

Sustainable Regional Economic Growth and Investment Programme (SREGIP)

“Validation of critical issues in the waste value chain and designing actions for implementation” with focus on Gili Trawangan, the western part of Lombok and Mataram

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Methodology of the assessment and report structure:

In the course of the 5 days spent between Gili T and Lombok a series of Interviews with all relevant stakeholders have been conducted either one to one or in small groups (when possible) as well as visits to the main landfill in Gili T, places of operations of the various collectors/recyclers in Gili T and Lombok, and relevant government departments.

Stakeholders interviewed are as follow:

In Gili Trawangan: Gili eco trust (head Mr. H. Malik, Delphine Robbe, Mr. Cahyo), FMPL (Mr. H. Achmad and Mr. Abdillah), APGT (Mr. Sam), KADUS (Mr.H. Lukman), BSBS (Mr. Syawal + Mrs Febri), recyclers at FMPL mess

In Lombok: 3 recyclers that buy from Gili T in the area of Teluk Dalem, BLHD KLU, Head of DKP KLU (Mr. Dewa), BSBS (same people as in Gili T but discussion was focused more on their operation in Lombok), APDUPI (Mr. Cahyo Rindani), BS NTB Mandiri (Mrs. Aysyah Odist), 9 recyclers in the area of Mataram, Lombok Barat and Banyumulek.

In this report we will first explain about the situation in Gili Trawangan and include findings from the discussion with the government in KLU as well as recyclers in KLU dealing directly with Gili T. Then we will describe the findings concerning the informal sector as well as the BS in Lombok their role and potentials. Last we will provide a set of recommendations For Gili T and BS (BS+BSM) as well as possible issues that needs further research

List of acronyms:

APDUPI: Asosiasi Pengusaha Daur Ulang Indonesia
APGT :Asosiasi Pengusaha Gili Trawangan
BAPPEDA: Local Planning Department
BLHD :Local Department of environment
BS :Bank Sampah (Waste bank)
BSBS : Bank Sampah Bintang Sejahtera
BSGI : Bank Sampah Gili Indah
BS NTB M: Bank Sampah NTB Mandiri
DKP : Dinas Kebersihan
FMPL : Forum Masyarakat Peduli Lingkungan
GET : Gili Eco Trust
KADUS : Kepala Dusun
KLU : Kabupaten Lombok Utara
SWM : Solid Waste Management
TPA :Tempat pemrosesan akhir

1. The issue of waste management in Indonesia in general and its relation to the Tourism Industry

In Indonesia the planning for Proper Solid Waste Management (SWM) systems and their implementation it is still a work in progress that faces many challenges and has been finally recognized as priority by the Government both at National and Local level.

This is creating more momentum and somehow mobilization of resources among the various stakeholders in the effort to create better action and networks.

A Proper SWM system is formed by many components that need to be addressed all at the same time if maximum success wants to be achieved

1. Proper and updated legislations and the ability of implementing them by the relevant authorities (national and local)
2. Proper Infrastructures and tools as well as technical solutions.
3. Clearly designed systems (collection, transportation, recovery of materials, final disposal)
4. Clear financial systems
5. Clear and recognized roles of stakeholders ,including the ability to create networks and links among stakeholders (government, private sector, informal sector, communities)

In terms of legislation Indonesia has already a very good base with the first national law issued in 2008 “UU18-2008” followed by a variety of related decrees and additional legislations which all states very clearly that SWM is seen as a comprehensive issue regulated by the principles of the 3Rs (reduce reuse recycle) at all level (from producers to final disposal) with the aim of reducing as much as possible the waste that needs to be disposed in landfills and maximizing the recovery of materials through composting- recycling or any other means (waste seen as a resource). Individuals, businesses and communities as producers of waste are all responsible to manage their waste responsibly and therefore to have an active role within the system. Burning and dumping is not permitted under this body of laws.

Most of the local governments have ratified already this national legislation issuing a ‘Peraturan Daerah untuk pengelolaan Sampah Padat’ (PERDA, this type of legislation is usually issued by each Regency/Kabupaten). Unfortunately the implementation of PERDA Persampaan by local governments it is still a work in progress in most areas.

Awareness among individuals, business and communities as well as the willingness to pay for SWM services is still very low. Instruments such as “Waste Banks or Bank Sampah (BS)” heavily promoted by the government, have been extensively established across the territory in the effort to create the awareness that waste it is a resource and should be treated as such. Success rates of BS vary in different areas depending on the level of awareness of communities as well as on the BS management ability and commitment.

As for the private sector and the informal sector working in the recovery and final process/recycling of waste, in general we can briefly describe it as follow:

- Factories for the final process of recyclables are based almost 100% in the island of Java (Surabaya and surroundings being one of the main center for recyclables in east Java and for the whole east Indonesia)
- The informal sector (from simple waste pickers to small medium and big collectors/bandars) is the sole responsible for collection and shipment of recyclables from all the islands of the Indonesian archipelago to the factories in Java. There are no financial instruments in place by the government to facilitate such industry.
- Types of waste recovered and traded vary according to accessibility of areas, ability to access recycling factories or establish links with bigger traders, but most of all the decisive factors are the market prices.

It can be said that the further the islands are from Java the fewer types of waste are collected for recycling by the local informal sector giving preference to the ones of higher value (selected plastics, metal and cardboard) that usually have a higher value. This leaves quite a substantial amount of waste without immediate value and use and therefore destined to be disposed in landfill (in best cases) or dumped illegally unless better network is created among stakeholders that will create the possibility to achieve higher recovered volumes of specific wastes which will

then become economically attractive to deal with or create local solutions for it (processed locally).

Considering this general and brief overview of issues and challenges of SWM we can understand how important is the role of tourism and its responsibilities that comes with the development of new tourism destinations.

Indonesia is a big country rich in nature and culture and most of its tourist destinations are developing in areas that are remote, less developed and therefore most probably facing lack of existing infrastructures and services. While tourism is bringing economic benefits to the local community is also posing the challenge of how to deal with the waste that these new and increased flow of people and goods are generating out of tourism activities.

Typically the fast development of tourism infrastructures and services very seldom goes hand in hand with the ability of the local community and government to react fast enough to the new conditions in terms of SWM (increased amount of waste produced, efficient collection and transportation, availability of proper final disposal infrastructures and systems for the recovery of recyclables).

It is within this context that this assessment has been conducted to verify the current SWM conditions in Gili Trawangan , challenges faced, roles of stakeholders, current state of the informal/recycling sector in Gili T and Lombok and opportunities for improvement.

2. Gili Trawangan

2.1 Background:

- Waste management has been a serious problem in the Gili islands for many years especially in Gili Trawangan where amount of waste produced is constantly growing due to the increasing number of tourists and number of hotels, restaurants, home-stays and business in general operating in the island. The number of tourists visiting the island was reported to be at 1 million in the year 2015 (source GET).
- During the years many efforts have been undertaken to address the problem of solid waste management and to try to plan a more comprehensive approach with the goal to reduce the amount of waste that needs to be disposed in the dumping site (TPA) and therefore affecting the island.

Lack of land for a proper SWM facility as well as support from the government in providing strategies and infrastructures have been and continue to be big obstacles that have left the local community (including Business and NGO's) operating in the island pretty much in the position to take the initiative and the lead in dealing with and solving the SWM problem counting until now on their own resources both humans and financial.

- The current stakeholders involved have to a variety of degrees the ability to understand how to approach the issue and which are the required solutions. In addition the business community has been also supportive with funding the acquisition of several machineries and buildings that will facilitate the operations.

- New players and partnerships have been formed in the past year in order to improve the current system so that more recyclables can be recovered and therefore less waste will have to be disposed in the local dumping site (TPA).
- Although several efforts are in place there are still many bottlenecks, issues and strategies as well as modality of collaborations and roles that need evaluations and adjustments. It is important to reassess activities and roles in order to make the point of the situation and identify which are the problems and needs that prevent a proper implementation so that the current system can be revised and become more efficient.
- The role of the current stakeholders involved need to be strengthened before involving other parties and introduce diversifications of activities that might add to the general confusion and create less trust in the whole system.

2.2 Main stakeholders involved in swm activities:

1. Gili Eco Trust (GET)
2. Forum Masyarakat Peduli Lingkungan (FMPL)
3. Bank Sampah Bintang Sejahtera (BSBS)
4. Bank Sampah Gili Indah (BSGI)
5. Asosiasi Pengusaha Gili Trawangan (APGT)
6. Kepala Dusun (KADUS)
7. Independent pemulung/recyclers

2.3 Waste production and recyclables:

Currently In Gili T it is reported to be collected approximately between 10-15 Tons of waste/day but these numbers depend on the season as in the low season can go as low as 3-5 Tons/day (source GET & FMPL). This waste is collected from 473 business (hotels, home-stays, warungs, restaurants etc) and from some of the families that resides in the island.

Not all the waste produced is reported to be collected as often there are small businesses or residents that do not want to pay for the service and dump their waste in different areas. There is no estimate of the amount of this waste but it is considered a small fraction.

Main Categories	Waste	%	Tons/Day	Tons/ Mth	
Organic scraps)	(food	40%	4-6	120	180

Waste produced is what is categorized as Domestic Waste and its composition appears to be approximately 58% organic and 42% non organic. The organic fraction is reported to be composed of 40% by food scraps and 18% of garden clips and wood while the 42% of non organic includes plastics, cardboard and mix paper, metal and cans, glass bottles, and mixed waste (anything that goes from sanitary pads and diapers, contaminated waste, light bulbs etc). Source FMPL

Organic (garden clips and wood)	18%	1.8-2.7	54	81
Non-Organic	42%	4.2-6.3	126	189
Total		10-15	300	450

As for the percentage of the various items in the non-organic category there was no data available but from FMPL was described that of the 42% represented in the table approximately 30-40% is plastic, 20% is cardboard and paper, another 20% is glass and metal and the rest is accounted as residue.

In order to have precise estimates of each fraction a detailed study with repeated sampling from various sources needs to be carried out for a period of few weeks therefore it was not possible to gather this data during the assessment..

Bank Sampah Bintang Sejahtera has estimated in their research conducted over a period of 1 month that there could be up to 4 Tons of plastics/day available most of which recyclable.

Also from the interviews with independent recyclers (pemulung and small Bandar) there is an estimate that approximately 3-4 pengepul operates in the island and ship recyclables 2-3 times/week to Lombok each in boats of the capacity of 2.5 Tons on average bringing the Total amount of recyclables currently recovered in the island to 90-120 Tons each month (this includes Hard Plastics, cardboard some metal and glass bottles).

Types of items collected for recycling by small or medium collectors(pemulung/pengepul) in the island are the ones that have more value and for which there is an already viable market in Lombok while for other items such as cheap metal (cans and tins), mixed paper, certain soft plastics and generally clear glass there is no or little interest.

Prices of recyclables bought within Gili T are reported as follow:

- PET and hard plastic is bought at Rp 1.000/kg,
- Aluminum cans at Rp.8.000/kg,
- Cardboard at Rp. 800/kg
- Beer bottles are bought at Rp. 200-500 depending on size.

Type of waste collected by recyclers in Gili Trawangan
PET water bottles or PET soda bottles
Hard plastics (buckets, detergent and shampoo bottles and similar)
Cardboard
Beer Bintang bottles and sauce or syrup glass bottles
Aluminum cans

For what concerns the organic fraction at the moment only 500-800 kg of organic waste/day is separated and recovered for composting utilizing the Felita system. These 500-800 Kg of organic waste are collected separately by GET from approximately 50 businesses (mainly hotels and restaurants) which have agreed to participate in this first attempt of processing organic waste in the island.

Overall It is estimated that up to 80% of the waste produced daily could be utilized if large scale composting systems and full recovery of recyclables were in place leaving only an estimated 20% to be disposed to landfill (source GET & BSBS).

2.4 SWM System currently implemented in the island:

- Waste separation:
 - Waste separation at source at large scale prior to collection is not practiced in the island at the moment. In the past color-coded bins for separating waste at source were distributed but this system has never taken off possibly because waste is then mixed in the cidomos used for collection.
 - Approximately 50 businesses are separating their organic waste (food scraps only) as they have agreed to participate in the first trial of the Felita composting system carried out by GET, these 50 businesses account for approximately 12-13% of the total amount of businesses active in the island.
 - There are also other businesses that are separating glass bottles (mostly spirits or beers other than Bintang) which go to GET to be crushed and processed locally.

- Daily Collection:
 - Daily collection is operated by FMPL for all the waste except for the organic fraction that goes to the Felita system located at TPA (collected by GET).
 - FMPL operates 9 cidomos with carts of the capacity of approximately 1m³ each and doing several rounds during the day.
 - Waste is mixed in the cidomo
 - All waste collected by FMPL is brought to TPA except for some recyclables (see point below)

- Recyclables by FMPL:
 - The most valuable items (PET bottles, aluminum cans and cardboard) are present in the waste collected daily and are first hand-picked by the operators of the cidomos (9 staff) and brought to their dormitory (gudang BSGI) and put aside to be sold. These recyclables are considered their own private extra income and they are selling it to third parties/pemulung active in the island. Also FMPL staff operating in the TPA are recovering recyclables that were overlooked by the cidomo operators.
 - In the past year BSBS has become a partner in order to increase the amount of recyclables recovered and deal directly with the newly formed BSGI which is supposed to operate in the island and managed by FMPL.
 - FMPL has managed to ship recyclables to Lombok to BSBS a couple of times but as they have encountered a variety of problems they have now stopped this activity (difficulties in packing, ability to load boat for transport to Lombok at optimal capacity)
 - Quantity of recyclables collected by FMPL staff (at TPA and on cidomos) is not clear. Raw data is partially available via FMPL manager but needs to be elaborated and evaluated accurately

- Recyclables by pemulung/pengepul:

- Most of the high value recyclable items are recovered directly at source by pemulung/recyclers (taken from waste that needs to be collected) or separated and kept directly from households or businesses to be sold directly to recyclers that ship these items to Lombok mostly in the area of Tanjung/Teluk Alam and Pemenang. A more detailed description of the number and approximate qty is provided in the following chapter.
- Recycled and up-cycled glasses by GET
 - Glass bottles mostly from beverages such as spirits and beers are collected and recovered by GET and converted by GET into upcycled glasses for sale or are crushed and used as material for the making of bricks used in building construction to be sold locally
- TPA and Felita composting system:
 - The TPA at the moment is not a processing facility but still a typical dumping site where only glasses and some of the high valuable recyclables are recovered. There is no recovery of less valuable recyclables such as tins, soft plastics and mix paper because the pemulung operating in the island do not offer a market for it, although in Lombok a market for many of those items actually exists.
 - There is no big scale composting facility yet only the Felita system that can accommodate only a minimum part of the organic part that is collected every day and is operated by GET
 - Accessibility to TPA is not very good, the road is not paved and during rainy seasons it is quite difficult to reach the site due to mud and that the area gets easily flooded.

2.5 Stakeholders their role and status:

2.5.1 Forum Masyarakat Peduli Lingkungan:

- In charge of operating the daily waste collection with cidomo/horse cart . They operate regularly 9 horse carts every day and they are ready to increase the number to 12 during the high season.
- They are collecting approximately 10-15 Tons of waste /day
- In charge of managing and sorting at TPA

FMPL details of staff and their activities	Working on cidomo collecting waste	Working at TPA
Number of Staff	9-12 (depending on the season)	6

Facilities provided to the staff	accommodation at the newly renovated dormitory	accommodation at the newly renovated dormitory
Average Salary	3 million/mth (they have higher salaries compared to the staff working at TPA as besides their work they need to take care of the horses they are working with so they have extra skills and put extra hours)	2.4 million/mth
Recovery Of Recyclables	<p>Yes.</p> <p>During collection recyclables are hand-picked, stored in their living quarters and then sold individually (not as a team) to the pemulung (approximately they recover ¾ of the good valuables ones). This becomes their private side-income and it is not shared among the team</p> <p>Data on qty of recyclables collected is not available</p>	<p>Yes.</p> <p>Sorting at TPA they have access to approx ¼ of the good valuable ones. Very little of other less valuable materials are recovered such as tins, soft plastic etc. They share among them the income from the sold recyclables.</p> <p>Data on qty of recyclables collected is not available</p>

- Last Year when the partnership with BSBS was formed FMPL has agreed to be in charge of BSGI and therefore to consolidate recyclables and to send it to Lombok to be then picked up by BSBS. After a couple of trial they have stopped the activity as they have encountered several problems in organizing properly packing and transportation.

2.5.2 Gili Eco Trust:

- Runs the Felita composting system
 - Collect from the business that have agreed to participate and are separating the organic fraction (food scraps only)
 - Operates the Felita system at TPA premises. 3 tanks of the capacity of 3000 Lt each
- Operates an organic garden (Kebun Organik)
- Operates Glass bottle recycling and upcycling
 - Crushing glass and making bricks. It operates 3 small crushing units at TPA and a bigger one close to the kebun organik
 - Upcycling (make new glassware and jewellery).
 - Manpower used is 2 staff collecting glass bottles at TPA and crushing the bottles with the machines. Also interns/volunteers helping at GET are collaborating in collecting glasses from the dump. 1 staff making the bricks and one staff in the upcycling process (cut, polish and engrave the glasses).

- Production capacity for bricks is 500 pcs/week (not full time activity). Bricks are sold at Rp. 3.200/pcs
- Production capacity for upcycling is estimated to 10 – 15 pcs/day depending on type and amount of work involved (each glass takes approx 20 minutes to be made). Upcycled glasses have various prices but a glass is about Rp.30.000/pcs

2.5.3 Bank Sampah Bintang Sejahtera:

- BSBS is operating regularly in Lombok Barat/Ampenan the legal status was UD Bintang Sejahtera but has been upgraded recently to the legal status of PT.
Although specialized in plastics it also trades in a variety of other items such as cardboard, mix paper, iron cans and aluminum cans (see complete profile in the following chapters).
- BSBS agreed to form a collaboration to help set up a BS system in the island (BSGI) and act as the main buyer of recyclables collected in the island and ready to pay a premium price compared to the one paid by local pemulung and covering also other items that are not usually traded by local pemulung, therefore providing the possibility to recover more materials and help reduce the amount of waste that needs to be disposed at TPA (residue)
- The initial agreement among parties was that BSBS would have trained FMPL staff on how to separate and pack the recyclables and also how to ship it via boat. They would have been ready to buy the recyclables in Lombok (where the boat transporting it would have docked). Their price is supposed to be higher than the one the pemulung are ready to buy in Gili T.

2.5.4 Bank Sampah Gili Indah:

- Established in 2015 with the function to be responsible for the whole recyclables recovery and trading system in the island and supposed to be run by FMPL. Should function as a BS for the whole island. It is envisioned that BSGI will be the one responsible of consolidating all the recyclables on the island obtained either via collection, sorting at TPA, buying from local pemulung or from businesses, schools and individuals.
- They can count in the future on the support of the local KADUS to issue a regulation based on awig-awig to become the sole managing body for all the recyclers produced in the island, whereby all people and businesses operating in the island will have to sell their recyclables only to them and not to third parties outside of the island therefore creating a centralized and better organized system that can count on volumes for all categories of recyclables and guaranteeing financial sustainability
- BSGI is not operational yet at the moment there is nobody in charge for the operational activities

2.5.5 Asosiasi Pengusaha Gili Trawangan:

- Their role is mostly to endorse SWM activities, represent the businesses and contributing financially to the various needs as well as supporting education initiatives.

2.5.6 Kepala Dusun:

- Represents the local authority
- Responsible for collecting fees for services including waste collection. Recently was established a unified system for paying fees called “system satu pintu” (one door system) whereby businesses pay one cumulative fee which includes waste collection, security and salaries for teachers for kindergarten and SMK (in Indonesia public school system do not include kindergarten).
- The total of 235 million collected in the island among 473 businesses and houses is allocated as follow 47 % to SWM (approx 111 million), 26% to the support to schools (approx 60 million) and 27% to the island security (approx 63 million).

n. of catg	Type of business or houses	total number /catg	monthly fee
1	Big resort + Party Night	6	Rp4,000,000
2	diveshop +hotel+ restaurant+ party	8	Rp3,000,000
3	hotel medium size- diveshop – restaurant	28	Rp2,000,000
4	hotel small - luxury rooms – restaurant	24	Rp1,000,000
5	bungalows - few rooms hotel	77	Rp500,000
6	Pondok – homestay	159	Rp300,000
7	private house – villas	58	Rp200,000
8	Kios - kos2an – took	113	Rp100,000

- It is estimated that of the amount of money allocated to SWM 70 millions are spent to cover the costs of maintaining horses and cidomos while 41 millions are allocated to the other costs of running the SWM service.
- Has the task to register all operating entities in the island including waste recyclers/pemulung. Until a couple of years ago approximately 16 pemulung were registered but now only few are left and data is not updated yet.

2.5.7 Recyclers:

Gili T during the years has attracted the interest of many waste recyclers that have seen the opportunity to collect valuable items disposed in the island and sell it to bigger traders in Lombok.

The system has various stakeholders involved with various roles:

- **Pemulung:**
These are collectors that are going around the island with carts and hand-pick recyclables from waste that is waiting to be collected. They usually do not buy the recyclables. They sell the recyclables to Pengepul which are linked with buyers. They are usually from Lombok Tengah or Lombok Praya.
- **Pengepul:**
These are buyers operating in Gili T, usually working for small Bandars in Lombok. They buy in big quantities and usually pack and ship the recyclables to Lombok KLU with small boats of the capacity of 2-3 Tons.
- **Small Bandar:**

These are located mostly in Lombok in the area of Teluk Dalem-Pemenang close to the Gilis. They usually buy the recyclables for a higher price, clean and repack the items and sell it again to bigger bandars mostly in Mataram or Lombok Barat

The number of Pemulung in the last 2 years has decreased dramatically from a total of 18 registered in Kadus to approximately 4-6 at present (still in the process of updating the registration). This is due to the fact that businesses and households have started to separate their recyclables and sell it directly to the Pengepul operating in the island.

The number of Pengepul operating in the island is estimated to be around 3-4 of which one is a resident of the island and located on the back of the Mesjid (Pak Rohman no ph. Available).

They generally buy PET and hard plastic at Rp 1.000/kg, Aluminum cans at Rp.8.000/kg, Cardboard at Rp. 800/kg and beer bottles at Rp. 200-500 depending on size.

They are all sending the recyclables to Lombok just to the coast close to the Gilis (Teluk Dalem and Pemenang) . Transportation is done using local boats with a capacity of 2-3 tons, the costs is approx Rp. 500.000/ shipment while an additional Rp. 500.000 is spent in bringing goods to the boat plus loading and unloading recyclables at both ends.

From information gathered during interviews it is estimated that each of the 3-4 Pengepul operating in the island is shipping recyclables 2-3 times/wk with an average capacity of 2.5 T. This provides us with a rough estimate of the total of recyclable collected and shipped each month from Gili T of 90-120 Ton.

We could not obtain the names of these pemulung nor their contact numbers but they are all working for the Small Bandars in Lombok which have been visited during the assessment in the area of Desa Medana – Teluk Dalem.

The number of Small Bandars in the area of Desa Medana – Teluk Dalem is 3 although 7 different operators were observed but many of them are related to each other and work together.

Data on Recyclers in Teluk Dalem:

n.	level: 1.Small Bandar 2.Pengepul 3.Pemulung	person in charge/ owner	address	Type of waste they buy with	N. of staff	Collect mainly from which areas	Qty of waste shipped/mth	Where do they ship the recyclables
1	pemulung	Ibu Rian tel 087765369093	Desa Medana, Teluk Dalem Keren	mostly plastics (water bottles), cardboards, can, glass bottles (kecap and beer)	?	Gili T	information not disclosed	pengepul in KLU and local buyers
2	pengepul	Pak Burhamudin (no phone)	Desa Medana, Teluk Dalem Keren	mostly plastics (water bottles), cardboards, can, glass bottles (kecap and beer)	20	Gili T, KLU	Not available as we could talk only with the staff and not the owner	pengepul in KLU and Mataram (possibly also Surabaya via agent)
3	pengepul	UD Patoni Pak Ayumi tel 087712532009	Desa Medana, Teluk Dalem Keren	mostly plastics (water bottles), cardboards, can, glass bottles (kecap and beer)	7 (3 operating in GiliT)	Gili T	37 T	Mataram to UD semangat, Surabaya (via agent)

All these recyclers recover and sell plastic water bottles. If the condition of these bottles is good they clean it and sell it locally as there is a big request among small resellers of petrol or for “tuak” (local semi alcoholic beverage). They are able to resell these bottles at Rp. 100/pcs if small size (600 ml) or Rp. 500/pcs if big size (1.5 l). In case bottles are dirty or broken they get pressed and sold to main recyclers/Big Bandar in Mataram or Lombok Barat where they get shredded and then sent to Surabaya.

As for the other items prices are as follow:

Type of waste	Buy /kg Rp	Sell/kg Rp
Cardboard	1.100	1.300
PET Bottles	1.000-1.500	4.000
Hard Plastic	1.000-1.300	2.000-2.500
AL cans	10.000	not disclosed
Iron cans	500	not disclosed
Mixed metal	1.200	2.000

No recyclers dealing in Gili T is collecting and selling mixed paper or soft plastics.

2.5.8 Government:

The role of the government has been quite weak until now in Gili T but is due to improve. During an interview the head of DKP of KLU has shared that plans for the acquisition of the land to be used as the new TPA are to be finalized within August. The plan is to buy 50 ara next to the current location and

build there the new TPA. Apparently funds will be available and also a donation from the Mandiri bank of 1.2 billion has been made of which 500 million will be used for the installation of road lights and the remaining 700 million to be used for SWM infrastructures. Besides maximizing recycling and composting there are plans to utilize in the new TPA the system called OSAMTU developed by a professor in the Mataram University which includes incineration of some organic matter plus residue (not very clear). Apparently at provincial level the government has already agreed to use this system in all the various TPA of the various regencies in Lombok. But it seems that the system is still facing technical challenges and cannot be implemented yet.

It needs to be reminded that any form of incineration is to be considered extremely detrimental both for the environment and for the health of the residents and tourists of the island therefore the OSAMTU solution should be avoided.

There is also a plan to form a new UPTD (Unit Pelaksanaan Teknik Daerah) from the DKP department that it is due to open an office in Gili T as soon as TPA land is secured and works will initiated. While sounds that the role of FMPL in collecting the waste will remain the same, there are plans from the government to collect SWM service fees (possibly due to TPA expenses). The plan still needs to be finalized and for sure will be discussed with all the relevant stakeholders.

2.6 System envisioned to be implemented in the island in the near future

- Waste separation at source implemented by all residents and businesses (organic and non organic possibly even more detailed)
- Collection of the 2 categories using separated carts one for each category only. But possibly not utilizing cidomos (electric carts have been experimented without success, stakeholders are still looking for a viable solution)
- Waste is brought to TPA/landfill (tempat pemrosesan akhir) where:
 - Organic waste is to be composted (via Felita and possible other composting methodologies)
 - Recyclables are fully recovered and sold to Lombok via BSGI and BSBS partnership (ensuring that besides PET,hard plastics, Al cans and cardboard also mixed paper, duplex, iron cans, soft clear plastic packaging as well as plastic shopping bags will be recovered and traded)
 - Glass bottles are upcycled and/or processed in the island (bricks or other)
 - Possible handy-crafts can be developed using waste (certain plastics and paper) and can be sold in the island
 - Residue disposed in TPA or brought to Lombok (still to be clarified)

In order to realize the above there are several needs that have to be met such as acquisition of additional land, infrastructures and tools.

During the interviews with the various stakeholders the following information were reported

Current Status	Remarks
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Collection	<p>At the moment collection is done via cidomo/horse cart. Maintenance is high up to 70 millions/mth (9 cidomos). GET has bought an electric motor cart OZONI but at the moment is not usable due to lack of spare parts</p>	<p>There is a need to look for alternatives to the cidomo. Electric carts or other non fuel facilities. Not easy to find and spare parts needs to be easily available. Unless FMPL can get a special dispensation from the Regent and get granted the possibility to use regular motorcarts</p>
TPA current location	<p>-is full and accessibility is bad especially during rainy season due to lack of paved roads</p>	<p>it is envisioned to close this location and restore the area covering the waste with soil. This area in the future can then be used for sports facilities fields (soccer, badminton, volleyball, tennis, basketball etc)</p>
New TPA	<p>-Government (Regent in Lombok) has promised 50 Ara by august 2016</p> <hr/> <p>-Preparation to put in place a better waste processing system with machineries</p>	<p>APGT, FMPL, KADUS and GET will continue to lobby the Regent in order to be granted this land although the technical and burocratic iter to obtain it is not very clear and might take 1 year before will all be done</p> <hr/> <p>The following equipment has been already purchased by GET via donation from Businesses and it is stored in Lombok:</p> <ul style="list-style-type: none"> • One big press/bailing machine (for recyclables) • One conveyor belt (to facilitate waste separation) • One big Shredder for organic waste
BSGI premises	<p>In order to make operative the BS a building for press and storage of recyclables was required. GET via donation from businesses was able to build a warehouse for the packaging and storage of the recyclables close to the FMPL staff dormitory. At the moment this building is used by FMPL for their recovered recyclables but also is used by other pemulung to pack and store their goods obtained via their collection.</p>	<p>A functioning bailing machine/press as well as scale has been provided for the warehouse by GET via donations from Businesses. Nobody is using the press at the moment as BSGI is not operational yet because FMPL has decided that they do not want to be in charge of it anymore</p>
Transportation	of The trials that have been done by FMPL	GET via donation from

recyclables to Lombok	have shown that cost of transportation is high, especially if boats have small capacity. Price of renting a boat with the capacity of 2-3 Tons is approx 1 million (this includes labor cost for loading and unloading the goods)	Businesses have already purchased since January a boat with the capacity of 16 Tons or 36m3 but at the moment has not been used yet
Felita composting system	3 units have been installed in TPA and are working but can process only to a max of 500-800 kg/day	GET and BSBS are exploring additional methodologies such as Biogas as well as aerobic composting
Glass upcycling and processing	-4 glass crushers are available and working bought by GET via donation from businesses -glass cutting machine is available for up-cycling purposes -Bricks manufacturing is ongoing	-bricks are constantly produced and sold within the island as construction material -up-cycled glasses are constantly produced and sold within the island

2.7 Main problems that the current SWM system is facing:

Many problems have been outlined during interviews and group discussions among stakeholders during this mission, the whole system has still several bottlenecks and issues but there are few problems that need immediate attention.

- A. Land availability for new TPA
- B. Ability of BSGI and BSBS to function properly

The above problems are of paramount importance to be solved as soon as possible as they can jeopardize the effectiveness of the whole system as well as the investments already done in terms of machineries.

- A. Land availability for new TPA:

The Old TPA is full and there is no space in it to install machineries to guarantee proper sorting and composting. Because of the promise made in the past months by the Regent GET already bought one shredder one bailer/press and one conveyor that are sitting in Lombok as cannot be transported to the island as there is no place where to place it and store it. GET is starting to worry about the conditions of the machines as they might get rusty. The head of GET has already said that will continue to lobby the Regent and is hoping for the land to be allocated officially and used by the beginning of 2017.

The ability to have new land/premises will guarantee a better management and therefore a better ability to process the constant increasing amount of waste related to higher number visitors and of business operating in the island.

- B. Ability of BSGI and BSBS to function properly

BSBS as per agreement is waiting for BSGI/FMPL to collect and ship the recyclables.

FMPL that in the beginning agreed to be in charge of BSGI after a couple of initial trials of packing and shipping recyclables that have encountered several problems has revised their position. They feel that they do not have the human resources and skills to manage the BS therefore they have made clear during our meetings that they want to be in charge only of the part relating with collection of waste and management in TPA.

FMPL staff is used to a system where the pemulung take care of packing and shipping and they get the money of the recyclables without having to put any extra work.

FMPL and BSBS had the agreement that recyclables will be bought by BSBS at premium price in Lombok after packing and shipping but no deposit payment system was put in place or incentive for the staff. FMPL staff does not seem to be motivated at the moment to take the lead of managing BSGI.

BSBS at the same time has not been proactive in addressing this issue due possibly to lack of communication or misunderstandings and has not put in place yet any alternative strategy to build a different system where BSBS might take a bigger leading role in the island and also create clear monetary incentives within the value chain that will motivate FMPL staff to become more active.

At the same time needs to be said that during the meeting held at KADUS office involving FMPL, Kadus, APGT and GET The representatives of FMPL have stressed that they are still very interested and willing to collaborate with BSBS although they do want that BSBS to take the lead in organizing BSGI putting in place people that can manage it. They have also renewed the commitment to use the awig-awig to issue a regulation for which all pemulung operating in the island can sell only to BSGI/BSBS therefore centralizing all recyclables flow to BSGI and BSBS.

They hope that payment schemes from BSBS especially at the beginning can follow the same system of cash & carry to which they are used at the moment with the normal pemulung. This will guarantee the extra income for FMPL staff on which they count to maintain themselves in the island since their salary is usually sent home to support their families.

This outcome of the discussion was reported and discussed by this team within the same day with representatives of BSBS as they later on came to the island.

6.Recommendations

6.1 Gili Trawangan:

It is important to strengthen the whole SWM system focusing on the different aspects:

- Finalize with all stakeholder the system that will be implemented with clear roles long terms, staff required, timing and technologies that will be used (management in TPA, recycling and composting). Create a road map document
- Carry out a financial analysis of the whole system in order to ensure that all components are properly included in order to cover operational but also small investments in infrastructures that will guarantee better services
- Capacity building for FMPL staff regarding service activities but also operational in the TPA (SOP, etc)

- Design a communication strategy targeting all businesses and residents.
- Clarification and strengthening of roles of stakeholders specifically to the role of BSGI and BSBS
 - Immediate revision by the stakeholders of previously agreed system, roles and responsibilities, evaluation of problems encountered and expectation. Formulation of new system.
 - BSBS in evaluating their position they need to take into consideration that they have to take a bigger leading role as at the moment there is nobody among the stakeholders in Gili T that is able to lead. The people in FMPL do lack the knowledge on how the value chain works and they do not want to take risks. Therefore BSBS has to position itself as acting BSGI manager putting in place the whole value chain system while looking for a local person that can be trained to then be in charge of managing the BSGI
 - BSBS need to show their ability to consistently buy pack and ship recyclables in order to create trust in their system (increased types/categories of recyclables are bought including the ones from TPA, cashflow is good, trust is built, results in decreasing waste at TPA are seen, motivation is restored) starting with FMPL staff first then widening to other stakeholders
 - The awig-awig system needs to be activated as soon as BSBS has already shipped few times and created the logistics to be able to handle within the island a bigger flow of recyclables.
 - BSBS can already count on using the facilities put in place in the island for BSGI such as the warehouse close to the dormitory which includes bailing machine/press, scales, carts to transport to harbor and boat with big capacity than can be used for a certain period at no rental costs.
 - Links with buyers of soft plastic in Lombok (banyumulek) needs to be made so that the recovery of those items can start in the island. Also new links for recyclers of shopping bags can be made via the APDUPI channel.
 - Link with buyer of used Tetra Pak cartons (milk, juices, tea etc) operating in Bali needs to be made (ecoBali Recycling) and discussion for trial collection and shipment needs to be initiated.
- Support to the recycling and upcycling of glass within the island
 - Improve glass bottles recovery at source. Incentives might be needed to motivate businesses therefore the possibility to put a price on these glass materials should be considered. This cost can then be included in the production cost.
 - Capacity building in order to increase number of bricks produced weekly
 - Capacity building in terms of quality and design of upcycled products
 - Improve marketing of bricks and upcycled products within the island
- Support to the composting efforts undertaken

- The felita system currently poses several challenges therefore is important to conduct an evaluation of the approach considering all pro and cons including costs and decide future strategies for its application.
- Alternative systems available in Indonesia needs to be taken into consideration and full knowledge of techniques for implementation needs to be analyzed in order to choose either the best option or a mix of technologies (aerobic, anaerobic, biogas etc)