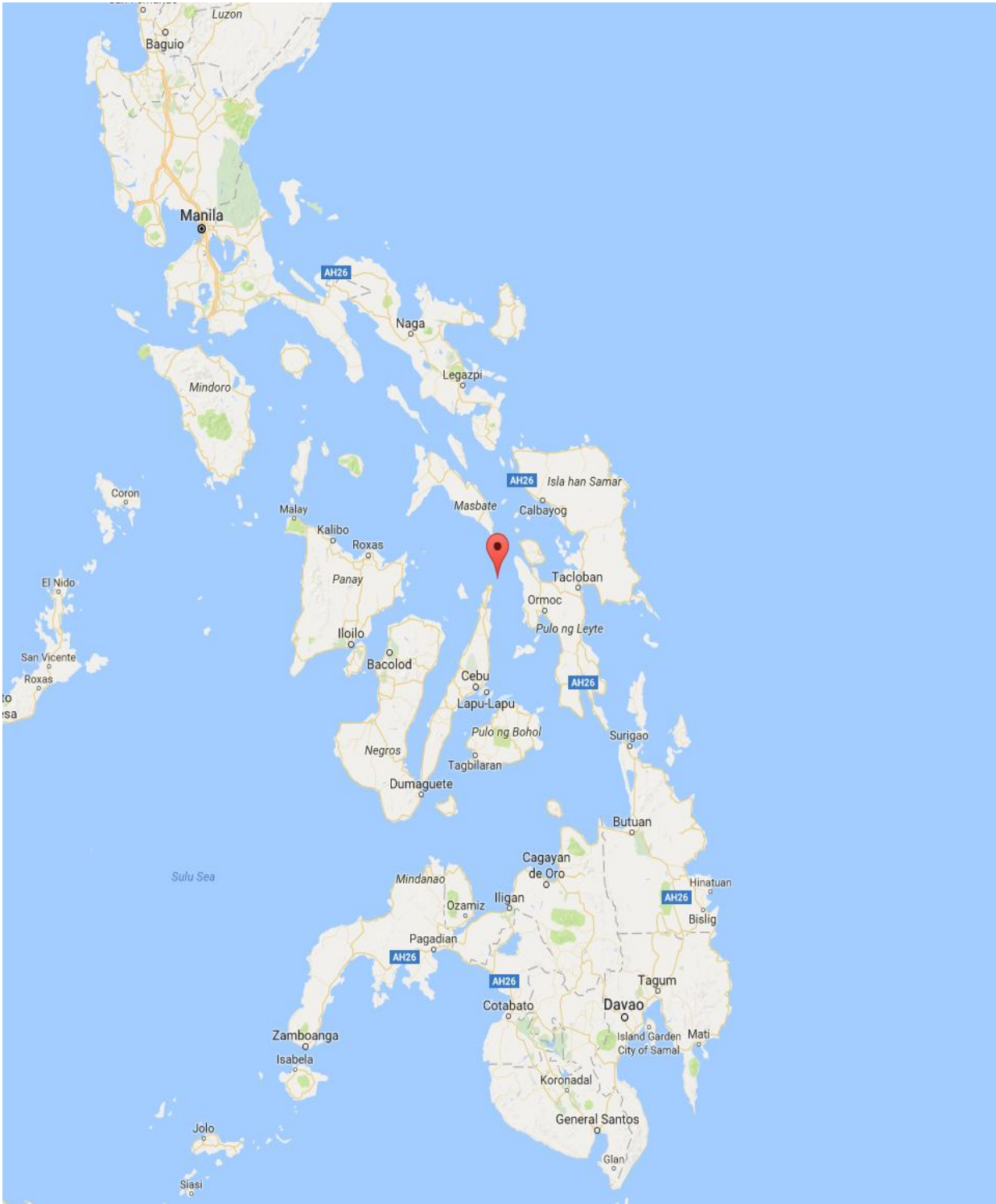
This increase in jobs soon surpasses the level of available labour, which in turn causes a migration to the island. This migration causes the local permanent population to increase. This in turn leads to an increase of solid waste that requires disposal. The traditional methods of waste disposal, either by burning or burying, can no longer cope with the increased amounts of waste being generated and serious issues start to arise. Malapascua Island is such a location. There has been a rapid increase in the amounts of tourists visiting the island and a corresponding increase in the amount of permanent residents on the island. It therefore makes Malapascua Island a perfect case study of solid waste management on small Islands.

Malapascua Island is in the Philippines and is located in the Visayan Sea about 6.8km from the northern tip of the island of Cebu (see map). Malapascua island is 2.5 kilometres by 1 kilometres, with a total land area of 2.5 square kilometers, about one third the size of the University of California San Diego Campus. Malapascua has a recorded local population of just over six thousand permanent residents (6,105), 1,255 households, and 2,933 registered voters.¹¹ Administratively, it is part of the insular Barangay of Logon, Daanbantayan, Cebu. Malapascua Island's economy is almost purely based on tourism with some subsistence fishing. The type of tourism, on Malapascua, is very concentrated on diving. However, there have been some attempts to diversify tourist activities. Malapascua tourism is based on diving, and providing lodgings, support and entertainment both above and below the surface for divers. The services provided are dive shops, dive boats, dive guides, restaurants, bars, hotels and spas.

Malapascua Island does not have a reliable government sponsored solid waste removal infrastructure. Malapascua Island does not have any significant governmental sponsored services: there is no permanent police force on the island, there is very little in the way of government sponsored medical facilities. However there is a government run elementary school as well as a government run secondary school. Continuous electricity on the island arrived in 2010 and prior to this electricity was only provided for between 3-8 hours a day. Electricity on the island is provided by an independent company. Many hotels on the island have their own diesel powered backup generators due to frequent disruptions of service. Malapascua island's water supply comes from ground wells and all human waste is disposed of in septic tanks. When interviewing resort owners, about the quality of the water on the island, they expressed their concern that some septic tanks may have been compromised during the super typhoon Yolanda which occurred in November of 2013. There is also evidence that due to the increased usage of fresh water from the aquifer, saltwater is now making its way into the aquifer causing the water to be brackish.

Malapascua Island does not have paved roads, there are only dirt tracks, and the main form of transport on the island is by small moped motorcycles. The lack of a road network precludes the use of a waste disposal truck. This in turn means that the idea of having a weekly or daily collection service, using the types of collection vehicles that we are accustomed to in a city such as San Diego, is not possible. The lack of a road network means that all solid waste needs to be transported to possible collection points, either by hand or on push carts. The lack of designated collection points and the difficulty of getting the solid waste to these collection

Figure 4: Map of the Philippines showing the location of Malapascua Island. (Google Maps)



points, if they existed, has led to the emergence and the proliferation of random solid waste dump sites scattered throughout the island.

Divers from around the world come to Malapascua to visit the thresher sharks on Monad Shoal. In the early 1990's divers discovered that thresher sharks were found to congregate around a submerged island off the Monad Shoal. The thresher sharks can be found at depths between 18 and 30 meters, well within the recreational diving limits and thus a big draw for sport divers. According to the local dive masters, thresher sharks visit the area on an almost daily basis to visit the cleaning stations found on the shoal. The importance of the thresher sharks on Monad shoal has not escaped the attention of the government and in 2002 Monad Shoal was declared a marine protected area.

The increase in tourism to the island has led to a construction boom to accommodate the increasing numbers of visiting tourists. There are at present anywhere between thirty and forty hotels on the island depending on which ones are being closed or opened at any given moment. (See most updated list provided by tourist bureau in the appendix). The island saw a total of 9,490 visitors for the last four months of 2016.¹² The number of tourists visiting Malapascua is set to increase going forward because of a new pier under construction on the northern tip of Cebu Island which is the departure point for Malapascua Island. With the increase in tourism and the increase in the local population there is going to be an increase in the amount of solid waste produced on the island.

Figure 5: Thresher sharks on Monad Shoal, Photos by A.van der Graaf.



Research Questions.

When using Malapascua Island as a case study for managing solid waste on small islands the questions that should be considered are:

1. What type of infrastructure is in place to deal with the removal of solid waste?
2. What disposal methods of the solid waste are the most appropriate?
3. Who is going to be responsible for the removal of the solid waste from the island?
4. What role does economics play in the generation of solid waste?
5. What role does economics play in the disposal of solid waste?
6. What role does the government have in dealing with the issue of solid waste removal?
7. Are people sufficiently educated in the issues of solid waste removal?
8. Does the islands society understand the consequences of not having solid waste removed correctly?
9. Is there a point where the failure to deal with solid waste removal causes a corresponding decrease in the amount of tourists willing to visit the island?

Malapascua Island does not have paved roads, there are only dirt tracks, and the main form of transport on the island is by small motorcycles. The lack of a road network precludes the use of a waste disposal truck. This in turn means that the idea of having a weekly or daily collection service, using the types of collection vehicles that we are accustomed to in a city such as San Diego, is not possible. The lack of a road network means that all solid waste needs to be transported to possible collection points, either by hand or on push carts. The lack of designated collection points and the difficulty of getting the solid waste to these collection points, if they

existed, has lead to the emergence and the proliferation of random solid waste dump sites scattered throughout the island.

Trash site locations and approach to disposal.

In order to identify the various solid waste dump sites across Malapascua Island, a drone was flown over the island at a height of 100m taking aerial photographs on transects. Specific locations were chosen from which to fly the drone. The choice of the locations were dependent on the current weather conditions of the day. The conditions determined the length of time the drone could be in the air, the stronger the winds the shorter the flight times. The length of flight also determined the distance to be covered. A DJI Phantom 3 pro drone was used in conjunction with DJI Ground Station Pro software. The software allowed the flights to be programmed in such a way as to gain the best coverage during each flight. There were over two thousand photos taken to create the finished map and when combined delivered a surprising amount of detail. The amount of detail made it possible to pinpoint the exact areas across the island where solid waste was being casually dumped. (Figure 5 Map of Malapascua Highlighting waste sites.) In the southern part of the island, over fifty solid waste dump sites were found. The southern area of Malapascua, near Bounty Beach, is where you can find the majority of the hotels, dive shops, restaurants and tourist attractions. You will notice that the area highlighted by boxes, yellow are relatively free of waste sites. This is because many of the resorts located in this area manage their own solid waste disposal. There are two exceptions to this on the map: These were two pits dug by the resorts to dispose of seaweed on the beach caused by recent

storms. After about a day both pits also had solid waste in them. They had become convenient places for people to dump solid waste.

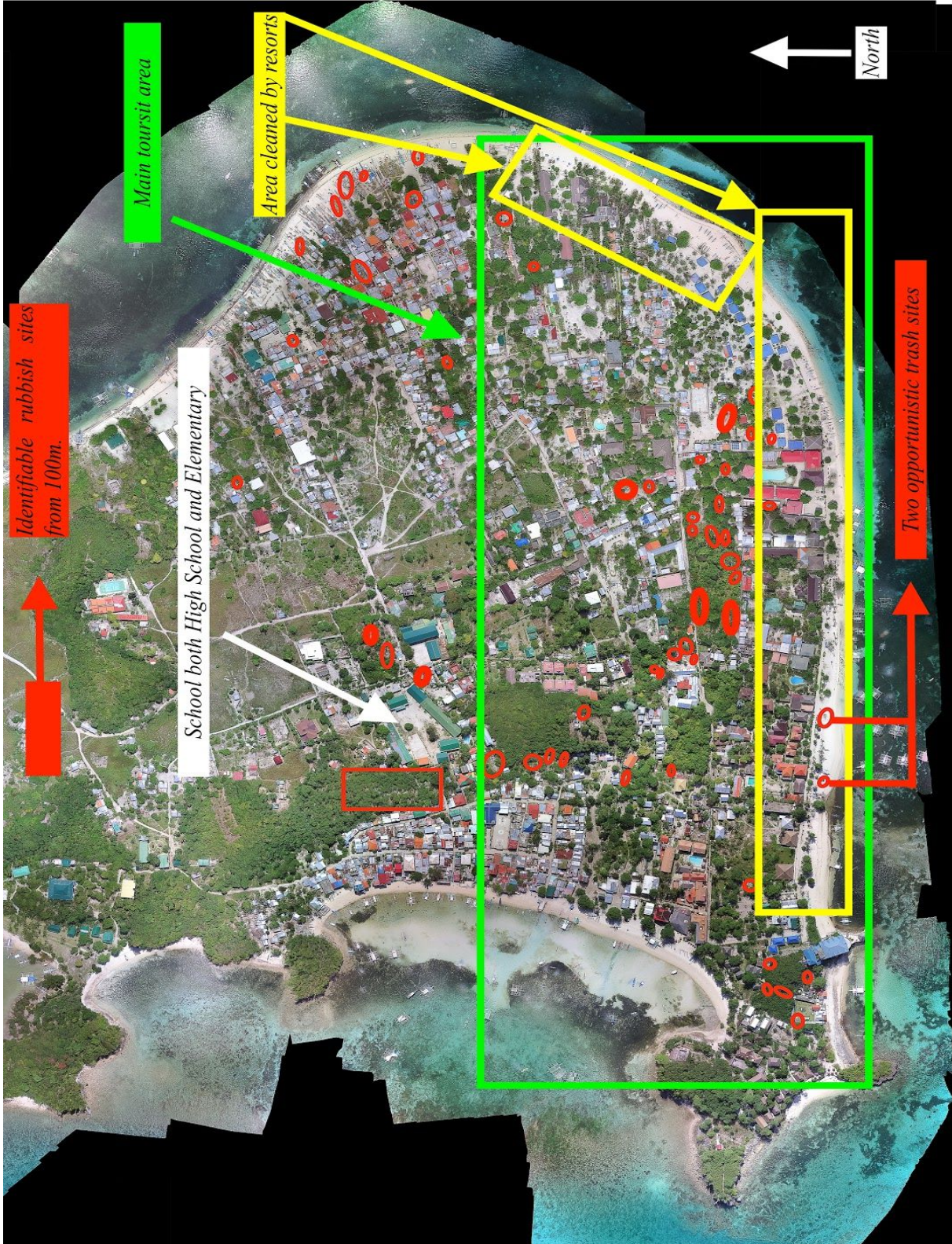
Resort Collective Solid Waste Removal.

One group of resorts on Malapascua island have come together to form their own waste collection service out of necessity. The need has arisen to be able to ensure a pleasant environment for tourists. The resorts want the tourists to come back or spread the news that Malapascua is a pleasant place to visit. Repeat visitors and positive feedback is crucial to the ongoing viability of attracting tourism to the island. The solid waste from the resorts is sorted into recyclable and non recyclable and food waste is collected by a pig farmer. Once the solidwaste is sorted, it is then transported by cart to the beach to be placed in designated locations for pickup by boat. (See figure 6 Map Showing waste collection points used by resorts.) The boat takes the waste to the main island of Cebu, where it is picked up by a truck (which is paid for by the mayor of the municipality) and transported to a landfill for disposal. The waste is however not segregated at the landfill, so all the waste that has been pre segregated by the resorts and their employees ends up all being dumped into the same pit. After interviewing Arturo Sagrado, the head of the Municipal Environment Natural Resource Office (MENRO) for the province, I was also told the local landfill that is being used to dispose of this waste will be closing. If this happens it will mean that Malapascua no longer has an outlet for the disposal of its solid waste.

As one resort owner (who did not want to be named) patiently explained to me.

“ We as resorts care about our environment and therefore sort through all of our waste.

Figure 6: Photographic Map Created using drone footage of Southern Malapascua highlighting location of waste sites. (Courtesy Blue Nomads, Allard van der Graaf)



Separating out what is recyclable and what is pure waste. We collect it all and transport it at our own cost to the boat then pay for the boat to transport the waste to Maya, a 20 minute boat ride where it is picked up by a government sponsored truck. Once it is on the truck it gets taken to the waste site and just gets dumped with everything else. So what is the point of us sorting our waste?

The collection service provided by the participating resorts happens every Monday, Wednesday and Friday.

The costs are as follows:

- 2000 PHP (USD 40) for the boat with a crew of four people.
- 100 PHP (USD 2) to have someone take the waste from the resort to the boat pick up site.

The participating resorts take it in turns to pay for the boat on a monthly rotating basis.

Each resort pays the same amount, and there is no variation in price, irrespective of how much a resort loads onto the boat. The current participating resorts in this resort sponsored solid waste collection are:

Evolution	Hippocampus	Buena Vida
Thresher cove	Little mermaid	
Ocean Vida	Thresher Shark	

The seven resorts have also informed their staff, that if they bring their personal waste to work the resorts will include the waste in the waste being picked up by the boat. This will be done at no cost to the employee. At first the employees were keen on the idea of doing this but over time their enthusiasm has waned and it has become too much of a chore. The resort collective has also instigated and paid for the first set of waste collection bins that can be found along some of the strategic routes around the island.

Through a series of interviews held with various businesses and hotel owners, it became clear that the majority of those interviewed are very committed to keeping the island clean and free of solid waste. This commitment ensures tourists continue to visit the island and also creates a pleasant place to live.

The disposal of solid waste on Malapascua, where the resorts dispose of the waste, is the perfect example of what economists call the non-excludability of public goods issue. Non-Excludability: non payers cannot be excluded from the benefits of the good or service.¹³

It also introduces the economic concept of a free riding problem: a market failure that occurs when people take advantage of being able to use a common resource, or collective good, without paying for it, as is the case when citizens of a country utilize public goods without paying their fair share in taxes.¹⁴

The resorts paying for and disposing of the solid waste in and around the tourist locations means the local population benefits from this cleanliness without having to endure any cost. Local government is also freeriding as they do not have to bear the cost of solid waste disposal, but do gain through increased tourist arrivals. The resorts paying for the waste disposal

Figure 7: Map showing waste collection points used by the resorts.
(map created using collected aerial footage, A. van der Graaf, Blue Nomads, during project)



Figure 8: Cart used for transporting waste to beach pick up area.

Image courtesy A.van der Graaf



Figure 9: Boat used to transport waste to mainland

Image courtesy A.van der Graaf



are creating a positive externality, where through their actions the rest of the islanders benefit from the cleaner environment.

Paying for the removal of waste by the resorts may seem like a cost of doing business as the resorts reap the benefits of having the solid waste removed. The resorts are also responsible for generating the waste in the first place. However the resorts do pay the following fees to the government on an annual basis:¹⁵

Governmental fees for the following:

- Property tax which is 5% of the value of the lease
- Hotel License Fee (annual)
- Restaurant Registration Fee (annual)
- Yoga Instruction Registration Fee (annual)
- Spa Operating and License Fee (annual)
- Retail outlet on premises of hotel licensing fee (annual)
- Environmental certificate of inspection certificate (annual inspection fee)
- Sanitary Permit (incurs a charge)

The following fee is also collected by the government:

- 150 PHP diver fee per day paid by each diver dependant on the location.

Malapascua Island generates a lot of fees and revenue that feeds back into the local government.

Mayor Loot and Local Government

During a private interview with the mayor of the region, Mayor Vicente Loot, he stated that:

“Malapascua is my biggest generator of revenue for the region. The revenue should be used to help develop other areas along the coast, to help develop the region and bring more tourists”

Mayor Loot was also interested in exploring the possibility of introducing greater commercial fishing as a viable option to increase the amount of revenue generated within the province.

When asked about the issue of waste management, he seemed to feel that there were no issues and that the resorts and local government had it well handled. Mayor Loot suggested that I speak to the provincial sanitation officer. The provincial sanitation officer informed me that there were plans to restart a government sponsored collection service, but could not give me any time frame as to when this would happen. He also informed me during our phone interview that the local landfill would be closing and that Malapascua Island would need to find somewhere else to dispose of its solid waste. When pressed as to when this would be happening he was very vague.

On Malapascua Island itself, local governmental issues are handled by Barangay Captains. A Barangay Captain is the most senior elected official in the Barangay. They are elected into their position by the local population and are agents of authority. The Barangay Captains are responsible for ensuring that the islands issues are being resolved in an appropriate manner, according to governmental edict and law. The Barangay Captain is the representative of the Philippine Government. During an interview with a resort owner, I asked how effective the Barangay Captains were in getting things done and how did it work on a day to day basis?

“ The Barangay Captain is hardly ever here. He has a house in Cebu City and spends most of his time there. He may come to the island once a month or so. Mayor Loot told us that we

should use his authority when asking to get something done that involved the Barangay Captain and if it doesn't get done after asking a second time, then feel free to use your own resources in order to get it accomplished.”

Economics and solid waste creation.

Economics has played an important role in the increase of waste being generated on Malapascua. Prior to the surge in tourism, the economy on Malapascua was based on a barter system.

As explained to me by one older Malapascuan who had grown up on the island.

“In the old days the fishermen would trade us fish for the vegetable we grew or the eggs from the chickens. If we needed other things, we would go to the mainland and just trade a chicken for oil or other staples.”

With the introduction and increase in tourism, the old barter economy has changed to one that is now based on cash transactions. Islanders have now become members of the bottom of the economic pyramid.

Sachets what are they and how do they contribute to waste on Malapascua?

C.K. Prahalad, the Paul and Ruth McCracken Distinguished University Professor of Corporate Strategy at the Stephen M. Ross School of Business in the University of Michigan, was a leader in focusing corporate attention on business opportunities among consumers at the bottom of the economic pyramid. His view that very-low-income markets are best reached

through the low-price, low-margin, high-volume model has cast a long shadow on corporate strategy in these markets.¹⁷ As a result of gaining access to these markets, he felt it would improve the lives of millions of impoverished people in developing countries. Companies such as Unilever and Procter and Gamble have used these theories in their business models with the introduction of sachet packets. The use of sachet packets is known as micro selling and is a way to distribute products to the poorer parts of society. Unilever alone produced 40 billion sachets to sell their product in 2012.

Sachet packaging, normally made of a thin film of plastic and aluminium in a sandwich laminate form, has captured many of the poor market segments and has allowed giants such as Unilever and P&G to gain market share and profit. Sachet packets have brought better quality products to poor communities and have even brought a better quality of life. The problem is that they have become an enormous problem. The issue with sachet packet waste is that there is no economic incentive to collect used sachets that have been improperly dumped. No one bothers to pick these up. A glass or plastic bottle at least has some economic value which makes it worth collecting.

These sachet packets can be found for sale all over the island of Malapascua. They are cheap enough that even the smallest sari sari store can stock them and they are at a price point where even the poorest consumer can afford them.

Sari-Sari store, or neighborhood variety store, is a convenience store found in the Philippines.¹⁸ During my research I visited a sari sari store and bought several items to find out what the actual cost is for general shoppers. All of these packets were single use and price is in PHP. The total cost was about USD 1.20.

Figure Shopping list and costs illustrating cost of sachet packages.

	PHP (Philippine Peso)
1 packet colgate tooth paste	10
1 packet coffee mate	2.50
1 packet deodorant	9
1 packet detergent	7
1 packet food flavouring	7
1 packet noodles	12
1 packet tang orange	12
Total	59.5

The issue with these sachets packets is the indiscriminate disposal after use. These small packets of consumer goods can be seen all over the island either on the sides of the roads, at impromptu waste sites and in fire pits ready to be burned. When left on burn pits and not burned immediately they get whisked away with the slightest breeze and end up everywhere.

Education and solid waste disposal management.

Education is also an important part of the process when discussing solid waste removal and disposal. If a society has grown from a barter society with very little waste being generated how are they to know the best form of disposal or more importantly where to put it? During an interview with a resort owner, he mentioned a very telling incident which brings home the point of where to put the waste.

The resort owner described to me how he was out swimming and noticed that one of the boat captains was pouring used motor oil into the water. The resort owner immediately swam up

to the boat and asked the boat captain to stop. The resort owner patiently explained in great detail that dumping motor oil into the water was not a good thing. The boat captain's response, after the full explanation how this was not a good thing was plain and simple "where else should I put it?". This one statement is so telling in that if the boat captain had been educated in two matters this situation may not have arisen:

1. Pouring used motor oil into the ocean is detrimental to the reefs and will cause irreparable damage.
2. There is a proper way to deal with used motor oil and that there is a designated location where the motor oil can be disposed of safely. (This presupposes that there is actual a location on the island that can deal with the recycling of motor oil.)

Small islands need to have a system in place where society is educated to the correct methods of disposal and where it should be placed for collection. In societies, where waste removal is a common thing, most people know what the color of the waste receptacle means, and if not, they can at least read the label. If you are introduced to the various coloured bins used for waste removal for the very first time you need to be taught what the various colours mean. You also need to be able to read, in order to understand what needs to go in each container. (Many of these small island societies only have a very rudimentary form of education.) In some locations there is the added complication of language, as various dialects are used. The issue of education regarding what the colored waste bins was brought home to me while surveying the island. I came across a set of waste bins where someone had tied waste object representing what needed

to go in each bin with a piece of string to ensure that people understood which items belonged in each bin.

Malapascua due to the lack of a regular waste pickup infrastructure dispose of their waste by burning or burying it. In the past this would have been an appropriate means of disposal as there was very little waste. Now fast forward to the current society which has access to disposable nappies, plastic containers, plastic wrap and chemical cleaners. All of these items when burned release chemical toxins. If the fire is not properly ventilated it can cause serious health hazards. The other method of disposing of the solid waste on Malapascua is to bury it in shallow pits and just cover it up. This buried waste has the potential for toxins to leach into the water system. Malapascua water system is based on deep wells, from which they pump water for washing and cleaning. Some of the resort owners interviewed were considering the installation of desalination plants, so as not to be reliant on the local deep well water systems. They were becoming uncomfortable with the quality of the water that was locally available from these deep water wells.

Increased solid waste, social media and Malapascua.

Malapascua Island does have an issue with waste disposal and it is beginning to affect the tourism on the island as can be seen by some of the comments found on the internet. Most of the comments on Tripadvisor are very positive. The issue of waste arises when you look at the negative comments. Even though some of the resorts are trying to collectively manage the waste issue, by collecting and disposing of their own waste, the bigger issue still remains. If the local population does not have a government sanctioned or organised infrastructure or regular waste removal system then only part of the issue of waste is being addressed. The resorts

effectiveness in dealing with all of the island's waste is one that is not practicable nor sustainable. There needs to be some aspect of government intervention for the waste issues on Malapascua to be resolved. If this does not happen the comments from Tripadvisor may no longer be just the few but could become the norm. If these comments continue to increase there is a strong likelihood that Malapascua tourist based economy suffer causing a decrease in revenue available for the other projects important to Mayor Loot.

These are the comments from tourists that have visited Malapascua island. That have expressed their displeasure with the issue of waste on the island.

“Garbage-Beach”

Reviewed February 6, 2016 via mobile

With high expectations to the snorkelling in front of Bounty Beach, we sadly realised that it's a garbage dump with years and years of rubbish.

Not really charming to see Nemo surrounded by old diapers, plastic bags, broken bottles and all sort of things you'll normally dump at a waste disposal site.

Tried to snorkel twice, but the nonstop incoming boats didn't really added any extra pleasure.

“Disappointing beach”

Reviewed August 16, 2015

The sand is not really white and somewhat coarse.

The entire beach is overrun with algae which makes swimming not great and the beach look dirty. Also it is very developed, there is one bar or dive shop next to the other, non stop.

“Disappointing”

Reviewed April 27, 2013

“.....The beach itself is looking good, but there is a lot of algae very close to the shore. With low tide, it's impossible to swim. This is caused by pollution. I was also very disappointed to see a LOT of garbage in the water. Plastics, glass, you name it. All this at 5 meters of the shore in front of the best resorts of the island. One could think these resorts could hire someone for a few days to pick this trash but they don't. Other thing I didn't like, there is way too many boats everywhere.

"Beach holiday with diving"

May 7, 2017 A TripAdvisor Member

A really very beautiful beach, however, the population self-destruct this beautiful landscape because everything is thrown into the sea or on the beach.

"Garbage in the water and on the beach"

May 2, 2017 A TripAdvisor Member

It would be paradise if specially the locals would not be such pigs and every garbage just where they stand there straight and just go dropped. After a beach clean-up, organized by foreigners, it looked at the next evening again the same as before. Garbage everywhere and at the other beaches! Add to that the extremely loud boats and the horns of the many mopeds come whose journeys are mostly useless. Annoying are the many stray dogs and the begging, thieving kids!

"The name indicates the beach too much credit."

Apr 19, 2017 A TripAdvisor Member

It is a narrow beach where there are dozens of boats. Everywhere is seaweed and trash. We thought nice to snorkel here, but that was an illusion.

"a lot of garbage on the beach and in the water"

Mar 12, 2017 A TripAdvisor Member

If one of you is going to stay on Malapascua it as beaches suggest you choose something other than Bounty Beach - the beach is awful amount of rubbish and dog buy, and in the water you can find everything - from oil cans over a beach in large parts littered the boats

Netherlands gets it right can Malapascua do the same?

In the case of Malapascua what can be done to alleviate the issues with solid waste management on the island and the possible disruption caused to the island's economy because of the solid waste issue.

One possible way of dealing with the current issue of waste is a change in methodology and attitude to solid waste management. In order to achieve this they may look towards the Netherlands for solutions to the current issues. The Netherlands waste management system is highly regarded around the world and is based on the overriding principle of keeping the plan simple. The Dutch, realising that solid waste is an ongoing issue which will only worsen over time if not addressed correctly adopted the “Social Response”. The “Social Response” is where the Netherlands unified its people, business sectors and government to reduce the environmental pressure of waste. The overriding goal is to improve the quality of its environment. The Dutch use a hierarchical model which is sometimes known as the Landlinks Ladder. (Named after the Dutch member of parliament that designed it.) Landlinks Ladder can be broken down into 5 separate categories that deal with the management of waste.¹⁹

1. Prevention
2. Product reuse
3. Waste recovery
4. Incineration
5. Landfill

The most important part of the hierarchy is prevention. The idea behind prevention is very simple in its nature:

Avoid waste production as much as possible.

To ensure the success of waste avoidance, there needs to be an infrastructure in places that allows for product reuse and recovery. Components of avoidance will include:

- types of packaging used

- the quantity of packaging used
- reusable materials
- an appropriate collection service

The fourth component of Landlinks Ladder is using waste as a fuel. Waste that is used as a fuel in the Netherlands, is sent to incinerators that produce energy for electricity generation, heating and for creating industrial steam. The last component on the ladder is the one that is the least favorable and over time has become the least used in the Netherlands. It is using a landfill.

All of these varying means of solid waste disposal is backed up by a tax regime that deters the amount of waste being produced. The Dutch government also uses incentives to encourage the use of alternatives. The Netherlands, as a nation, plans to be completely sustainable by the year 2050 and is on track to achieve this goal. One of the key reasons that this has been so successful in the Netherlands, is that it is a collaboration of all the participating parties. You have a government that is committed to making sure waste disposal is high on the agenda it is carried out responsibly. You have a society that is well educated as to the consequences of poor solid waste disposal and therefore is well motivated to do their part. Business wants to take part as they know that if they don't they will face extra costs to doing business due to non compliance. Societies participation is also made easier by the government's attention to detail, and innovative infrastructure system created to deal with the issues of solid waste removal. The highly complex and well developed waste management system in the Netherlands is not being advocated as the solution to Malapascua's issues, but it does serve as an example that through innovation and working collectively positive results can be achieved.

How can innovative actions and in particular the five points of Landlinks hierarchy be translated into workable solutions for Malapascua? This may seem like a tall order but through a strong sense of community and community action Malapascua may develop a sense of social responsibility to the issues with waste. (This is going to be the hardest first step considering that some Malapascuans greatest worry is being able to eat on a daily basis.) Through education programmes, possibly provided by government organizations, Malapascuans could be shown that the inappropriate disposal of waste is an issue that first and foremost will have serious effects on the well being of the population. The inappropriate disposal of solid waste will in the long run also damage the future viability of the tourist economy of the island. A collaboration, to help resolve solid waste management on the island, between the government of the region, the businesses on the island, manufacturers of the products being consumed and the local inhabitants could develop an infrastructure to deal with current issues. Without the solid commitment of all parties involved, there is very little likelihood of successful resolution of solid waste management on Malapascua..

One of the important components of social response is the education of society on the issues that concern solid waste. On Malapascua an organization named Go Green Malapascua, an NGO, is heavily involved in education of the local society regarding the solid waste problems. Go Green Malapascua hold garbage days where they invite families to take part in collecting the solid waste and disposing of it correctly. These are similar to some of the beach cleanups that you see organised elsewhere. Part of the informative process is showing the various methods of correct disposal. Go Green Malapascua also visits the Malapascua High school to run lectures on waste management and what can be done to help change the way in

which solid waste is handled. An important part of Go Green Malapascua is educating children on the importance of waste management. (This is similar to the children in San Diego being conditioned either at home or at school that the garbage needs to be sorted and placed outside for collection.) The education is done in such a way as to make learning fun, (through the use of games, quizzes and beach collection days) and it gets the children involved in learning about the importance of solid waste disposal. The current method of indiscriminate waste dumps is not the way forward.

Figure 10: Go Green Malapascua Logo. (Courtesy of Go Green Malapascua.)



Figure 11: Local opportunistic waste site. (Image courtesy A.van der Graaf)



Photo courtesy of Go Green Malapascua

Segregation and the correct method of collection is the way to move forward.

Figure 12: Segregated waste using recycled bags. (Image courtesy Go Green Malapascua)



Education is important.

Figure 13: Classroom full of High School students being taught about waste management.



So you can go from this

Figure 14: Children Playing on a waste tip site.



To this

Figure 15: Children taking part in a beach cleaning day and learning about waste segregation.



Workable solutions to deal with solid waste management Malapascua.

Product reuse and waste recovery are also two important aspects of Lanlinks Ladder. Instead of using sachet packets for the delivery of consumer goods, the consumer could be provided with a reusable container. This is similar to what is being done with plastic water bottles in Cambodia under the refill not landfill campaign. Tourists in Cambodia are provided with metal containers that they can refill with water at designated stations in order to reduce the amount of plastic water bottles that end up in landfills ²⁰. In the case of sachet packets the large multi nationals that produce these sachets could start a programme where they hand out small reusable bottles to the consumer that can be taken to the Sari Sari store and refilled. This would eliminate the need for sachets. (The action of taking your bottle back to the shop for a refill has been used in such stores as Body Shop and Lush as a means of decreasing the amount of waste generated.) The sari sari store could buy the product in large containers, similar to the containers used to dispense water. They could also return these to the manufacturer once empty to get refilled. These larger dispensing bottles should have a return value to help motivate Sari Sari store owners to use them.

Multinational Corporations and corporate social responsibility. A solution?


If the large multinationals insist on using sachet packets for the delivery of the product, one of the solutions that they could instigate would be a recovery programme for the sachets. Their social corporate responsibility departments could help design such a recovery programme. This would be similar to way that the manufacturers in the Netherlands work to create solutions that deal with the solid waste products generated by their products. Many of these recovery programmes are being developed within the social corporate responsibility


departments of the manufacturers. The overriding issue with the sachets is that there is no economic value in the wrapper, so people do not collect them in the same way that glass or plastic bottles are collected for their value. If people could collect empty sachets and get paid for returning them then they suddenly become valuable. Unilever has instigated such a programme in India. Unilever pays people to collect the sachets then through a process of pyrolysis they turn the sachets into reusable oils ²¹. One other method that could be adopted by the multinationals in the collection of empty sachet packets by reversing the already existing distribution network. A programme where for ten (number could vary) empty packets that get returned to the sari sari store the consumer receives one free packet. The empty sachet packet now has value and therefore makes it worthwhile collecting.

Government funding and “Bags for Cash”


The local government both on the island and in the municipality would start a regular collection service for the solid waste would be another way of dealing with the issue. The government could use the aerial map created as part of this project as a means of identifying the best places to locate these collection sites. Through interviews I managed to ascertain that this had been tried before with collections on Monday and Friday. The local population was encouraged to bring their waste to the designated collection points to have it removed off the island. This collection service was no longer being done because of the lack of available funding. At the time, Keep Malapascua Green tried to help in informing people of the collection service by posting it on their Facebook page. (Nearly everyone on the island has access to social media through their smartphones.) When examining what a motivated handful

Figure 16: Facebook Notification of Waste Collection. (Courtesy Go Green Malapascua.)


GO GREEN MALAPASCUA
BARANGAY OF LOGON - GARBAGE COLLECTION POINTS
Schedule: Monday & Friday



STOP: BURN, BURY OR THROW YOUR GARBAGE
THINK: TAKE CARE OF MALAPASCUA, IT IS YOUR HOME!!!
ACT: SEGREGATE AND BRING IT TO THE COLLECTION POINTS



of resorts have managed to achieve it is hard to imagine that the local government with the resources at its disposal cannot do the same thing. It may now be time for the local politicians to work in conjunction with the resorts to determine the best infrastructure needed to deal with the waste issues on Malapascua. This could be similar to what is done in the Netherlands where the various stakeholders work together as opposed to independently. If funds are limited, the government could instigate a “bags for cash” scheme. In this scenario the government instead of using funds to create a collection network on the island instead hand out bags for waste to islanders. Then pay, using government funds, the islanders to return the waste to designated locations. Maybe even use the existing resort collection points.

The Philippines has over seven thousand islands²² and the Department of Tourism of the Philippines heavily promotes this fact. Being a governmental institution it would benefit the Department of Tourism to work closely with local municipal governments in the development and implementation of an infrastructure that deals with solid waste management on many of these tourist islands. The Department of Tourism should work closely with the Department of the Environment to create an easily adaptable infrastructure. A “cookie cutter” infrastructure that could be easily applied to cover the absolute basics of waste management. The “cookie cutter” type infrastructure, before a more formal method is implemented, could start with something as simple as paying islanders to collect waste and providing education on waste disposal and the dangers that can arise if not done correctly. This type of “cookie cutter” model would be very basic and simple for the smallest islands but get more detailed and refined as the island size and population increase. This infrastructure will ultimately need to be funded and

provided by The Government of the Philippines. The government should not rely on being able to freeride on private enterprise when dealing with public goods.

Encouragingly, the Government of the Philippines is aware of the importance of tourism and has a National Tourism Development Plan to help promote the Philippines and aid in the development of specific areas that benefit economically from tourism. Not only does there need to be an appropriate plan of action, but there also needs to be a timeline for the plan to be executed. Since 2002 Malapascua Island has had the Malapascua Island Eco Tourism development plan which has been updated several times, the last being in 2014.²³ The plan has PHP 5 million (USD100,000) set aside to for the construction of a new disaster preparedness multi-purpose building on Malapascua Island, which included police outpost, health center, and tourist assistance office. Much of this is still waiting to be implemented. Some of these available funds were to be allocated for the construction of a road around the island. The construction of a circumnavigational road would be extremely beneficial to the development of an infrastructure to deal with waste solid removal. The road would help gain access to various locations on the island and help with the collection of waste. This does not mean that the road could not cause other issues. As an example, the road would create easier access to other parts of Malapascua which in turn could make it easier to develop other parts of the island. More people, more waste. Included in the Malapascua Island Eco Tourism development plan are three goals²⁴.


1. proper use of resources,
2. development directly beneficial to residents
3. protection of Malapascua local culture and natural resources.

Also, as part of the plan, the municipal government will have an education program to emphasize the need to protect corals, mangroves and practice solid waste management. The plan also calls for a desalination plant to be built on the island. Lastly, the plan also calls for the use of solar power as a cheap and reliable energy source. If this plan is executed Malapascua island will be well on its way to having a well thought out infrastructure, that can deal with the increase of waste generated by tourism and be able to dispose of it in an economical and environmentally friendly way.

JO THE FINAL SOLUTION

If the Malapascua Eco Tourism development plan does not go into effect, the island may have no other choice but to rely on Jo as a means of dealing with solid waste removal. Jo, who can be contacted on 0932233 0265 is available to ensure that the Malapascua’s waste needs are effectively dealt with.

GO GREEN MALAPASCUA



Scrap Buyer
Jose (Jo) is trash buyer that is coming regularly to Malapascua. If you are already segregating your trash, now you have a chance to earn money with it. If you still don't do it, **what are you waiting for...?** With the help of our friend Jo, now you can earn some money and keep clean and healthy the island.
YOUR HOME!!!

Trash price:
Plastic biottle: **3 php/kg.**
Aluminum cans: **20 php/Kg.**
4 Tanduary bottle: **1 php**
Cardboard: **1 php /Kg.**

Contact info:
Name: **Jo**
Phone number: **093 2233 0265**
Boat: **San Roque**

Figure 17: Advert for Jo the Trash Buyer. (Courtesy Go Green Malapascua.)

Conclusion

Many small islands have issues with the means in which they dispose of their waste. The circumstances of how the waste is created may not be the same for all, but it nonetheless remains an issue that needs to be resolved. How the small island deals with the issue will depend on what is occurring on the island, the country and its political system, the finances that are available to deal with the issue, and to a great extent the general level of understanding of the issue. Using Malapascua as a case study gives some insight into the types of issues that arise, who the key players may be, the importance of education, and most encouragingly that the issue is recognised and that there is a willingness to tackle the problem. Ultimately the issue of solid waste on small islands can only be resolved by having a robust infrastructure in place. An infrastructure that is based on the contributions of all relevant parties. The infrastructure needs to be adaptable enough in its simplicity in order to utilise all available resources, no matter what they may be, to achieve the desired goal. Waste management is an issue for all, and just because you live on a small island in some distant place it should not mean that you are precluded from available solutions to the issue.

Special thanks to :

Capstone Committee:

- Dr. Mark Jacobsen, Chair
- Dr. Emily Kelly (Advisor)
- Dr. Nico Ravenilla (Advisor)
- Dr. Simon Oliver (Advisor)

The people of Malapascua who were always willing to answer any question that I had about their island.

Sea Explorers (you all know who you are) that made my stay and travel through the Philippines possible.

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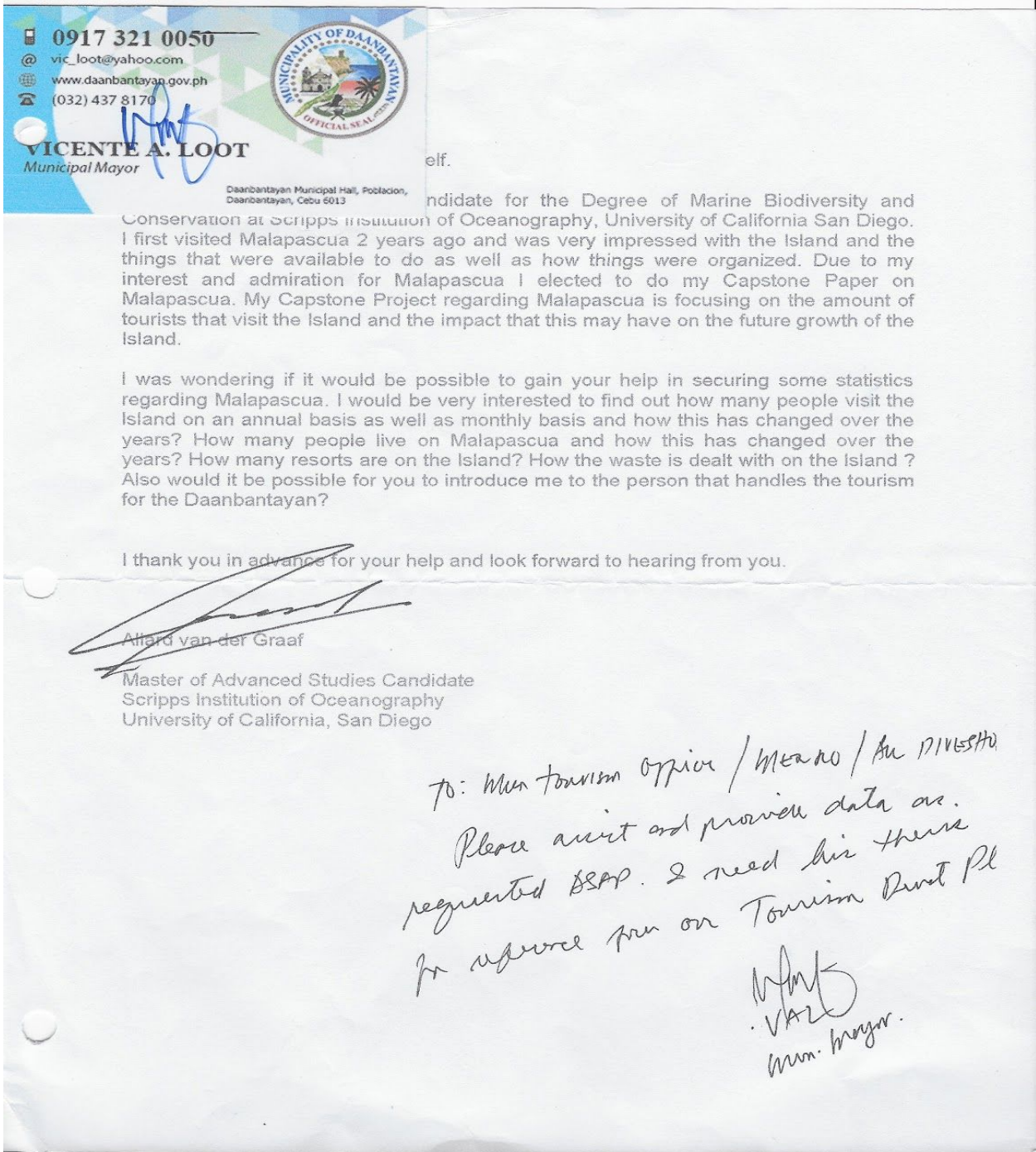
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Trip Advisor: comments relating to Malapascua posted by members

Help with Drone Photography was provided by Blue Nomads Malapascua.

Appendix



Appendix(1) Letter signed by Mayor Loot asking people to aid me in my research. He signed one of his business cards and told me to show it to anyone that was causing issues.

Appendix (2) information provided on tourism numbers.

OFFICE FILE

Republic of the Philippines
Province of Cebu
Municipality of Daanbantayan



MUNICIPAL TOURISM OFFICE

TOURISM ATTRACTION VISITOR RECORD IN MAINLAND

Name of Establishment	Months	Place of Residences						Foreign Country Residences			Grand Total Number of Visitors		
		Philippines			Other Province			Male	Female	Total	Male	Female	Total
		This Province	Male	Female	Total	Male	Female						
ST. GREGORY RESTAURANT	Jan	253	179	432	109	92	201	15	11	26	377	282	659
	Feb	247	185	432	103	85	188	17	8	25	367	278	645
	Mar	250	180	430	98	90	188	20	13	33	368	283	651
	Apr	259	189	448	111	95	206	12	15	27	382	299	681
	May	240	170	410	95	101	196	16	18	34	351	289	640
	Jun	255	175	430	89	91	180	11	9	20	355	275	630
	Jul	261	185	426	112	89	201	18	12	30	391	266	657
	Aug	245	152	397	115	93	208	14	8	22	374	253	627
	Sept	234	159	393	110	87	197	15	11	26	359	257	616
	Oct	246	182	428	85	96	181	23	20	43	354	298	652
	Nov	257	187	444	80	78	158	21	19	40	358	284	642
	Dec	264	195	459	114	89	203	24	20	44	402	304	706
Total		3011	2118	5129	1221	1086	2307	206	164	370	4438	3368	7806
BEAR & RABBITS FOOD HOUSE AND BAR	Jan	300	175	475	10	15	25	0	0	0	310	190	500
	Feb	250	414	664	0	0	0	2	2	4	252	416	668
	Mar	200	100	300	5	2	7	0	1	1	205	103	308
	Apr	250	200	450	18	29	47	3	3	6	271	232	503
	May	200	200	400	20	16	36	5	5	10	225	221	446
	Jun	200	100	300	5	2	7	3	3	6	208	105	313
	Jul	270	50	320	6	10	16	1	1	2	277	61	338
	Aug	350	300	650	50	0	50	3	3	6	403	303	706
	Sept	250	200	450	29	18	47	1	1	2	280	219	499
	Oct	320	90	410	10	10	20	3	3	6	333	103	436
	Nov	300	210	510	52	40	92	5	7	12	357	257	614
	Dec	510	300	810	60	70	130	6	6	12	576	376	952
Total		3400	2339	5739	265	212	477	32	35	67	3697	2586	6283

<u>SKIPS BEACH RESTAURANT</u>															
Jan	3	0	3	0	0	0	0	0	0	7	4	11	10	4	14
Feb	5	5	10	0	0	2	2	2	2	5	4	9	10	11	21
Mar	0	0	0	10	5	15	0	0	0	0	0	0	10	5	15
Apr	6	4	10	7	2	9	19	28	22	9	19	28	22	25	47
May	5	6	11	6	6	12	0	0	0	0	0	0	11	12	23
Jun	10	2	12	3	3	6	0	0	0	0	0	0	13	5	18
Jul	19	6	25	0	0	0	0	0	0	0	0	0	19	6	25
Aug	5	4	9	18	10	28	6	5	11	6	5	11	29	19	48
Sept	10	4	14	0	0	2	2	2	2	2	0	2	12	6	18
Oct	28	2	30	0	0	0	0	0	0	12	0	12	40	2	42
Nov	17	7	24	0	0	0	0	0	0	6	6	12	23	13	36
Dec	2	2	4	3	1	4	20	16	36	6	12	36	25	19	44
Total	110	42	152	47	31	78	67	54	121	67	54	121	224	127	351
<u>PERRY VIRGIN BEACH RESTAURANT</u>															
Jan	2	2	4	3	3	3	6	1	1	1	2	2	5	5	10
Feb	4	4	8	3	3	6	1	1	1	1	1	2	8	8	16
March	8	8	16	4	4	8	0	0	0	0	0	0	12	12	24
Apr	18	23	41	8	9	17	1	1	2	1	2	2	27	33	60
May	19	19	38	3	3	6	1	1	2	1	2	2	23	23	46
Jun	3	3	6	2	2	4	1	1	2	1	2	2	6	6	12
Jul	13	15	28	8	7	15	2	2	4	2	4	4	23	24	47
Aug	16	15	31	2	2	4	1	1	2	1	2	2	19	18	37
Sept	6	6	12	6	6	12	0	0	0	0	0	0	12	12	24
Oct	7	7	14	2	2	4	1	1	2	1	2	2	10	10	20
Nov	17	19	36	4	4	8	0	0	0	0	0	0	21	23	44
Dec	10	12	22	0	0	0	0	0	0	0	0	0	10	12	22
Total	123	133	256	45	45	90	8	8	16	8	8	16	176	186	362
<u>MONSANTO ISLAND RESORT RESTAURANT</u>															
Jan	2	2	4	0	0	0	0	0	0	0	0	0	2	2	4
Feb	0	0	0	1	1	2	3	3	6	3	3	6	4	4	8
Mar	3	1	4	0	0	0	0	0	0	0	0	0	3	5	8
Apr	6	0	6	0	0	0	0	0	0	0	0	0	6	0	6
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sept	2	3	5	0	0	0	1	1	2	1	2	3	3	5	8
Oct	0	1	1	0	0	0	0	0	0	0	0	0	1	1	2
Nov	3	4	7	0	0	0	0	0	0	0	0	0	3	4	7
Dec	6	6	12	0	0	0	0	0	0	0	0	0	6	6	12
Total	22	11	33	1	1	2	5	5	10	5	10	15	28	22	50
<u>Grand Total</u>															
	6666	4643	11309	1579	1375	2954	318	271	589	318	271	589	8563	6289	14852

		KUSINA SA DAANBANTAYAN											
		Jan	10	15	25	0	0	0	0	0	3	2	5
Feb	5	7	12	0	0	0	0	0	0	3	3	10	15
Mar	8	4	12	0	0	0	0	0	0	2	6	10	20
Apr	10	6	16	0	0	0	0	0	0	3	3	13	22
May	20	15	35	0	0	0	0	0	0	4	3	24	42
Jun	4	3	7	0	0	0	0	0	0	2	1	6	10
Jul	3	2	5	0	0	0	0	0	0	2	2	5	9
Aug	20	15	35	0	0	0	0	0	0	4	6	24	45
Sept	5	8	13	0	0	0	0	0	0	2	3	7	18
Oct	5	6	11	0	0	0	0	0	0	3	3	8	17
Nov	14	15	29	0	0	0	0	0	0	3	2	17	34
Dec	10	10	20	0	0	0	0	0	0	3	3	13	26
Total	114	106	220	0	0	0	0	0	0	31	37	145	288
Grand Total	6787	4753	11540	1582	1378	2960	356	312	668	8725	6443	15168	

Prepared by:

CHERRILYN A. SINGUA
 Tourism Statistician

Approved by:

MARIA LIZA R. CUNANAN
 Tourism Officer - Designate



Republic of the Philippines
Province of Cebu
Municipality of Daanbantayan

MUNICIPAL TOURISM OFFICE



2016 Tourism Attraction Visitor Record

No.	NAME OF ESTABLISHMENTS	MONTHS	PLACE OF RESIDENCES										FOREIGN COUNTRY RESIDENCE			GRAND TOTAL NUMBER OF VISITORS				
			PHILIPPINES		Other Province		Male		Female		Total		Male	Female	Total	Male	Female	Total		
			This Province	Total	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total			
1	AMIHAN RESTAURANT	January	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		February	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		March	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		April	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		May	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		June	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		July	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		August	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		September	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		October	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		November	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		December	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		TOTAL	12	13	25	14	12	26	87	85	172	113	110	223	143	132	275			
2	ANGELINA BEACH RESTAURANT	January	8	8	8	10	12	22	125	120	245	136	132	268	136	132	268			
		February	-	-	-	11	5	16	125	127	252	136	132	268	136	132	268			
		March	1	1	2	2	2	4	128	130	258	131	133	264	131	133	264			
		April	1	1	2	1	1	2	115	116	231	117	118	235	117	118	235			
		May	1	1	2	1	1	2	115	114	229	117	116	233	117	116	233			
		June	1	1	2	1	1	2	107	108	215	109	111	220	109	111	220			
		July	1	1	2	1	1	2	99	98	197	101	100	201	101	100	201			
		August	1	1	2	1	1	2	87	91	178	89	93	182	89	93	182			
		September	1	1	2	1	1	2	157	155	312	157	155	312	157	155	312			
		October	-	-	-	1	1	2	114	145	259	115	146	261	115	146	261			
		November	-	-	-	-	-	-	245	249	494	245	249	494	245	249	494			
		December	26	19	45	43	38	81	1,504	1,538	3,042	1,573	1,595	3,168	1,573	1,595	3,168			

9	DAÑO BEACH RESORT - RESTAURANT	January	12	12	24	25	25	50	13	18	31	50	55	105	
		February	10	12	22	36	29	65	45	42	87	91	83	174	
		March	25	31	56	26	29	55	52	59	111	103	119	222	
		April	65	64	129	66	69	135	79	78	157	210	211	421	
		May	38	32	70	49	53	102	75	73	148	162	158	320	
		June	18	15	33	37	46	83	92	93	185	147	154	301	
		July	16	12	28	17	16	33	14	24	38	47	52	99	
		August	24	29	53	14	10	24	21	27	48	59	66	125	
		September	16	18	34	24	34	58	16	12	28	56	64	120	
		October	19	24	43	34	35	69	16	21	37	69	80	149	
		November	45	45	90	37	37	74	69	61	130	151	143	294	
		December	52	56	108	54	53	107	62	62	124	168	171	339	
			TOTAL	340	350	690	419	436	855	554	570	1,124	1,313	1,356	2,669
10	DAN'S DIVE MALAPASCUA	January	-	-	-	-	-	-	28	5	33	28	5	33	
		February	-	-	-	-	-	-	22	8	30	22	8	30	
		March	-	-	-	-	-	-	10	3	13	10	3	13	
		April	-	-	-	-	-	-	8	1	9	8	1	9	
		May	-	-	-	-	-	-	6	1	7	6	1	7	
		June	-	-	-	-	-	-	2	2	2	2	-	2	
		July	-	-	-	-	-	-	-	-	-	-	-	-	-
		August	-	-	-	-	-	-	3	1	4	3	1	4	
		September	-	-	-	-	-	-	3	1	4	3	1	4	
		October	-	-	-	-	-	-	8	8	16	8	8	8	16
		November	-	-	-	-	-	-	1	1	2	1	1	2	
		December	-	-	-	-	-	-	9	2	11	9	2	11	
	TOTAL	-	-	-	-	-	100	31	131	100	31	131	131		
11	DEVOCEAN - DIVE SHOP	January	-	-	-	-	-	-	148	149	297	148	149	297	
		February	-	-	-	-	-	-	67	67	134	67	67	134	
		March	-	-	-	-	-	-	58	58	116	58	58	116	
		April	-	-	-	-	-	-	57	56	113	57	56	113	
		May	-	-	-	-	-	-	63	57	120	63	57	120	
		June	-	-	-	-	-	-	49	53	102	49	53	102	
		July	-	-	-	-	-	-	36	42	78	36	42	78	
		August	-	-	-	-	-	-	56	59	115	56	59	115	
		September	-	-	-	-	-	-	64	64	128	64	64	128	
		October	-	-	-	-	-	-	106	107	213	106	107	213	
		November	-	-	-	-	-	-	203	195	398	203	195	398	
		December	-	-	-	-	-	-	188	137	325	188	137	325	
	TOTAL	-	-	-	-	-	1,095	1,044	2,139	1,095	1,044	2,139			

27	LOGON FISH BUDDIES	January								144	78	222	144	78	222
		February		-	-	-	-	-	-	155	98	253	155	98	253
		March		-	-	-	-	-	-	147	79	226	147	79	226
		April		-	-	-	-	-	-	122	79	201	122	79	201
		May		-	-	-	-	-	-	58	39	97	58	39	97
		June		-	-	-	-	-	-	81	50	131	81	50	131
		July		-	-	-	-	-	-	94	50	144	94	50	144
		August		-	-	-	-	-	-	95	51	146	95	51	146
		September		-	-	-	-	-	-	111	59	170	111	59	170
		October		-	-	-	-	-	-	117	60	177	117	60	177
		November		-	-	-	-	-	-	116	65	181	116	65	181
		December		-	-	-	-	-	-	156	99	255	156	99	255
		TOTAL									1,396	807	2,203	1,396	807
28	MABUHAY RESTAURANT	January	101	189	290	208	110	318	440	463	903	749	762	1,511	
		February	223	289	512	245	266	511	184	366	550	652	921	1,573	
		March	388	364	752	218	220	438	389	299	688	995	883	1,878	
		April	189	389	578	267	256	523	438	404	842	894	1,049	1,943	
		May	167	103	270	200	300	500	298	388	686	665	791	1,456	
		June	156	204	360	298	200	498	267	398	665	721	802	1,523	
		July	127	137	264	125	245	370	267	301	568	519	683	1,202	
		August	345	234	379	136	123	259	276	289	568	557	646	1,203	
		September	235	288	523	165	132	297	266	234	500	666	654	1,320	
		October	277	462	739	188	254	442	294	452	746	759	1,168	1,927	
		November	415	487	902	209	263	472	304	452	756	928	1,202	2,130	
		December	477	579	1,056	216	263	479	473	539	1,012	1,166	1,381	2,547	
		TOTAL	2,900	3,725	6,625	2,475	2,632	5,107	3,896	4,585	8,481	9,271	10,942	20,213	
29	MALAPASCUA BEACH & DIVE RESORT	January	13	18	31	17	23	25	24	49	55	65	120		
		February	12	14	26	8	6	6	26	26	52	46	92		
		March	5	7	12	8	9	9	29	25	54	42	41		
		April	10	12	22	11	11	11	46	46	92	67	69		
		May	25	26	51	25	26	26	51	53	104	101	105		
		June	19	17	36	19	24	24	53	58	111	91	99		
		July	25	26	51	45	49	49	96	96	192	166	171		
		August	18	18	36	26	26	26	52	52	104	96	96		
		September	10	19	29	36	34	34	86	92	178	132	145		
		October	53	48	101	54	53	53	92	94	186	199	195		
		November	59	59	118	78	78	78	102	105	207	239	242		
		December	68	69	137	88	92	92	127	128	255	283	289		
		TOTAL	317	333	650	415	431	846	785	799	1,584	1,517	1,563	3,080	

30	MALAPASCUA BEACH REST- O-BAR	January	26	23	49	28	29	57	69	69	138	123	121	244	
		February	13	12	25	15	19	34	64	66	130	92	97	189	
		March	15	10	25	21	8	29	20	19	39	56	37	93	
		April	4	8	12	12	8	20	26	21	47	42	37	79	
		May	17	12	29	21	5	26	41	38	79	79	55	134	
		June					6	6	6	21	34	55	21	40	61
		July	1	2	3	6	14	20	17	17	34	24	33	33	57
		August				4	4	8	50	42	92	54	46	46	100
		September	1	1	2	3	5	8	35	23	58	39	29	29	68
		October	12	12	24	4	6	10	42	23	65	58	41	41	99
		November	3	3	3	13	17	30	114	47	161	127	67	67	194
		December	2	4	6	19	6	25	100	23	123	123	121	33	154
		TOTAL	91	87	178	146	127	273	599	422	1,021	836	636	1,472	
31	MALAPASCUA EXOTIC ISLAND AND DIVESHOP	January	17	3	20	3	9	12	117	89	206	137	101	238	
		February	15	12	27	7	5	12	178	147	325	200	164	364	
		March	19	5	24	10	9	19	187	136	323	216	150	366	
		April	9	1	10	-	-	-	141	119	260	150	120	270	
		May	13	7	20	2	1	3	156	141	297	171	149	320	
		June	10	-	10	1	1	2	137	116	253	148	117	265	
		July	11	6	17	4	8	12	113	94	207	128	108	236	
		August	8	-	8	-	-	-	140	136	276	148	136	284	
		September	11	3	14	3	6	9	80	70	150	94	79	173	
		October	10	5	15	2	8	10	95	103	198	107	116	223	
		November	5	5	10	3	10	13	105	115	220	113	130	243	
		December	7	-	7	-	11	11	121	143	264	128	154	282	
		TOTAL	135	47	182	35	68	103	1,570	1,409	2,979	1,740	1,524	3,264	
32	MALAPASCUA LEGEND BAR & RESTAURANT	January													
		February													
		March													
		April													
		May													
		June													
		July													
		August													
		September													
		October													
		November													
		December													
		TOTAL													

36	OCEAN VIDA BEACH & DIVE RESORT - RESTAURANT & BAR	January	3	5	8	2	2	4	502	503	1,005	507	510	1,017	
		February	17	32	49	5	6	11	865	628	1,493	887	666	1,553	
		March	110	261	371	10	16	26	790	500	1,290	910	777	1,687	
		April	98	163	261	70	96	166	904	390	1,294	1,072	649	1,721	
		May	126	202	328	50	71	121	612	384	996	788	657	1,445	
		June	-	-	-	-	-	-	52	25	77	52	25	77	77
		July	3	5	8	7	2	9	514	702	1,216	524	709	1,233	1,233
		August	23	41	64	3	3	6	944	800	1,744	970	844	1,814	1,814
		September	15	23	38	5	8	13	722	860	1,582	742	891	1,633	1,633
		October	21	62	83	10	3	13	987	1,087	2,074	1,018	1,152	2,170	2,170
		November	10	16	26	5	5	10	1,396	1,190	2,586	1,411	1,211	2,622	2,622
		December	15	13	28	27	18	45	1,552	1,554	3,106	1,594	1,585	3,179	3,179
		TOTAL	441	823	1,264	194	230	424	9,840	8,623	#####	10,475	9,676	20,151	20,151
37	ROMANTIC PLACE GUESTHOUSE- RESTAURANT (started from Dec.1-31, 2016)	January													
		February													
		March													
		April													
		May													
		June													
		July													
		August													
		September													
		October													
		November													
		December	33	23	56	43	56	99	43	55	98	119	134	253	253
TOTAL	33	23	56	43	56	99	43	55	98	119	134	253	253		
38	RHEIN & GING-GING RESTAURANT	January	85	84		79	75		115	125	240	279	284	563	
		February	52	53	105	50	49	99	102	107	209	204	209	413	
		March	52	52	104	41	48	89	98	87	185	191	187	378	
		April	86	86	172	45	42	87	117	118	235	248	246	494	
		May	56	52	108	45	43	88	117	115	232	218	210	428	
		June	49	45	94	48	23	71	100	102	202	197	170	367	
		July	25	23	48	25	25	50	82	81	163	132	129	261	
		August	23	23	46	20	21	41	72	70	142	115	114	229	
		September	21	23	44	18	19	37	51	54	105	90	96	186	
		October	25	47	72	52	53	105	105	102	207	182	202	384	
		November	45	42	87	51	51	102	109	115	224	205	208	413	
		December	75	73	148	50	62	112	189	205	394	314	340	654	
		TOTAL	594	603	1,197	524	511	1,035	1,257	1,281	2,538	2,375	2,395	4,770	4,770

Appendix (3) Receipts for purchase of sachets.

ORDER BOOK

No. _____
Date 04/11/17, 20__

Order by CAH
Address _____

Quantity	ARTICLES	Unit Price	Amount
60	sachets extra rasa	8	48
10	pack Caffe Mito	2.50	25
10	pack Mentol	1	10
			770
			1337
			128
			2295
			TOTAL ₹

Received the above goods in good order and condition.

NOTE: This order slip at the same time serves as temporary delivery receipt. Our official Invoice will be issued upon return of the receipt and fully signed by the customer.

By _____
Customer's Signature

ORDER BOOK

No. _____
Date 04/11/17, 20__

Order by CAH
Address _____

Quantity	ARTICLES	Unit Price	Amount
48	sachets Nescafe classic	3	144
12	sachets Nestea	12	144
10	pack Creamy white	8	80
8	pack Redoxa	9	72
10	pack King	10	100
12	pack Celgata	10	120
6	pack frds jumbo	12	72
7	pack foreground	20	140
12	packes Red Spalder	7	84
9	packes 104	7	63
10	packes Skin White Cream	20	200
6	packes KING MASTER	3	18

Received the above goods in good order and condition.

NOTE: This order slip at the same time serves as temporary delivery receipt. Our official Invoice will be issued upon return of the receipt and fully signed by the customer.

By _____
Customer's Signature

ORDER BOOK

No. _____
Date 04/11/17, 20__

Order by CAH
Address _____

Quantity	ARTICLES	Unit Price	Amount
10	sachets bambi esl	8	80
12	Milo	7	84
10	Frang Orange	12	120
7	Unica Mix	4	28
9	Singapore mix	9	81
11	Knorr	7	77
12	Adang	3	36
12	gatsely nas	6	72
6	flouring arlonac	7	42
10	Nips white	5	50
10	twila pack Nescafe	12	120
			TOTAL ₹

Received the above goods in good order and condition.

NOTE: This order slip at the same time serves as temporary delivery receipt. Our official Invoice will be issued upon return of the receipt and fully signed by the customer.

By _____
Customer's Signature

Appendix (4) Barangay Monitoring Board showing local population numbers.

BARANGAY	PUNONG BARANGAY	DISTANCE FROM POBLACION (in kilometers)	LAND AREA (in hectares)	NUMBER OF POPULATION	NUMBER OF HOUSEHOLDS	NUMBER OF REGISTERED VOTERS	INCOME	MAJOR AGRICULTURAL PRODUCTS
1. AGUJO	ZENaida C. ARRESGADO		394.9267	6,225	1,535	2,945		
2. BAGAY	ERNESTO S. SINTUOSIDAD		764.9399	6,195	1,474	2,731		
3. BAKHANAN	LUCIA C. ELEPTICO		310.9587	3,220	610	1,645		
4. BATERIA	ARSENIO S. LUCIANO		429.8309	6,825	921	2,207		
5. BITOON	MORLYN P. VALIENTE		646.8309	5,380	736	2,647		
6. CALADE	HERMINIA C. DE CASTRO		444.7539	2,355	802	1,908		
7. CARNAZA	NARCISO CANETE		166.0907	2,670	748	1,329		
8. DALINGDING	ALEJANDRO Y. PUNAY		676.3582	2,730	598	1,234		
9. LANA	REMEDIOS R. LAYOS		525.0311	3,915	754	1,888		
10. JOGON	REX M. NOVABOS		136.5634	6,105	1,255	2,933		
11. MALIBAGO	VIRBILIO E. MISA		565.6310	5,925	1,282	2,446		
12. MALINGIN	FRANCISCA A. ROSALEJOS		280.5087	2,285	578	1,090		
13. MAYA	ELLEN A. CONJE		433.6812	10,455	2,182	4,542		
14. PAJO	LETICIA A. PERPETUA		436.4494	4,915	880	2,008		
15. PAYPAY	FELISA T. ISABEL		414.3040	4,550	823	1,821		
16. POBLACION	ROMULO C. DE LEON		216.8406	8,625	1,764	4,530		
17. TALISAY	MALUISA P. BARIJO		585.9310	5,520	1,263	2,681		
18. TAPILON	LEONILDO P. PAREJA		534.2584	9,781	1,909	4,432		
19. TINUBDAN	PABLO T. ARCEVAL, JR.		594.2355	2,575	560	1,284		
20. TOMINGAO	ISIDRO T. RODRIGO		668.9764	2,300	995	2,300		

Appendix (5) Numbers showing tourist arrivals for last 4 months of 2016, numbers were posted but was not allowed to take hard copy. Photo was ok though.

MONTHS 2016	AMERICA	EUROPEAN	ASEAN	AUSTRALIASIA / PACIFIC	AFRICA	FILIPINOS	UNSPECIFIED	TOTAL MALES	TOTAL FEMALES	TOTAL GUESTS
SEPTEMBER 21-30, 2016	16	197	192	13	-	311	-	397	332	729
OCTOBER 1-30, 2016	107	722	609	44	-	1,413	-	1,415	1,480	2,895
NOVEMBER 1-30, 2016	194	1,013	493	131	-	998	62	1,506	1,383	2,889
DECEMBER 1-31, 2016	163	1,032	488	31	4	1,178	81	1,582	1,395	2,977
TOTAL	480	2,964	1,782	219	4	3,900	143	4,900	4,590	9,490