

# Circular economy and degrowth perspectives on plastic collection and recycling on Bali

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Insamling och återvinning av plast på Bali utifrån perspektiven cirkulär ekonomi och nerväxt

Sammandrag

Den här uppsatsen handlar om nedskräpning, insamling och återvinning av plast på Bali i Indonesien. På grund av osäkra avfallshanteringssystem, brist på kunskap och få incitament för insamling, har plastavfall en tendens att hamna i naturen där det sedan förorenar mark och vatten, och därmed utgör en risk för djurs och människors hälsa. Genom en fallstudie av den vinstdrivande och sociala organisationen The Plastic Bank, som handlar med just plastavfall, undersöker den här studien vilka plaster som anses vara återvinningsbara, respektive icke-återvinningsbara, och varför. Data samlades in i form av en fältstudie på Bali och innehöll moment som plockanalyser, intervjuer och deltagande observationer. Den vanligaste kategorin av plast i miljön var tunna, mjuka matförpackningar (i stil med tex. chipspåsar). Dessa anses i regel vara icke-återvinningsbara eftersom de har ett lågt marknadsvärde och ofta är täckta av matrester. För The Plastic Bank är en plast återvinningsbar om det finns en återvinnare inom rimligt avstånd – en aktör inom Balis återvinningsindustri – som är villig att ta emot den. Resultaten från datainsamlingen analyserades utifrån två olika hållbarhetsperspektiv: cirkulär ekonomi och nerväxt (eng. degrowth). Cirkulär ekonomi, som syftar till att material ska cirkulera i slutna flöden utan att skapa avfall, valdes på grund av den betoning på återvinning som den ofta förknippas med. Nerväxt valdes då det tar starkare ställning för sociala värden vid sidan av ekologisk hållbarhet – något som man är ovillig att kompromissa med gentemot rådande tillväxtfixering. Båda perspektiven propagerar för en omorganisation av hur vi hanterar materiella resurser i samhället, men skiljer sig i synen på hur materialanvändning och miljöpåverkan hänger samman. Analysen visar på vilket sätt The Plastic Banks hantering av plast på Bali sammanfaller med värderingarna från cirkulär ekonomi och nerväxt, och diskuterar skillnader och likheter mellan de två begreppen när det kommer till att lösa plastrelaterade miljöproblem. The Plastic Bank har som mål att ge dem som plockar avfall större inkomster och att stoppa nedskräpningen genom ökad återvinning. Dessvärre är dessa två mål inte helt möjliga att samordna eftersom marknaden inte ser något värde i flera av de mest förorenande plasterna. Incitament för att ta hand om alla sorters plaster behövs för att de inte ska hamna i miljön (från ett cirkulärekonomiskt perspektiv). Alternativt behöver plastanvändningen minska i absolut mening (från ett nerväxt-perspektiv). Det här är ett signifikant och viktigt problem att angripa med förebyggande och avhjälpande lösningar mot plastavfallets negativa konsekvenser, särskilt eftersom produktionen av plast i världen förväntas öka.

Nyckelord

Cirkulär ekonomi, nerväxt, plastavfall, nedskräpning, återvinning, plockanalys, social företagsverksamhet

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Abstract

This thesis studies plastic littering, collection and recycling on Bali in Indonesia. Due to unsound waste management systems, low awareness and few incentives for collection, plastic waste has the tendency to leak to the environment, where it pollutes land and water, and poses a threat to wildlife and human health. With a case study of the for-profit social enterprise the Plastic Bank that trades with plastic waste, this study investigates what types of plastics are considered ‘recyclable’ or ‘non-recyclable’ and why. Data was collected as fieldwork on Bali through pick analyses, interviews and participant observations. In the environment, the most commonly found plastic waste category was ‘food wrappers’, which are considered non-recyclable because of their low market value and typical food contamination. The Plastic Bank defines a plastic type or product ‘recyclable’ if there is a recycler relatively nearby (on Bali) that is willing to buy the material. The findings were analysed through the lens of two sustainability concepts: circular economy and degrowth. Circular economy was chosen due to its emphasis on recycling to maintain materials in waste-free closed-loops, and degrowth due to its uncompromising and highlighted importance of not only ecology, but also social values and equity. Both concepts advocate a re-organisation of how we handle material resources in our societies, however with rather different ideas of how material use and environmental impact connect. The analysis brings forward how the Plastic Bank aligns with circular economy and degrowth in the form of a case study, and discusses differences and synergies between the two concepts when it comes to solving sustainability problems related to plastic waste. Today, the Plastic Bank’s model of financially incentivising collectors and enhancing circularity of material flows is not coherent since the market is not assigning a value to the most polluting types of plastic waste. In order to stop plastic littering to the environment, incentives to care for all types of plastic waste need to be created (from a circular economy perspective). Alternatively, plastic use has to be reduced in absolute terms (from a degrowth perspective). This is a significant problem to address, with mitigation or remediation efforts against plastic waste, since the global demand for plastic is only expected to increase.

Keywords

Circular economy, degrowth, plastic waste, littering, recycling, pick analysis, social enterprise

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## Preface

This master thesis developed at the junction of waste management, recycling and sustainability. I happened to know about the Plastic Bank from a documentary called *A Plastic Ocean* and got in touch with Paul Brooks, the volunteer manager of the Plastic Bank. My supervisors, Ekaterina Chertkovskaya and Valentin Vogl, introduced me to the relatively new and radical grip on sustainability that is degrowth. Thanks to the ‘Minor Field Study Scholarship’ from the Swedish International Development Cooperation Agency, it became possible to travel to Bali, Indonesia, to collect field data.

The fieldwork consisted of a myriad of observations that fed my curiosity. Plastic waste and the littering to water ways and the ocean is a momentous environmental problem and an ill-fated question of our time. Seldom have I felt a greater sense of purpose than while picking plastic in the mangrove forest or on the beach.

I think of this time as a journey of meaningful and educational chaos. During fieldwork, I was navigating within the spontaneous calm that is life on Bali. At times, I felt like an explorer, aspiring to climb the waste mountain. At other times, I felt like an archaeologist, digging into layers of mud-buried trash that speak of the lifestyles of the yesteryears. Sometimes I felt like a journalist, telling the peculiar story of waste and our lives with it. Then finally, submerged in the writing process, I felt like a scientist.

### Special thanks to

- The entire team of Plastic Bank Indonesia, led by Paula Cortese on Bali, and the interviewees in particular
- Paul Brooks – Volunteer, Intern & Social Media Manager at the Plastic Bank
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## GLOSSARY

**Bonus tokens** – A currency that the Plastic Bank allots to waste pickers for collected plastics in addition to the market price.

**Collectors** – Also **waste pickers** or **scavengers**. People who collect plastic waste to make an income. Collectors connected to the Plastic Bank are being called **members** by the Plastic Bank. Those are given a **payment**, not a salary, since they are not employed by the Plastic Bank.

**Consumer goods** – End products consumed for personal use or enjoyment by the average consumer.

**Decoupling** – Continuous productivity and growth without the associated (increase of) environmental impact. Can be relative to GDP and produced unit, or absolute.

**Downcycling** – Process of loss in quality that happens to some materials during recycling; the recycled material is of lower quality than the original material and can therefore only be recycled a limited number of times.

**Economic growth** – “[A]n integrated cultural, political, ecological, and economic process manifested as an increase in the total market value of all goods and services (GDP)” (Kallis et al., 2018: p. 292). Also **growth paradigm**, which is the belief that unlimited economic growth is possible, imperative and beneficial for society.

**Ecosystem Activation** – A business model of the Plastic Bank, where they add their bonus system on top of the already existing informal waste management system.

**Mangrove forest** – Tropical coastal biotope of mangrove trees. The trees have a unique ability to tolerate saline water and stand against wave action from the ocean. Mangrove forests provide important ecosystem services like protecting the coasts from erosion, providing nurseries for fish, protecting tropical bays from increasing water temperatures and acidity, and living in symbiosis with coral reefs.

**Mangrove Mob** – Clean-up events in the Wisata Hutan Mangrove organised by the Plastic Bank, in cooperation with a couple of other organisations on Bali. Volunteers pick up plastics from the ground and through them in a container.

**Material throughput** – Also **biophysical throughput**. The amount of material and energy that ‘flows’ in and out of the economy. Sometimes referred to as **metabolism**.

**Material (throughput) reduction** – The process of reducing the amount of material and energy needed for a product or service. Can appear as **dematerialisation** in degrowth literature.

**Mika** – Crisp plastic container (figure 1).



**FIGURE 1 MIKA FROM TOKOPEDIA E-SHOP**  
[HTTPS://WWW.TOKOPEDIA.COM/SUMBER-PLASTIK/KEMASAN-MIKA-PLASTIK-KUE-DAN-MAKANAN-UKURAN-5T](https://www.tokopedia.com/sumber-plastik/kemasan-mika-plastik-kue-dan-makanan-ukuran-5t) [ACCESSED 6TH MAY 2020].

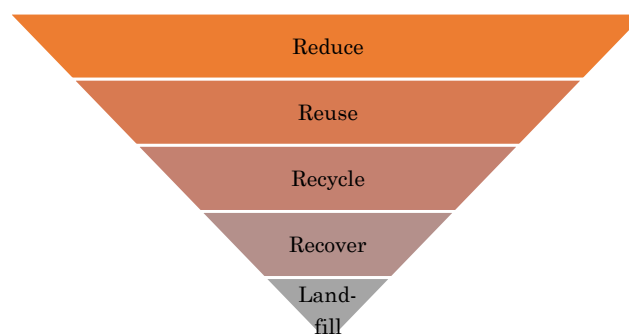
**Plastic** – Polymer material (carbon chains) created through distillation, steaming and anaerobic heating processes. Plural **plastics** refer to different **types of plastic**. The majority of plastics are made from fossil feedstock. The following five types are the most common: Polyethylene (34.4%), polypropylene (24.2%), polyvinyl chloride (16.5%), PET (7.7%) and polystyrene (7.3%) (Centre for International Environmental Law, n.d.).

**(The) Plastic Bank** – A for-profit social enterprise that sells collected plastics for recycling. Originally founded in Canada, it now exists on Bali, Indonesia, among other places.

**Plastic Neutrality** – A product and trademark of the Plastic Bank which entails getting clients' plastic waste collected and recycled.

**Production and consumption system** – The way in which production and consumption is organised in our society. This is usually a linear (sometimes called **nature-society-nature** or **take-make-use-dispose**) model where natural resources (and energy) are extracted and turned into products, which are then consumed and eventually discarded as trash.

**Reduce, reuse, recycle (the 3R framework)** – In that specific order, the top three steps in the **waste hierarchy** or the **R hierarchy** (figure 2). Sometime 'recovery' is added as a 4<sup>th</sup> R.



**FIGURE 2 ILLUSTRATION OF THE WASTE HIERARCHY. REDUCING IS THE MOST FAVOURABLE, AND LANDFILLING IS THE LEAST FAVOURABLE. OWN FIGURE.**

**Processor** – Processor within the recycling industry; one who processes recyclable material. Also **recycler**.

**Sachets** – Small to medium size, thin, flexible plastic packaging for foods and consumer goods.

**Scatolic framing of waste** – Attitude for organisational engagement with waste, suggested by Corvellec (2018). This engagement includes the “contingent, multiple, and transient value of waste” (p. 219). Waste should not be systematically neglected or organised to “disappear”.

**Social Enterprise** – Business with emphasised social objectives. Seeks to maximise profit while/in order to maximise positive output for society, people and the environment.

**Social Plastic** – A product and trademark of the Plastic Bank. All plastics that are handled by the Plastic Bank are called Social Plastic. Partner companies that use this plastic for manufacturing can brand their products as being made from Social Plastic.

**Sustainable development** – Launched in the so-called **Brundtland report** (titled ‘Our common future’) as: “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN Documents, 1987). **Needs** refer to the essential needs of the world’s poor. The report points out that the environment’s ability to meet present and future needs is limited.

**Wisata Hutan Mangrove** – Translates as the Tourist Mangrove Forest. A mangrove forest east of Kuta, on Bali, partly used as recreational area.

**Zero-waste** – Waste management strategy that considers waste prevention through sustainable consumption practices and design, linked to new material cycle paradigms (such as circular economy). For businesses this means restricting production and material use so that minimum waste is created, avoiding incineration and landfill, and prioritising the use of recycled materials as raw material above new extraction (Zero Waste Europe, n.d.; Zero Waste International Alliance, n.d.). For consumers this means restricting consumption so that minimum waste is created, e.g. refusing single-use products and unnecessary packaging. Sometimes as **zero-waste economy** and **zero-waste lifestyle**.

# 1. INTRODUCTION

This opening chapter introduces the topic, formulates the research questions and defines the aim within the chosen research area. Here, plastic pollution is studied within a context of the Balinese waste management system and the social enterprise the Plastic Bank in Indonesia.

## 1.1 TOPIC

Around the world, plastic waste is accumulating in natural environments at alarming pace (e.g. Best, 2017; Earth Day, 2018). It is stated that one truck load of plastic is dumped into the ocean every minute (Fela, 2018), and that there will be more plastic than fish in the oceans by 2050 if we continue to consume and litter as we do today (Ellen MacArthur Foundation, 2017a). This is worrying because ocean plastic is a threat to wildlife, causing for example entanglement and choking (Derrail, 2002; Wilcox et al., 2016; Earth Day, 2018). Plastic also adds worrying new dimensions of toxicological threat to already health damaging waste (Harvey, 2019), not the least on a molecular level since littered plastics are known to break down and scatter in the natural environment in micro-sized pieces (Lebreton, Egger & Slat, 2019).

One place vastly affected by plastic littering is Bali in the Indonesian archipelago where the beaches are regularly flooded by plastic waste (e.g. Gokkon, 2018; The Straits Times, 2018a; Rogvall, 2019). In December 2017, Indonesian authorities even called the problematic waste situation a ‘plastic crisis’ and a ‘garbage emergency’, and as a result, a ‘war against marine plastic debris’ was proclaimed in 2016 (e.g. The Straits Times, 2018a; Purba, 2019). With this rhetoric, Bali is seen as a pioneering island for the rest of Indonesia, which is the world’s second largest plastic polluter<sup>1</sup> and the source of 10 % of the world’s plastic ocean debris (Gokkon, 2019). The Balinese provincial government started regulating single-use plastics with a fine on trial during 2018, enforced a ban in January 2019, and rejected protests from the plastic-recycling industry in the Supreme Court in 2019 (The Straits Times, 2018b; Gokkon, 2019; Heyden, 2019; Mei, 2019). At the national level, president Joko Widodo has set the goal to reduce ocean plastic by 70 % until 2025 (SYSTEMIQ, 2019).

As much as 80 % of the ocean plastic found along Bali’s coastline is believed to originate from the island itself as waste is often dumped in rivers that will carry the waste to the ocean (The Straits Times, 2018a; The Straits Times, 2018b; Johns, 2019; Purba, 2019). Researchers who study debris circulation dynamics have found that waste has the tendency to get trapped by nearshore currents and travel back and forth with the tides and therefore stay rather close to the same coasts where it was littered (Henry, 2019; Lebreton, Egger & Slat, 2019). According to the Governor’s Waste Management Task Force on Bali, 1.6 million tonnes of waste is generated on the island yearly, of which 20 % is plastic (SYSTEMIQ, 2019). Of the plastic waste, 7 % is collected for recycling, and 11 % is believed to reach waterways and the ocean (ibid.).

As in many places in the developing world, Bali faces the challenge of increasing waste generation but inferior infrastructure and financing for sound handling of waste. Bali shares many of the same traits as the group of Small Island Developing States<sup>2</sup>, such as a limited area, a long coastline, sensitivity to rising sea levels and few connections to mainland cities and

<sup>1</sup> World’s top five plastic polluters: 1) China, 2) Indonesia, 3) the Philippines, 4) Thailand and 5) Vietnam (Ocean Conservancy & McKinsey Centre for Business and Environment, 2015).

<sup>2</sup> Coined by the UN and used since 1994, Barbados conference.

industries (Lachmann et al., 2017). Such places are often economically vulnerable to plastic litter because of the negative effects on fisheries and tourism (ibid.). Some suggested measures to the problem are mitigation (improved control or management of plastic) and remediation (remove the already littered plastic from the environment). This is to be paired with international collaborative efforts that assist government agencies in forming better waste management programs, building technical know-how and developing recycling markets (ibid.). The World Bank has estimated that municipalities in developing countries can sometimes spend up to half of their annual budget on solid waste management (Rajendran, 2018). It is primarily waste collection, transportation and the treatment itself that make up this cost. Among few treatment options, landfilling is seen as practical and cheap (The World Bank, 1999; Rajendran, 2018). Bali has 10 official landfills (SYSTEMIQ, 2019). One of them is the open dump or landfill<sup>3</sup> Tempat Pembuang Akhir (TPA) on the artificial peninsula Seranang. The TPA is one of the default final destinations for household waste on Bali where there is a door-to-door service or other forms of community collection of waste. Alternative treatment is open-pit burning (also called backyard burning) or littering. Open-pit burning is problematic since it releases greenhouse gases and toxins into the air (Heinrich Böll Stiftung, 2019).

One of the most distinct differences in waste management between high- and low-income countries is the presence of a characteristic informal waste sector in low-income countries. The informal waste sector consists of waste pickers that rely on waste collection as their only means of livelihood (Kashyap & Visvanathan, 2014). Some of the challenges associated with scavenging in the informal sector are social stigma, unsafe working environment, health concerns, and irregular income. Activities within the informal waste sector are collection (scavenging), segregation and sorting into different categories based on plastic type and colour, washing and cleaning, followed by sale and purchase of recyclables on the market. Despite the fact that waste management and recycling is big business (Kashyap & Visvanathan, 2014), post-consumer recycling rates for plastic are generally small because small pieces of used plastics are worth little and tend to get lost in mixed waste streams (Allwood & Cullen, 2012). Most plastics are possible to recyclable, but only if perfectly separated according to type or sometimes colour (Allwood & Cullen, 2012). Out of all plastics ever produced since the 1950's (8300 tonnes until 2015), 9 % has been recycled according to Allwood and Cullen (2012) and 14 % according to the *Plastic Atlas* report (Heinrich Böll Stiftung, 2019). The rest has been burned, landfilled or littered (Geyer, Jambeck & Law, 2017; Mortillaro, 2019; Heinrich Böll Stiftung, 2019).

One type of plastic that is extra challenging to recycle is thin and flexible plastic packaging, the so-called sachets (Wu, 2014; Bio Energy Consult, 2019; Smithers, 2020). Sachets are commonly seen in snack packaging and various consumer goods in small- to medium-sized portions (Purba, 2019). Some sachets are 'multilayers' with aluminium foil laminated to the plastic film. Multilayers are possible to recycle but require high amounts of expensive additives that are not commonly used within the recycling industry today (Uehara, França & Canevarolo Junior, 2015; Kaiser, Schmid & Schlummer, 2017). Economies where this type of packaging is especially common, due to its convenience and affordability, are sometimes called 'sachet economies'<sup>4</sup> (Posadas, 2014; Disruptive Innovation Festival, 2019). The Asia Pacific region is the biggest market for flexible plastic packaging (Markets and markets, 2017). According to

<sup>3</sup> Whether the TPA should be considered an open dump or a (sanitary) landfill depends on its technical design. This is to be discussed further in section 4.2.2.

<sup>4</sup> Encountered sources bring up Asian countries with quick urbanisation, such as the Philippines, as examples.

the *Plastic Atlas* report, Philippine consumers were estimated to use 591 sachets per person per year in 2014 (Heinrich Böll Stiftung, 2019). The justification for sachets is to distribute high-quality products to low-income consumers (Disruptive Innovation Festival, 2019). They are also seen as important in protecting food, extending shelf-life and reducing food waste (Markets and markets, 2017; Kaiser, Schmid & Schlummer, 2017; Sustainability in Packaging Europe, 2020). The active use of sachets can also be explained by insufficient refrigerating, vermin and lack of space at home, and little motivation price-wise to choose bulk over single servings (Disruptive Innovation Festival, 2019; Johns, 2019).

Besides the previously mentioned treatment options, the highest level of the waste hierarchy is reducing – or even refusing – waste. Waste reduction connects to material reduction; using less material for production, using things for longer and avoiding material-intensive services. Absolute material reduction might be the only way to mitigate climate change and ecological breakdown since no empirical evidence has yet been found where resources use is entirely decoupled from economic growth (Hickel & Kallis, 2019). Plastic industry is currently in a strong, structural fossil carbon lock-in (Bauer et al., 2018). The production of virgin plastic emits 2-3 kg carbon dioxide per kg plastic (Allwood & Cullen, 2012). The production of plastic, steel, cement, paper and aluminium are together accountable for half of the world's industrial carbon emissions and the demand for these materials is predicted to double until 2050 (industrial emissions account for 35 % of the world's total emissions; Allwood & Cullen, 2012). Reduced use of plastics is one identified pathway to how the future plastic sector (a possibly reduced and transformed one) can be circular and decarbonised (Bauer et al., 2018). If the current production trend of plastic continues, 12 000 million tonnes of plastic will be littered to the environment or stored in landfills by 2050 (Geyer, Jambeck & Law, 2017). In order to provide modern life with basic materials, the prevalent but relatively small efficiency gains in material use needs to be complemented with absolute material reduction (or material sufficiency) – otherwise the expected increase in market demand will make the total material use and emissions increase nonetheless (Allwood & Cullen, 2012). Reducing the demand for plastics will inevitably be key when we run out of ideas of how to re-use or extend product life (ibid.), though a review has found that measures to improve waste management, e.g. through recycling, has broader political support than regulating production and consumption (Nielsen et al., 2019).

Packaging is the largest (e.g. 40 % of plastic use in Europe) and fastest growing category of plastics and the biggest contributor to plastic pollution (Centre for International Environmental Law, n.d.). Other categories that often receive political attention are bags, bottles and single-use items (Nielsen et al., 2019). These are being targeted with e.g. bans and pricing mechanisms (on bags; Nielsen, Holmberg & Stripple, 2019). The petrochemical industry, plastic producers and brand-owners naturally oppose such policies, though, restricting a few plastic objects have minor effect on the overall output from the big plastic industry (ibid.). In response to being shamed by clean-ups and anti-littering campaigns (Break Free From Plastic, 2019), some companies do act on the unsustainable waste situation: "It is becoming a major threat to their business, not doing anything about this [plastic waste]" (quoted Wingstrand in Mortillaro, 2019: section 5). In order to convey that they are (part of) solving the problem, to shift responsibility from the producers to the consumers, and to avoid legislations and bans on plastic (MacBride, 2012; Break Free From Plastic, 2019; Broken5, 2019), it is sometimes the producing companies

<sup>5</sup> Broken is a Netflix investigative documentary series released on 11/27/2019. The 4<sup>th</sup> episode 'Recycling Sham' is about the plastic recycling industry.

themselves that are the funders behind anti-littering campaigns (American Chemistry Council, 2010; MacBride, 2012) However, despite ventures for self-launched collection systems, plastic continues to leak to the environment. Framing plastic-related problems solely as a consequence of littering carries the association that the individual litterer is to blame and “implies a moral failing” (Nielsen et al., 2019: p. 5). Contemporary artwork has been found to join in this emphasis on disposability and consumer responsibility (Chertkovskaya et al., 2020). The multifaceted ‘plastic crisis’ is, in other words, increasingly studied, debated, politicised and expressed, by different actors in different arenas, from different angles and perspectives.

## 1.2 PROBLEM STATEMENT

This thesis addresses the use of plastic as a basic material and consequent impact on people and the environment. As outlined above, the management of waste is inadequate in many places and plastic continues to leak to the environment. The use of plastic becomes a sustainability problem both because it causes carbon emissions and is a direct threat to wildlife and human health. Seemingly, the production of plastics has to be limited. Simultaneously, the incentives to care for (all types of) plastic waste have to improve. If not significantly altered, the consequences for the environment and people will worsen as the demand for plastic is expected to increase.

Two different concepts that can be used in order to theoretically problematise, discuss and frame sustainability problems are **circular economy** and **degrowth**. Circular economy is a critique of the linear production and consumption system and advocates closed loop cycles of material use through improved design and recycling. Circular economy has become a mainstream concept within business and policy making (Ellen MacArthur Foundation, 2017b). Degrowth, on the other hand, is a critique of the high and constantly expanding production and consumption system of modern society, which is seen as both ecologically unsustainable and socially unjust. Degrowth is prominent mainly within the realms of activism and academia, and advocates, for example, less biophysical throughput and equitable distribution of resources (Demaria et al., 2013). Discussing synergies and differences between circular economy and degrowth has the potential to “advance strong global sustainability efforts” despite for example ideological differences (Schröder, 2019: abstract p.190). At the time of writing, the complexity of these concepts is a topic of very recent research which presents degrowth as part of the discourse(s) of circularity thinking (Calisto Friant, Vermeulen & Salomone, 2020). The aim of this merging is ultimately to help the transition to a more sustainable future.

### 1.2.1 RESEARCH QUESTIONS

The following two research questions were formulated with respect to plastic waste littering, circular economy and degrowth:

- 1) *How are the different types of plastics that can be found on Bali handled, and why (using the example of the Plastic Bank)?*
- 2) *How does the current handling of plastics align with the sustainability narratives from circular economy and degrowth perspectives?*

### 1.2.3 SCOPE

The scope of the thesis is littered plastic waste on Bali. It includes primarily the organisation Plastic Bank Indonesia, which at present has most of its activities based on Bali. It does not include the whole enterprise Plastic Bank on a global level. It should be noticed that the Plastic Bank does not present itself as either a circular economy or degrowth oriented business. This



analysis was undertaken for academic purposes only. The word ‘plastic’ refers to conventional plastic, which ought to be seen as a fossil-based material. Over 99 % of produced plastics are made from crude oil and natural gas liquids (Centre for International Environmental Law, n.d). Only a small proportion of the produced plastics are made from bio-based feedstocks.

The two sustainability concepts circular economy and degrowth are both umbrella terms which include multiple ideas and sources. This thesis addresses their perspectives as being relevant for material use in general, and plastic in particular, as will be presented in the literature review, sections 2.1.1 – 2.1.2. The literature review, followed by the analytical framework, narrow the broad concepts of circular economy and degrowth down to what is relevant for waste and waste management<sup>6</sup>, and applies it to plastic waste.

Circular economy is taken up as a sustainability concept for resources management and sustainable societal transition, mainly promoted by corporate business leaders and policy makers such as the European Commission. For the sake of this thesis, however, European legislation will only be mentioned in brief. Also, a large part of degrowth literature is originating from Europe (Demaria et al., 2011; Chiengkul, 2018), but little significance will here be given to geographical place (of the two concepts in theory) or the differences between Global North and Global South that might play out on Bali (Chiengkul, 2018).

Finally, this thesis targets the larger pieces of plastic, one step up-stream from microplastics. After they have entered the environment, larger pieces of plastic break down to microplastics through weathering processes. That is another environmental problem with toxicological risks at a molecular level, which is however outside the scope of this thesis.

## 2. THEORY

In this theory chapter, the two concepts circular economy and degrowth will be presented by means of a literature review and an analytical framework. The concepts are broad and diverse and loaded with different connotations for different people, and therefore need an overview as well as a focus towards the specific topic of this thesis, which is plastic waste. Overlap and conflicts between the two concepts will be discussed in the analytical framework which constitutes the later part of this section (2.2).

### 2.1 LITERATURE REVIEW

This literature review presents circular economy and degrowth respectively, by engaging with academic literature, business publications and media that are relevant to the context of this study.

#### 2.1.1 CIRCULAR ECONOMY

Circular economy is a sustainability concept for resources management and sustainable societal transition, mainly by means of handling material and energy resources in a circular manner. In terms of material use, this is achieved by designing for recyclability, prolonging use and reuse over time, and focusing on material efficiency in production processes (Bocken et al., 2016; Ellen MacArthur Foundation, 2017b). It embraces technical and design-related solutions to

<sup>6</sup> E.g. as initiated in the collection *Discards, Diverse Economies, and Degrowth* (Lepawsky & Liboiron, 2015).

limit environmental impact (D’Alisa, 2019). Circular economy agrees with the waste hierarchy (Korhonen, Honkasalo & Seppälä, 2018) and the idea that a society can minimize both the extraction of resources and consequent emissions by reducing, reusing and recycling (Tanaka, 2014; Corvellec, 2018). Circular economy encourages producers and consumers to keep materials in use for longer and to derive as much value from the material as possible (Blomsma & Brennan, 2017; Eloksari, 2019), in slower, narrower and closed resource loops (Bocken et al., 2016).

As subject to emerging interest in research (Korhonen, Honkasalo and Seppälä, 2018; Temesgen, Storsletten and Jakobsen, 2019), circular economy has been defined in the following way (Korhonen, Honkasalo and Seppälä (2018: p. 39):

*“Circular economy is an economy constructed from societal production-consumption systems that maximizes the service produced from the linear nature-society-nature material and energy throughput flow. This is done by using cyclical materials flows (...) Successful circular economy contributes to all the three dimensions of sustainable development. Circular economy limits the throughput flow to a level that nature tolerates and utilises ecosystem cycles in economic cycles by respecting their natural reproduction rates.” (p. 39)*

Circular economy is highly associated with recycling – it even gets *mistaken as* recycling sometimes – but the concept does actually contain much more (Kirchherr, Reike & Hekkert, 2017; Korhonen, Honkasalo and Seppälä, 2018; Kristensen & Mosgaard, 2020). Among others, it draws inspiration from cradle-to-cradle, industrial ecology and symbiosis, natural capitalism<sup>7</sup> and environmental or ecological economics (Corvellec, 2018). The circular economy includes elements of waste reduction too, since it should aim at preventing goods from becoming waste and accumulating in landfills or in the environment (Rajendran, 2018). Circular economy is working towards notions like ‘zero-waste’ (aiming at waste prevention and reduction, diverting waste from landfill and minimising the impact of waste) and ‘sustainable materials management’ (aiming at material cycles), with a vision of changing the entire ‘waste discourse paradigm’ (Silva, Stocker, Mercieca & Rosano, 2016). This change of the waste discourse paradigm happens within an economic framework that wants to recover as much *value* as possible from waste (Blomsma & Brennan, 2017). Formulations of zero-waste can sometimes be strikingly alike the descriptions of circular economy, as in this example from Boston Zero Waste Task Force (2014):

*“Zero Waste (ZW) is a re-envisioning of how society relates to production, consumption and disposal of the products and materials we use every day. (...) [I]ts goal is to end the generation of toxic and unnecessarily wasteful products through systemic redesign, channeling remaining discards into reuse or recycling for the creation of new products, and using those materials as engines of local job growth. It requires coordination between engaged producers and consumer, governments and citizens, neighbourhood activists and neighbours.” (p. 1)*

<sup>7</sup> In contrast to Industrial Capitalism, Natural Capitalism is dependent of the resources and services that nature provides.

The advocated reducing, reusing and recycling (or sometimes recovering) happen in a market-based and capitalised production and consumption process (Kirchherr, Reike & Hekkert, 2017). The following is a telling example of the business mindset surrounding the circular economy: The CEO of the Asian Venture Philanthropy Network debates on a world where plastic should never become waste; instead of wasting billions of dollars of value annually, the plastic industry could move into “a positive spiral of value capture” that serves both the oceans and the economy (Batra, 2020: paragraph 21). ‘Networks’ often appear as a key concept in circular economy literature and media. Networks between investors, capacity-builders and social enterprises are believed to play an important role in scaling circular economy efforts. In the Indonesian context, several Jakarta Post articles from the recent year (2019) report on joint efforts from many of the top plastic polluter brands to even *drive* a proclaimed transition towards a circular economy (e.g. Eloksari, 2019; Batra, 2020). Coca-Cola’s public affairs and communications director in Indonesia, Triyono Pujosoelilo, addresses households as the very *source* of waste and that better sorting of the waste on a household level is the key challenge for scaling recycling. He draws on an argument from a ‘Behavioural Index of Environmental Indifference 2018 report’ (primary source not found) that suggested that most consumers are indifferent about waste management and do not consider plastic waste generation when shopping (Eloksari, 2019). As the introductory chapter (1) urged us to beware; it is in the producers and brand-owners’ interest to convey that plastic leakage (to the environment) is due to littering, as the responsibility then moves from the producers to the consumers (MacBride, 2012; Nielsen et al., 2019; Chertkovskaya et al., 2020). These business interpretations of the circular economy coincide to what has been found in academic reviews: that the somewhat unclear definition of the circular economy makes it convenient to adopt in a business favourable form (Calisto Friant, Vermeulen & Salomone, 2020).

The value capturing, beneficial networking and hypothesis of green growth (Hickel & Kallis, 2019) might be why circular economy is so attractive. In recent years, it has become nearly a mainstream approach to resource management, explained and endorsed in various policy documents from the business world and political authorities. One of the most renowned advocates for circular economy – the U.K. based environmental charity The Ellen MacArthur Foundation – brings businesses, policymakers, popular opinion leaders and academia on board for new business models with the explicit aim to redefine growth (Ellen MacArthur Foundation, 2017b). They say that they propose efficient economic activity that grows with society-wide benefits at all scales with a world of prospecting business and economic opportunities. An example of networking on Bali is the research collaboration named ‘The Bali Partnership Program’ that strives to contribute to Indonesia’s national goal of reducing plastic waste by 70 % to 2025 by implementing “circular waste management solutions” (SYSTEMIQ, 2019). For example, Norway has launched a project where they will contribute with expertise, experience and money (3 million USD) to reduce plastic pollution and promote a transition to circular economy in the ASEAN region (Anjaiah, 2019). Within the European Union, circular economy strategies are launched with a ‘Circular Economy Package’ and an accompanying ‘Circular Economy Action Plan’ (European Commission, 2015; European Commission, 2019a; European Commission, 2020). The strategy is meant to create jobs and generate sustainable economic growth (ibid.). Maximum value and use are expected to be extracted from all raw materials by enhanced reusing and recycling in preferably closed loops. Part of the strategy is to ban the most polluting single-use products (European Commission, 2019b).

Another idea for a circular economy strategy, articulated by Corvellec (2018), is that organisations become meticulously engaged with their waste (so called ‘scatolic association’). That signifies integrated measures within the entire value chain; from procurements, production,

distribution, to use and post-consumer disposal. Corvellec explains how classifying something as ‘waste’ should be done with great care and intent since the label ‘waste’ changes the perceived value of the material. Within a scatolic frame, one ought to question how and why something becomes waste and investigate the material performance (ibid.).

Changing the connotation of the word ‘waste’ into something that sounds more useful, and extends its productive life, can be seen in circular economy discourses (e.g. Blomsma & Brennan, 2017). One example is how ‘waste management’ becomes ‘resources management’; a shift that is made together with zero-waste initiatives (Franco-García, Carpio-Aguilar & Bressers, 2019). Korhonen, Honkasalo and Seppälä point out the concept of ‘waste’ itself, to be one of the challenges for circular economy (2018). Waste is a classification that is socially constructed and that changes in dynamic ways in relation to our societies and cultures. People decide for themselves what is a useful product, a material, waste or a by-product, for example. When the circular economy notions of material are this many, it is hard to define what is really a resource in the process of reusing, remanufacturing, recycling and recovering (ibid.).

Some actors interpret circular economy to include not only recycling but also making something durable of waste; such as Indonesia’s largest petrochemical company Chandra Asri, which now uses plastic waste of high-density polyethylene (HDPE) for road construction by mixing shredded plastic waste with asphalt. The plastic road would not go back into manufacturing of plastic in a closed loop, but the company is anyhow keen to highlight the circular economy aspects of their plastic roads (longform ad: Chandra Asri Petrochemical, n.d.). Neither are they shy to highlight the economic potential of plastic. The roads can be made with plastics that down-cycle and can’t be made into new recyclable products (ibid.).

The limitations of the common uses of circular economy is that recycling (which tends to be the most emphasized) is not *the* solution to all waste, pollution and resource scarcity problems. Critical media articles report that the majority of waste is still improperly processed (so called ‘unmanaged’) because; 1) much of it derives from food and beverage packaging and is therefore unclean, which makes it less valuable and more difficult to recycle, 2) the informal waste sector has a limited ability to process large amounts of waste and 3) the demand for recycled material is low (e.g. Wu, 2014; Septania, 2019). Areas of inadequate or insufficient capacity for more, and better, recycling are infrastructure, advanced technology, collection systems, sorting and cleaning (ibid.). These factors prevent local recyclers from creating clean, high-quality end-products out of recycled material. Circular economy also needs to pay attention to bigger changes in production and consumption patterns that radically would reduce waste generation – otherwise it risks leading to serious rebound effects<sup>8</sup> (Valenzuela & Böhm, 2017; Temesgen, Storsletten & Jakobsen, 2019). In most cases, recycled material is down-cycled to a material of poorer quality which means it cannot fully replace the use of virgin material (ibid.). Unless circular economy activities result in materials and products that truly substitute primary production in terms of quality, price or target market, it is nearly guaranteed that rebound will occur (Zink & Geyer, 2017). For this reason, it has been argued that circular economy activities do not prevent primary production but rather increase overall production, which reduces the benefit of recycling (ibid.). Another criticism is that the linkage to social equity, and even overall sustainability, is too weak (Kirchherr, Reike & Hekkert, 2017). Instead, the circular

<sup>8</sup> In this case: Behavior or systems response to material efficiency that, in the end, results in a larger material use and waste creation over all; the opposite to what was intended.

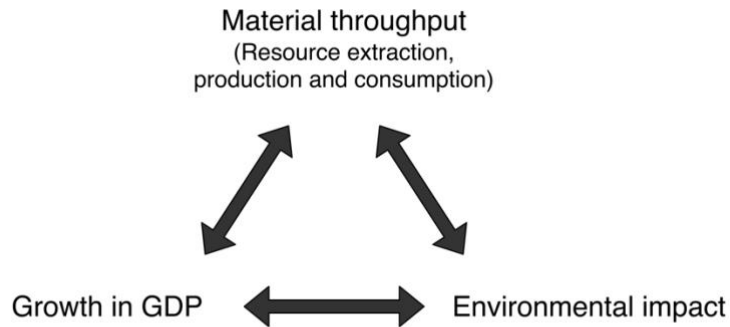
economy prioritises economic prosperity and environmental quality<sup>9</sup>, according to the review (ibid.). To conclude, these “critical perspectives on circular economy assert that besides overhauling our production and consumption systems we need to examine our fundamental worldviews and paradigms that guide the economy, our lifestyles and our culture” (Temesgen, Storsletten & Jakobsen, 2019: p. 5). A “real circular economy” or a “circular economy in its truest sense” can be depicted as a transition made by not-for-profit businesses, for the cause of the common good (Ede, 2016: p. 25). According to Ede (2016) both circular economy and not-for-profit models are necessary, but that they need also to embrace a transformational approach away from the paradigm of growth. This is where degrowth comes in.

### *2.1.2 DEGROWTH*

Degrowth is a critique of productivism and growth. The high and constantly expanding production and consumption in the modern society is seen as both ecologically unsustainable and socially unjust (Kallis, 2018). According to its proponents, sustainable development (as launched in the Brundtland report) cannot be ecologically sustainable because “industrial economies deplete resources and overload sinks” (Demaria et al., 2011: paragraph 2). The concept can be seen as an umbrella keyword (Kallis, 2018) that has sprung from streams of both ecological and social thought; including development critiques, ecological sustainability, social justice and the need for a greater sense of meaning in life, among others (Demaria et al., 2013).

According to Kallis (2017), growth (in GDP) has a strong correlation with environmental damage and leads to inevitable increases in material and energy throughput. It is argued that no example of decoupling studied so far has resulted in an absolute decrease in environmental degradation but rather outsourced environmental impact from a consuming country to a producing country (Kallis, 2018). Some even call economic growth and capitalism the very driver of unsustainability (Asara, Otero, Demaria & Corbera, 2015) where large-scale and resource intensive production and consumption are pointed out as the most harmful (Schneider, Kallis & Martínez-Alier, 2010). The Ecological Footprint Index of the world is currently 1.75; that is how fast natural resources are used and waste generated in relation to how fast Earth can generate new resources and absorb waste (Latouche, 2009; Global Footprint Network, 2020). Material throughput must be sustainable in a global perspective, taking into account the material use and needs of 9 billion people. This is of extra importance in use of already over-exploited or non-renewable resources. The material reduction needs to be so vast that the current economic system is unlikely to foster such a radical change (Lorek, 2014). That is why degrowth scholars agree that perpetual economic growth is incompatible with the imperative changes, for the sake of the environment. Reduced throughput will not lead to economic growth (Kallis, 2017). Vice versa, if the size of the economy would voluntarily and equitably be reduced, the pressure on Earth’s natural systems would reduce too (e.g. Demaria et al., 2011). These equivalences are illustrated in figure 3.

<sup>9</sup> Defined by Kirchherr, Reike & Hekkert (2017: p. 223, table 2) as: “Discussion on how [circular economy] aims to maintain, protect and/or restore the environment and/or resource efficiency/enable the transition towards a low carbon economy”.



**FIGURE 3 IDEA OF HOW MATERIAL THROUGHPUT, GROWTH AND ENVIRONMENTAL IMPACT CONNECT IN DEGROWTH THINKING. IF EITHER ASPECT IS REDUCED, THE OTHERS WILL REDUCE TOO. OWN FIGURE.**

Degrowth is not meant as the opposite of economic growth per se, but in contrast to the common paradigm, economic growth is never an intrinsic value, especially not when it is wasteful and does not improve wellbeing and social equity (Demaria et al., 2011). Degrowth is not presented as an economic theory (Khmara & Kronenberg, 2017; Kallis, 2018). Rather, some consider degrowth to be indifferent to economic growth (Schneider, Kallis & Martínez-Alier, 2010), and economic activity reduced or marginalised in degrowth literature (Khmara & Kronenberg, 2017). Instead, degrowth addresses material and energy input for production (of goods and services) as the source of many environmental problems, and advocates a reduction of the material throughput of our society by decreasing the metabolism of goods and services, so-called dematerialisation (e.g. Lorek, 2015; Kallis, 2017). This refers to absolute material demand reduction relative to Earth’s capacity to reproduce resources and absorb waste, without relying on the hypothesis of decoupling. Kallis (2017) concludes that “radical dematerialisation can only be part and parcel of degrowth” (abstract p. 1). In Demaria, Schneider, Sekulova & Martínez-Alier (2013) material reduction is (partly) what degrowth is: “[D]egrowth is the reduction of energy and material throughput, needed in order to face the existing biophysical constraints (in terms of natural resources and ecosystem’s assimilative capacity)” (p. 209). Another definition states that sustainable degrowth is “an equitable downscaling of production and consumption that increases human well-being and enhances ecological conditions at the local and global level” (Schneider, Kallis & Martínez-Alier, 2010: abstract p. 511). Note that equity and human well-being are central in this definition, as discussed in a roundtable debate on the book *Degrowth: A vocabulary for a new era* (Chertkovskaya et al., 2016). Degrowth should not be interpreted as only a request to individuals to reduce their consumption. Also Demaria et al. (2011) raise some warnings about the risk with overemphasising this aspect (voluntary simplicity) alone since reduced consumption could come with excess production and reduced production could bring shortage. Degrowth literature discusses whether the most important action is to transform or downscale the existing production and consumption patterns, while also reminding of the necessity of both; we should extract, produce and consume both differently and less (Kallis, 2017), with emphasis on differently as opposed to “less of the same” (Kallis, Demaria & D’Alisa, 2015; Chertkovskaya et al., 2016).

Some argue that waste is an important topic to address in degrowth scholarship (Martínez-Alier, 2012; Weber et al., 2019). Waste degrowth should aim at reducing and eventually eliminating the production of (disposable) materials and oppose all toxic and undesired waste (such as plastic). An anti-plastic movement could be part of a new ‘waste degrowth’. Weber et al. (2019)

also warn that previous degrowth studies have failed to acknowledge the ongoing ‘waste crisis’, and especially to recognise the relationships between waste and environmental impact. However, Tanaka (2014) writes that the ‘global warming crisis’, the ‘resource crisis’ and the ‘ecosystem crisis’ all are closely related to waste and that degrowth acknowledges the connection between the three.

Degrowth scholars do not seem to be too fond of the recycling solution to polluting waste. Liboiron (2015) reminds that besides the conception that recycling “takes care” of the waste and saves material, the recycling industry itself requires energy, uses virgin materials and creates new pollution. And because of the downcycling of recycled materials, some degrowthers do not think of recycling as a true circular economy activity (Liboiron, 2015; Cullen, 2017; Temesgen, Storsletten & Jakobsen, 2019). The pledge to recycle can become an excuse for producing industries to create even more disposables. In short, recycling is within these orientations of thought not even a net environmental good but rather “an economic good premised on growth” (Liboiron, 2015: paragraph 8). Similarly, the understanding of zero-waste under circular economy is seen as problematic because it pins largely on efficient technology and the (unrealistic) idea that societies can have 100 % reuse and recycling rates<sup>10</sup> (Tian Song, 2016). Tian Song (2016) argues that zero-waste is impossible under the laws of thermodynamics since the fact that all material breaks down over time counts out any possibility of unlimited reuse (same argument goes for circular economy; Cullen, 2017). Though, the idea of zero-waste is useful under degrowth in initiating the thought of “stopping”; to stop the development of environmentally degrading technologies and practices, and the fixation on economic growth (ibid.). When it comes to the use of basic materials (such as plastics) the focus lies on narrowing down, slowing down and simplifying material flows (Kallis, 2017; Schröder et al., 2019). Degrowth scholarship advocates smaller-scale and more localized, though interconnected, systems with less biophysical throughput and equitable distribution of resources rather than large-scale systems of global commodities dependent on long-distance trade and unequal exchange (ibid.).

Despite the standpoint against perpetual economic growth, there is no fixed path to degrowth in practice – no track to a real utopia, as noted by critics (Mayert, 2016). Degrowth is purposely open-ended as it transitions into a desirable socioecological future (Kallis & March, 2015). However, there is arguably a coherency that gives it a shared direction (Demaria et al., 2013; Kallis, Demaria & D’Alisa, 2015a). Much of the literature on degrowth is concerned with describing *what* it actually is. It organises all the different streams of thought that fit within degrowth as an umbrella term and source their origins (e.g. Demaria et al., 2013). Kallis et al. (2018) illustrate the research field of degrowth to cover the wide range of history, economics, anthropology and social sciences, technology studies, political science and ecological economics. Also Weiss & Cattaneo (2017) conclude, after an extensive review, that the academic field of degrowth is an interdisciplinary merging of social sciences and applied environmental sciences. Degrowth exists in the crossroads of all these fields and philosophies and defends its standpoint by arguing that the interdisciplinary approach is necessary and that the different approaches and solutions complement each other. The diversity is the strength and novelty of the degrowth movement (Demaria et al., 2011).

<sup>10</sup> Though, according to Zaman and Ahsan (2020), Zero Waste does not intend 100 % recycling, but rather 0 % unwanted waste.

Social enterprises have been given special attention in degrowth literature, in search for genuine degrowth businesses and drivers for a transformation towards degrowth. With the purpose of contributing to the common good, social enterprises can be candidates for sustainable degrowth, however, under the presumption that they are so in the capacity of being different from shareholder-owned companies that always strive for maximized financial returns (e.g. Sekulova et al., 2013). A genuine degrowth businesses, is a business with an alternative understanding and showcasing of themselves, that is guided by democratic leadership, collaboration in creating value, links to social movements and activism, and work to reduce environmental impact (Khmara & Kronenberg, 2017; Nesterova, 2020). Highlighted are also the close connections to local business activities. All of these criteria are said to reduce the risk for greenwashing<sup>11</sup> (Khmara & Kronenberg, 2017). Wiefek and Heinitz (2018) analyse in what ways social entrepreneurs align with a collection of principles suggested to trigger social-economic development towards degrowth; re-evaluate, reconceptualize, restructure, redistribute, re-localize, reduce, reuse and recycle (Latouche, 2009). Degrowth alignment was found in enterprises that hold values such as fairness and cooperation, diversity, independence, democracy, transparency, using local suppliers and distributing surpluses (Wiefek & Heinitz, 2018).

More work on social enterprises have conceptualised how profit maximising companies and social enterprises can interact and be drivers of degrowth together (Johanisova, Crabtree & Fraňková, 2013). So called ‘secondary social enterprises’ provide services and non-market capital – such as land or know-how – to local ‘primary social enterprises’ on the ground. Primary social enterprises are those that always work first-hand with the local community to assist local needs. In order for this arrangement to be successful it would have to be built on the principle of subsidiarity and democratic governance. The primary social enterprise could even be represented on the board of the secondary social enterprise (i.e. as owners). Similarly, collaboration between social enterprises have been assigned a certain importance in helping each other in their pursuit of multiple social and environmental missions, as well as in redefining “scaling” as a collaborative and diverse approach to scaling of impact, as opposed to scaling of size (Bauwens, Huybrechts & Dufays, 2019). Another premise of this arrangement is for the (secondary) social enterprise not to be overly focused on “efficiency” in narrow financial sense, nor on pursuing profit solely for shareholders, but on the contribution of positive externalities, no matter if it is a commercial actor or not (Johanisova, Crabtree & Fraňková, 2013; Bauwens, Huybrechts & Dufays, 2019). Being a genuine degrowth business does not entirely exclude the possibility to grow as a business. Rather, it is the main focus and intent of the business that is relevant in degrowth discussion. Profitability might still be needed to cover expenses, but profit should not be the significant indicator for success or serve as an end goal in itself (Wiefek & Heinitz, 2018).

Relevant, explicit degrowth sources from a Balinese or Indonesian context were not found, in English, and therefore no such examples of degrowth are covered.

<sup>11</sup> Falsely advertising something as environmentally friendly or sustainable for PR.



## 2.2 ANALYTICAL FRAMEWORK

With reference to the literature review above, an analytical framework has been created. This framework works as a theoretical lens that will inform the analysis in order to give the empirical data meaning and later help to answer the research questions – especially the qualitative and interpretative dimensions of them.

The aim is not to disparage and subvert the two concepts (as warned for example by Kirchherr, Reike & Hekkert, 2017), but to step away from the generalisation that circular economy would be mainstream while degrowth would be alternative or radical. Such generalisation would not help the analysis. Instead, this analytical framework highlights points of connection and contrast, based on my interpretation. The text is intended to be without citations as it summarises and paraphrases the literature review and every statement of facts draws on the exact same sources (as in section 2.1).

### 2.2.1 COMPARISON BETWEEN CIRCULAR ECONOMY AND DEGROWTH

While the two concepts agree that the current production and consumption system is giving rise to environmental problems, they do have different perceptions of the **root cause of environmental impact**. This, in turn, leads them to address different solutions to the same problem. Circular economy addresses the amount and rate of environmental degradation due to the current linear nature-society-nature model of extraction, production and consumption, and the subsequent creation of non-biodegradable waste (such as plastic). If the cause is *how* we produce and consume, then changing how we do it is the solution. Circular economy advocates a transition into an organisation of material use that protects the environment and the economy. Degrowth addresses the amount and rate of environmental degradation caused by extraction of (finite) natural resources driven by productivism and over-consumption, as well as the social inequity thereof. If the cause is *that* we produce and consume, and *the extent* to which we produce and consume, then decreasing the consumption and production is the solution. Degrowth advocates absolute consumption reduction and radical change of the current production and consumption system.

The two concepts share environmental protection as a **key principle and motivation for change**. Besides, the circular economy is expected to create jobs and business opportunities, for example within the recycling industry. Waste is ultimately seen as a (monetary) resource and managing it in a circular way is an opportunity for business. Economic, environmental and social values are all significant in theory, but the economic incentives are important in practice for the industry to transition. For degrowth, on the other side, social values – such as social justice and equity – are on top of the agenda, alongside environmental protection for humans and non-humans over time. The importance of social and environmental values cannot be compromised for economic gains.

For both concepts, smaller-scale and local enterprises can be possible **drivers of change**. The enterprises can be not-for-profit or for-profit depending on intention, authenticity and level of democracy. Circular economy, as promoted by the Ellen MacArthur foundation, is attracting the industry. Policymakers enforce top-down implementation of circular economy models on the market. Networks between different actors are often emphasised. Degrowth, on the other hand, is initiated (created) bottom-up by democratic social movements, communities and organisations. Social enterprises can be good ambassadors for degrowth, for example through collaborative links to activism, by distributing surpluses in alternative ways and communicating that they live as they learn.

Both concepts draw on an **intention to reduce biophysical throughput** in terms of reducing (finite) resource extraction while still assuring basic material provision for society's need. One of the core ideas of circular economy is to provide modern society (of urbanisation, development, growing middle classes etc.) with materials for goods and services with less environmental impact despite increased demand. The size of the economy is not problematised much, but the total throughput should be limited to a level that is bearable for nature. The obstacles related to low quality (including down-cycling), insufficient processing capacity and low market demands of recycled materials should not be overlooked. The extraction of natural resources and use of virgin material is supposed to decrease, per delivered product or service, as the material is used for longer. For this to happen, materials have to get perfectly and safely recycled and made into new products and services. Degrowth, on the other hand, warns that we are already using too much resources for the planet to bear and therefore finds it preferable to decrease material use in absolute terms. Degrowth advocates dematerialisation with a focus on narrowing down, slowing down and simplifying material flows, i.e. reducing society's metabolism (e.g. of plastics). It prefers reduction over recycling and sufficiency over efficiency.

The two concepts share the **intention to prevent waste** in a pre-production and pre-consumption stage and having things in use for longer (reuse). In this framework, circular economy is defined as the idealistic zero-waste circular economy which moves towards a full cycle approach where turning waste into a resource is essential for achieving close-loop material flows. The 3R:s (reduce-reuse-recycle) and the waste hierarchy underpin material use and closed-loop recycling to become "waste free" with no material or waste leaking out. The approach to waste reduction is to design and recycle waste "away" or to ban materials and compartments of products that are difficult to reuse or recycle. Degrowth, on the other hand, is mainly preventing waste by means of reduced consumption, which connects to the consumer side of zero-waste. Altering the production and consumption system could indirectly lead to waste reduction too. It is a given to consider and manage the consequences of waste and pollution at the core of economic activity – not as an aftereffect.

**Recycling** is useful for both concepts even though its framing, as a means to sustainable material use, is different. Recycling is essential particularly for the circular economy since it is the recycling activity that fulfils the envisioned closed-loop material flows. The plastic recycling industry (obedient to the market demand) would have to keep up with the expected increase in plastic production. Design waste "away" and increase collection and recycling rates, in accordance with the reduce-reuse-recycle principle. Though, common challenges are down-cycling of material quality, low market demand of recycled goods, insufficient infrastructure for collection and processing that can service the recycling industry (especially in parts of the developing world). To degrowth on the other hand, "recyclable" is strongly not an excuse for not reducing the material use through design or decreased consumption. The industry of recycling itself (as it is today) is too resource intensive, carries unwanted rebound effects that cause new pollution, and only perpetuates growth that leads to more waste. Perfectly closed loop material cycles are believed to be extremely difficult to achieve.

Both concepts assign **responsibility for plastic littering** to producing companies, to some extent. The common awareness of plastic pollution puts pressure on the companies. Beside the emphasis on company engagement in the entire value chain, circular economy might in the worst case be an excuse for companies to resign from the post-consumer responsibility through the exhortation to recycle. Companies can to some extent define for themselves what the real source of waste is and who is to hold responsible for treating it. Degrowth on the other hand puts greater emphasis on the producer responsibility and big brands are shamed by activists.

The comparison between circular economy and degrowth is summarised in table 1 below. It takes the form of an interpretative scheme with seven ‘points of comparison’.

**TABLE 1 SCHEME FOR ANALYTICAL FRAMEWORK: SIMILARITIES AND DIFFERENCES BETWEEN CIRCULAR ECONOMY AND DEGROWTH BASED ON SEVEN ‘POINTS OF COMPARISON’. THE TABLE SUMMARISES THE OUTLINE ABOVE.**

<i>Point of comparison</i>	<i>Similarity</i>	<i>Circular economy</i>	<i>Degrowth</i>
<i>1 Root cause of environmental impact</i>	The production and consumption system is giving rise to environmental impact.	The linear organisation of the production and consumption system.	The linear organisation, as well as the size and rate of the production and consumption system.
<i>2 Key principles and motivation for change</i>	Environmental protection.	Economic benefits; new jobs, business opportunities, efficiency gains. Social values to a lesser extent.	Social equity, democracy, well-being, a greater sense of meaning in life.
<i>3 Drivers of change</i>	Possibly, smaller-scale and local enterprises (not-for-profit or for-profit) depending on intention, authenticity and level of democracy.	Companies and industry networks, policymakers, governments. Top-down hierarchy.	Not-for-profit organisations, activists, social movements, local communities. Bottom-up hierarchy.
<i>4 Intention to reduce biophysical throughput</i>	Intention to reduce resources extraction, assure basic material provision for society’s need.	Reduction by means of closed loop circling of material through multiple life cycles, based on decoupling hypothesis.	Via dematerialisation and reduced use of material intense goods and services, not relying on, or believing in, decoupling.
<i>5 Intention to prevent waste</i>	Intention to prevent waste in a pre-production and pre-consumption stage. Having things in use for longer (reuse).	Waste prevention through design and by converting waste into a valuable resource.	Primarily by producing and consuming less.
<i>6 Recycling</i>	Recycling to some extent, of some materials.	Should be supported by means of technological improvements, infrastructure, collection systems, industrial symbiosis etc.	Can be part of the degrowth vision but is definitely not a priority. Preference for local recycling.
<i>7 Responsibility for plastic littering</i>	Producing companies are responsible to some extent. The common awareness of plastic pollution puts pressure on the companies.	Producing companies are responsible to a lesser extent, or according to their own ambition level. Shared responsibility with consumers and other actors.	Producing companies are the responsible ones. Consumer consciousness is important; consumers can go ‘zero-waste’ to some extent.

### 3. METHODOLOGY

The research questions suggested investigating what plastics are to be found in the Balinese environment and analysing the Plastic Bank handling of waste in depth. The fieldwork took place between September 12<sup>th</sup> and November 26<sup>th</sup>, 2019, in cooperation with the local Plastic Bank team. A mixed methods approach was used so as to answer the research questions with (methodological) triangulation. Triangulation is when one phenomenon is studied with multiple methods or theories, with the purpose of increasing the credibility and validity of the work by complementing and converging evidence (Bailey, 2007: pp. 76-77; Yin, 2014: pp. 119-120; Bryman, 2008: pp. 607, 611). The following table (2) presents an overview of the empirical data that were collected during this study. The rest of this chapter will elaborate on each method. It will also explain how the data was analysed.

**TABLE 2 OVERVIEW OF THE METHODS, SAMPLING STRATEGIES, MEASUREMENTS AND TOOLS THAT WERE USED FOR COLLECTING EMPIRICAL DATA IN THE FIELD.**

<i>Method</i>	<i>Number of samples / occasions</i>	<i>Days in which samples were taken</i>	<i>Measurements / modes of engagement</i>	<i>Tools and documentation</i>
<i>Pick analyses on beach</i>	9	7	Number of items, waste composition	Clean Swell App
<i>Pick analyses in mangrove</i>	21	6	Number of items, waste composition	Clean Swell App
<i>Overview of littered waste (without picking)</i>	4	4	Interpretation, number of items, waste composition	Notes and photos
<i>Line transect sampling</i>	8	3	Number of sachets, composition of sachet products	Notes
<i>Balance among sachets</i>	6	3	Number of multilayers vs. non-multilayers	Notes
<i>Quadrant sample of PET</i>	4	3	Number of PET	Notes
<i>Mangrove Mobs with the Plastic Bank</i>	4	4	Complementary for seeing the broader picture	Notes, follow-ups with other participants
<i>Interviews</i>	6	6	Informative answers to specific questions	Recordings
<i>Participant observation: Daily observations, informal talk</i>	Continuous	Continuous	Complementary for seeing the broader picture	Notes, memos, photos
<i>Participant observation on traditional market</i>	3	3	Understanding of what is collected and what not	Notes, memos

### 3.1 CASE STUDY OF THE PLASTIC BANK

The Plastic Bank is a for-profit organisation and social enterprise that is taking initiative to stop ocean plastic pollution by assigning plastics a greater value, and thereby creating incentives to collect larger volumes of plastic waste (The Plastic Bank, 2020a). The Balinese branch of the Plastic Bank goes by the name Plastic Bank Indonesia and engages more than 9 000 collectors (Cortese, 2020). The Plastic Bank buys plastic from the collectors and sells it to processors within the recycling industry. The collectors get payed based on the current market value of the plastic, and in addition to that, receive sponsored bonuses that come from the Plastic Bank's partner companies (The Plastic Bank, 2020b). The bonuses can also be distributed to other collectors and junkyards on Bali by registering every actor, or middleman within the "ecosystem" of waste, as partners to the Plastic Bank – this is referred to as "ecosystem activation". This way, the Plastic Bank aims at enhancing the waste management system that already exists in the area, as a collaborator (and not a competitor). On Bali, the Plastic Bank's mayor sponsor is SC Johnson; a company that manufactures cleaning supply and other household chemicals (The Plastic Bank, 2020b; SC Johnson, 2019a; SC Johnson 2019b). As will be said in chapter 4 (results), SC Johnson's sponsorship was an important factor in bringing the Plastic Bank to Bali. Together, the Plastic Bank and SC Johnson run eight collection centres (these are called branches) where members can deliver what they have collected.

The Plastic Bank makes an interesting case for this study for several reasons. Their core activity is collection of recyclable plastics which naturally connects to circular economy. Plastic is an interesting material since it is vastly polluting the environment, and so challenging to recycle. The Plastic Bank portrays itself as a social enterprise with an emphasised social mission to increase waste collector incomes. Indeed, the Plastic Bank is a social enterprise in the sense that they apply market mechanisms to achieve social and environmental aims, using their profits to fund it. Both the social aspects and the role of being a social enterprise connects to degrowth, though possibly perplexed by the fact that it is a for-profit enterprise and partner with big global corporations (as introduced in the literature review, section 2.1.2). The research questions are meant to target the Plastic Bank specifically in order to give this study feasible boundaries. Their handling and approach to plastic waste makes a case study – a case study of how they align with circular economy and degrowth ideals according to the analytical framework. Case study is a frequent approach to qualitative research (Kuckartz, 2014; Yin, 2014; pp. 16-17). A case study allows the researcher to study people or phenomena in its natural setting and search to answer exploratory questions of *what, how and why* something is happening (ibid.). Data of the Plastic Bank was collected by means of semi-structured interviews.

#### 3.1.1 INTERVIEWS

Six semi-structured interviews were done with six different Plastic Bank managers (overview in table 3). The benefit of the semi-structured interview method is that it balances flexibility with focus on selected topics (Gillham, 2008). It is an interview approach that allows expansion on new or surprising topics as the interviews unfold. It also allows for the interviewees to formulate their own thoughts more freely and let them steer the talk into what they think is interesting, while nevertheless staying within reach of what is useful for the study. For the benefit of this study, the semi-structured interviews give the otherwise rather impersonal quantitative analysis of plastic more character and voice (Gillham, 2008: p. 25; Sunstein & Chiseri-Strater, 2007: p. 439). It also gives the interviewer flexibility and room for asking for clarifications and letting the interviewees further develop their answers during the interviews (Gillham, 2008: p. 20) – an interaction that is impossible, for example, if only reading about the Plastic Bank on the internet.

The main goal and learning outcome of the interviews was to understand what incentives the Plastic Bank provides for waste pickers and where the collected plastics go to. The Plastic Bank managers were chosen as interviewees because they can function as informants with respect to how the Plastic Bank handles plastic waste, and why. The managers were selected due to their professional roles and insights in different topics relevant for the study (see table 3). A separate interview guide was made for each interview. All interviews cover different topics in order to broaden the understanding of the Plastic Bank as an organisation and the presence of plastic waste on Bali. All interview guides can be found in Appendix A. Numerous sub-questions were added as those sprang to mind (so called prompts, probes and cues to continue). The interview guides helped to keep the aim of each interview clear and assure that all the intended questions and topics were covered before finishing up.

The interviews were done after a couple of weeks in the field. This time was used for identifying relevant and important problem areas that would be interesting to cover during the interviews. The questions for the interview guides were carefully formulated, revised, grouped and ordered. The intention behind the questions was also to position the interview topics in relation to the literature review, according to advice in Gillham (2008: p. 41).

**TABLE 3 OVERVIEW OF INTERVIEWS. SIX MANAGERS WERE INTERVIEWED, EACH COVERING A DIFFERENT TOPIC RELEVANT TO THEIR PROFESSIONAL ROLE WITHIN THE PLASTIC BANK.**

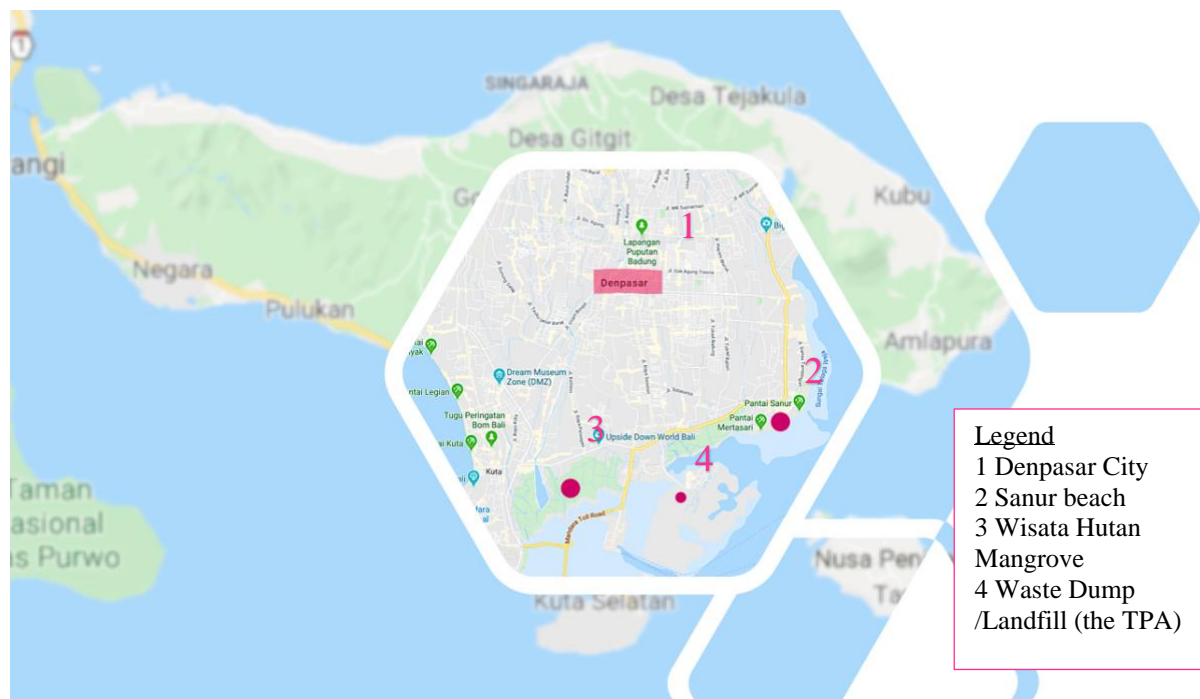
<i>Label</i>	<i>Date of interview 2019</i>	<i>Length of interview</i>	<i>Setting</i>	<i>Interview topics</i>
<i>Manager A</i>	Sep. 26 <sup>th</sup>	23 min.	At a branch/ collection centre	What is a ‘recyclable’? How do we distinguish the different types of plastics?
<i>Manager B</i>	Oct. 14 <sup>th</sup>	44 min.	At a hostel	The Plastic Bank’s involvement in the Wisata Hutan Mangrove. Where does the plastic come from? Future of the mangrove.
<i>Manager C</i>	Oct. 16 <sup>th</sup>	38 min.	At a branch/ collection centre	Waste pickers (members). The social mission of the Plastic Bank.
<i>Manager D</i>	Oct. 22 <sup>nd</sup>	44 min.	In a co-working space	Social Plastic. Working with partners, such as SC Johnson.
<i>Manager E</i>	Oct. 24 <sup>th</sup>	1 h 32 min.	At a restaurant/café over coffee	Processors. What happens to the collected plastics? How does the value of the plastic create incentives for collection?
<i>Manager F</i>	Nov. 15 <sup>th</sup>	34 min.	At a restaurant over lunch	The Plastic Bank business model and organisation. Complementing previous interviews.

### 3.2 PICK ANALYSIS

A typical method to investigate waste composition is pick analysis (which can also be referred to as waste composition analysis, waste characterisation study, waste sort, and similar). The procedure of a pick analysis is to hand pick through a sample of trash, piece by piece, and count

the content in different categories. The categories are made by the researcher and depend on the purpose of the research. The aim behind a pick analysis is to prepare for informed policy decision-making or investment by providing insight on waste composition and generation (UNEP, 2009; The World Bank, 1999). One example is the clean-ups of ocean debris made by Marin Litter Watch; 1,600 of these have been made around European coastlines and are now inspiring bans on single-use plastics within the EU (European Environment Agency, 2018; European Commission, 2019). Disadvantages of pick analyses include that they are cost and time consuming and are therefore often carried out on a relatively small number of samples (Food Loss and Waste Protocol, n.d.). Pick analyses also concern health and safety processes when handling the waste (ibid.).

In this study, pick analyses were conducted in order to identify important categories of waste and to study plastic waste composition in places representative for littering. The pick analyses were done on Sanur beach and in the mangrove forest called Wisata Hutan Mangrove (figure 4). The Sanur beach was chosen because it is the beach closest to Denpasar city<sup>12</sup> that also has regular clean-up events with local groups. The Plastic Bank has pointed out the Wisata Hutan Mangrove as a focus point for their awareness-raising campaigns and has been arranging clean-ups there since April 2019.



**FIGURE 4 MAP OF BALI; AREA AROUND DENPASAR CITY. OWN MARKS ON PICTURE FROM GOOGLE MAPS.**

During a pick analysis, every single piece of plastic within a chosen sample was hand-picked and counted. On Sanur beach the samples were collected by wandering along the shoreline, usually between 400 m and 1 km, gazing for plastics on the ground. In the mangrove forest the samples were collected by marking an area on the ground and picking every piece of plastic

<sup>12</sup> Biggest city on Bali, with 900 000 inhabitants according to Wikipedia.

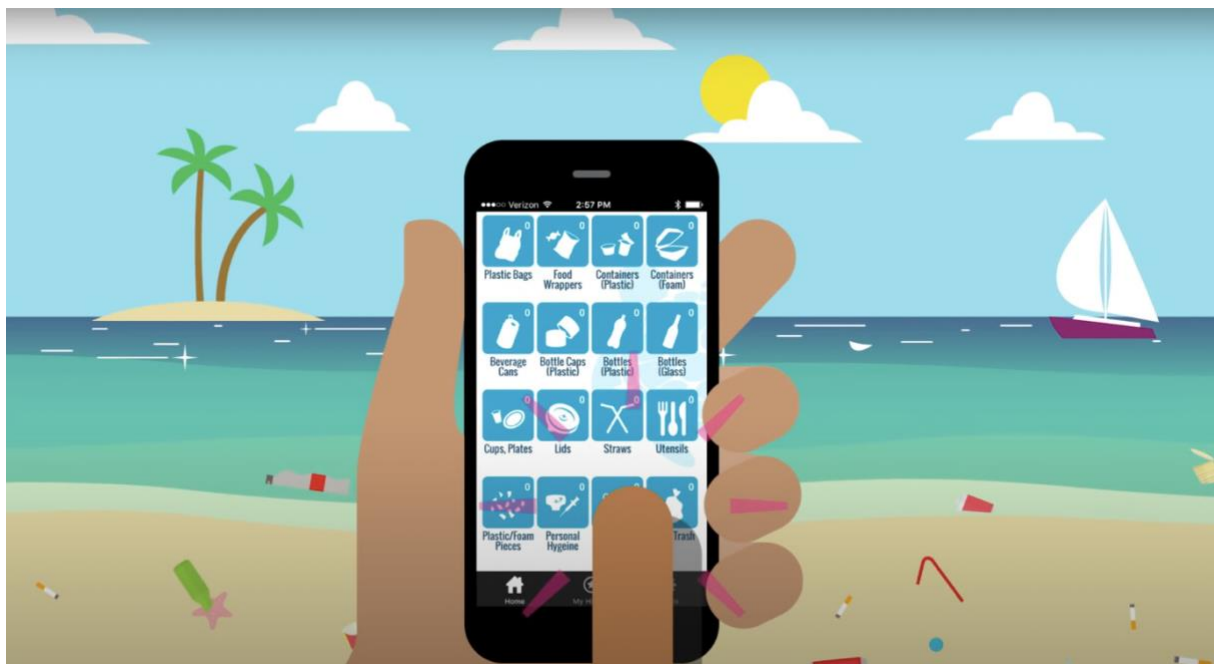


from the top layer (plastic was not dug from inside the mud). Sample *sizes* were irrelevant since it was the waste composition that was being studied.

### 3.2.1 INVENTORY WITH THE OCEAN CONSERVANCY CLEAN SWELL APP

The inventories (the counting element of the pick analyses) were done in the Ocean Conservancy Clean Swell App, version 1.8.2 (figure 5). It is an international app that is used during clean-ups around the world. What is recorded in the app contributes to building a global ocean trash database for identifying the most problematic areas and items of ocean bound waste around the world's coastlines and waterways (Sparkman, 2019a; App Store Preview, 2020). The app allows easy data collection during clean-ups. For each item picked up, one clicks on the right category icon and the app keeps the counting. Sometimes counting was done simultaneously as the pieces were picked up, and sometimes counting was done afterwards from the trash bag, when the whole sample was already collected. The results are automatically sent to the collector (me) via email.

In this study, the app was used to count 21 samples in the mangrove and nine samples on the beach. Four clean-ups were done as participant observations (see section 3.3). For these, the Clean Swell App was not used. Instead these events contributed to understand how the beach clean-ups work in order to be able to use those groups' shared knowledge and experience. At one occasion the waste washed up on the shoreline was inventoried with ocular overview and manually counted in a notebook (instead of picked up and counted that way).



**FIGURE 5 SCREEN SHOT FROM CLEAN SWELL APP INSTRUCTION VIDEO (OCEAN CONSERVANCY, 2016).**

The categories used in the Clean Swell App are presented in table 4, with the exception of beverage cans and glass bottles (since non-plastic) and fishing gear (since not found). The category system in the app is not a perfect resemblance of the waste composition in every area. When an object does not clearly fit into a category it ought to be put in the closest category, dependent on the user's own judgement (Sparkman, 2019b). Some categories were assigned a broader definition to cover more objects. For example, the 'food wrappers' category was



extended to ‘single-use flexible plastic bags that store and hold consumer goods’ (own definition, for the reason of sachet economy: Appropedia, 2010). This meant for instance that sachets and plastic bags without handles come together in one group based on the *function* of storing consumer goods. In other words, the ‘food wrapper’ category is a heterogenous group of plastic bags of many different sorts; coloured or transparent, multilayer or single layer, big or small, dry or wet content, and so on. The same thing happened to the categories of caps and lids. The number of caps does not represent PET bottle caps only. These variations must be taken into consideration when drawing conclusions from the data.

Another sampling-related delimitation is that beach clean-ups were conducted together with other participants. This brings the source of error that in case other participants were less meticulous and had a tendency to pick up larger pieces of plastic first (such as PET or cups), the inventories would show a larger number concentration of the less obvious pieces in my samples (such as small straws or transparent sachets). The number of ‘plastic and foam pieces’ is likely underestimated and not given a greater attention because the study focuses on what the Plastic Bank collects, which larger goods upstream, before they enter the environment and degrade and scatter uncontrollably. Foam containers are likely underestimated too, as they easily break into pieces (which, if anything, increases the amount of ‘plastic and foam pieces’ if counted). Foam containers were spotted upstream the mangrove forest, on the water surface of the stream, but not in the mud among the mangrove trees where samples were usually taken.

**TABLE 4 INVENTORY CATEGORIES AND TYPICAL PRODUCTS**

<i>Category name</i>	<i>Commonly found products placed in this category</i>
<i>Cigarette butts</i>	Just cigarette butts
<i>Balloons</i>	Just balloons
<i>Toys</i>	Just toys
<i>Plastic bags</i>	Bags with handles; hence with the purpose of carrying things, independent of size
<i>Food wrappers</i>	Sachets incl. multilayers, flexible plastic bags for consumer goods, bags without handles
<i>Plastic containers</i>	Food containers with or without a lid, cups for jelly candy, small bottles for dairy products, e.g. yogurt drinks
<i>Foam containers</i>	Just foam containers
<i>Plastic bottle caps</i>	PET-bottle caps, cap rings, miscellaneous small caps, e.g. pen caps
<i>Plastic bottles</i>	PET-bottles
<i>Cups and plates</i>	Just cups, from drinks sold in cups instead of bottles
<i>Lids</i>	For beverage cups, miscellaneous large caps
<i>Straws</i>	Just straws, thick-thin-long-short, sometimes in bundle
<i>Utensils</i>	Just spoons
<i>Plastic- and foam pieces</i>	Pieces from unidentified objects or less than 40 % of the original product left, > 5 mm, loose labels e.g. from bottles
<i>Personal hygiene</i>	Diapers, scrunchies, syringes
<i>Other packaging</i>	Packaging nets for fruits, buckets
<i>Other trash</i>	Lighters, pieces of string and cord, flip flops

### 3.2.2 ASSESSMENT OF SACHETS WITH LINE TRANSECT SAMPLING

In the mangrove forest, the pick analyses were complemented with eight line transect samples of plastic sachets. This method was inspired by methods from ecology (Landscape Toolbox, 2015). Every sachet from the top layer of trash was noted along a straight line (continuous sampling along the line transect). The length of the line was estimated by striding, since sample size was irrelevant for the purpose of this assessment. The photo in figure 6 gives an idea of what the environment looked like where the line transect samples were made. On six occasions multilayers and non-multilayers were noted differently to get a clue of the balance between them. This was done by hand picking and visual identification. The purpose behind these assessments was to better understand the composition of the category ‘food wrappers’ in terms of product types.



**FIGURE 6 PLACE WHERE LINE TRANSECT SAMPLING OF SACHETS WERE MADE, IN THE WISATA HUTAN MANGROVE. PHOTO: ELIN HENRIKSSON.**

### 3.2.3 QUADRAT SAMPLE OF PET

Four overview assessments of PET bottles in the mangrove were made by passive quadrat sampling<sup>13</sup>. This is another method from ecology (see e.g. application in marine biology; Census of Marine Life, 2009). Passive quadrat sampling is when the objects are not removed. Every object within the study site is counted, as number per quadrat.

In the Wisata Hutan Mangrove, a river runs out in a built pool (see figure 7). Every visible PET-bottle was counted while walking along the pool. Plastic bottles smaller than 250 ml, commonly used for dairy products, were not considered belonging to this category, thus not counted.

<sup>13</sup> In Swedish: Översiktsanalys





**FIGURE 7 POOL WHERE A SMALL RIVER RUNS OUT IN THE WISATA HUTAN MANGROVE. OVERVIEWS OF PET WERE DONE HERE WITH QUADRAT SAMPLING. PHOTO: ELIN HENRIKSSON.**

### 3.4 OBSERVATIONS AND INFORMAL TALKS

The time in the field on Bali can be considered a participant observation, thus making me a *participant observer* (Bailey, 2007: p. 80). I learnt from the *participants* of different activities in the field. Thus, I was participating in, and observing, activities at the same time, in the role of a researcher.

The always ongoing participant observation provided many opportunities to air spontaneous questions and learn from informal talk in everyday life and plain routine (as predicted in Gillham, 2008: p. 20). The approach for working in the field was kept very open with an “inquiring mind during data collection” (Yin, 2014: p.72-73). Insights were saved for later reference through journaling and notetaking (Sunstein & Chisen-Strater’s 2007: p. 94,105), filming, photographing, and sometimes through changing contact details with the informants. Informal talk would often provide tips on where to look next and find new study objects with so-called snowball sampling (Bryman, 2008: p. 184).

All the voices that were heard through informal talk are forming stories that could help explain the Balinese’s relationship with plastic and pollution in their environment. The prospect is that the inclusion of informal talk and other observations can complement the pick analyses, interviews and participant observations. The informal talks will not be used in order to answer the research questions alone (in a scientific way) but rather build a picture of the surrounding realm in which the research questions exist. They are also an inspiration for discussion and development of new ideas for further research.

In order to get first-hand information from waste pickers connected to the Plastic Bank, participant observations were conducted on a marketplace in Sanur where I collected plastics together with two cleaning personnel. Beside their payed employment at the market, they hand

over recyclable plastics to the Plastic Bank for an extra income. They were chosen based on suggestions from the branch manager in Sanur branch. I did what they did hands-on during a full day of their normal working routine and paid additional two visits to the market afterwards.

In the Wisata Hutan Mangrove I participated in three so-called ‘Mangrove Mobs’, organised by the Plastic Bank. Those are events where volunteers show up, learn about the mangrove, are provided with boots and clean up a piece of the forest together. The first time my task was to weigh all the sacks of trash, divided into recyclables and non-recyclables. The second time I participated in picking up trash. The third time I simultaneously calculated a balance between sachets and other food wrappers (as described earlier).

**3.5 METHODS FOR DATA ANALYSIS**

The empirical data from the field were later processed through calculations and the analytical framework. As described earlier, both quantitative and qualitative methods were used in order to address the research questions.

*3.5.1 QUALITATIVE DATA: USE OF ANALYTICAL FRAMEWORK*

The analytical framework in section 2.2 was built specifically for this thesis and is proceeded from the literature review in section 2.1. The analytical framework was designed for the analysis of the interview material, with the research questions in mind, but also informed by the empirical analysis. The approach used has a hermeneutic character, i.e. resemblance with empirical research that aims to understand and interpret written, verbal and non-verbal communication. No fixed method, strict guideline or software was used. The design of the analytical framework is justified due to the centrality of the research questions and the openness to the material. Kuckartz (2014) writes that:

*“(...) qualitative text analysis is a method that is characterized by the fact that the research question is of central importance throughout the entire analysis process. Qualitative text analysis enables you to anchor the empirical results of your research and develop and test your theories based on the data” (p. 160).*

The creation of the analytical framework in section 2.2 and the use of it in section 4.3 evolved in coherence with each other. Working with the analytical framework involved the following steps, in an iterative process (list 1). The list summarises the process and was articulated with help of Kuckartz (2014).

<i>Creating a system with ‘points of comparison’</i>	Methodologically speaking, the ‘points of comparison’ are thematic categories within a category system. These were deductively found in the literature based on the focus of the thesis (material use and plastic pollution) and the examined relationships (circular economy and degrowth). Each ‘point of comparison’ refers to a specific topic, such as “recycling”.
<i>Defining the framework</i>	The ‘points of comparison’ require definition. This is done through the summarising text passages in the scheme in section 2.2.1, table 1. The literature was differentiated so that the literature that concerns the topic of “recycling” is used for defining the ‘point of comparison’ of recycling, and so on. This was done for circular economy and degrowth respectively.

	It was assumed that both similarities and differences between circular economy and degrowth could be found for every single ‘point of comparison’.
<i>Developing interview guides</i>	Interview questions were stated with the research questions in mind, as described in section 3.2. Triangulation naturally occurred between pick analyses, interviews, observations and informal talk since the experiences from the field helped identifying relevant interview topics. The interview guides were planned to cover different topics, but thanks to the semi-structured interview approach there was also room for overlap between the interviews.
<i>Assessing the interview material</i>	Interviews were transcribed from the recordings and summarised (see Appendix C). Different passages and statements were marked and assessed based on what information they could provide pertaining the research questions. Also, the interview material guided the modification of the analytical framework and inspired new ‘points of comparison’ (i.e. inductive category construction). Agreements and differences with circular economy and degrowth were assessed accordingly.
<i>Assessing the current situation of the Plastic Bank (from the circular economy and degrowth perspectives)</i>	The analytical framework was used as a guideline for further analysing the interview material in-depth. This included the interpretation of selected “cases”, e.g. the case of sachets, or the case of Mangrove Mobs. The interviews complement each other to better understand the Plastic Bank organisation from the sustainability perspectives. The interview summaries in Appendix C can be seen as case descriptions that focus on what was important to the research questions. They are fact-oriented and stay close to what was said during interviews.
<i>Presenting results</i>	Results are assembled in chapter 4. In table 5 the evaluation of whether the Plastic Bank engages with the ‘point of comparison’ in an agreeable way is marked with green, orange and red, from high to low agreement (as a traffic light). The “richness of information” was reduced to make it neater to read and easier to overview. Memos were taken for further discussion and conclusions.

#### LIST 1 STEPS OF WORKING WITH THE ANALYTICAL FRAMEWORK.

##### 3.5.2 QUANTITATIVE DATA: CALCULATIONS

As described above (section 3.2.1), the number densities of plastic types were inventoried in the Clean Swell App. The results were transferred from the e-mailed reports to an Excel spreadsheet. Manually recorded quantitative data were also entered into the spreadsheet. Excel allows for convenient calculations of sum, averages, separating mangrove and beach data etc. Raw data can be found in Appendix D. The quantitative parts of the study were also analysed in a more qualitative manner (interpretation) in order to identify meaning in the results.

### 3.6 REFLECTIONS, LIMITATIONS AND SOURCES OF ERRORS

Language barriers were always present during the fieldwork. The Plastic Bank employees use English mixed with the standard language in Indonesia; Bahasa Indonesia. Local Balinese people speak their own Balinese language. People that have come to Bali from other Indonesian islands may speak any or several out of many thousand local languages. The language barriers require some extra caution when interpreting material and data.

A few different forms of informed consent were used over the course of the fieldwork (an overview can be found in Appendix B). Despite many unexpected or unprepared occasions with no or little preparation, I always had at least oral consent for using the encountered information or observations as data for this study. Informants knew, despite the language barriers, that I was a student from Sweden that conducted research on plastic waste on Bali. The type of information I was looking for was always related to the tangibility of plastic waste and recycling, and the Plastic Bank employees were addressed as informants in their professional role. In order to protect the interviewees' privacy and confidentiality, they will be referred to as anonymous managers of the Plastic Bank. This complies with their given consent. Only the cleaning personnel on the Sanur market ticked the non-anonymous box on the consent form. However, this was done under the influence of a translator, thus with an extra layer of language barrier, and I will for ethical reasons keep them anonymous anyhow.

During the time on Bali, I autonomously followed my own research plan and participated in the Plastic Bank's activities that I found meaningful for my study. The benefits of this arrangement, were that 1) it was easier to keep a certain neutrality and self-distance to the study object/subjects as a researcher, and similarly; 2) it was easier to balance good rapport and friendship with a level of "impersonal professionalism" that can benefit interviews and other elements of research (Gillham, 2008: p.29). I might, however, have learned *even more* about the Plastic Bank organisation if I had been involved deeper in all types of daily activities.

In the mangrove forest, each patch on the ground did not have an equal chance of being chosen for a sample. This was for the sake of good working environment and safety since the mangrove forest is muddy and partly inaccessible, especially after a high tide or rainfall. This led to convenience sampling (Bryman, 2008: p. 183), with the constraints of not going too far off the path (1-10 m) and not too close to the river. Samples were also chosen where the depth of plastic was manageable (about 20 cm). Areas where the accumulated amount was deeper were suitable for line transect sampling, since that only included an overview of what was visible from the top layer. Neither did I open plastic bags, so a plastic bag full of trash would be inventoried as only *one* plastic bag.

In the field, opportunities for data collection would sometimes show up unexpectedly. The challenges in such moments were to sense the boundary of the scope, position myself as a researcher in the situation and organise the right form of consent (not a rare case according to Bailey, 2007: p. 70). Neither were the number of samples systematically chosen but happened as a result of what was manageable timewise in the field, and of what suited the different people that I relied on (interviewees, scheduled clean-ups, the managers in the mangrove, and so on). Unpredictability in undertaking the scientific method can raise concerns of reliability and validity, which is of course a risk to contemplate, as always in research.



## 4. RESULTS

This chapter presents the findings generated from the data. First, the composition of littered plastic waste is presented. Second, it is described how different plastics are handled on Bali, and how they are valued by the Plastic Bank. Third, the analytical framework from section 2.2 is used in order to analyse how the Plastic Bank aligns with the sustainability narratives from circular economy and degrowth perspectives. Raw data from pick analyses can be found in Appendix C. A summary of the interviews can be found in Appendix D.

### 4.1 LITTERED PLASTICS ON BALI

The pick analyses and inventories in the Clean Swell App, showed that ‘food wrappers’ was the most littered plastic waste category on Bali (42 % of total pieces). Only the category ‘plastic and foam pieces’ ever had a higher number density in a sample (this was the case 25 % of the time). Food wrappers is a broad category that included packages, bags and pouches of different sorts. According to the line transect sampling, 40 – 45 % of the food-wrappers were so called sachets, and 70 % of the sachets were so called multilayers (with foil on the inside). The most common product types for sachets were snacks, noodles, coffee, cookies and crackers, detergent and candy. The concentration of food wrappers was generally higher in the mangrove than on the beach. The beach had more straws, bottle caps and cups, while the mangrove had more plastic bags, containers and personal hygiene products. Top 7 commonly found categories are presented in table 5.

**TABLE 5 THE SEVEN MOST COMMONLY FOUND LITTERED PLASTIC WASTE CATEGORIES ON BALI.**

<b>Rank</b>	<b><i>Mangrove (% of all pieces found in mangrove)</i></b>		<b><i>Beach (% of all pieces found on beach)</i></b>		<b><i>Of the total count (% of all pieces found)</i></b>	
1	Food wrappers	51 %	Plastic and foam pieces	34 %	Food wrappers	42 %
2	Plastic bags	14 %	Food wrappers	25 %	Plastic and foam pieces	20 %
3	Plastic and foam pieces	13 %	Straws	12 %	Plastic bags	10 %
4	Straws	6 %	Bottle caps	8 %	Straws	8 %
5	Plastic containers	3 %	Other trash	5 %	Other trash	4 %
6	Personal hygiene	3 %	Cups, plates	4 %	Bottle caps	3 %
7	Other trash	3 %	Plastic containers	3 %	Plastic containers	3 %

There were also variations among the pick analysis samples. In one overview inventory along the beach, 143 cups and 174 food wrappers were spotted. This was the highest ratio between cups and food wrappers ever encountered during an inventory and is a result that does not correspond with the other findings. No other category (besides ‘plastic and foam pieces’) ever come that close to the number of food wrappers in any sample. This sample was spotted right after a beach clean-up, when the high tide came in, and suggests that the variation in waste composition might actually vary depending on time of day or time of tide. It was also known from media and informal talk that ocean waste varies with the seasons, where more waste is washed ashore during rainy season. This study was conducted during mid-season. It might also

be that certain plastic types get collected to a larger extent by waste pickers, and that the removal of those plastics happened before I arrived with the clean-up groups (usually in the evening). Cups might be one such type that is collected, though this is a speculation.

One sample from the mangrove had an unusually high amount of plastic containers of the mika type. This sample was taken just a little bit further in among the mangrove trees than most of the other samples. A man engaged in the Mangrove Mobs since the start, and a long-term Bali resident, confirmed that some years ago the mika was the regular packaging for foods. He also explained that sachet consumption and littering likely is a result of little incentives to buy bulk over single-use pricewise and due to little storage space in the homes. It is also common to eat take-away food on Bali, which is usually packaged in plastic bags and foam boxes.

A conspicuous observation from the field was 11 bags of PET bottle labels thrown into the bushes on the side of the road. More labels were also loosely littered on the ground around the same spot. About 50 meters away, a large amount of coffee sachets was littered in a similar way. These observations suggest that littering is sometimes used as a practice of getting rid of unwanted plastic waste. The person that littered the labels had likely prepared PET bottles for recycling but had nowhere to send off the labels, e.g. for recycling.

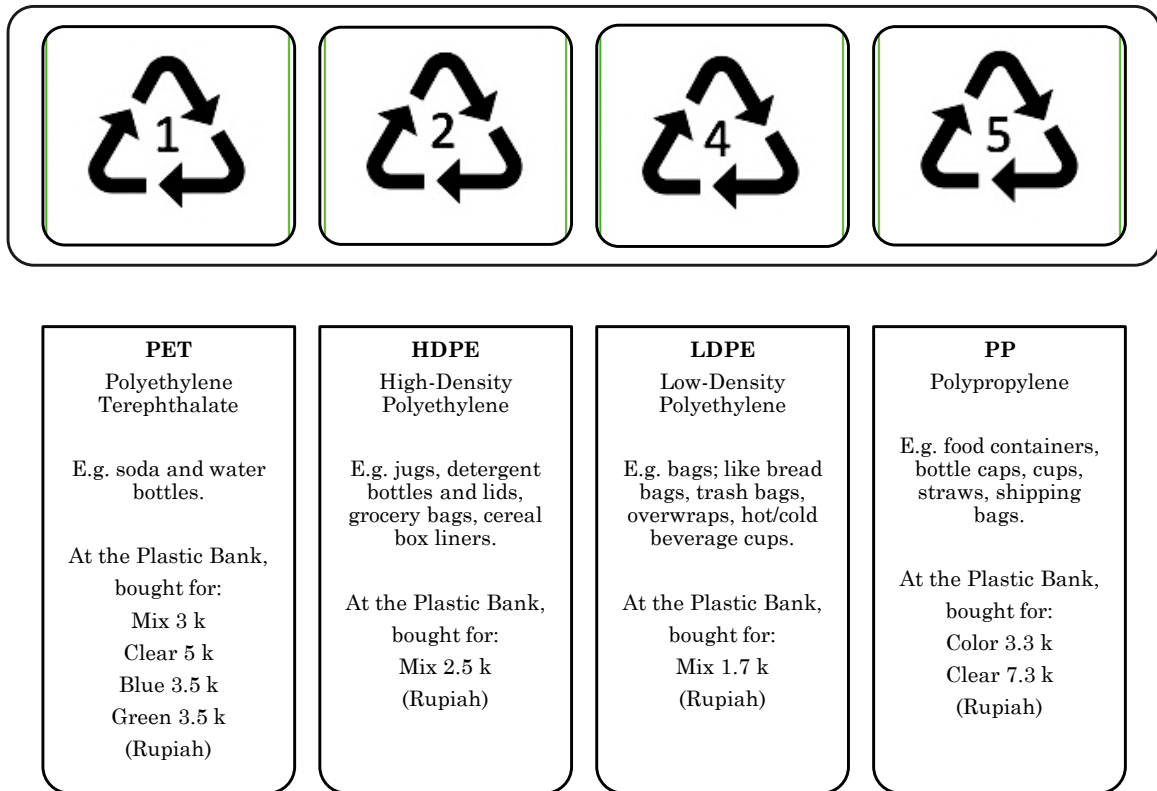
During the quadrat samples of PET, totally 436 bottles were found in three days. At most, there were 5 bottles per square meter in the studied area. The ratio of bottles with no cap (cap lost), to bottles with cap, was as much as 1:129 in one sample. In other words, the vast majority of bottles seems to have been littered with the cap on. In the inventories in the Clean Swell App, the number density of loose caps in the mangrove was only about 1 % (3 times as many as bottles). On the beach though, the number density of loose caps was as high as 8 % (7 times as many as bottles). The ratio between bottle caps to bottles is a slight overestimation here though, since it was possible to put other caps in this category too, due to the ‘closest-category’ principle described in section 3.2. However, it is still possible to make the comparison between the mangrove and the beach, and to tell that there are more caps than bottles in these places. The inventories do not provide enough data to tell why this is the case and reveal the true ratio of bottles to caps (e.g. since bottles without caps likely sink in water). In the next section, however, we will see that bottles have a greater value than caps.

## 4.2 HANDLING OF PLASTIC WASTE ON BALI

### 4.2.1 RECYCLABILITY ACCORDING TO THE PLASTIC BANK

Most plastics are technically possible to recycle (Allwood & Cullen, 2012) – and this was mentioned by the Managers – but in practice the Plastic Bank divides plastic into ‘recyclable’ and ‘non-recyclable’ according to their own capacity to do trade with them. A plastic is considered recyclable if there is a receiving processor for that type on Bali. Broadly speaking, plastic types polyethylene terephthalate (PET), high-density polyethylene (HDPE), low-density polyethylene (LDPE) and polypropylene (PP) are considered recyclable by the Plastic Bank (figure 8). Categories from the inventories that are accepted include PET bottles, bottle caps, cups and plastic bags (figure 9). Together, these constitute of 21 % of the inventoried pieces (plastic and foam pieces excluded). Besides, some plastic containers are considered recyclable, but not the entire category.





**FIGURE 8 TYPES OF PLASTICS THAT THE PLASTIC BANK CAN ACCEPT FOR RECYCLING. THE VALUE OF ONE INDONESIAN RUPIAH IS LOW, AND THUS NOTES HAVE HIGH-DENOMINATIONS; K STANDS FOR 1000.**



**FIGURE 9 COMMONLY FOUND RECYCLABLE PRODUCTS. PHOTO: ELIN HENRIKSSON.**

Two specific things that were brought up as ‘non-recyclables’ by Manager A were labels from PET bottles and multilayer sachets. However, not only is recyclability a matter of plastic type (PET, HDPE etc.) or product type, but also of quality and cleanliness, explained the manager(s). A recyclable plastic that is littered, gets contaminated and starts to weather, is not necessarily considered recyclable anymore. This is the fate of the littered plastics in the mangrove. Managers B and E pointed at it and said “this is all trash”; for the simple reason that it is dirty from mud and food residues. Most of it is of too low quality and cannot be sold, and the little percentage that can be rescued takes a lot of effort to clean. Some examples of commonly found ‘non-recyclables’ are shown in figure 10. Sachets and small plastic bags with a knot were inventoried as ‘food wrappers’, mika as ‘plastic containers’, and labels as ‘plastic and foam pieces’ in the Clean Swell App.



**FIGURE 10 COMMONLY FOUND NON-RECYCLABLE PRODUCTS. PHOTO: ELIN HENRIKSSON.**

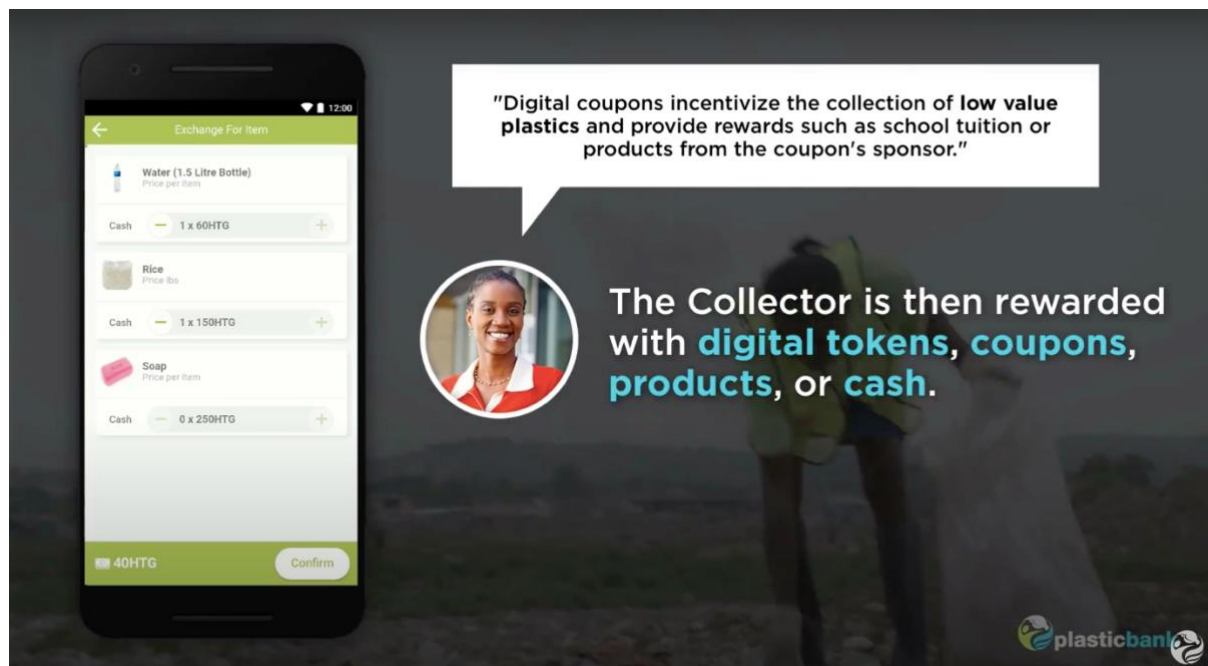
During the studied Mangrove Mobs, 350, 352, 444 and 652 kilos of plastic were picked up respectively on four occasions. When plastics were separated and cleaned, recyclables accounted for 2 - 4 %. This is thought to be too low for the Plastic Bank to benefit financially from picking plastics from the mangrove. Similarly, when the same separation method was applied to a beach pick analysis sample, 10 % was ‘recyclable’, which is still very low. Waste that is collected during Mangrove Mobs and beach clean-ups are thrown into a container and later send to landfill.

The Plastic Bank runs several collection centres, that they call “branches”, where collectors can come in, weight and sell their plastic waste. ‘Non-recyclables’ are rarely collected by the Plastic Bank members, according to Manager A, because they know very well what is valuable and not. Neither is the Plastic Bank in any way obliged to accept collected non-recyclable plastics. This was confirmed by Manager A who spoke for a long time about snack bags (usually multilayer sachets) which are notoriously non-recyclable on Bali and part of the biggest plastic waste category according to the pick analyses. If someone came with a large sack of snack bags, the Plastic Bank would not accept it. Manager E uses basic economic principles to explain why

some plastics are recyclable and some are not. The demand of recycled plastic as raw material creates the recycling market – “if there is demand there will be supply”. With similar logic, the reasons why PET is now profitable to recycle is a combination of “peak oil” and a scaling of the recycling industry. However, the same could not happen to sachets, because the recycled and virgin material differ too much in quality; it is a down-cycling problem for sachets.

All plastics that is handled by the Plastic Bank is branded as ‘social plastic’ (as a trademark). The Plastic Bank comes in as a collaborator to improve whatever system already exists in an area by adding their bonus system to the entire value chain of waste management – from collectors on the ground, to junkyards, distributors and processors – by registering every party in the Plastic Bank App (figure 11). All user types – members, branch operators, processors and other partners – are using the same app (App Store Preview, 2020b). Today, 90 % of all the collected material that travels through the Plastic Bank system comes from junkyards that are registered as partners through the app, and not from waste pickers that delivers the plastic directly to the Plastic Bank as members. The Plastic Bank does not disturb the transaction of materials between the different parties, but just adds the corresponding bonus tokens to the amount of plastic that is handled. The plastic and its quality and properties are the same – it is due to the bonuses that the Plastic Bank distributes and shares with the collectors that they call it ‘social plastic’. A partner company, such as SC Johnson, can use the label on a product when the Plastic Bank purchases the recycled material back from the processors and sells it to the sponsoring company that then replaces the raw material with ‘social plastic’ in their production. It is anticipated that 100 % of the material that the Plastic Bank delivers to a processor will get recycled. The app makes it possible to follow what volumes are transferred in different phases of the recycling process. ‘Plastic neutrality’ is another product. By paying for plastic neutrality, the client gets the provided service from the Plastic Bank who picks up the plastic and makes sure it gets recycled.

For the Plastic Bank members, the pledged money is the greatest incentive for collection. The members separate and clean the material in order to get as much money, bonus tokens and ratings as possible in the app. Members own Plastic Bank accounts with unique ID:s, digital wallets and savings accounts (App Store Preview, 2020b). The bonus comes directly from the sponsors, and the Plastic Bank capital comes from selling material to the processors alone. The bonus is *the* extra incentive to collect more plastic. The cleaning personnel on the Sanur market were very selective with what they picked. They picked the best quality and left the rest. What they discard will end up on a dump or landfill (more about that in section 4.2.2). In one day, we collected 3.3 kg clear and 1.3 kg mixed coloured plastic bags. That is worth 6 600 Rupiahs at the Plastic Bank. In addition, the bonus is about 1 000 Rupia a day (less than 0.07 USD) for a full-time collector and makes “a real difference”, according to Manager D.

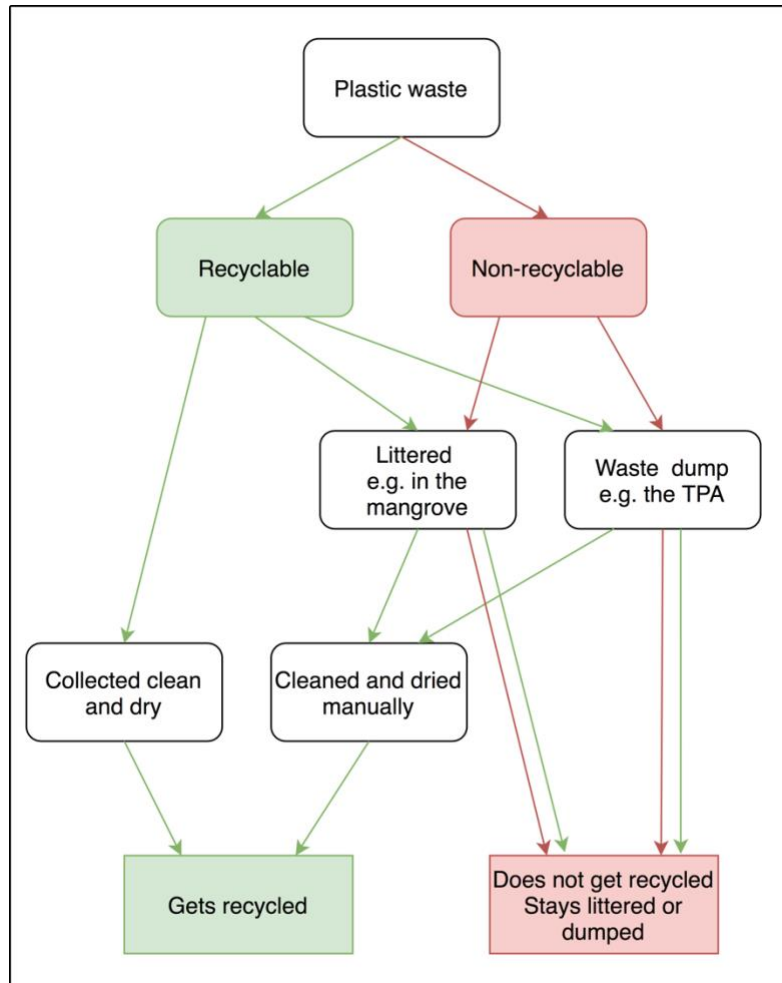


**FIGURE 11 SCREEN SHOT FROM VIDEO OF THE PLASTIC BANK APP, PRESENTING A DEMO OF CORE FEATURES (PLASTIC BANK, 2018).**

#### *4.2.2 OBSERVATIONS OF HOW PLASTICS ARE HANDLED ON BALI*

There is a full, complex organisation of waste management that intertwines both formal and informal actors on Bali. The Plastic Bank refers to this as an ‘ecosystem’. Exactly how this ecosystem works in detail – how different actors relate to each other, who is responsible in which geographical area, who collects what, who gets paid by whom – is outside the scope of this thesis. Still, many observations were done in the field that can provide background for the broader picture and will be brought up in this section. Figure 12 shows a simplified overview of general plastic fates on Bali. In theory, this is what any actor that trades with waste is managing and adapting to. The Plastic Bank targets mainly the flow to the far left – collecting recyclables before they are littered or dumped – because that is when they have the highest monetary value. Besides, a common material fate is burning.





**FIGURE 12 SIMPLIFIED FLOWCHART OF THE FATE OF ‘RECYCLABLE’ AND ‘NON-RECYCLABLE’ PLASTICS. BESIDES THESE FATES, MANY PLASTICS GET BURNED. OWN FIGURE.**

Trash was seen littered, dumped or burned in many places. The so-called open-pit burning, or backyard burning, was not an unusual sight (as in figure 13-14). It was also common to see PET bottles and other recyclables neatly gathered in many places (figure 15). Some workers that clean by the outlet of a large river, said they collect and sell PET bottles for some extra “coffee money”.



**FIGURE 13-14 IN THE MANGROVE: BURNING OF TRASH AND SIGNS OF BURNING ON DUMP. PHOTO: ELIN HENRIKSSON.**



**FIGURE 15 COLLECTED PET. PHOTO: ELIN HENRIKSSON.**

The default destination for collected waste is any of the open dumps or landfills on Bali. Tempat Pembuang Akhir (TPA), on the artificial peninsula Seranang, is the closest open dump to where this fieldwork was executed (figure 16). Where there is a door-to-door service or other forms of community collection of waste around that area, it ends up at the TPA. The technical design of the TPA decides whether it is a proper (sanitary) landfill or not. Previously, a 32-hectare landfill site, called Suwung was in use here, right next to the currently used dump in figure 16. The Suwung is now in the process of “greening” which includes reinforcing the slopes with so called geogrids and capping the surface with geosynthetic clay (figures 17-18; Kelsey, 2019). According to one encountered travel story online, the remaining part of the dump site (figure 16) will be transformed into a sanitary landfill with a waste-to-energy plant (Mein Leben auf Bali, 2014; Seminyak Times, 2017). At the TPA, waste pickers scavenge also for lower qualities of plastic, for example the ‘mika’ and bubble plastic wrap. According to what I was told, the collected recyclables are sent to processors on Bali or the neighbouring island Java. The waste pickers work together to send off trucks with larger batches.



**FIGURE 16 THE TPA WITH BAGS OF RECYCLABLES. PHOTO: ELIN HENRIKSSON.**





**FIGURES 17-18 GREENING PROJECT OF THE SUWUNG WASTE DUMP. PHOTO: ELIN HENRIKSSON.**

Around Bali, recyclable waste is handled in so called junkyards. A junkyard is organised so that the waste pickers work for a “boss” to whom they collect and prepare waste for recycling. In exchange they get money and somewhere to eat and sleep for free, so that they basically both work and live in the junkyard. The boss sells the recyclable material to a processor within the recycling industry. Manager C elaborated on this during the interview and shared that s/he dreams of starting her/his own junkyard one day in her/his home island. Manager C believes that many waste pickers chose to work with the junkyards over the Plastic Bank collection centres in spite of the better price, because of the basic need of shelter and food. The junkyards are part of what the Plastic Bank refers to as the “ecosystem” of waste management, that existed on Bali before the Plastic Bank came. The junkyards can now become members of the Plastic Bank and let their waste pickers take part of the bonuses from the sponsors. Note that the junkyards are not the same as the Plastic Bank’s own collection centres (also called branches).

Apparent around Bali were the many posters about the plastic bag ban (figure 19-20). During informal talk, people were very keen to tell that “Bali don’t use plastic bag [*sic*]” or “Bali don’t use plastic, Bali is good [*sic*]”, and similar. This occurred repeatedly in different situations, almost like a mantra. Bans and regulations target at least plastic bags, straws, coffee cups and spoons. There are no regulations yet on sachets.



**FIGURE 19-20 POSTERS ABOUT THE PLASTIC BAG BAN. PHOTO: ELIN HENRIKSSON.**

The company Tirta Rahmat Bahari<sup>14</sup> that manages the Wisata Hutan Mangrove as a recreational area and tourist attraction, provided some background information and history of that. Efforts to clean up the Wisata Hutan Mangrove have been going on since 1991. It started as a cooperation between Indonesian authorities and the Japan International Cooperation Agency (JICA). During three years, 13 people were working full-time with cleaning up waste. Today, 4 people work with cleaning up inside the tourist area, and 9 people work in the surrounding areas (where the Mangrove Mobs also take place). They are employed by Tirta Rahmat Bahari. According to some villagers that Manager B had talked to near the mangrove, the trash in the mangrove is 10 years old. Despite all the people that have cleaned in the mangrove for nearly 30 years, the Wisata Hutan Mangrove is still a remarkably polluted place.

#### 4.3 THE PLASTIC BANK FROM CIRCULAR ECONOMY AND DEGROWTH PERSPECTIVES

Here, the interview material is analysed according to the seven ‘points of comparison’ of the analytical framework (from section 2.2.3). Table 6 presents the results with indicative colours; green for alignment, orange for some alignment and red for non-alignment.

##### **Point of comparison 1: Root cause of environmental impact**

The Plastic Bank targets the problem of ocean bound plastic. This visible and tangible environmental problem indicates an unsustainable size and rate of plastic production and consumption, in relation to the inability of the waste system to collect waste in the same amount and rate. I have not heard the Plastic Bank express any intentions to work towards changing the way plastics are produced and consumed, but their business idea supports a reorganisation built on greater recycling of recyclables. The Plastic Bank enables greater collection of recyclables while giving the collectors a comparatively high payment in return. The plastics that are recognised as valuable by the Plastic Bank are those that already have a value (a demand) on the market of recycled plastics. The approach to non-recyclables (e.g. the sachets in the Mangrove) is to search for a processor that has the capacity and will to accept it.

Based on the assumption that recycling reorganises the production and consumption system from a linear to a more circular mode, it can be argued that the Plastic Bank connects to the circular economy viewpoint of the root cause of environmental impact. However, due to the phenomenon of downcycling it is not a given that recycling substitutes unsustainable practices like linear production, use of virgin material, production of non-recyclable products or overconsumption. The size, rate or design of the production and consumption system is not discussed, and it is therefore not motivated to argue that the Plastic Bank aligns with degrowth in this regard.

##### **Point of comparison 2: Key principles and motivation for change**

The Plastic Bank provides an income both for members and employees. Manager C spoke especially passionately about the job at the Plastic Bank where s/he can work for money and for people and the environment at the same time. Manager F said that the waste pickers connected to the Plastic Bank are called members in order to signal inclusion and avoiding negative connotations. The Plastic Bank keenly points out and puts emphasis on the social

<sup>14</sup> For reference in Indonesian, see e.g.: <https://metroballi.com/kuasa-hukum-pt-tirta-rahmat-bahari-nyatakan-banding/>



aspects of the members' lives (but from the Plastic Bank's perspective). The Plastic Bank believes money is the highest priority for the members and therefore strives to ensure a high and stable price for the plastic (as close as possible to the real market price). According to Manager C, the Plastic Bank always gives "the best price". Manager D expanded on this and said that the Plastic Bank gives 50 - 75 % of the value that they get from the processors back to the collectors. The greatest difference between the Plastic Bank and a junkyard is that the Plastic Bank adds the bonus (tokens) on top of the market price.

On this point of comparison, the Plastic Bank aligns with some of the social aspects from circular economy and degrowth by emphasising the raise in income for waste pickers. The proclaimed intention is absolutely to pair social sustainability with environmental protection, though it can be discussed if and how this can actually be done when the market demand determines what is recyclable and what the material is worth monetarily. Still, stronger social values such as equity, democracy, well-being and a greater sense of meaning in life would have to be brought forward and put in centre of the entire organisation of the Plastic Bank in order to really recognise alignment with degrowth – something that cannot be proved with the collected data. It might otherwise be tempting to assign the analysis some alignment with degrowth simply because the Plastic Bank is, after all, a social enterprise and the social aspects are so central to degrowth. Though, considering the fact that only economic benefits are provided for the waste pickers, this is not enough according to degrowth standards.

### **Point of comparison 3: Drivers of change**

The Plastic Bank networks with companies for 'ecosystem activation' in order to start up in new places. SC Johnson's sponsorship was an important factor in bringing the Plastic Bank to Bali. For a start, SC Johnson bought an "Ecosystem Activation Proposal" and committed to purchase certain amounts of social plastic. Essentially though, the only true shareholders are the global corporation Plastic Bank and the founders. The Plastic Bank is an international organisation but locally established on Bali with many of the employees being from Bali and other parts of Indonesia. The sponsors' money is part of creating the incentive to collect plastic waste; thus, they are co-drivers for change in the Plastic Bank's business model. Out of the revenue from Plastic Bank Indonesia, 70 % stays in-country. Selling more "Ecosystem Activations" is what the Plastic Bank ideally needs in order to scale in terms of collecting even larger volumes and expanding to other islands or countries. The Plastic Bank also networks with local actors of different sorts; e.g. school children and their parents to educate them about the dangers of plastic waste and the benefits of bringing plastic waste to the Plastic Bank. In Manager E's words, this is "making branding awareness [of the Plastic Bank] in the local community [*sic*]". Furthermore, the Mangrove Mobs are not-for-profit activities.

On this point of comparison, the alignment with circular economy is clear given the networking with sponsoring partner companies which is the distinguishing quality of the Plastic Bank business idea. As read in the literature review, networks between businesses and other actors are seen as essential enablers in the transition towards a circular economy. The whole idea of the 'ecosystem activation' with the app is inherently a kind of networking by design. On the account of degrowth, the facts that the Plastic Bank is a for-profit organisation, a global corporation and works with large producing companies (that probably cause a considerable amount of pollution) are very problematic. For-profit organisations might still be drivers of degrowth depending on intentions, authenticity and level of democracy (e.g. according to Johanisova, Crabtree and Fraňková, 2013), however the collected empirical data is not enough to decide how distinct these factors are within the Plastic Bank. On a local level still, the Plastic Bank is perceptive and responsive to circumstances in the field, such as the polluted mangrove

forest, local groups of activists, the local government, villagers etc. For these activities to be drivers of degrowth, they would ideally be initiated bottom-up.

#### **Point of comparison 4: Intention to reduce biophysical throughput**

The Plastic Bank's intention is primarily to collect recyclable plastic to stop ocean plastic and empower the collectors, not to reduce resource extraction. Manager E explained that the Plastic Bank is unlikely to aspire to creating a demand for recycled plastic themselves: "Plastic Bank is all business. The core business of Plastic Bank is not to become a manufacturer, Plastic Bank is not a junkyard (...) Plastic Bank comes with the system, the app". Though, reduced resource extraction could happen indirectly considering that the recyclable plastic can produce a high-quality material that can replace the use of a virgin material. One can also argue that the awareness-raising activities, such as the Mangrove Mobs, have the potential to inspire to reduced use of material-intense goods and services. A message to produce and consume less (and then waste less) might be indirectly conveyed.

In case recycled material maintained a (high enough) quality, it could be argued that the Plastic Bank contributes to protecting natural resources and reduces biophysical throughput, and therefore aligns with circular economy ideals through closed loop recycling. However, this is very hard to achieve in reality because of downcycling. No alignment with degrowth was found, since reducing material throughput is not at all a priority.

#### **Point of comparison 5: Intention to prevent waste**

Waste prevention on a pre-production and pre-consumption stage is not a business activity for the Plastic Bank, however, preventing waste from being littered is. The Plastic Bank prevents plastic from being wasted, so to speak, by assigning plastic waste a monetary value. The fact that recyclable waste is a resource for the Plastic Bank, and that the collected material is turned into something valuable within the recycling industry, has alignment with circular economy ideals. However, because of the recycling industry and the nature of market demands, this is only true for 'recyclable' plastics. The Mangrove Mobs work as awareness-raising campaigns that can have a discouraging effect on the volunteers when it comes to buying plastic. Manager F described the Mangrove Mobs as a kind of service that the Plastic Bank provides but adds that "we need to work upstream to protect the downstream", meaning that the mangrove is already downstream. In other words, collection at the source is preferred above mitigating ocean plastics by cleaning up what is already littered.

Since already created waste is turned into a resource, the Plastic Bank connects to circular economy on this point. However, waste prevention is not a priority and it is not at all emphasised that producing and consuming less would also stop ocean bound plastics. The Plastic Bank can therefore not be said to connect to degrowth in this regard. Neither does the Plastic Bank demonstrate the convergence of circular economy and degrowth when it comes to waste prevention.

#### **Point of comparison 6: Recycling**

The Plastic Bank exists along the value chain of recycling with focus on collection. Collected recyclables get recycled by partnering processors within the recycling industry. The incentive the Plastic Bank creates – in order to enhance the 'ecosystem' of waste management and increase collected volumes – comes in the form of payment: from the plastic market value and additional bonus tokens from the sponsoring companies. The collectors come to the Plastic Bank with their collected material voluntarily, attracted only by the pledged payment. If not

satisfied with this, they can sell their material to a regular junkyard within the formal or informal waste management system. Manager D and Manager F said that the Plastic Bank does not control where and how the members collect the material, but the monetary incentive should motivate them to go further and collect larger volumes, as well as keep selling the material to the Plastic Bank. Manager D also spoke of the important role the collectors have in a potential scaling of the Plastic Bank – for collecting larger volumes and expanding to new geographical places. Moreover, the bonus is an incentive for the junkyards to sell to processors certified by the Plastic Bank (and not to other processors). Manager F emphasised that this is done as a collaboration, not as competition. Moreover, the notion of ‘social plastic’ brands the recycled material to producing companies. There is inherently a preference for local recycling due to logistical reasons. Manager E explained that places close enough to suitable processors have the best conditions for environmental clean-up: “if there is a processor you can clean up (...) if there are no processors you can’t”.

Since recycling is such an important core activity, the Plastic Bank aligns with the convergence of circular economy and degrowth on recycling. The Plastic Bank enhances the ‘ecosystem’ of recycling by means of financial support, networking, technology (the app) etc. Alignment with degrowth was found with respect to local recycling.

#### **Point of comparison 7: Responsibility for plastic littering**

The Plastic Bank as an organisation is not outspoken about who is responsible for plastic littering. A common belief on Bali is that the trash comes from other islands, from tourism or even other countries. According to Manager B, however, it still happens that waste is dumped in backyards and rivers. Preferably, local governments could do more to clean the mangrove continuously and educate people on how to keep the river(s) clean, in Manager B’s opinion. The Plastic Bank’s ambition for the near future is to engage more companies in the Mangrove Mob events to help clean up. The companies could join motivated by a shared mission and the opportunity for branding. On Bali, where the environmental awareness is higher than on other Indonesian islands, it is important for companies to show that they also care for the environment, according to Manager B. What the Plastic Bank offers is a platform for the sponsors to demonstrate their sustainability ambitions and efforts. The Plastic Bank receive money from the sponsor companies without blaming them for producing waste. The producing companies are either self-proclaimed polluters or environmental heroes; the authenticity and transparency in this undertaking may vary as a result of varying ambition levels. Sometimes activists criticise the Plastic Bank for working with large corporations. Manager F’s response on that issue was that if the corporations have the will and resources to do something, the Plastic Bank can help them reach their sustainability goals, but also added that “it would be lovely if they take a step further, for example refill system – that would be great! [*sic*]”.

Since the Plastic Bank is based on partnerships with large companies who finance the collection of waste, it arguably shows alignment with circular economy in which companies are expected to take on voluntary responsibility according to their own ambition levels. Alignment with degrowth, on the other hand, would require taking a stronger standpoint *against* producing companies that causes pollution (i.e. plastic littering). To align with degrowth, the Plastic Bank would have to be more selective with what companies they partner with and evaluate whether a sponsor truly contributes to the same, desired mission. If a company in fact compensated only a small fraction of the waste they produced, it would not be considered alignment with degrowth either.

**TABLE 6 COPY OF THE SCHEME FROM SECTION 2.2.1, TABLE 1. GREEN COLOR INDICATES ALIGNMENT WITH THE STATEMENTS IN THE BOX, ORANGE COLOR INDICATES SOME ALIGNMENT, AND RED COLOR INDICATES NON-ALIGNMENT. THE RIGHT COLUMN BRIEFLY COMMENTS ON HOW THE PLASTIC BANK ENGAGES WITH EACH POINT.**

<i>Point of comparison</i>	<i>Similarity</i>	<i>Circular economy</i>	<i>Degrowth</i>	<i>Plastic Bank engagement</i>
<i>1 Root cause of environmental impact</i>	The production and consumption system is giving rise to environmental impact.	The linear organisation of the production and consumption system.	The linear organisation, as well as the size and rate of the production and consumption system.	Reorganisation of the production and consumption system – from linear, where plastic flows towards the ocean, to circular, where plastic goes back into the industry.
<i>2 Key principles and motivation for change</i>	Environmental protection.	Economic benefits; new jobs, business opportunities, efficiency gains. Social values to some/lesser extent.	Social equity, democracy, well-being, a greater sense of meaning in life.	Working for people and the environment. Increase the payment and reduce social stigma of picking waste.
<i>3 Drivers of change</i>	Possibly, smaller-scale and local enterprises (not-for-profit or for-profit) depending on intention, authenticity and level of democracy.	Companies and industry networks, policymakers, governments. Top-down hierarchy.	Not-for-profit organisations, activists, social movements, local communities. Bottom-up hierarchy.	Locally engaged, though rooted in Canada and financially supported by international corporations. Interaction with local waste management systems.
<i>4 Intention to reduce biophysical throughput</i>	Intention to reduce resources extraction, assure basic material provision for society's need.	Reduction by means of closed loop circling of material through multiple life cycles, based on decoupling hypothesis.	Via dematerialisation and reduced use of material intense goods and services, not relying on, or believing in, decoupling.	Indirect reduction of raw material extraction/use if material is recycled with maintained (high) quality, however hard to achieve.
<i>5 Intention to prevent waste</i>	Intention to prevent waste in a pre-production and pre-consumption stage. Having things in use for longer (reuse).	Waste prevention through design and by converting waste into a valuable resource.	Primarily by producing and consuming less.	Waste prevention is not a priority, nor a business activity, but already created waste is turned into a resource.

6 Recycling	Recycling to some extent, of some materials.	Should be supported by means of technological improvements, infrastructure, collection systems, industrial symbiosis etc.	Can be part of the degrowth vision but is definitely not a priority. Preference for local recycling.	Enhances the existing waste and recycling system, aims at increasing the collection rate with stronger monetary incentives.
7 Responsibility for plastic littering	Producing companies are responsible to some extent. The common awareness of plastic pollution puts pressure on the companies.	Producing companies are responsible to a lesser extent, or according to their own ambition level. Shared responsibility with consumers and other actors.	Producing companies are the responsible ones. Consumer consciousness is important; consumers can go 'zero-waste' to some extent.	The sponsoring companies join the Plastic Bank based on their own ambition and mutual gains.

## 5. DISCUSSION

### 5.1 STOPPING RECYCLABLE OCEAN PLASTICS ONLY

The results point out that it is the recycling industry that defines the value of the plastics that the Plastic Bank collects. Within this scope, only so many incentives can be created to clean up the environment as there is market demand for recycled plastic. The plastics that the Plastic Bank wants to assign a value already do have a recognised value on Bali and are collected by actors within the informal waste sector. What the Plastic Bank adds to the system is a larger payment for the material. The higher payment works as an incentive to collect larger volumes of recyclable plastics but does not create any incentive to collect the non-recyclable.

Since the value of recyclables depends on quality, cleanliness and dryness, the incentive that the Plastic Bank creates primarily targets mitigation and *not* remediation; collection happens *before* the plastic enters the environment or ocean. Already littered waste is less likely to be collected and generate a good income for someone. Non-recyclable plastics are what end up in the environment the most, according to the pick analyses (for example sachets and other 'food wrappers'). Not surprisingly, the Plastic Bank views all 'food wrappers' as non-recyclable. The literature review shows that some of the challenges for sachet recycling include advanced technology and using a lot of chemicals (Uehara, França & Canevarolo Junior, 2015; Kaiser, Schmid & Schlummer, 2017). As a side note on this remark, this kind of recycling is especially problematic from a degrowth perspective since it creates new pollution. Other concrete challenges for increased recyclability that now can be drawn from the interview material include down-cycling, low market demand, long-distance logistics and transports (e.g. to the neighbouring island Java), and contamination from food (which makes them time-consuming to clean and dry).

A noticeable plastic bag ban is in force on Bali since January 2019, but nonetheless 'plastic bags' was the second largest category on the total count of the pick analyses. The potential effect of the restrictions of plastic bags, straws, cups and other single-use products has not yet manifested in the environment. However, that might change over time. The sample from the mangrove that had an unusually high number of mika containers could be a heartening sign of

that. The testimony from informal talks of how common *mika* was just a few years back speak for the interpretation of the sample as a time capsule. The use of plastic changes over time, and what is being littered changes as a result (though consumer reactions to public policies might also vary (Nielsen, Holmberg & Stripple, 2019)).

Another peculiar sample was the overview analysis of PET bottles in the mangrove. Firstly, it was surprising to see that almost every bottle still had the cap on. During pick analyses on the beach, however, it was common to see loose caps (it even made it to the fourth rank). Secondly, it was surprising to hear Manager B explain that no collectors had been interested in picking plastics (including PET) in the mangrove so far because of the low value. If assumed that a PET bottle weighs 20 grams, then the 436 counted PET bottles would be worth about 13 000 Rupiah in mix. 13 000 Rupiah is about double the amount that the cleaning personnel got in a day from collecting plastic bags on the traditional market. The PET bottles could be worth double the amount or more, if separated according to colour. The Mangrove Mobs demonstrated that some (though a small percentage) of the littered plastic waste can indeed be fed into the recycling industry – under the prerequisites that someone is willing to do the cleaning and drying. Even larger percentages could probably be recycled if recyclers on Java or other islands were included; though this would be problematic from a degrowth stance, which holds a preference for local recycling.

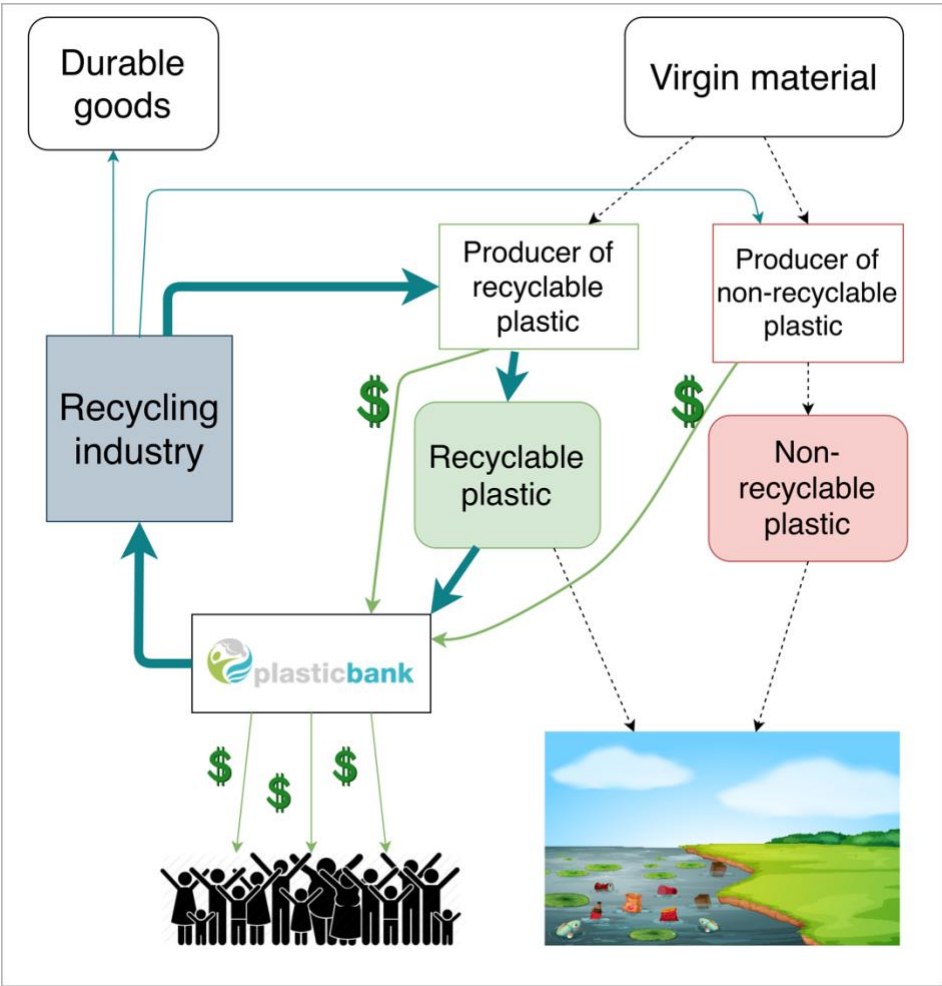
The above remarks lead to the identification of the following conflict: the plastics that need to be cleaned up are not the same as those worth the most money. In other words, there is a contradiction between wanting to clean up as much plastic waste as possible from the environment and wanting to create highest possible payment to the collectors. As an example, the bottle cap is not worth as much money as the bottle itself. A collector earns better if she focuses on bottles instead of caps. Even less valuable are the labels, which could be the reason behind the many littered bags of labels that were spotted littered in the field. These patterns and observations should be worth taking into consideration when thinking of incentives to stop ocean plastic, if the intention is to assign *polluting* plastic a value. Non-recyclable waste is also highly polluting waste.

## 5.2 VOLUNTARY POLLUTER PAYS PRINCIPLE

The Plastic Bank provides an alternative form of international financial assistance to collection and recycling on Bali, with money from the sponsors. As someone spontaneously exclaimed: “It’s like the polluter pays principle!”. But if so, instead of being an application of environmental law, it is a voluntary effort made on the premise of good-will. Manager F said that the Plastic Bank does not problematise *where* the money come from. The money is legitimised by the fact that they increase the payment to waste collectors, which the Plastic Bank sees as a way of empowering local and vulnerable communities. It is not taken into consideration whether the sponsoring company is working against the Plastic Bank’s cause to stop ocean plastic on the other side of the value chain, for example, by investing in plastic production.

According to Corvellec’s scatolic framing of waste (2018), the responsibility of a producer does not stop by the gate. In the Plastic Bank’s case, that means that their own responsibility for the plastic that they have collected does not stop at the moment that the plastic is delivered to a processor. Similarly, a producing company’s responsibility must not stop when they pay the Plastic Bank to collect more plastic waste. The sponsors certainly engage with plastic waste by means of partnering with the Plastic Bank, but they are not engaged enough to ensure that the recycled plastic waste does not return to the environment. As illustrated in figure 21, the

intention of exchanging virgin plastic with recycled plastic might still contribute to the creation of non-recyclable plastic, since both recyclable and non-recyclable plastic can be made from recycled feedstock.



**FIGURE 21 MODEL OF RECYCLING SYSTEM THAT PERPETUATES BOTH RECYCLABLE AND NON-RECYCLABLE PLASTICS. OWN FIGURE.**

As illustrated in figure 21, the loop of collecting recyclables, feeding them to processors that make new recyclables and collecting them again (thick blue arrows), is the material flow that the Plastic Bank would have to perpetuate in order to align with the sustainability narrative of circular economy. Alternatively, collected plastics can be made into durable goods that have less tendency to get littered. This can be made both from recyclable and non-recyclable plastics, as in the example of plastic roads (Chandra Asri Petrochemical, n.d.). The dotted arrows are desirable to decrease; that is the use of (fossil-based) virgin material and littering to the environment. Even in case the Plastic Bank does not steer where the recycled plastic goes after the processors, they still succeed to channel the bonuses to the collectors. So far so good, but it is the duality in wanting to both financially incentivising the collectors and clean up the environment that contributes to the complexity or even ambiguity of this model. As a consequence of this discussion, it can be questioned whether the sponsors and the Plastic Bank together really contribute to the goal of stopping ocean plastic. The fact that the petrochemical company Shell is a partner to the Plastic Bank on Haiti (Shell, n.d.; Shell, 2017) is arguably outside the (geographical) scope of this thesis, but it is worth mentioning here since it is an

example of how the global corporation Plastic Bank is supported in a way that is impossible to fully align with degrowth. Shell might contribute to incentivise the collection of recyclable plastic, but at the same time there is little doubt that the plastics they produce also cause pollution (e.g. Centre for International Environmental Law, n.d.). There is also reason to question whether Shell's involvement with the Plastic Bank is even applicable to a circular economy, which is a matter of how recyclable the plastics they produce are.

In awareness-raising campaigns, such as the Mangrove Mobs, the following dynamic can be identified: partnering with producing companies that create plastic waste on one hand, and signalling that consumers are (partly) responsible for plastic littering and thereby inspiring to a zero-waste lifestyle on the other hand. As raised in the literature review, companies might want to convey that the consumer is responsible for taking care of the waste, and thereby legitimate continued production (e.g. MacBride, 2012; Heinrich Böll Stiftung, 2019). Though, it might also be the case that the Plastic Bank raises awareness *against* producing companies – those that at the same time might be sponsors to the Plastic Bank. Deliberately campaigning for waste reduction is, and can only be, a side activity for the Plastic Bank since a core activity must bring in profit. This is another conflict for the Plastic Bank.

### 5.3 CIRCULAR ECONOMY AND DEGROWTH COMPATIBILITY IN THE CASE OF A SOCIAL ENTERPRISE

The analytical framework showed that the Plastic Bank aligns in principle with circular economy on 'root cause of environmental impact', 'key principles and motivation for change', 'drivers of change', 'recycling' and 'responsibility for plastic littering'. The Plastic Bank aligns to some extent with degrowth on 'drivers of change' since they are locally engaged and interact to enhance the local waste management system. They also bring social movements, activists and volunteers on board in the Mangrove Mobs. On 'recycling', some degrowth alignment was found considering the Plastic Bank's preference for local recycling. Least alignment was found on points regarding waste prevention and reducing biophysical throughput. The emphasis that degrowth advocates put on restricting the production and consumption system is one reason to why the synergies with degrowth was so low. Besides the Mangrove Mobs and awareness-raising campaigns in schools, waste prevention and downsizing the economy surrounding plastic use is simply not a business activity for the Plastic Bank. Alignment with circular economy and degrowth together was found, for example regarding 'recycling' to the extent that degrowth would accept recycling of certain materials (for society's need). Similarly, the original intent to decrease environmental impact is both a circular economy and degrowth value. It was noted that circular economy and degrowth cross and share similarities where social values play a role and where multifaceted work of locality (versus globality), equity, environment and people can come together.

While circular economy is an improvement of a resource-intensive lifestyle and society, degrowth is a critique of the entire resource-intensive system. It would be prevaricating to say that the business idea of the Plastic Bank aligns with degrowth since it is based and dependent only on recycling and global corporations' sponsorship. The social work that is done in order to raise collector incomes is good in principle, but the core activities do not target the root cause of plastic-related problems, such as over-consumption and littering of non-recyclable plastics. Only if the Plastic Bank scaled in such way that they could catch all types of plastic waste, and if processors could recycle all types of waste and make a profit, would they be able to stop ocean plastic with their current business idea. However, that would be even less in line with



degrowth, since recycling perpetuates growth and means for the industry that upstream plastic production (e.g. making of disposables) can continue (Liboiron, 2015).

The Plastic Bank is a for-profit social enterprise. In degrowth literature, social enterprises are described as “taking out” capital from the capitalistic system and redistributing it in ways of enhanced democratic and local influence (Johanisova, Crabtree & Fraňková, 2013). At least in theory, social enterprises could defend a (socially and environmentally) better version of circular economy than the mainstream and be forerunners for degrowth. According to one conceptualisation, ‘secondary social enterprises’ provide services and resources to ‘primary social enterprises’ on the ground (ibid.). Hypothetically, the Plastic Bank could work as a secondary social enterprise on Bali, and by that be a driver of degrowth, but under two important conditions: 1) that they assisted local, bottom-up and not-for-profit social enterprises on the ground, and 2) didn’t compromise their social principles (for waste pickers and the environment) when accepting external sponsorships. Again, the Plastic Bank would have to be more restrictive with where the bonuses come from in order to find true alignment with degrowth. The partnerships with more traditional – and profit maximising – businesses such as SC Johnson and Shell are problematic in this regard. The potential alignment with degrowth is determined both by where the money comes from and how it is used on the ground. Though, this should not be taken as a final verdict. A deeper understanding of the Plastic Bank organisation is desired in order to assess what kind of social enterprise it actually is, and if (any of) the sponsoring companies would also have a place within the conceptualisation of social enterprises as drivers for degrowth. In principle, a social enterprise can be an ambassador or driver of degrowth no matter if it is a commercial actor or not; the importance lies in democracy, collaboration, diversity, independence, producing positive externalities and distributing surpluses, among other things. In the case of the Plastic Bank, that could mean alleviating some of the hardships associated with scavenging, such as social stigma, unsafe working environment, health concerns, and irregular income. It could also include vertically and democratically integrating collectors in Plastic Bank Indonesia (or even raised to the global organisation), making collectors more “visible” or giving them recognition as stakeholders. Working with not-for-profit businesses, and embracing a transitional approach away from the paradigm of growth, is one way in which the Plastic Bank could model a “circular econom[y] in [its] truest sense” that circulate wealth equitably and shared, in service of the common good (based on Ede, 2016: p. 25).

## 6. CONCLUSIONS

The aim of this thesis was to investigate what types of plastics can be found littered on Bali, how those are handled by the Plastic Bank Indonesia, and how that aligns with the sustainability narratives from circular economy and degrowth perspectives. The Plastic Bank is a for-profit social enterprise that trades with recyclable plastic waste and channels monetary bonuses from partnering companies to waste pickers. A mixed methods approach with complementary quantitative and qualitative elements was used in order to address these questions. First, the tangible, physical plastic litter was examined through pick analyses at a selected beach and mangrove forest on Bali. Second, six managers at the Plastic Bank were interviewed about recyclability and handling of plastics. Third, participant observations provided complementary insights from the field.

The study found that thin, flexible, single-use plastic bags that store and hold consumer goods (inventoried as ‘food wrappers’) were the most abundant type of waste found in the Balinese

environment. The pick analyses, both on the beach and in the mangrove, suggested that Bali is a ‘sachet economy’. At present, this category of plastic waste is considered non-recyclable by the Plastic Bank because it has low quality, is contaminated with food and is difficult and/or time-consuming to clean and dry. A similar fate awaits all plastic waste that is littered, especially in the muddy mangrove forest, independent of whether it was theoretically recyclable before it was littered. Other identified factors that affect recyclability are low market demand, down-cycling, long-distance logistics and transports. In practice, it is up to each actor within the formal or informal waste management system to decide what is “recyclable” for them, based on their capacity to trade with different materials. For the Plastic Bank, recyclable types of plastics include PET, HDPE, LDPE and PP, in the form of selected products: e.g. water and soda bottles, bottle caps, cups and plastic bags. The studied waste pickers were selective and chose what to collect depending on quality and cleanliness. What is not considered recyclable at the Plastic Bank might still be collected elsewhere, e.g. by the waste pickers at the TPA landfill that have organised the capacity to send material to processors on Java. This was observed to be the case, for example, for the plastic type called “mika” which is also common on Bali.

The interviews with the Plastic Bank managers testify that “recyclability” is largely determined by the market demand, which makes a plastic type recyclable if there is a recycler. The current business idea of the Plastic Bank, which intends to assign plastic a value, reinforces the incentives to collect plastics that already have a value on the market of recycled material. No incentives are created, yet, to collect the least valuable plastics – those that unfortunately pollute the environment the most. In other words, the monetary incentives (as created by the recycling industry and market demand) are not enough to “close the tap” of plastic waste that enters the oceans. The Plastic Bank helps to mitigate some littering but does not remediate ocean-bound plastic from the environment. This situation confirms that a conceivable circular economy has to be selective with what is produced and consumed. Since food wrappers get down-cycled and have so little value on the market of recycled material, it is a category that should be targeted with waste reduction rather than recycling. It is possible that circular economy and degrowth find common ground in a radical take on zero-waste in the case of food wrappers and other distinct non-recyclables. From a circular economy perspective, it is motivated to reduce the use of plastic if it cannot circulate in waste-free closed-loops. From a degrowth perspective, it is motivated to reduce the use of plastic since that would target the source of environmental impact, through dematerialisation.

In order to further evaluate the Plastic Bank’s alignment with circular economy and degrowth, an analytical framework was created deductively based on the literature review, but also inductively based on what topics came up during the interviews. Since the Plastic Bank’s core activities are tied to recycling, alignment was found in terms of supporting collection of recyclables and re-organising linear material flows into more circular ones, and thereby keeping material in use for longer. The Plastic Bank also creates jobs, increases the payment to the collectors and networks with other businesses. Considerably less alignment with degrowth was found; the closest topics included engaging with the local environment and people, the not-for-profit activity of cleaning up in the mangrove forest, and the preference for local recycling. Even though the Plastic Bank is operating as a social enterprise, it would have to put greater emphasis on bottom-up movements, democracy, equity and other aspects of social inclusion and well-being in order to align with degrowth (though this conclusion might also be affected by how the study was designed). For the Plastic Bank to be a driver of degrowth, they would also have to be more selective with what companies they approve to be sponsors, so that the partnership does not counteract the mission to stop ocean bound plastic at another stage of the

value-chain of plastic production. There is an imminent risk that even when the polluter pays, it still continues to pollute. According to degrowth ideals, the Plastic Bank could also be more creative in directing how their own resources and sponsors' money support the local communities.

This study contributes to the discussion of circular economy and degrowth in their search for sustainability measures. The mixed methods approach comprised the strength of openness to what happens in the field during data collection. The interviewees had the opportunity to express their individual motives, views and reasoning as Plastic Bank employees. The data has portrayed plastic waste on Bali as a heterogenous stream of situational 'recyclables' and 'non-recyclables' which helps evaluating the sustainability of plastics and informs what types are most urgent to act on. The literature review has portrayed not only degrowth, but also circular economy in its truest sense to require a real systemic shift of how we handle material resources in our societies. In order not to get trapped between the two missions of both raising the payment for plastic waste and closing the tap to ocean plastics, the Plastic Bank could benefit from taking the leap into a systemic shift too, into a version of degrowth with elements of circular economy that is selective about what is produced and consumed.

## 7. RECOMMENDATIONS

Based on the gathered material and all the insights during the study, this thesis ends with sharing the following recommendations.

### 7.1 TO THE PLASTIC BANK

Since non-recyclables were the most commonly found plastic litter during pick analyses, it should be even more important to convey the message that no plastic belongs in the environment – no matter how it is priced on the market. As much as calling something 'recyclable' might make people mindful about their waste, condemning something as 'non-recyclable' might signal that it is not worth taking care of. For Earth, every little piece of plastic is worth caring for so it doesn't pollute. Maybe there is a better way to communicate what the Plastic Bank can and cannot buy (see e.g. Corvellec, 2018).

The pick analyses, especially from the mangrove, gave the impression that Bali is a so called "sachet economy". This information can be used in order to design programs or activities that target the most polluting waste specifically. When targeting ocean plastic, it is generally recommended to include remediation efforts (meaning, cleaning up plastic that is already in the environment) since that mitigates the creation of microplastics. Even though the Mangrove Mobs have no or little economic significance from a business perspective, they are still meaningful and needful from an ecological perspective, maybe even more so than the recycling itself.

The reason behind this statement is that recycling might return plastic to the environment in the form of new products. The new products might be 'recyclable' or 'non-recyclable' and might be made of down-cycled material which reduces the probability that it will be recycled again. Instead, it would be necessary to look at the material flows from a larger systems perspective, try to steer where recycled material go to after the collectors and be careful about what sponsors to partner with so that every part in the value-chain of social plastic is contributing to the mission of increasing the payment to collectors and stopping ocean plastic. A wider systems thinking also requires a definition of what is 'upstream', as opposed to 'downstream', in plastic

waste related problems. For degrowth, the production of plastic would be the upstream root cause to all plastic waste problems.

Inspired by the literature, the Plastic Bank could hypothetically take the role of a ‘secondary social enterprise’ according to Johannisova, Crabtree and Fraňková (2013). From a degrowth perspective, that implies distributing monetary value further into the local community and further away from the capitalised market. As a secondary social enterprise, the Plastic Bank could serve primary social enterprises on Bali with more than bonuses; such as skills, premises, manufactured capital etc. The Plastic Bank could hypothetically also bridge the informal and formal waste sectors on Bali into a “hybrid recycling approach” that could increase the overall recycling rate with help of the Plastic Bank App (Kashyap & Visvanathan, 2014: p. 59).

## 7.2 FOR FURTHER RESEARCH

Now when the types of plastic waste have been inventoried with the Clean Swell App, a new tailored category system could be outlined, designed for Bali (and similar economies). New categories could include multilayer sachets (as separated from single-layer sachets), plastic bags without a handle (as separated from plastic bags with handles), drinks packaged in cups (as separated from loose single-use cups), and mika (as separated from other plastic containers). Such detailed and tailored inventories would make it easier to compare plastic littering with what is processed, e.g. by the Plastic Bank, or following up on bans and regulations on single-use plastics.

For a future study, the social aspects and equity in plastic waste handling can be given larger focus. So far, degrowth scholars have paid little attention to uneven development, unequal relations between countries and differentiated means to drive transformative change (Chiengkul, 2018). This could be interesting for another case study of the Plastic Bank, since the Plastic Bank was founded in Canada but operates in developing countries in the Global South. Furthermore, the identified conflict between wanting to achieve multiple goals (social and environmental) as well as dealing with business strategies for performance and scale is really topical in organisational theory and management – which opens up for possible transdisciplinary steps in that direction (see e.g. Bauwens, Huybrechts & Dufays, 2019).

This study could also be extended with material flow analyses to learn more about where plastic waste comes from. This could be paired with system analyses where the external costs of plastic use are included. The companies that sponsor the Plastic Bank engage with waste as an externality. The money that they voluntarily pay the Plastic Bank might be very different from the “true” costs of the damages that plastic waste pose on the environment and people in the Global South. On this issue, it can be discussed whether solid waste financing (e.g. through networking as proposed by circular economy advocates), is keeping pace with growth in waste quantities, population growth and ever-increasing plastic production.

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## APPENDIX A. INTERVIEW GUIDES

### **For Manager A – About the definition of recyclables**

- i. Tell me about what training you have got on how to distinguish recyclable plastics from non-recyclable plastics.
    - a. Do the waste pickers have similar training?
    - b. Do the waste picker have similar knowledge (as you do regarding recyclable plastics)?
  - ii. What are the criteria for a recyclable (plastics) here on Bali?
  - iii. How is the sorting of plastics done here in the branch?
  - iv. Tell me about social plastic; is it any different from recyclables?
- 

### **For Manager B – About the Mangroves**

- i. Tell me about how the Mangrove project started.
  - ii. What is your explanation to how the plastics end up in the Mangrove?
  - iii. How do you work with other actors around the Mangrove project?
  - iv. If you could guess, or dream a little, what do you think is the future of the Mangrove (in terms of plastic pollution)?
  - v. What do you think is the future of Plastic Bank's engagement in the Mangrove?
  - vi. Anything else that you think we should talk about related to the Mangrove?
- 

### **For Manager C – About the waste pickers working- and life conditions, drivers for working at the Plastic Bank and social mission of the Plastic Bank**

- i. Is there something you think is characteristic for the waste pickers here at Plastic Bank (something they have in common)?
  - ii. About how much do the waste pickers earn each week/month?
  - iii. What do you say to convince people to start collecting plastics?
-

## **For Manager D – About business relationships**

- i. Tell me about your roll here on Plastic Bank?
  - ii. The logistics team deliver plastics to the processors, tell me, what happens next?
    - a. What happens AFTER the processor?
    - b. Does Plastic Bank know?
  - iii. Tell me about SCJohnsons roll here in Plastic Bank Bali.
    - a. What is Shells roll in Plastic Bank? (Are they only in Haiti?)
    - b. <https://www.youtube.com/watch?v=RI5lmb3hygQ>
    - c. Have you received any critique on this?
    - d. How do you handle the critique?
  - iv. What do you think Plastic Bank would be like on Bali without partners like SCJohnson?
  - v. Tell me about Social Plastic, what is Social Plastic?
    - a. How does it work?
    - b. Who gets this plastic?
    - c. What does it cost? Premium price or same price on all?
    - d. If all plastics are social, what happens? Is it too expensive for local businesses to buy?
    - e. What is ocean-bound plastic?
    - f. How do you know if/that the plastic that gets collected is ocean bound?
  - vi. How does the Plastic Bank work with education and awareness-raising?
  - vii. Does Plastic Bank operate with the support of government policies?
  - viii. Where does Plastic Bank operate in relation to formal- and/or informal waste management practices?
- 

## **For Manager E – About the processors and the search for new processors**

- i. Tell me about your roll here on Plastic Bank.
- ii. What is the most valuable, and least valuable, plastic right now? Why?
  - a. Where is it collected?
- iii. How can you assure price stability to the waste pickers?
- iv. What are your criteria for start working with a processor (geographically, other...)?
  - a. Where are the processors that you work with located?
  - b. Why/How come?
- v. Earlier we talked a little about the multi-layer sachets in the Mangrove. Tell me about the search for multi-layer sachet processors.

- vi. What are your thoughts on/what do you know about recycling of plastic film(s)?
    - a. Maybe ask the branch team/managers about that. But has probably “no” value. No demand.
  - vii. What other plastic types are you looking to start collecting?
  - viii. As the Plastic Bank program is designed today, how much of the total plastic waste do you think Plastic Bank covers? + thought about it
- 

### **For Manager F – About business**

- i) Tell me about your roll here on Plastic Bank.
- ii) Why Indonesia, why Bali?
- iii) Do you see Plastic Bank here on Bali as a locally rooted organisation or more like an international, global “movement” (in lack of better words).
- iv) Plastic Bank revenue:
  - a. Who are the shareholders of the Plastic Bank (Bali)?
  - b. Expand in what direction, with what mission or intention?
  - c. What do you need in order to grow?
- v) Have you ever received critiques for working with a specific partner?
- vi) What do you think is the future of Plastic Bank’s engagement in the Mangrove?
  - a. How to clean up the environment from low quality plastics?
- vii) Is Plastic Bank engaged in any initiatives for **reducing** the use of plastics or in other ways changing the consumption behaviour of plastics?
  - a. Could Plastic Bank for example **invest** in the recycling industry?
- viii) What difference does it make that the waste pickers are called ‘members’? What does a membership implies?

## APPENDIX B. CONSENT FORMS

Overview of activities and form of consent for the different participants.

<i>Participant</i>	<i>Activity</i>	<i>Consent</i>	<i>Main spoken language</i>
<i>Managers B, C, D &amp; E; The Plastic Bank</i>	Semi-structured interviews	Oral consent before interview. Written informed consent form (I) after the interview. Mutual continuous contact.	English
<i>Manager F; The Plastic Bank</i>	Semi-structured interview	Written informed consent form (II) before interview. Mutual continuous contact.	English
<i>Manager A; previously at the Plastic Bank</i>	Semi-structured interview	Oral consent before interview.	English
<i>Cleaning personnel</i>	Participating observation on Sanur traditional market	Oral consent through the branch manager. Written consent form (III) afterwards.	Indonesian and Balinese. Written consent in Indonesian and translation in Balinese with help of two Balinese friends.
<i>Visit to junkyard and the Tempat Pembuangan Akhir (TPA) waste dump</i>	Informal talk and observations	Oral consent through Christina from Pure Planet.	Indonesian
<i>Tirta Rahmat Bahari; the company in the Wisata Hutan Mangrove. Visit to junkyard and the Tempat Pembuangan Akhir (TPA) waste dump and other.</i>	Informal talk and observations	Oral consent.	English and Indonesian mix, on various levels. Translating aid by friends and apps.
<i>Pure Planet and Trash Hero Sanur</i>	Beach clean-ups	Oral consent	English

# Informed consent form I

## For master thesis project with working title “Littered plastic waste on Bali - Analysing collection and recycling from degrowth and circular economy perspectives”

On ..... me..... was interviewed about the Plastic Bank and the handling of plastics.

### Consent

I understand that Miss Elin Henriksson is doing a research project about plastic waste on Bali with a special focus on littering to the environment and sustainability using the example of The Plastic Bank. I agree that Miss Elin Henriksson uses the interview material for writing her thesis, drawing conclusions based on the material and publishes the thesis, possibly with all or parts of the material in it. If there is anything, at any point, that I wish to know about the research I will contact Miss Elin Henriksson and tell her about my concerns. I participated in the interviews voluntarily. I remember that I gave Miss Elin Henriksson oral consent to record the interviews before we started. The interviews were held in English. I also take part of the important information (at the back of this sheet).

**Do you give your consent that the interview material is used as stated above?**

Yes  No

**If yes, tick what’s right for you regarding anonymity:**

I want to be anonymous and don’t have my name and/or job position mentioned in the thesis:

Yes  No

I want to have my name and/or job position mentioned in the thesis:

Yes  No

Either way, both anonymity or non-anonymity are fine with me:

Yes  No

**If you don’t consent, that’s OK too. Is there anything you would like to have changed in order to participate:** .....

.....  
.....  
.....

I welcome Miss Elin Henriksson to get back to me via my WhatsApp or email for validation and/or complementary questions if needed:

Yes  No

**Date**

**Name**

**Signature**

---

**Contact Miss Elin Henriksson on**

Email: [kin10ehe@student.lu.se](mailto:kin10ehe@student.lu.se)

or

WhatsApp: +46729760546

### **Important information to you**

- You can change your mind and withdraw from this study at any time for any reason. You don't have to explain why.
- I am happy to share and discuss the results with **you** at any point before, during and after writing the thesis.
- If you wish I will send you the recording.
- If you wish I will delete the recording.
- The purpose of this study is to further scientific knowledge.

## **Informed consent form II**

**For master thesis project with working title "Littered plastic waste on Bali - Analysing collection and recycling from degrowth and circular economy perspectives"**

### **Consent**

I understand that Miss Elin Henriksson is doing a research project about plastic waste on Bali with a special focus on littering to the environment and sustainability using the example of The Plastic Bank. I agree that Miss Elin Henriksson uses the interview material for writing her thesis, drawing conclusions based on the material and publishes the thesis, possibly with all or parts of the material in it. If there is anything, at any point, that I wish to know about the research I will contact Miss Elin Henriksson and tell her about my concerns. I participate in the interview voluntarily. The interview is being held in English. I also take part of the important information (written on the back of this paper).

**Do you give your consent to participate and that the interview material is used as stated?**

Yes       No

**If yes, tick what's right for you regarding anonymity:**

- I want to be anonymous and don't have my name and/or job position mentioned in the thesis.
- I want to have my name and/or job position mentioned in the thesis.
- Either way, both anonymity or non-anonymity are fine with me.

**If you don't consent, that's OK too. Is there anything you would like to have changed in order to participate:** .....

.....  
.....  
.....

I welcome Miss Elin Henriksson to get back to me via my WhatsApp or email for validation and/or complementary questions if needed:

Yes  No

**Date**

**Name**

**Signature**

---

**Contact Miss Elin Henriksson on**

Email: [kin10ehe@student.lu.se](mailto:kin10ehe@student.lu.se)

or

WhatsApp: +46729760546

**Important information to you**

- You can change your mind and withdraw from this study at any time for any reason. You don't have to explain why.
- I am happy to share and discuss the results with you at any point before, during and after writing the thesis.
- If we record the interview (optional and voluntarily) I will send you the record and/or delete the record anytime upon your request.
- The purpose of this study is to further scientific knowledge.

### Informed consent form III

Elin Henriksson adalah mahasiswa di Lund University, di Swedia. Dia meneliti sampah plastik dan daur ulang plastik di Bali. Dia akan menulis skripsi tentang plastik. Skripsi ini akan dipublikasikan melalui Lund University.

Apakah Elin boleh melakukan pengamatan dengan Anda di pasar tradisional Sanur untuk skripsinya? Dia akan menulis tentang pekerjaan Anda, plastiknya yang Anda kumpulkan dan bagaimana anda menjual plastik tersebut kepada Bank Plastik.

Boleh  Tidak boleh

Nama: \_\_\_\_\_ Tanggal: \_\_\_\_\_

Jika Anda tidak ingin berpartisipasi, itu juga tidak masalah. Seandainya Anda berubah pikiran, Anda dapat membatalkannya dengan menghubungi Elin langsung atau Pak Sandi di Bank Plastik Sanur.

Jika Anda setuju untuk berpartisipasi, apakah Anda lebih suka menjadi anonim atau disebutkan namanya? Atau lainnya?

Anonim  Dengan nama  Lainnya

Terima kasih.



# APPENDIX C. DATA FROM PICK ANALYSES

DATA FROM ALL PICK ANALYSES THAT WERE INVENTORIED WITH THE CLEAN SWELL APP. TABLE EXPORTED FROM EXCEL.

Results from waste pick analysis and inventories															Total pieces on beach:		Total pieces in mangrove:		2084		4058				
Inventory	Event	Date	Place (1)	Cigarette Butts	Balloons	Toys	Plastic bags	Food Wrappers	Plastic	Containers (plastic)	Containers (foam)	Bottle caps (plastic)	Bottle caps (plastic)	Cups	Plates	Lids	Straws	Utensils	Plastic / Foam pieces	Hygien packaging	Other trash	Total pieces	Fraction of food wrappers of cups	Place (2)	
1	1	09/30/2019	Beach	4	0	0	12	1	21	1	13	7	3	5	1	4	0	6	232	0	1	6	436	27.8	3.0 Beach
2	3	10/28/2019	Beach	21	0	0	2	27	3	3	0	12	2	3	0	16	1	83	0	10	1	11	197	16.8	1.5 Beach
3	3	10/28/2019	Beach	22	0	0	0	37	0	7	0	12	3	3	0	20	1	93	1	1	2	17	233	24.7	3.1 Beach
4	1	10/28/2019	Beach	22	0	0	0	64	1	13	0	23	4	12	8	21	11	107	2	0	9	296	25.3	4.1 Beach	
5	4	11/02/2019	Mangrove	0	0	1	3	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	29	4.1	Beach
6	5	11/05/2019	Mangrove	0	0	0	0	48	0	4	1	0	0	0	0	0	0	0	0	0	0	19	272	48.5	2.8 Mangrove
7	5	11/05/2019	Mangrove	0	0	0	0	48	0	4	1	0	0	0	0	0	0	0	0	0	0	19	272	48.5	2.8 Mangrove
8	5	11/05/2019	Mangrove	0	0	0	0	20	0	99	6	1	0	0	0	0	0	0	0	0	0	8	163	60.7	3.7 Mangrove
9	5	11/05/2019	Mangrove	0	0	0	0	19	0	136	9	3	5	0	4	0	4	0	0	0	0	4	221	61.5	1.8 Mangrove
10	5	11/05/2019	Mangrove	1	0	0	32	164	2	3	0	6	0	6	0	0	0	0	0	0	0	0	273	60.1	2.2 Mangrove
11	5	11/05/2019	Mangrove	0	0	2	45	191	6	2	4	4	3	7	0	27	3	44	10	0	0	12	356	53.7	2.0 Mangrove
12	6	11/05/2019	Mangrove	1	0	2	159	715	27	10	3	24	0	71	8	169	28	1	1	1	1	31	1268	55.5	1.9 Mangrove
13	6	11/05/2019	Mangrove	0	0	0	21	65	7	1	4	0	2	1	3	2	9	4	0	0	0	1	122	54.1	1.6 Mangrove
14	6	11/05/2019	Mangrove	0	0	1	70	180	9	3	5	1	4	1	38	9	45	17	2	17	2	17	460	45.0	1.0 Mangrove
15	6	11/05/2019	Mangrove	0	0	1	91	246	14	4	1	6	1	6	1	41	21	5	11	5	4	18	522	47.1	1.1 Mangrove
16	7	11/06/2019	Mangrove	0	0	1	52	143	8	0	2	0	2	0	22	2	32	10	4	6	0	6	283	50.5	0.4 Mangrove
17	7	11/06/2019	Mangrove	0	0	1	40	84	4	0	0	2	0	2	0	8	6	27	12	0	0	3	192	43.8	1.0 Mangrove
18	8	11/06/2019	Mangrove	0	0	1	92	227	12	0	4	0	3	3	0	30	8	31	21	0	0	4	473	47.8	0.1 Mangrove
19	8	11/06/2019	Mangrove	0	0	2	13	68	6	0	1	32	2	19	0	46	4	83	1	0	0	9	493	24.0	5.4 Beach
20	10	11/11/2019	Mangrove	0	0	1	40	103	6	0	1	2	1	8	1	21	3	20	9	3	0	5	222	45.9	1.6 Mangrove
21	10	11/11/2019	Mangrove	0	0	1	40	103	6	0	1	2	1	8	1	21	3	20	9	3	0	5	222	45.9	1.6 Mangrove
22	11	11/16/2019	Beach	1	0	3	2	79	13	0	26	2	9	4	29	8	56	3	0	0	0	8	193	15.0	4.7 Beach
23	12	11/16/2019	Beach	2	0	1	4	105	17	13	19	4	76	10	74	5	0	0	0	0	0	34	410	25.6	4.6 Beach
24	13	11/18/2019	Mangrove	0	0	1	39	138	9	1	0	1	3	0	21	4	44	24	0	0	0	5	290	47.6	1.0 Mangrove
25	13	11/18/2019	Mangrove	0	0	0	34	175	50	1	3	1	10	2	22	2	92	5	0	0	0	3	399	43.9	2.5 Mangrove
26	13	11/18/2019	Mangrove	0	0	0	36	111	8	0	2	2	5	0	11	2	22	5	0	0	0	8	212	52.4	2.4 Mangrove
27	13	11/18/2019	Mangrove	0	0	0	18	100	10	0	1	2	7	1	6	2	25	6	1	5	184	54.3	3.8 Mangrove		
28	13	11/18/2019	Mangrove	0	0	1	0	62	201	4	2	4	3	17	1	18	4	34	11	4	3	369	54.5	4.6 Mangrove	
29	13	11/18/2019	Mangrove	0	0	1	1	189	723	81	4	10	9	42	4	78	13	217	51	5	24	1454	49.9	2.5 Mangrove	
30	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
31	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
32	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
33	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
34	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
35	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
36	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
37	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
38	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
39	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
40	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
41	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
42	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
43	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
44	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
45	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
46	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
47	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
48	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
49	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
50	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
51	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
52	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
53	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
54	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
55	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
56	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
57	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
58	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
59	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
60	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
61	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
62	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13	0	5	2	33	2	53	0	0	0	12	2077	31.4	2.4 Beach
63	14	11/23/2019	Beach	8	0	1	14	618	2397	208	22	13													

**DATA FROM THE LINE TRANSECT SAMPLES OF SACHETS. TABLE EXPORTED FROM EXCEL.**

<b>Sachets Line Transect Sampling</b>										
Product	Line #1	Line #2	Line #3	Line #4	Line #5	Line #6	Line #7	Line #8	Sum	Rank
Stock, condiments	2	7	2	2	0	2	6	2	23	8
Noodles	10	7	4	13	6	15	13	19	87	2
Biscuits, cookies	7	8	8	10	4	7	14	7	65	4
Coffee	4	12	8	10	7	15	17	8	81	3
Candie	8	13	5	3	3	6	6	3	47	6
Drinks	6	4	1	1	1	4	5	1	23	8
Detergent	3	10	7	7	8	12	8	10	65	4
Snacks	8	15	9	5	12	15	21	10	95	1
Ice cream	2	1	1	2	2	1	2	1	12	13
Schampoo	2	3	6	2	0	2	2	2	19	11
Sauce, sambal	1	8	1	1	0	1	3	2	17	12
Other	1	0	4	2	0	2	10	3	22	10
Unrecognisable	3	2	2	4	1	8	2	4	26	7
<b>Sum</b>	<b>57</b>	<b>90</b>	<b>58</b>	<b>62</b>	<b>44</b>	<b>90</b>	<b>109</b>	<b>72</b>		

**DATA FROM THE OVERVIEW QUADRAT SAMPLES OF PET.**

Event	Date	Area m2	Number of PET
1	11/11/2019	528	54
2	11/14/2019	528	164
3	11/18/2019	35	130
4	11/18/2019	18	88

**RESULTS ACCORDING TO THE COMPILATION OF INVENTORY DATA, SEND FROM THE CLEAN SWELL APP. TOP 5, BESIDES ‘PLASTIC AND FOAM PIECES’ AND ‘OTHER TRASH’, MARKED AS BOLD.**

Category (in order of rank from high to low)	Total count	Percentage of total pieces
<b>Food wrappers</b>	2 587	42 %
Plastic and foam pieces	1 228	20 %
<b>Plastic bags</b>	618	10 %
<b>Straws</b>	494	8 %
Other trash	219	4 %
<b>Plastic bottle caps</b>	214	3 %
<b>Plastic containers</b>	208	3 %
Cups and plates	174	3 %
Personal hygiene	146	2 %
Utensils	88	1 %
Cigarette butts	41	1 %
Plastic bottles	39	1 %
Lids	30	< 0.5 %
Foam containers	22	< 0.5 %
Other packaging	18	< 0.5 %
Toys	14	< 0.5 %
Balloons	2	< 0.5 %

**TOP 7 CATEGORIES ON THE BEACH, RESPECTIVELY IN THE MANGROVE. TOP 5, BESIDES ‘PLASTIC AND FOAM PIECES’ AND ‘OTHER TRASH’, MARKED AS BOLD.**

<i>Rank</i>	<i>Mangrove</i>	<i>Percentage of tot. counted pieces in mangrove</i>	<i>Beach</i>	<i>Percentage of tot. counted pieces on beach</i>
1	<b>Food wrappers</b>	50.8 %	Plastic and foam pieces	33.5 %
2	<b>Plastic bags</b>	14.4 %	<b>Food wrappers</b>	25.3 %
3	Plastic and foam pieces	13.1 %	<b>Straws</b>	11.8 %
4	<b>Straws</b>	6.1 %	<b>Bottle caps</b>	8 %
5	<b>Plastic containers</b>	3.4 %	Other trash	5.2 %
6	<b>Personal hygiene</b>	3.3 %	<b>Cups, plates</b>	4 %
7	Other trash	2.7 %	<b>Plastic containers</b>	3.3 %

## APPENDIX D. SUMMARY OF INTERVIEWS

Six semi-structured interviews were done. All were roughly transcribed, then summarised one by one. All that is presented here are statements given as facts by the interviewees in the roll of informants. This is where the ideas and operations behind Plastic Bank are illuminated.

### **Manager A – Motto: The presence of processors defines the ‘recyclable’**

A plastic type can be considered a ‘recyclable’ if there is a receiving processor on Bali. Vice versa, if there is no processor, the Plastic Bank does not have to accept the material from the collectors. The separation and cleaning of the material is usually done by the collectors themselves; that way the collectors get the highest salary and highest rating in the app. If a collector brings a sack of mixed plastic and/or dirty plastic to Plastic Bank, Plastic Bank might accept it but would have to manage their time to do the sorting and cleaning themselves, for example with the help of employed ‘daily workers’.

Usually the collectors are very good at distinguishing the different types of plastic. Especially those who operated like scavengers (with their own small businesses) before Plastic Bank existed on Bali: “They know better”. Thus, little training of the collectors is needed, expect some introduction the first time they get in touch with Plastic Bank. Plastic Bank also introduces the program to local villagers and Banjars. The managers or operators at Plastic Bank “learn by doing”, and the newly hired learn from the seniors.

Broadly speaking, plastic types PET, HDPE, LDPE and PP are recyclable, but not all products within the categories are. Two things that were brought up as non-recyclables were the labels to PET bottles and snack bags with foil on the inside. Speaking of which:

*“There is no recycler in Bali that can accept it.”*

*“So we cannot accept, like, plastic with... Cheetos! You know...”*

*“We don’t have recycler to accept this [pointing] – the label.”*

If a large sack of snack bags comes in, Plastic Bank would not accept it.

### **Manager B – Motto: Mangroves trap trash from rivers and tides**

Plastic Bank has held regular clean-up events (Mangrove Mobs) in the mangrove since March 2019. It was chosen as a target area by SC Johnson upon consolidation with Plastic Bank employees who had searched for especially dirty places. After some time, Rip Curl also got connected and is now a regular co-host of the events. The mangrove is a good target area because it is *always* dirty. The beaches around Bali already receive sufficient attention by authorities, and many scheduled clean-ups are organized by local communities. Both foreigners and local people have a great “spirit” for cleaning the environment.

The trash in the mangrove is believed to come from rivers (in particular a small river that has its outlet in the mangrove). Rivers bring trash to the beaches and the ocean which in turn bring trash to the mangrove when the water is high. Manager B has seen this with s/he’s own eyes while traveling on a stand-up paddle board. The mangrove traps and holds the trash. Some of the trash might also come from the nearby “waste mountain”, if so, via the ocean. Villagers near the mangrove have told Manager B that the trash in the mangrove is 10 years old. A common belief is that the trash comes from another island but Manager B thinks it derives from Bali. Villagers would still throw their trash into the water, s/he explains.

S/he has driven along the small river on a motorbike and seen trash thrown into the river. However, it is difficult to trace the source; aka *who* is littering. Formally organised waste collection, from the authorities, does only exist in Denpasar City. Manager B personally wants to know more about the different waste systems in the villages and meet with the local governments. Manager B suspects that the local villages are waiting for directions from the central government but those have only focused on the biggest areas so far. Manager B’s opinion is that local governments could do more, for example to clean the mangrove continuously and educate people on how to keep the river(s) clean.

For the near future, Plastic Bank’s ambition is to engage more companies in the Mangrove Mob events that can help to clean up, in any way they can. The companies could join motivated by a shared mission and the opportunity for branding. On Bali, it is important to show that: “I have a company but I also care for the environment”. This is a special trait on Bali, where the environmental awareness is higher than on other Indonesian islands, according to Manager B. The mangrove could become a “zero-waste place”.

Personally, Manager B also wishes that Plastic Bank could do more than just cleaning up – such as engaging in more social work and educating people – otherwise the trash will just be coming back again. However, there are different opinions about that within Plastic Bank since Plastic Bank is a business after all. Plastic Bank doesn’t benefit from cleaning up the river or educating people, because they can’t sell the plastic they found there – it’s of too low quality.

*“Plastic Bank is not only social.”*

### **Manager C – Motto: Social business made from trash**

Manager C is passionate about the job at Plastic Bank where s/he gets to work for money and for people at the same time. Manager C speaks of a deep concern for future children and grandchildren that might drown in plastic if we don’t act now and from whom we are borrowing this planet. Manager C says that people should think of what happens to their family and other people around them in a few years from now if they use too much plastic today. If we wait it might soon be too late to act.

*“We need all humans to think that plastic is really dangerous, we must take action for that.”*

*“The people here think about the money, but I think about the children.”*

*“If not now, so when?”*

Within Plastic Bank, Manager C had learned all about recycling of plastic, price setting of the material – what’s too low and what’s too high – and how waste is handled via so called “junkyards”. At a junkyard, waste pickers give the waste to a “boss” in exchange for little money and somewhere to eat and sleep for free. Plastic Bank strives at giving the members the highest possible value (close to the real market price), but still with some marginal to cover daily costs at the branches. According to Manager C, Plastic Bank always gives the best price. However, to have somewhere to sleep and eat is obviously also important. Manager C believes that many waste pickers chose the junkyards over Plastic Bank in spite of the good price.

Manager C instruct the members to clean and dry the plastic to get as much money from it as possible. Junkyards don’t have the same standards on cleaning and drying, instead they pay people to do that as a job. The really dirty plastics though, is accepted by neither one, because it is too time consuming to clean.

*“It is a little bit business and then social, for me. In here, I learn how to make a business with trash, with the plastic.”*

*“We must really, really think about the plastic that we cannot recycle.”*

Plastic Bank members belong to the middle and lower castes, are both men and women, young and old. Anyone can become a member. Some are housewives. Some households (husband and wife) work together as a team. Sometimes one partner collects plastic while the other partner has another job. Plastic can be found in every street and on the beach.

### **Manager D – Motto: Bonus tokens make a difference**

Manager D confirms that all plastic that is handled by Plastic Bank can be called ‘social plastic’. A partner company, such as SC Johnson, can use the label on a product when Plastic Bank purchases the recycled material back from the processors and sells it to the company that then replaces the usual raw material with recycled plastic in their products. The processors are registered in the app; that way it is possible to follow exactly what volumes are transferred in different phases of the recycling process. It is anticipated that 100 % of the material that Plastic Bank delivers to a processor will get recycled. Manager D implies that the process is transparent thanks to the app and digital scales. Partner companies can see very clearly how much plastic the Plastic Bank handles.

‘Plastic neutrality’ is another product. It is sold to hotels, restaurants and other actors (Manger D calls them industries) who use plastic and share responsibility for some of the related negative consequences. By paying for plastic neutrality, they get the provided service from Plastic Bank who picks up the plastic and makes sure it gets recycled.

One strategy that Plastic Bank has in order to make all the 9 branches on Bali more profitable, is to create more collection points. Collection points could for example be stores, hotels, restaurants and schools. The branches can then work as hubs, connecting dussions of collection points. When Plastic Bank scales like that they could use the help from full-time collectors to pick up plastic from the collection points and deliver it to the hubs or storage places. Full-time

collectors are free to go wherever they want, but a few extra tokens and money for the favour could work as extra motivation.

Manager D also talks about the junkyards on Bali, just like Manager C. The greatest difference between Plastic Bank and a junkyard is that Plastic Bank adds a bonus (tokens) on top of the market price. The bonus is about 1'000 Rupia a day for a full-time collector and makes “a real difference”. The bonus comes from the partner companies (the Plastic Bank capital comes from selling material to the processors alone). Moreover, Plastic Bank gives at least 50 % of the value that they get from the processors back to the collectors. Sometimes it can be as much as 75 %. The remaining revenue is used for transportation cost, operational cost etc. The junkyards however, would presumably keep as much revenue as possible for themselves. For the future, there are many ideas about adding the Plastic Bank concept to the already existing junkyards in order to distributing the bonuses to them. The junkyards would get registered as Plastic Bank members in the app.

Plastic Bank is about to expand to other islands in Indonesia in order to find more processors and junkyards and to connect with new partners around the ‘social plastic’ concept. The idea to come to Indonesia at all, and start out on Bali, came from the founders and became a reality together with SC Johnson. SC Johnson committed to purchase certain amounts of social plastic. Moreover, together they are making “branding awareness in the local community”, through education on the dangers of plastic waste and why we need to stop plastic flowing into the oceans. There are educational programs for school children where the benefits of bringing plastic to Plastic Bank are thought. Every kid or parent who participates gets registered as a member in the app.

### **Manager E – Motto: To recycle, or not to recycle, is a question of market demand**

Manager E uses basic economic principles to explain how the demand of recycled plastic as raw material creates the recycling market.

*“If there is demand there will be supply.”*

The demand increases if the price on recycled material is lower than for virgin material of the same quality. This has happened to PET. The reasons why PET is now profitable to recycle is a combination of “peak oil” and a scaling of the recycling industry. The same could not happen to sachets, because recycled and virgin material differ too much in quality. Clear plastic has a higher value because it could be made into any colour. Manager E believes Plastic Bank is unlikely to aspire to creating a demand for recycled plastic themselves.

*“Plastic Bank is all business: The core business of Plastic Bank is not to become a manufacturer, Plastic Bank is not a junkyard (...) Plastic Bank comes with the system, the app.”*

Manager E talks about ‘social plastic’ as a trademark. Plastic Bank can come in and add their bonus system in the entire value chain – from collectors on the ground, to junkyards, distributors and processors – by registering every party in the app. The app allows Plastic Bank to integrate with the waste management systems and local communities. The app is what manages everything and tracks the material flow from the ground to the end product (the flakes that the processors produce is the end product in this case). Manager E likens Plastic Bank to Gojek (Indonesian Uber) that doesn’t own any cars or bike. Plastic Bank doesn’t disturb the transaction of materials between the different parties, but just adds the corresponding bonuses

(tokens) to the amounts. The plastic is the same, the quality and properties are the same, but thanks to the bonuses that Plastic Bank distribute and share with the collectors, it can be called ‘social plastic’.

*“The product is the same, but the story is different.”*

For example a junkyard, that is registered in the app, is considered a partner to Plastic Bank. Besides, there are big sponsor companies such as SC Johnson and Henkel. Plastic Bank could well exist without those partners, however, the sponsorship that they provide allows Plastic Bank to expand faster and add that extra bonus to the waste pickers. The bonus comes directly from the sponsors, as Manager D also spoke about. The bonus is *the* extra incentive to collect more plastic.

*“We have to recycle the plastic, to reduce the plastic, to put no more waste to the environment (...) this is not regular business, this is something.”*

One idea of what to do with non-recyclable plastic, that Manager E is excited about, is to use it as a substitute for gravel in lightweight concrete. The challenge with that however, is to find a processor that wants to be the “middleman” and prepare a material that has no other existing market today.

Manager E says that the recycling industry on Bali is so small that “Bali is only for showcase”. Moreover, “massive production” is unlikely on Bali because all recycling plants operate in one-shift only, something that Manager E has never encountered anywhere else in Indonesia. S/he mentions one potentially interesting processor but adds that “the only problem is that they don’t work at night”. In order to manage Plastic Bank’s projected exponential growth of material volumes, they will expand to East Java. However, that brings about challenges related to logistics and transportation costs. Ideally, places nearby any suitable processors have the best conditions for environmental clean-up.

*“If there is a processor you can clean up (...) if there are no processors you can’t.”*

### **Manager F – Motto: ‘Glocal’ Plastic Bank for businesses’ sustainability goals**

Being the last interviewee, Manager F confirms many things that was brought up by the other managers. Bali is the start of Plastic Bank Indonesia’s learning curve. Here, they can use the app exactly as it was supposed to be used. What they learn in Indonesia can be applied also in other parts of the world.

Manager F says that we need to be ‘glocal’ – local and global at the same time. Out of the revenue from Plastic Bank Indonesia, 70 % stays in-country. The global corporation Plastic Bank and the founders are the only true shareholders. SC Johnson is only a client that bought an “Ecosystem Activation Proposal” stating how much Plastic Bank wanted to clean up and what they needed in order to do that. Selling more “Ecosystem Activations” is what Plastic Bank ideally needs in order to scale and expand to other islands or countries.

The waste pickers connected to Plastic Bank are called members in order to signalling inclusion and avoiding negative connotations. Plastic Bank does not control where the members go and what they do, but if they don’t continue to sell to Plastic Bank they will miss out on the bonus. It should also motivate them to do more; go further and collect larger volumes. The bonus

is also the incentive for the junkyards to sell to processors certified by the Plastic Bank (and not to other processors).

Plastic Bank receive and openly welcome critique from many different fronts. Activists criticise them on working with large corporations.

*“But, the big corporations want to do something and have the resources, so we should help them to reach their sustainability goals (...) it would be lovely if they take a step further, for example refill system – that would be great!”*

Plastic Bank does not allocate resources on creating a market demand, nor has any ambition to invest in the recycling industry. For now, they just focus on collecting as much plastic as possible. Plastic Bank comes in and improves whatever system already exist. If Plastic Bank did create something from scratch they would become a competitor instead of a collaborator, Manager F explains. Today, 90 % of the collected material comes from partnering junkyards, not from the SC Johnson-sponsored branches.

*“Whenever there is a recycling industry, we reach out to them for partnership and then we improve whatever are the conditions in that area.”*

*“Why create something from scratch when there is already an informal waste sector?”*

Besides, the Mangrove Mobs is a kind of service that Plastic Bank provides. Maybe in the future that activity could gain larger focus and a special budget.

*“We need to work upstream to protect the downstream.”*