A CRITICAL STUDY OF THE WASTESCAPE IN THE WESTERN PROVINCE OF SRI LANKA:
PATHWAYS TOWARDS ALTERNATIVE APPROACHES

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To Ammi, Thaththi, Yohan and my family in Sri Lanka

With love......
Abstract

In this thesis I critically analyse the waste management system (which I have termed “wastescape”) in the Western province of Sri Lanka and explore the experiences of informal waste workers who depend on waste for their daily survival. In addition, I consider one potential intervention to facilitate and strengthen their role or to ‘emancipate’ the workers to mitigate against particular forms of injustice. I argue that understanding the social injustices experienced by informal waste workers, and providing insights into the social, political, economic and cultural dynamics that operate within the wastescape is imperative. The challenge, however, is to develop alternative systems that resist the inequalities and demands of the wastescape. This could only be achieved by providing alternative examples of economic productivity and social relationships.

In an attempt to make the invisible visible, to hear unheard voices and attempt to understand the autonomy of informal workers within the power dynamics of the wastescape, I use a number of critical theoretical lenses and a range of methodologies drawing from social science and education domains. Combining these with the technical problem-solving skills of engineering and practices of waste management enables a rich study of alternative systems and processes appropriate to the Sri Lankan context. The alternative intervention considered in this study draws from the not-for-profit organisation ‘Waste for Life’ (WFL) which aims to co-create local poverty reducing solutions to environmental problems. A feasibility study was conducted in the Western province of Sri Lanka over a three year period from 2011-2014, to explore the socio-technical-political context in which such participatory programs might be developed, together with their emancipatory potential.

Merging critique and creation of alternatives is a model that could potentially be used to critically analyse any complex socio-technical system and to develop meaningful alternatives. This study, therefore, presents the development of a critical socio-technical methodology. The findings of the study demonstrate that there is potential to develop poverty-reducing approaches to recycling, based on the Waste for Life model in the Western province of Sri Lanka.
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If I have seen further, it is by standing on the shoulders of giants.
Sir Isaac Newton (1642 - 1727)

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You raise me up so I can stand on mountains,
You raise me up to walk on stormy seas,
I am strong when I am on your shoulders,
You raise me up to more than I can be...

Thank you and May God Bless you.
Statement of candidate contribution

DECLARATION FOR THESE CONTAINING PUBLISHED WORK AND/OR WORK PREPARED FOR PUBLICATION

This thesis has been completed during the course of research towards the degree of Doctor of Philosophy at The University of Western Australia (UWA). This work has not previously been accepted for a degree at this or any other institution.

The work described in this thesis is entirely based on my own original research, conducted under the supervision of Professor Caroline Baillie (Coordinating supervisor) and Professor Carolyn Oldham (Co-supervisor). I am fully responsible for the preparation of the thesis and publication drafts, under the supervision of my Coordinating supervisor, Professor Caroline Baillie who is also the co-author for all possible publications arising from this study.

Chapter 5 consists of a paper that is also co-authored by Dr. Michael Azariadis ( Graduate Education officer, UWA). I conducted all the fieldwork, data analyses and wrote the paper, with Caroline and Michael providing valuable feedback and edits.

The thesis contains variants of four manuscripts prepared for publication. This study has also resulted in the publication of three other publications (not included within this thesis) and three conference presentations.

Student Signature     Coordinating Supervisor Signature

Randika Anjalie Jayasinghe     Caroline Baillie
Publications arising from this research

**Book**


**Book chapters**


**Journal articles**


Conference presentations


CHAPTER 1

Introduction
1.1 Introduction

Waste is a problem in the Western province of Sri Lanka. The Western province is considered the most developed province on the island, contributing 48 percent of the national GDP (Central Bank of Sri Lanka, 2014). It has a population of 5.8 million and an additional floating population of 1.5 million (Western Provincial council, 2014).

With a population density of 1458 per km\(^2\), the Western province is the most densely populated area and accounts for 70 percent of the industries in the country. Rapid urbanisation and industrialisation, an increasingly affluent population, high consumption patterns and increased migration from other areas has put pressure on both natural and physical resources of the province while also increasing the volumes of waste generated.

Being the commercial hub of the country, the Western Province is under particular pressure to show the new attractiveness of Sri Lanka after ending the civil war that had such detrimental effects on the country. As a result, during the last few years, the government has commenced a number of city beautification projects in and around the urban cities of the Western province. Now, there are more highways, skyscrapers and shopping malls in urban cities, but there is a lack of management systems to cope with the increasing volumes of waste. In the midst of development, waste management remains one of the greatest challenges for the local authorities of the Western province.

In the absence of adequate waste management facilities, waste is dumped haphazardly, posing serious health and environmental risks to the public and the environment. Waste is dumped along roadsides, vacant lands and thrown into waterways by households, industries and even by the local authorities (Environmental Foundation LTD., 2007). Whilst local authorities are preoccupied with managing the organic waste component and finding disposal sites, much of waste recycling is conducted by a largely unnoticed population. Recovery and recycling of non-biodegradable waste, particularly plastic waste is primarily carried out by the informal sector in the Western province (Perera, 2007). They play an important role by providing cost savings for the local authorities, reducing waste that goes to dumps, providing materials for industries and most importantly creating income generation activities for economically marginalised groups.
CHAPTER 1 | Introduction

Literature and media often report environmental issues surrounding large dumps, new waste projects and technical solutions, but little is reported about the informal waste sector and their important contributions to waste management and poverty reduction.

In this thesis, I explore the experiences of this unrecognised group of people who depend on waste for their daily survival and consider one potential intervention to facilitate and strengthen their role. The alternative intervention considered draws from the not-for-profit organisation ‘Waste for Life’ (WFL) that aims to develop poverty reducing solutions to environmental problems. WFL, with its network of academics, students and professionals around the world and informal waste groups on the ground, co-create small-scale technology to upcycle\(^1\) plastic waste into useable products. Their aim is to create benefits to informal waste workers in terms of social and economic autonomy (Baillie, Feinblatt, Thamae, & Berrington, 2010; Waste for Life, n.d.).

To facilitate the discussion around waste management and the informal waste sector in the Western province, I introduce a concept, which I term ‘wastescape’. Wastescape\(^2\) is used to conceptualise the space(s) within which formal and informal waste workers operate. The idea of a wastescape includes both waste as material, and as a social-space constructed by and (re)producing a set of social, cultural and political relationships. Thus, I present the wastescape as a space where social, cultural and political aspects of waste management and its stakeholders operate. The wastescape in the Western province of Sri Lanka is made up of two distinct wastescapes – a formal and an informal wastescape.

My aim in this study is therefore;

*To critically analyse the wastescape in the Western province of Sri Lanka in order to assess the emancipatory potential and practical feasibility of alternative poverty-reducing approaches to informal waste recycling.*

The specific objectives of this study are;

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\(^1\) Upcycling is the process of converting waste materials into new materials or useable products of better quality.

1. To analyse the wastescape in the Western province and the experiences of informal waste workers.
2. To identify the dominant power structures and discourses that govern the wastescape in the Western province of Sri Lanka.
3. To investigate perceptions of informal waste workers’ autonomy.
4. To assess the practical feasibility of a waste based manufacturing business taking WFL as a case study.

The rationale for each objective and the associated research question is given in Table 1.1 and the full research plan is given in Figure 1.1.

To critically examine the wastescape in the Western province, and therefore to determine the emancipatory potential of WFL, I draw on a variety of theoretical lenses drawing from a wide range of critical theories and frameworks. The complexity of intangible problems such as poverty and environmental justice need new ideas and alternative approaches which come from the juxtaposition of ideas and theories not normally put together. Traditional ideas have not shown promise in the solving of complex problems. Social science and even education studies have given us excellent tools of analysis and critique, and engineering has provided problem solving. However it is rare that the potential of these are brought together to address serious global problems from a critical perspective. Bring these together with an understanding of waste management and we can perhaps develop alternative approaches to waste management which work towards social justice and which contributes to the reduction of poverty.

Firstly, my work is framed by post development theory exemplified by James Ferguson (1990) who critiques traditional and historical forms of development and maintains that ‘developers’ (both local and global) should understand the social, cultural and political aspects surrounding the issues in developing contexts. I also draw on two critical theorists; Michel Foucault (1972, 1980) for his framings of power, and Antonio Gramscì’s (1971) concept of ‘hegemony’ – ways of knowing and being that seem ‘common sense’ to us, as they draw from the dominant paradigm. Finally, I draw on social commentator and Emeritus Professor of Metallurgy, Ursula Franklin (1992) who
suggests that a cost benefit analysis of ‘who benefits’ and ‘who pays’ must be undertaken, before any project is implemented.
<table>
<thead>
<tr>
<th>Specific objectives</th>
<th>Rationale</th>
<th>Research questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To analyse the wastescape in the Western province and the experiences of informal waste workers.</td>
<td>Informal waste workers are unrecognised and invisible from the wastescape. Lack of knowledge about their lives impedes meaningful collaborations. It is important to give them a voice and tell their stories.</td>
<td>Who are the actors in the informal sector? How are they organised? What problems do they face?</td>
</tr>
<tr>
<td>2. To identify the dominant power structures and discourses that govern the wastescape in the Western province of Sri Lanka.</td>
<td>Decision makers in the formal sector make decisions related to waste management. It is important to identify the dominant structures and discourses that govern the wastescape and what impact they have on the informal waste sector.</td>
<td>Who governs the wastescape? What decisions are made? How are informal waste workers marginalised?</td>
</tr>
<tr>
<td>3. To investigate perceptions of informal waste workers’ autonomy.</td>
<td>People understand social phenomena differently. It is important to investigate how people in waste management conceptualise the autonomy of informal waste workers.</td>
<td>What qualitatively different ways do people conceptualise the autonomy of informal waste workers?</td>
</tr>
<tr>
<td>4. To assess the practical feasibility of a waste-based manufacturing business taking WFL as a case study.</td>
<td>Development projects need to be informed by the societal and environmental needs of the local context.</td>
<td>Who are the stakeholders and what networks are identified? What funding sources are available? What waste materials could be found in the local context? Can the technology be developed locally? What products can be made and what markets are there?</td>
</tr>
</tbody>
</table>

Table 1.1: Specific objectives of the study
CHAPTER 1 | Introduction

The work described in this thesis is presented in a manuscript format. Four papers (Chapter 4-7), written for publication, draw their methodologies from different research fields. Each paper links into the main aim of this thesis, but could also be read as a standalone manuscript. Following this introductory chapter, the next two chapters present a literature review and the research design. In these two chapters, while engaging in existing academic literature, I also draw on my own experiences to position myself within the wider academic and research contexts that I am engaged in. Chapters 4 - 7 present the empirical findings of this study.

In chapter 4, entitled “Making the invisible visible: Exploring the informal wastescape in the Western province of Sri Lanka”, I explore the lives and experiences of the informal waste sector in the Western province of Sri Lanka. In this chapter, I develop a series of case study narratives to present descriptive accounts of the lives of informal waste workers. These enable us to understand working conditions and the socio-economic and political issues surrounding their activities. To ensure that the needs of the informal waste workers are addressed through the proposed WFL project, I argue that it is crucial to understand the experiences and limitations of their lives.

In chapter 5, “Waste, Power and Hegemony: A Foucauldian Discourse Analysis of the wastescape in the Western province of Sri Lanka”, I explore the power dynamics that shape the waste management in Sri Lanka. In this chapter, I seek to investigate how the more powerful discourses of ‘expert knowledge’ and formal waste management processes marginalise the discourses of the informal waste sector. Informal waste workers possess valuable knowledge that should be included in decision-making processes related to waste management in Sri Lanka. I demonstrate how the hegemony of formal discourses of waste management in Sri Lanka has led to the subordination of informal waste workers’ claims to legitimate knowledge, and created a socially unjust waste management system.

In chapter 6, “Autonomy of informal waste workers: A phenomenographic analysis of the wastescape in the Western province of Sri Lanka”, I explore how people in both formal and informal wastescapes in the Western province conceptualise the autonomy of informal waste workers. I also present phenomenography, a methodological approach widely used in education research as a useful tool to analyse social phenomena. I
CHAPTER 1 | Introduction

demonstrate that understanding the conceptions of autonomy of informal waste workers and how that relates to power can provide a basis for co-creating meaningful projects with informal waste workers.

In chapter 7, entitled, “Engineering with people: A practical participatory needs and feasibility study – The case of Waste for Life Sri Lanka”, I explore the practical feasibility of a WFL project in the Western province. In this chapter, I present the development of a socio-technical methodology to investigate whether a WFL project could be useful to informal waste workers and marginalised communities in the Western Province. Prior to any project being implemented, it is important to know who the stakeholders are, what materials are available, who will fund the project, what products can be made and what markets are available. Using Waste for Life Sri Lanka as a case study, I explore and attempt to answer these questions.

Chapter 8 draws from the empirical findings presented in Chapters 4 - 7 and presents the general discussion of the thesis and direction for future work. I conclude the chapter with my contribution to knowledge and closing remarks.

1.2 Personal history

Before continuing with the academic content of my work, I feel it is important to position myself within the study and its broader aim. Until I left Sri Lanka in 2011 to pursue my higher studies in Australia, I lived, studied and grew up in the Western province of the country where my home town is located. I have seen the massive transformation the province has gone through during the last two decades.

I grew up in the Western province during the time of the civil war. In fact, the war erupted the same year I was born, 1983. Although I did not grow up in the North-Eastern parts of the country where the conflict was taking place, 26 years of my life were marked by war. A number of suicide bombings carried out by the terrorist group targeting the commercial hub - the Western province, led people to live in fear and anxiety, not knowing when and where the next bomb would explode. In this environment, war, terrorism and poverty were everyday issues for us. The political patronage and rampant corruption of political leaders worsened this situation. In 2009, the year I graduated from university, the war ended. For those 26 years, I experienced
the emotional, social and economic hardships caused by the war on my people, environment and the economy of my country, killing almost 100,000 during its course.

Since its independence from the British Empire in 1948, there has been tension between the two main ethnic groups on the island over employment and opportunities. Excessive State power, corrupt politics, unfair resource distribution and unemployment underpinned this conflict. These social injustices persist today.

I believe that paying attention to issues of social injustice and power is key to the success of any attempts to build a peaceful and just society. I also believe that change comes about slowly, and it should start with every individual. I have taken a small step toward this, choosing to work with marginalised groups working with waste in the Western province of Sri Lanka. The work described in this thesis stems from this.

Before explaining my research findings, I believe it is important to describe my research background. I come to this research from a Science background having completed my undergraduate degree in Environmental Sciences at a public university in Sri Lanka. My final year research project was about a landfill and its effect on a nearby reservoir in the Central province of Sri Lanka. This required collecting water samples, many hours of laboratory work and analysing numerical data using statistical software. During the 10 months I travelled to collect samples, I encountered people from a nearby local community who used this reservoir for different purposes. They had many stories to tell about their water body. I actively listened to those and even made notes, but made little use of the information gathered during these informal conversations in my dissertation. I was taught to be ‘objective’ as a scientist and therefore my findings and conclusions were based on the results of the experiments and the statistical analysis. My research interest took a different path with this and I was actively seeking projects where “people matter” in research that I do.

My postgraduate journey begins with me finding out about an innovative project that utilises plastic waste and natural fibres for upcycling. The organisation, Waste for Life captured my attention as the project combines waste management with poverty reduction and has its roots in social justice. I was motivated to write to the project’s co-founder, Professor Caroline Baillie who then agreed to supervise my doctoral research. I
came to UWA from a waste management/environmental science background to seek out Waste for Life as a possible intervention in my home country – both to assist with waste management and also to enhance social justice.

Discovering whether WFL would be appropriate, not only in terms of its technical and practical feasibility but in its potential to enhance the emancipatory potential of informal waste workers, became my study. In doing this I acknowledge the potential conflict of interest of studying an organization founded by my supervisor. However, Waste for Life claims to be focussed on critical post development and in benefitting communities. They have advised me that they will take any criticism as necessary for future changes and will not proceed with a project in Sri Lanka if the results deem it inappropriate. They have no financial or other benefit in working there.
AIM:
To critically analyse the wastescape in the Western province of Sri Lanka in order to assess the emancipatory potential and practical feasibility of alternative poverty-reducing approaches to informal waste recycling.

SPECIFIC OBJECTIVES:
1. To analyse the wastescape in the Western province and the experiences of informal waste workers.
2. To identify the dominant power structures and discourses that govern the wastescape in the Western province of Sri Lanka.
3. To investigate perceptions of informal waste workers’ autonomy.
4. To assess the practical feasibility of a waste based manufacturing business taking WFL as a case study.

THEORETICAL LENSES:
Post development (Ferguson, 1990)
Power (Foucault, 1972)
Hegemony (Gramsci, 1971)
Social justice (Franklin, 1992)

METHODOLOGY
Case study
Foucauldian Discourse Analysis
Phenomenography
Participatory needs and feasibility study

Waste for Life project Sri Lanka

Figure 1.1: Research plan
CHAPTER 1 | Introduction

1.3 References


CHAPTER 2

Literature Review
In Mr. Thompson’s factory, they’re making plastic Christmas trees, complete with silver tinsel and a geodesic stand...

The plastics mixed in giant vats, from some conglomeration, that’s been piped from deep within the Earth, or strip-mined from the land...

And if you question anything they say, “Why don’t you see? It’s absolutely needed for [our] economy.”

Oh, Garbage, garbage, garbage, garbage
We’re filling up the [Earth] with garbage...
What will we do when there’s no place left
to put all the garbage...

Taken from the famous song by Bill Steele, Peter Seeger and Mike Agranoff (1977)³

2.1 Introduction

Waste management is a problem in both developed and developing countries alike. The large volumes of waste generated in the past few decades are a direct result of “predatory behaviours” (Chalmin & Gaillochet, 2009, p. 1) and exploitative human activities (Clapp, 2002). Nevertheless, a common justification - “Why don’t you see? It's absolutely needed for the economy” - is used to rationalise the wasteful consumption patterns and habits of humans. I would argue that our production processes and consumption patterns are unjust and unsustainable, yet we continue to be a part of that same system. We directly or indirectly promote a wasteful culture as consumers.

In this environment, I was continuously looking to expand my knowledge about alternative waste management approaches that are socially just, environmentally friendly and economically feasible. During this time, I came across the not-for-profit organisation, Waste for Life (WFL) who works with informal waste workers in developing countries to upcycle plastic waste and natural fibres into usable products. I became interested in their work and whether this approach could be useful to informal waste workers in Sri Lanka. This led me to Professor Caroline Baillie, co-founder of WFL who later became my research supervisor at the University of Western Australia.

³ In 1999, for a school cultural day program, we did a drama based on this song. The lyrics were slightly changed for the drama, and I have used that version here.
CHAPTER 2 | Literature Review

This chapter serves as both an entry point and as a backdrop for my research by reviewing the literature concerning waste management and social justice. The chapter is divided into six sections spanning from general topics on waste management to more specific topics such as social justice. The first section presents a general overview of waste and how it is defined in this thesis. This is followed by a discussion on waste management in developing countries, positioning Sri Lanka as an example. The role of the informal waste workers in waste management is described in the third section. Section four reviews the literature about social justice and social justice approaches respectively. The final section presents a synopsis of the large project this research is part of; the Waste for Life project. The chapter concludes by presenting knowledge gaps identified.

2.2 Waste – An overview

The production of waste is the most natural of human acts, yet it is a complex, subjective and sensitive topic. Waste is regarded as something unwanted and often considered as a negative externality, with adverse impacts on social, environmental and economic aspects. At the centre of this issue is the excessive production and consumption patterns followed around the world (Chalmin & Gaillochet, 2009; Hoornweg & Bhada-Tata, 2012). The nature of waste has changed rapidly over the past few years, with goods that have become more complex now a significant component of the waste stream (Hoornweg & Bhada-Tata, 2012; Puckett, 2011; UNEP & Secretariat of the Basel Convention, 2004). This change is affecting our capacity to manage waste in a socially and an environmentally acceptable manner (Pellow, 2004).

There is no single universal definition for waste. It is defined differently by different groups. According to the United Nations statistics division (UNEP & Secretariat of the Basel Convention, 2004), wastes are;

materials that are not prime products (that is products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose. Wastes may be generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the
consumption of final products, and other human activities. Residuals recycled or reused at the place of generation are excluded (p. 5).

The Australian government Productivity Commission’s waste management report provides a similar definition, but goes on to add the resource value to waste. Thus, waste is defined as;

any product or substance that has no further use or value for the person or organisation that owns it, and which is, or will be, discarded. But what is discarded by one party may have value for another. Thus, a broad approach to defining ‘waste’ can include products that are recoverable by others (The Australian government Productivity Commission, 2006, p. xxvii).

There are others who argue that waste should be viewed as “a product of social relations of global consumerism” (Fagan, 2003, p. 81). This notion of waste as a ‘product of social relations’ has earned much attention in the areas of research, practice, and governance over the years.

The relationship between different groups in society with their waste is a highly complex phenomenon resulting in many different ways to define, describe, and measure waste (UNEP & Secretariat of the Basel Convention, 2004). For example, an acceptable way of removing and disposing waste for people living in an affluent area can be problematic to people living in the peripheries of the city. What is waste for one person can be a resource for another. Based on this premise, two distinct ways in which the society views waste can be identified in the literature as; 1) waste as a problem and 2) waste as a resource.

2.2.1 Waste as a problem

Waste is a problem when not managed properly. Current research appears to validate the view that the health, environmental and social implications associated with improper waste management are mounting in urgency, particularly in developing countries (UN-HABITAT, 2009; Ustohalova, 2011; Visvanathan & Tränkler, 2003).

Impacts of waste on the environment can take many forms. Unmanaged waste is associated with foul odours and unsightliness (Rouse, 2006b). Local authorities and
residents often burn waste to curtail these problems and to reduce volumes (Rouse, 2006b; UN-HABITAT, 2010; Visvanathan & Glawe, 2006). However, open burning of waste causes severe air pollution associated with low-temperature combustion, leading to the formation of toxic gaseous compounds, such as dioxins and furans (Van Zon & Siriwardena, 2000). The prolonged exposure to these can result in cancers, birth defects and organ failure among other health issues (UN-HABITAT, 2010).

Unmanaged waste often ends up in drainage channels and other waterways causing pollution and disrupting the water-flow. Blocked drainage and waterways cause flooding during periods of rainfall (Van Zon & Siriwardena, 2000; Visvanathan & Tränkler, 2003). In addition, scattered waste attracts rodents and vector insects, which leads to the spread of vector borne diseases such as Leptospirosis, Dengue and Malaria (Asian Institute of Technology, 2004; Asian Productivity Organization, 2007). In particular, mosquitoes that transmit the potentially fatal Dengue fever prefer to breed in clear stagnant water. Such conditions are often provided by containers, discarded tyres and coconut shells filled with rainwater which are generally found in open waste dumps (Asian Institute of Technology, 2004; Van Zon & Siriwardena, 2000). The literature reports many other negative health effects associated with waste, including skin and eye infections, respiratory problems and exposure to heavy-metal poisoning (Asian Institute of Technology, 2004; Asian Productivity Organization, 2007).

Health issues, cleanliness, aesthetics, and environmental damage associated with waste is frequently reported and given priority in research (Asian Institute of Technology, 2004; Hoornweg & Bhada-Tata, 2012; UN-HABITAT, 2010). Therefore, waste related decision-making, policies and projects focus mainly on waste volumes and management technologies (Guerrero, Maas, & Hogland, 2013; Hazra & Goel, 2009; Ministry of Environment and Natural Resources, 2007). It is important to note that there has been relatively few research studies focusing on the social aspects related to waste management.

2.2.2 Waste as a resource

Resource recovery plays an important role in the economies of waste management throughout the world. Resource recovery is defined as the process of extracting materials or energy from waste through re-use, recycling or recovering energy (The
Allen Consulting Group, 2009). The resource potential of waste has been described primarily in three different forms in the literature (Asian Institute of Technology, 2004; Hoornweg & Bhada-Tata, 2012; UNEP, 2005, 2013). Firstly, waste can be re-used in its current form when recovered from the waste stream. Secondly, there is an increasing trend to recover energy by incineration, anaerobic digestion, or similar processes. Thirdly, waste can be recycled or recovered as materials for use as direct or indirect inputs to new products. It is this transition from waste to resource status, in particular through informal recycling, that forms the basis of this thesis.

The benefit of using waste as a resource is widely explored in the literature. Resource recovery saves energy and raw materials for manufacturing products. According to a study conducted in the University of Nottingham in the UK, recycled pellets in the production of plastic bags saves around 70 percent in energy use and 90 percent in water use, compared to the use of pellets made of virgin material (WASTE Consultants, 1995). It further reduces the amount of waste that need to be collected, transported and disposed of, extending the life of dumps and landfills (Asian Institute of Technology, 2004; Moreno-Sanchez & Maldonado, 2006).

Resource recovery in developing countries relies largely on the informal recovery of materials from waste (Medina, 2005; UNEP, 2005; Wilson et al., 2006). It can thus be argued that, if managed properly, resource recovery can contribute to alleviating problems such as poverty and unemployment, and even create paths to innovation and entrepreneurship whilst at the same time addressing the issue of inadequate waste disposal (Medina, 2005; Rouse, 2006a; Scheinberg, 2008).
2.3 Waste management in developing countries

*Solid waste has become a major consequence of development and modernization, yet some of the greatest challenges to its management are felt most keenly in the developing countries. This is part of the larger paradox of development; namely, that factors that create the most intransigent problems currently facing the developing countries are invariably those which derive from development itself.*

Thomas-Hope (1998, p. 1)

Solid waste management remains a critical problem in developing countries. Managing waste in a socially acceptable, environmentally friendly, technically feasible, and economically affordable manner is a challenge faced by every developing country (Wilson, Velis, & Rodic, 2013). The increasing population, rapid urbanisation and changing consumption patterns have aggravated this problem (Guerrero et al., 2013; Hazra & Goel, 2009). The waste problem presents even greater challenges as generation rates and compositions vary between countries, cities and even between communities within the same area (Hoornweg & Bhada-Tata, 2012; Thomas-Hope, 1998).

According to the literature waste generation rates and compositions can vary based on (The World Bank, 1999; Visvanathan & Glawe, 2006);

- the socio-economic development,
- degree of industrialisation,
- culture, consumption patterns and life styles
- and climatic conditions.

However, a more generalised assumption would be, the greater the economic development rate and the growth of the urban population, the greater the amount of waste produced (Hoornweg & Bhada-Tata, 2012). This also leads to a shift in composition to include more packaging material including plastic, tetra packs and other synthetic material in the waste stream (UN-HABITAT, 2010). Accumulation of these

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*The most commonly used terms to describe and differentiate between countries are “developed” and “developing” countries. The term “developing” implies inferiority of a “developing country” compared to a “developed country”. For this reason, I prefer the term “global south”. However, most waste management related literature use the more common term “developing countries” and I have use that in this study to avoid any confusion.*
non-degradable waste poses new challenges for waste management in developing countries.

Traditionally, local councils hold the responsibility for ensuring that waste generated within their city limits are managed properly (Guerrero et al., 2013; Shekdar, 2009; van Beukering, Sehker, Gerlagh, & Kumar, 1999). However, they are not the only stakeholders of waste management. A closer look at the system indicates that it is a complex system with many stakeholders playing different roles. According to research, the stakeholders, the characteristics and key issues of waste management systems in developing countries had remained unchanged over the past decades. These include; (Asian Institute of Technology, 2004; Hoornweg & Bhada-Tata, 2012; van Beukering et al., 1999; Zurbrügg, 2003);

- low labour costs
- lack of funds and poorly distributed capital and physical infrastructure
- a waste stream dominated by organic waste often mixed with all types of other waste including industrial hazardous waste
- a complex informal sector that is very active in the collection, separation and recycling of waste
- inadequate governance and weak enforcement of legislation
- poor public involvement and
- lack of appropriate planning.

A World Bank study states that urban areas in Asia have spent USD 25 billion on solid waste management in 2005, and that this figure will increase to USD 50 billion in 2025 (Hoornweg & Bhada-Tata, 2012). Although the waste management costs in developing countries are high, the level of service remains poor (Cointreau, 2005; Zurbrügg, 2003). In developing countries, municipalities spend 20-50 percent of their available budget on solid waste management, albeit 30-60 percent of all the urban solid waste remains uncollected and less than 50 percent of the population is served (UNEP, 2009b).

The local councils in developing countries have experimented with many technologies and strategies (Figure 2.1), both local and imported to manage waste, however a majority have not returned the expected results (Asian Productivity Organization,
One of the most obvious impacts of unsuccessful waste management systems can be seen in the form of unattended piles of waste on the roads and in waterways. Zurbrügg (2003) reports that the poor in society suffer most from the disorganised waste management as the authorities tend to allocate their limited waste management resources to the affluent areas where citizens with more financial and political power reside. According to researchers, the low-income neighbourhoods, slums and squatter settlements receive the poorest waste collection service with very infrequent collection levels (often less than once every two weeks) (Cointreau, 2005; Medina, 2005).

Figure 2.1: Waste management hierarchy

Final disposal of the collected waste in a socially and environmentally acceptable manner poses another key challenge in developing countries. Final disposal in many developing countries means merely transporting the collected waste to an available open space. Open dumping of waste in barren lands, wetlands, water bodies and roadsides is still the most predominant final disposal method (UN-HABITAT, 2010). This is followed by burning and/or burying of waste to reduce the volume and exposure to the environment (Asian Institute of Technology, 2004). Not all developing countries have properly maintained sanitary or engineered landfills (Asian Productivity Organization, 2007). According to a report on waste management in Asia, often the authorities and
waste management companies misuse these concepts where waste is dumped in an open land area and a soil cover is put on top of the waste materials (Asian Institute of Technology, 2004). These dumpsites have no leachate or gas collection systems in place and often overflow, creating more serious socio-environmental issues (Guerrero et al., 2013).

Chalmin and Gaillochet (2009) argue that waste management in developing countries needs an approach suited to their socio-economic context, which differs from that of industrialised countries. However, as pointed out by Medina (2005) the governments of most developing countries tend to align their waste management strategies to the interests of the developed countries. According to Marshall and Farahbakhsh (2013), this focus on high-tech systems rather than basic waste management through waste minimisation, collection and recycling have led to growing inequalities in urban cities in developing countries. These researchers further note that most local authorities in developing countries do not pay much attention to recycling or recovery programmes as they are preoccupied with waste collection and disposal. Thus, recycling and recovery of waste in developing countries is carried out primarily by an informal sector.

Researchers argue that unless effective waste management measures are introduced and effectively enforced, the burden of solid waste management in developing countries will be worsened given their rapidly growing consumer societies (Marshall & Farahbakhsh, 2013; Wilson, 2007). Landfills everywhere are at full capacity but it is in nations such as Sri Lanka – where there is a lack of even the most basic safety requirements in landfill design – that the impact of these problems are most keenly felt by the communities.

2.3.1 Waste management in Sri Lanka

Sri Lanka is an island nation in the Indian Ocean located to the south of the Indian subcontinent. It has many names. The Chinese called it the Land without Sorrow. The Arabs called it Serendip. The Hindu epic Ramayana referred to it as the Garden in the Sky. It is also referred to as the “Pearl of the Indian Ocean”, a name which unveils the natural beauty and prosperity of the island.
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The island has a total land area of 65,610 square kilometres with a population of 20.4 million inhabitants (The World Bank, 2013). Sri Lanka’s economy was entirely based on agriculture and trade for many centuries. However, the country began to shift away from a socialist orientation in 1977 to an open economy (Athukorala & Jayasuriya, 2012; Keerthisinghe, 2014). Since then, the government has been privatising, and opening the economy to international markets (Athukorala & Jayasuriya, 2012) making tourism, tea export, apparel industry, agriculture and migrant workers the main economic sectors of the country (Ofstad, 2000).

The economy of the country has been severely affected by the 2004 Indian Ocean Tsunami and a number of rebellions, such as the 1971, the 1987-89 and the 1983-2009 civil war. In particular, the civil war which lasted for almost 26 years had devastating effects on the economy and development as a large portion of the financial budget was allocated for war and security-related expenses (Athukorala & Jayasuriya, 2012; Ofstad, 2000). For this reason, as well as the government’s attempt to accelerate the pace of industrial development, the country failed to pay attention to one of the key necessities of the society - the management of waste (Perera, 2007). Waste management has become a grave socio-environmental concern, particularly in the urbanised areas of Sri Lanka with their high population densities and lack of suitable land for waste disposal (Van Zon & Siriwardena, 2000).

The population growth, changing consumption patterns, improved living standards, and rapid urbanisation have increased the waste generation in the country over the years (Asian Institute of Technology, 2004). With the increasing population, the waste problem too has grown from being an annoyance for local governments to an issue of national importance (Bandara, 2008). Poor waste management has incurred severe penalties and adverse impacts on the environment and on public well-being. According to the Environmental Foundation LTD. (2007), the waste problem has reduced the aesthetic value of cities, contributed to flash floods due to blockage of drainage systems, and has increased health risks by providing breeding grounds for disease spreading vectors such as mosquitoes and rodents.
In fact, haphazard waste disposal has been identified as a major factor contributing to environmental degradation in the National Policy on Solid Waste Management (Ministry of Environment and Natural Resources, 2007). However, Bandara (2008) notes that open dumping and open burning are still the most common final disposal methods practiced in the country. The problem is most severe in the Western Province (Figure 2.2), the most densely populated area in Sri Lanka (Mannapperuma &
Basnayake, 2007) with a population density of 1445.5/km² and an annual population increase of 32.5 percent (Department of Census and Statistics, 2001).

The total municipal solid waste generation in Sri Lanka is assumed to be around 6,400 tons per day with a per capita per day waste generation average of 0.85 kg in Colombo Municipal Council, 0.75 kg in other Municipal Councils, 0.60 kg in Urban Councils and 0.40 kg in Pradeshiya Sabahas – the smallest local administrative unit (Asian Institute of Technology, 2004). Daily waste collection in Sri Lanka is approximately 2,900 tons, of which 59 percent comes from the Western Province. The overall coverage of solid waste collection services is low among most local authorities, averaging 65 percent for Urban Councils and just over 50 percent for Pradeshiya Sabhas (ANZDEC Limited, 2005).

Waste management in Sri Lanka, like many other developing countries is the responsibility of the respective local council (Abeysuriya, 2007). Bandara (2008) notes that the majority of funds for waste management from the local councils are allocated for waste collection and transportation rather than for waste disposal and treatment. All local councils spend more than 80 percent of their waste management budget in collection and transportation of waste (Wipulasena, 2013), of which a significant amount is spent on salaries, maintenance and fuel costs (Asian Institute of Technology, 2004). An insufficient amount is allocated for final disposal, which leads to waste being dumped on vacant lands without spreading, compacting and covering with soil (Vidanaarachchi, Yuen, & Pilapitiya, 2006).

Sri Lanka does not have a fully controlled sanitary landfill in operation. The first sanitary landfill site commenced its construction at Dompe in 2012 (Mudalige, 2012). Due to lack of proper disposal sites, most local councils dispose waste at a number of uncontrolled open dumpsites (De Silva & Jayamanne, 2008; Environmental Foundation LTD., 2007). A majority of open dumps are in the low-lying areas, marshlands and abandoned lands that are filled with solid waste, predominantly as a land reclamation measure (Bandara, 2008). The problem has become severe as waste is not segregated, resulting in every type of waste such as industrial, slaughterhouse and hospital waste being dumped in the same dumpsite, together with municipal solid waste (Asian Institute of Technology, 2004; Visvanathan & Tränkler, 2003).
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Proper waste management is crucial for the health of humans, animals and the environment as a whole. However, this is far from reality for Sri Lanka – the paradise of the Indian Ocean is now struggling with its mounting garbage dumps. National and local government measures to manage the problem have not yielded satisfactory results and in some places have even instigated public protests (Fernando & Hassan, 2005; Mudugamuwa, 2013; Wipulasena, 2013). To address this dilemma, Medina (2005) suggests that developing countries need an alternative approach:

affordable solutions that work well in a Third world context, that create jobs, that protect the environment, that promote community participation, that encourage and support the entrepreneurial spirit in the community and that consider the contribution that informal refuse collectors and scavengers can make (p. 5).

As described in previous sections, the informal waste workers play a significant role in the waste management in developing countries including in Sri Lanka (Perera, 2007). According to Medina (2005), developing countries do not pay much attention to recycling or recovery programmes as they are preoccupied with waste collection and disposal. In the absence of effective formal recycling programmes in place in most developing countries, waste recovery and recycling is carried out by an active informal waste sector.

2.4 The informal waste sector

Drawing closer, visitors hurriedly close car windows to keep the acrid smoke and swarms of flies at bay...Figures of men, women and young children appear momentarily before disappearing again into the smoke to continue their work of sorting through piles of smouldering waste....It is striking that this site of abject poverty, appalling living conditions and demeaning work thrives as a result of a wealthier waste-producing consumer society of which most inhabitants form no part.

Seeking common ground for people: Livelihoods, governance and waste

J. R. Rouse (2006b, p. 743)

I went to a private school in Colombo for my primary and secondary education (1990 – 2002). The school van I travelled in used to take a shortcut route adjoining the largest
waste dump at that time in the Western province, the Blomendhal waste dump. This was a 30m high garbage mountain situated outside the main commercial city, Colombo. While reading the paper “Seeking common ground for people” (Rouse, 2006b), I had no difficulty picturing how the above-mentioned situation would be, as I had seen a similar site almost every day for 14 years. I went past every day, this vast expanse of refuse where trucks come and go to unload the rubbish collected from Colombo and nearby suburbs. I later came to realise that the thick smoke was not a result of a fire that was deliberately lit, but a result of spontaneous combustion. Smoke was everywhere and the stench of garbage was overpowering. We too, used to close our vehicle windows while passing the dump. The sight of men, women and children collecting waste in these appalling conditions might have puzzled me when I was small. I do not remember exactly what I had felt when I first saw them with their waste sacks on the waste dump. However, I know that this view became all too familiar as time passed by. We often discussed among ourselves how these people who work on the dump and others who lived close by would bare the stench of the decaying garbage and an unpleasant view right in front of their houses. Having a privileged status, we simply could not understand that there are people who collect waste for a living. After almost a decade, sitting comfortably in an air-conditioned office in Australia, in the process of reading for my PhD, I am revisiting those memories again.

I believe this experience, to a certain extent has shaped my direction. For the past 12 years, I have met, interviewed and worked with many informal waste workers in different capacities, but mostly as a student researcher. I have also read a number of journal papers, reports, documents etc. written about the informal waste sector. This section presents a fraction of those as an entry point to my work with informal waste workers in Sri Lanka.

2.4.1 Definitions

Recycling of solid waste in developing countries relies largely on the recovery of materials from waste carried out by the informal sector (Ezeah, Fazakerley, & Roberts, 2013; Medina, 2005; Nas & Jaffe, 2004; Nzeadibe & Anyadike, 2012; Wilson et al., 2006). Although defined and used in different ways, the informal sector has prompted increasing attention, and there is a vast amount of literature across a range of
disciplines. The International Labour Organization (ILO) (2002), based on its employment mission report on Kenya characterises the informal sector as follows. Existing literature (Chikarmane & Narayan, 2009; Medina, 2005; Wilson et al., 2006) demonstrates that the informal waste sector is no exception.

i. Ease of entry and low entry barriers to the occupation

ii. Reliance on local resources

iii. Family ownership of enterprises

iv. Small scale of operation

v. Labour-intensive and adapted technologies

vi. Trade/industry know-how gained through experience and learning takes place outside formal educational structures

vii. Dependency on unregulated and competitive markets

A report by UN Habitat (2010) define the informal waste sector as “individuals or enterprises who are involved in waste activities but are not sponsored, financed, recognized or allowed by the formal solid waste authorities, or who operate in violation of, or in competition with, formal authorities.” (p.214). Conversely, waste management activities “planned, sponsored, financed, carried out or regulated and/or recognized by the formal local authorities or their agents, usually through contracts, licences or concessions” are considered as formal waste activities (UN-HABITAT, 2010, p. 214).

Chikarmane and Narayan (2009) provide a more general definition referring to the informal waste sector as those who “generally make a living from solid waste but are not formally in charge of providing the service” (p.11).

It is interesting to note, however that most researchers focus only on the waste collectors in the informal economy (Gonzales, 2003; Huysman, 1994; Medina, 2005). Whilst waste collectors are the most marginalised group in the informal waste economy, there are other researchers (Mitchell, 2009; Rogerson, 2001) who argue that other informal waste workers - waste traders, recyclers, small-scale product manufacturers face similar problems and that the informal waste sector as a whole needs to be considered.
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2.4.2 Informal waste recycling in developing countries

The resource value in waste provides a potential source of livelihood for economically deprived members of society. Therefore, in developing countries informal recycling activities take place in parallel with the formal waste management system. Existing literature suggest that informal waste recycling is carried out primarily by economically poor groups as an income generation activity (Moreno-Sanchez & Maldonado, 2006; Rouse, 2006b; Scheinberg, Anschütz, & van de Klundert, 2006). According to researchers, in 2000 around 2 percent of the population in developing countries were depending on waste for their daily survival (Medina, 2005; Wilson et al., 2006). A recent report published by the International Solid Waste Association (ISWA) in 2014 states that 20 million people around the world depend on informal recycling for a livelihood (ISWA Task Force, 2014). This informal waste sector consists of various actors - waste collectors, waste traders, recyclers, small-scale product manufacturers and middlemen (Mitchell, 2009; Rogerson, 2001; Sasaki & Araki, 2013; Wilson et al., 2006).

Despite the lack of quantitative data as to how much waste is processed by the informal waste sector, a number of studies have highlighted the importance of informal waste activities for generating an income stream and supporting waste management (Masocha, 2006; Medina, 2005). Informal waste activities are well adapted to the conditions in developing countries where there is a scarcity of capital, but a high labour force. The informal waste sector also provides significant environmental benefits as recycling materials saves energy, water and generates less pollution than obtaining virgin materials (Medina, 2005). Further, it reduces the amount of waste that need to be collected, transported and disposed of, lessening the burden of waste management for local authorities and extending the life of dumps and landfills (Moreno-Sanchez & Maldonado, 2006).

While informal waste workers provide valuable services to the society and the environment, they have little or no support from local governments. Medina (2005) notes that the formal waste management sector ignore the existence and contributions of the informal sector that has developed around waste collection and recycling. Other researchers support this claim by arguing that the formal waste sector does not fully
realize the benefits of the recycling carried out by informal waste workers (Perera, 2007; Rouse, 2006a).

The role of the informal sector in waste management and creating livelihoods is researched, debated and discussed extensively in both academic literature and other publications. However, the condition of the workers remains unchanged in many parts of the world. For example, Table 2.1 lists some of the common problems of informal waste workers identified in a few selected literature.

<table>
<thead>
<tr>
<th>Problems identified</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adverse working and living conditions</td>
<td>(Gonzales, 2003; Rouse, 2006b)</td>
</tr>
<tr>
<td>High health and safety risks</td>
<td>(Patwary, O'Hare, &amp; Sarker, 2011; Wilson et al., 2006)</td>
</tr>
<tr>
<td>Low social status and social exclusion</td>
<td>(Nas &amp; Jaffe, 2004; Snel, 1999)</td>
</tr>
<tr>
<td>Low income and poverty</td>
<td>(Gonzales, 2003; Huysman, 1994)</td>
</tr>
<tr>
<td>Exploitation by middlemen</td>
<td>(Ezeah et al., 2013; Medina, 2005)</td>
</tr>
<tr>
<td>Harassment by the authorities</td>
<td>(Rouse, 2006b; Wilson et al., 2006)</td>
</tr>
<tr>
<td>Repressive government policies</td>
<td>(Rouse, 2006a; Scheinberg, 2008; Sternberg, 2013)</td>
</tr>
</tbody>
</table>

Table 2.1: Problems faced by informal waste workers

**2.4.3 Working with the informal waste sector**

In recent years, a number of initiatives have attempted to support informal waste workers and to give recognition to their market niche (Das, 2012). This has been done mainly through organising informal groups to form cooperatives. Medina (2005) notes that “community based systems take advantage of the creativity and entrepreneurial abilities of individuals who are familiar with their communities, with the surrounding environment and the opportunities it offers to them” (p. 5). Therefore supporting informal waste workers can improve efficiency and cost effectiveness of waste management in developing countries while supporting an important economic niche available for low-income communities.
The International Solid Waste Association (ISWA) has established a Task Force in 2010 with the overall aim to establish a conceptual framework for understanding the relationship between globalisation and waste management. To achieve this aim, the Task Force has addressed four thematic topics, and one of the themes they have considered is the role of the informal sector as a global stakeholder in waste management. The Task Force’s final report highlights that it is important to consider the informal sector as an important stakeholder group in waste management. The report also suggest that there is a need to analyse local market trends and study the existing waste management systems and value chains when planning and implementing new waste management initiatives (ISWA Task Force, 2014). However, the report highly recommends to integrate informal sector into a formalised recycling system that will facilitate better environmental control as well as bringing in the informal sector inside the legal and tax systems (ISWA Task Force, 2014). Conversely, drawing from a case study in Buenos Aires, Sternberg (2013) argues that regulating informal activities through integration processes does not provide informal waste pickers an opportunity to become “central actors in the future of urban waste management in the city” (p. 187).

While there are many organisations working with informal waste workers in developing countries, most aim at ‘helping’ the informal waste workers (Scheinberg, 2011). The not-for-profit organisation Waste for Life (WFL), who works with informal waste workers in developing countries attempts claims to follow a different approach to this. They aim to support informal groups to be self-sufficient and autonomous (Baillie, 2012). Waste for Life works with informal waste workers to co-create composite materials and products from waste plastic and natural fibres that informal waste workers can sell for a higher price than waste alone (Baillie, Feinblatt, Thamae, & Berrington, 2010). Enhancing social justice by supporting local autonomy is a key priority for Waste for Life (Baillie, 2012).

2.5 Social justice and waste management

Before embarking on my PhD journey in 2011, I did not give much thought to the concept of ‘social justice’. Given that I was brought up in a devoted Catholic surrounding, I believe I assumed I knew what social justice meant. On the other hand,

5 This will be discussed in full in section 2.5.
“What does social justice mean to you?” was not a question anyone would likely ask or attempt to answer in the cultural and political background I grew up in. In fact, I was advised by some not to use the term ‘social justice’ too much during my interviews in Sri Lanka as some people might not respond to it well.

I started questioning my understanding of the concept (or whether I even knew what social justice is) at the beginning of my PhD four years ago. Understanding the theories and concepts related to social justice proved to be the easy part of the research; applying that to the work I was conducting in Sri Lanka was much more difficult and challenging. This section presents some of the literature that guided me through this challenging journey. I also believe that it is both important and necessary to review the literature on social justice as a backdrop to my work presented in this thesis.

2.5.1 What is Social justice?

In order to understand the meaning of social justice, it is necessary to trace what social justice means in general. The first recorded concepts of social justice are found in scriptures of different religious traditions including Christianity, Islam, Buddhism, Judaism and Hinduism. All religions emphasised the importance of sharing, equality, helping the disadvantaged groups in society, righteousness, being fair and just toward others. However, the values reflected in these religions were undermined by religious institutions and leaders who compete for power and resources, thus “failing to practice what they preached” (National Pro Bono Resource Centre, 2011, p. 5). These institutions and the dominant cultures they create continue to decide what is ‘just’ in many societies to date. This understanding of ‘justice’ has created many complex issues around the world because what is considered justice by one group might be injustice according to another.

In scholarly traditions, social justice has been defined by many – dating back to Plato in 380 BC to more recent scholars like Sen and Rawls (National Pro Bono Resource Centre, 2011; Reisch, 2002). Scholars in different disciplines use their own definitions of what social justice is. In fact, researchers argue that our conception of social justice is contextual and somewhat subjective, influenced by our social positions and experiences. This point is re-echoed by Riley (2008) who notes that social justice is a difficult term
to define. She writes, “It’s not that the term is poorly understood; … each of us knows what we mean by it. The problem is that the term resists a concise and permanent definition. Its mutability and multiplicity are in fact key characteristics of social justice” (p. 1).

In her book “Social justice and Engineering”, Riley (2008) lists many definitions of social justice. These definitions are grounded in various schools of thoughts such as Marxist traditions, rights traditions, faith traditions, and critical theories. Riley points out a common theme that cuts across these definitions - social justice is “the struggle to end different kinds of oppression, to create economic equality, to uphold human rights or dignity, and to restore right relationships among all people and the environment” (p.4).

Similarly, Young (1990) argues that social justice is not just about equal distribution of goods but also “the institutional conditions necessary for the development and exercise of individual capacities and collective communication and cooperation” (p. 39). Based on this, she refers to oppression and domination as two main components of social injustice. She goes on to explain five forms of oppression that creates unjust outcomes. Baillie (2012) explains these as follows:

1. Exploitation - benefiting at the expense of others
2. Marginalization - being pushed away from participation in social life
3. Powerlessness - being unable to make one’s voice heard due to lack of status or respect
4. Cultural imperialism - the dominant culture becomes the way of interpreting social life

According to Young (1990), the need to promote social justice is related to the prevalence of the forms of oppression in society. With this understanding of oppression, the notion of power plays an important role in defining social justice. In fact, Goodman (2001) defines social justice as a process of addressing the issues of equity and power relations. He notes that social justice is a process that,
seeks to establish a more equitable distribution of power and resources so that all people can live with dignity, self-determination, and physical and psychological safety. It creates opportunities for people to reach their full potential within a mutually responsible, interdependent society. Working toward social justice requires changing unjust institutional structures, policies, and practices and challenging the dominant ideology” (Goodman, 2001, pp. 4-5).

Collectively, these scholars signify the need to address issues of unjust power, privilege, and oppression. They note that the goal of social justice is full and equal participation of all groups in society and an equal distribution of power and resources. Thus, a social justice lens serves well in understanding issues related to informal waste workers in developing countries. Promoting social justice is necessary to resist forms of oppression and to improve social conditions of people who are marginalised in society. There is a growing movement within waste management, particularly in developing countries where there is an active informal waste sector, calling on authorities, engineers, practitioners and academics to integrate a holistic perspective into waste management systems and practices. Having said this, very few empirical studies exist with a focus on social justice in waste management. This research attempts to fill this gap.

2.5.2 Social justice frameworks for waste management

As explained above, there is a need for systems and policies that support informal waste workers, resist oppression and promote justice. Researchers and activists have worked and published ideas, theories and approaches that promote social justice and which can inform and guide waste practice. In recent years there have been new debates about the whole concept of development, including gender, political, cultural and environmental aspects (Munck & O'Hearn, 1999). These critical theories invite engineers, academics and project developers to critique the hegemonic assumptions they hold as experts and be critical of how these assumptions influence their practice, in particular development work they are engaged in. According to Munck (2010), critical development theories refer to “those approaches which explain what is wrong with the current social order, identifies the agents for social change and provides practical goals for social transformation” (p. 34). In the next section, the critical theories used as theoretical lenses in this research are discussed.
2.5.2.1 Post development theory

A number of post-development theorists including Arturo Escobar (1995) and James Ferguson (1990) have critiqued the concept of development. They argue that the hegemony of the ‘developed’ countries has come to define the direction and discourse of ‘development’ in developing countries. According to Escobar (1995) the notion of an underdeveloped ‘Third World’ has been produced by the discourses and practices of development after the post–World War II period. He refers to Foucault’s work on discourse and power as essential tools in uncovering the mechanisms by which dominant discourses produce acceptable modes of being in the society while disqualifying and even making other forms unacceptable. The ways in which dominant discourses and power shape the wastescape in the Western province of Sri Lanka is discussed in Chapter 5. Escobar (1995) further notes that the post-development school of thought is interested in local culture and knowledge and promoting grassroots movements. He argues that “instead of searching for grand alternative models or strategies, what is needed is the investigation of alternative representations and practices in concrete local settings” (p.19).

Similarly, Ferguson (1990) argues that, ‘development’ as seen by the developed nations or the experts, is not the only available form of engagement with problems of poverty, hunger and oppression in the developing communities. He does not reject the idea of people from the North working together with the communities of the South, however, he points out that there is a need to adopt a local, contextualised understanding of the cultural and political dimensions involved when working in a developing context (Ferguson & Lohmann, 1994). As such, adopting participatory approaches when working with local communities has proven to be effective in many parts of the world.

2.5.2.2 Understanding power and hegemony

Conceptual theories provided by critical social theorists including Foucault and Gramsci provide excellent tools to dissect power relations and identify domination and oppression in waste management processes. It is important to note that although these two theorists address power from very different points of view, they can be used
productively together to understand hegemonic power structures in the society (Ekers & Loftus, 2008).

Michael Foucault is one of the most influential theorists of power. Following Foucault’s view that his theories are toolboxes (Foucault, 1972), the concept of “power” is used as the main theoretical framework in Chapter 5. His work on power, discourse and knowledge (Foucault, 1972) could be used to uncover hegemonic powers exercised both by and on various stakeholders involved in waste management in Sri Lanka. Foucault criticizes the modern forms of knowledge, rationality, social institutions, and subjectivity taking educational institutions, asylums and prisons as examples (Foucault, 1972, 1980).

Foucault argues that all truths are constructed by power. He saw theories of knowledge and truth not as neutral, objective or universal aspects but as components of power and domination (Arvanitakis, 2009). For Foucault, power operates through the hegemony of norms, political systems and influencing social practices (Richardson, 1996). He further argued that power, discourses, institutions, and social practices interact with each other to create specific ways of thinking, acting, and being in the society (Foucault, 1972, 1988). Importantly, he provides means of analysing the subtle ways in which power may be exercised in society and how knowledge may become accepted as the “truth”, allowing us to link power relations to the mechanisms that create dominant discourse (Mushtaq, 2011).

Foucault argued that discourses and power are intricately connected. Following this, Willig (2008) writes that discourses “facilitate and limit, enable and constrain what can be said, by whom, where and when” (p.112). Similarly, Strega (2005) points out that hegemonic or “legitimate” discourses and subordinate or “illegitimate” discourses are simultaneously constructed through “sanctioning, including, excluding, valuing, and devaluing of certain concepts, ideas, language, and worlds” (p.219) by those who claim to have power. An identification of discourses, their field of operation, and the subjects and objects constituted by them can therefore be regarded as indicating how power is deployed and knowledge formed between different groups within a system. This forms the basis of our analysis of power structures within the waste management system of Sri Lanka as discussed in Chapter 5.
The notion of what is thought ‘normal’ in society – the legitimisation of particular people to speak the truth – is well explained by the idea of political and cultural “hegemony” (Gramsci, 1971). Gramsci saw culture as something embedded in both our everyday actions and also in the institutions around us. This reproduction of culture through institutions and everyday actions is a concept he described as hegemony (Gramsci, 1971). As such, Gramsci’s work prompts us to question everything around us including what we consider to be “common sense” in society.

According to Gramsci (1971) the diverse forms of culture are never neutral or separate from politics. He argued, culture, which often is taken for granted and hence “rarely questioned, is bound with power, control, leadership and history” (Arvanitakis, 2009, p. 31). Gramsci (1971) explains how the ruling class manipulate the beliefs, perceptions, values and explanations of the society, making their views been imposed and accepted as the cultural norm. It is then accepted as the universally valid dominant ideology that justifies the social, political, and economic status quo as natural, consensual, popular knowledge (Carroll & Ratner, 2010; Gramsci, 1971; Landertinger, 2011).

According to Gramsci (1971) power is maintained, not necessarily by violence and force, but through culture and ideology. Culture leads to the establishment of “common sense” which in turn plays a role in maintaining the status quo that promotes the interests of those who are already in power and makes the inequalities to appear as normal (Landertinger, 2011). In fact, Gramsci argued that the interests of the authorities are often accepted by the working class who support structures that negatively impact them rather than fighting back. Therefore, he described power as much more complex comprised of both force (through coercion) and consent (through cultural hegemony) “achieved through a complex series of cultural, political and ideological practices” (Arvanitakis, 2009, p. 32).

It is important to note that, cultural norms in Sri Lanka play an important role to date in assigning a place in society for people working with waste. Although identifying groups of people as belonging to a certain caste is not as strong as it used to be, waste and related activities are still considered “unclean” that threaten the purity of the society. This marginalisation is even more severe when women take on the waste activities as means of an income. Cultural and political ideologies have established commonly
accepted norms around waste management. Therefore, we argue that Gramsci’s work on hegemony and power complements Foucault’s work on power as a framework to analyse the power structures in waste management in Sri Lanka.

2.5.2.3 Supporting local autonomy

Gustavo Esteva and Madhu Suri Prakash (1998) argue that “local autonomy is the only available antidote for the ‘Global Project’” (p. 37) which includes all the market and state forces; the neoliberal policies, globalized economy and free trade. They note that locally autonomous groups can reject the global agendas that marginalise them, thereby promoting self-sufficiency and social justice in their communities. Esteva and Prakash (1998) further critique the process of absorption or integration of local systems by the nation-state.

There are individuals and organisations such as Waste for Life who promote this idea of supporting the local autonomy, hence they have chosen not to work with governments or corporations, but with marginalised groups. Baillie (2012) claims that supporting the autonomy of informal waste workers is a way to enhance social justice. Similarly, others note that enabling informal waste workers to be autonomous can result in their livelihood development, poverty alleviation, and environmental protection (Chikarmane & Narayan, 2009). The different ways in which people conceptualise autonomy of informal waste workers in Sri Lanka is discussed in Chapter 6.

2.5.2.4 Whose benefits and whose costs?

Ursula Franklin, a Quaker, feminist and Emeritus Professor of Metallurgy, argues that we should answer “whose benefits and whose costs?” when considering a particular project (Franklin, 1992, p. 126). She provides a checklist to help in the discourse of decision-making. According to her, we should ask whether the project,

- promotes justice;
- restores reciprocity;
- confers divisible or indivisible benefits;
- favours people over machines;
- whether its strategy maximizes gain or minimizes disaster;
- whether conservation is favoured over waste;
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- and whether the reversible is favoured over the irreversible (p.126).

She further argues that in order to make socially responsible decisions, engineers and decision makers of any project need to keep three books. The first book is for finances with a clearly visible column for money saved; the second book is to keep an account of the people and social impacts; and the third book is to keep an account of the environmental gains and losses. In order for a project to be socially just, all three books need to be taken into consideration prior to implementing the project.

2.5.2.5 Participatory approaches

Participatory approaches emerged as an alternative to mainstream development approaches, in which power and decision-making processes are largely top-down and linear. In contrast, participatory approaches are governed by the underlying principle that participation can contribute to equitable development and reduce unjust outcomes (Chambers, 2004). Participatory approaches include a range of activities that enable local communities to play an active role in decisions, which affect their lives (Cornwall & Jewkes, 1995). This means that in participatory approaches, the local knowledge and experience is respected. This results in interventions that reflect local realities, often leading to sustainable social change.

The conventional waste management approaches often do not use the insights of participatory approaches. Chambers (1997) explains this as a common fault of development interventions, where the observers consider themselves as experts and treat the marginalised groups as objects. Participatory approaches work differently, enabling marginalised people to analyse and articulate their own needs (Chambers, 1995). It rejects the idea of the Northern or expert view that engaging in informal work itself is the problem.

The term ‘participatory approaches’ disguises a range of approaches. There are many different theories, traditions, and methods of participatory practice including Participatory Action Research (PAR), Participatory Rural Appraisal (PRA) and Participatory technology development (Chambers, 2004; Cornwall & Jewkes, 1995). A common feature of all these approaches is a stronger focus on facilitation,
empowerment, local knowledge, and sustainable action (Bradley & Schneider, 2004). These approaches also encourage reflection, learning and an understanding of power relations (Cornwall & Jewkes, 1995)

The guidelines for research and scientific reporting within PAR provided by Orlando Fals-Borda (1995, April 8) during his plenary address at the Southern Sociological Society meeting is a valuable guide for participatory approaches. These are universally applicable and resonate the ideas of many schools of research that could be followed when working with marginalised groups in the society.

1. Do not monopolize your knowledge nor impose arrogantly your techniques but respect and combine your skills with the knowledge of the researched or grassroots communities, taking them as full partners and co-researchers. That is, fill in the distance between subject and object;
2. Do not trust elitist versions of history and science which respond to dominant interests, but be receptive to counter-narratives and try to recapture them;
3. Do not depend solely on your culture to interpret facts, but recover local values, traits, beliefs, and arts for action by and with the research organizations;
4. Do not impose your own ponderous scientific style for communicating results, but diffuse and share what you have learned together with the people, in a manner that is wholly understandable and even literary and pleasant, for science should not necessarily be a mystery nor a monopoly of experts and intellectuals (Fals-Borda, 1995).

Chapter 7 of the thesis presents the findings of a participatory needs and feasibility study conducted for a potential Waste for Life project in Sri Lanka.

2.6 Waste for Life (WFL)

*We are students, academics, and professionals engaging in research, development, and design who make the outputs of our work freely available for others to use and extend. We are the community groups and cooperatives, which take those outputs, build them, shape them, and turn them into initiatives that meet our local needs. We leverage our diversity to implement creative solutions to complex and persistent social and environmental problems.*
Waste for Life (n.d.-c)

2.6.1 Background

Waste has too often been seen as a problem to be dumped into landfills. This is changing around the globe. Waste management is not a mere technical challenge anymore. The environmental impact, socio-cultural, economic, institutional, policy, legal and political aspects are fundamental in planning, designing and maintaining a sustainable waste management system. It is difficult to predict all possible effects that can arise because of a project. However, if all projects follow socially just approaches and undertake in-depth background research, many problems and failures can be avoided or at least identified prior to a project being implemented. Waste for Life claims to follow this approach when working with informal groups to co-create composite manufacturing projects in developing countries.

Waste for Life (WFL) is a “loosely joined network of scientists, engineers, educators, designers, architects, cooperatives and artists as well as students of different disciplines and countries” working towards a common goal - to develop poverty reducing solutions to environmental and social problems (Baillie et al., 2010, p. 8). The aim of the WFL network is to promote social and environmental justice through a socially just engineering practice. WFL has therefore chosen to work with economically marginalised sectors in the society and is investigating how to assist informal groups to become more autonomous and economically self-sufficient by processing the waste they collect (Baillie, 2012; Baillie & Feinblatt, 2010).

The intention of WFL is to reduce poverty by generating more stable income sources for marginalised groups who work with waste as well as providing a sustainable mechanism of waste management (Waste for Life, n.d.-c). According to project’s co-founder Caroline Baillie, throughout this process, WFL continuously questions its approach and why and what impact their actions might have on marginalised people with whom they are working (Baillie, 2012). This approach distinguishes WFL from mainstream development organisations, many of whom aim to alleviate poverty through integration of marginalised groups into the mainstream economy (Baillie et al., 2010).
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WFL projects are centred around developing manufacturing processes to create natural fibre composites using low-cost technologies that can be sourced locally (Baillie, Matovic, Thamae, & Vaja, 2011). WFL has put years of research into adapting hot-press technology to develop usable and ‘upcycled’ composite materials made from recycled plastics and natural fibre waste (Waste for Life, n.d.-b). Products made from waste-based materials offer great potential for poverty reduction, especially for marginalised communities who depend primarily on waste collection and processing for their daily survival. Students play a key role in this network through research and developing low-cost technologies to convert low-value materials to higher-value products, improving the livelihoods of some of the poorest members of society (Baillie, 2008). It is for these reasons that WFL is selected as an appropriate alternative intervention to study the context of Sri Lanka.

2.6.2 Natural fibre composites (NFCs)

Plastic waste represents a promising source of raw material for the development of composites with natural fibres, mainly due to the large volume of plastics, which are currently thrown away in developing countries (UNEP, 2009a). Moreover, in many developing countries, a large amount of natural fibre waste is generated from different agricultural processes and such waste is mainly disposed of in landfills, open dumpsites, burnt or buried in the fields (Asian Institute of Technology, 2004). This availability of waste plastics and fibre provides an ideal condition to develop natural fibre composites in developing countries.

Reinforcing fibres such as cotton, jute, flax, hemp, sisal, kenaf and more recently corn and soy are increasingly replacing synthetic fibres (Campbell, 2006) although frequently the matrix material (plastic) used is thermosetting, which cannot itself be recycled at the end of use. In contrast, Baillie et al. (2011) note that the WFL process uses thermoplastics in the composite development process, which can be recycled back at the end of use, making it a more environmentally friendly product. In addition, reinforced thermoplastics are stronger than the constituent plastics and tougher and more flexible than the constituent fibre (Baillie, 2004). Therefore, composite materials have a higher potential to produce quality products than the waste materials recycled alone (Adhikary, Pang, & Staiger, 2008; Ashori & Nourdakhsh, 2009).
There are many advantages of waste-based composites using small-scale technology over conventional types of composite materials produced on a large scale. NFC production, in comparison with traditional glass fibre composites, can be created with a potentially lower environmental impact as determined by Life Cycle Assessments (Thamae & Baillie, 2008). Moreover, a study carried out by Pervaiz and Sain (2003) demonstrate that the use of natural fibres in thermoplastics has great potential to act as a sustainable ‘sink’ for atmospheric CO₂ and at the same time saving non-renewable resources.

The drawback however, is that conventional NFC manufacturing processes use additives to improve bonding of plastics and fibres (Ashori & Nourbakhsh, 2009). In contrast, WFL has developed and tested different types of NFCs in different contexts using heat and pressure and no added chemicals (Thamae & Baillie, 2009). At Queens University in Canada, bale wrap (high density polyethylene) was reinforced with flax and hemp; in Lesotho, corn, wheat and agave plant fibres were combined with plastic bags (low density polyethylene), and in Buenos Aires, paper, cardboard and textile was combined with plastics using a simple hot press method to create NFCs (Baillie et al., 2011).

2.6.3 WFL ‘Kingston’ hot press

The key piece of equipment used in the WFL production process is a hot press (Waste for Life, n.d.-a). Baillie et al. (2011) note that designing and developing a low cost hot press, which could be manufactured locally in participating developing countries was one of the key challenges. The first model of a hot press was designed at Queen’s University in Canada by Professor Darko Matovic in the Faculty of Engineering (Baillie et al., 2011). Several prototypes of ‘the Kingston hot press’ were developed by WFL and used by partners in different parts of the world and within different disciplines to support their work (University of Buenos Aires (Architecture), Argentina, Queens University (Engineering), Canada, Rhode island School of Design (Furniture and Product design), US, University of Western Australia (Engineering), Australia). The prototype was the basis of subsequent hot presses designed by WFL for its Argentinean and Lesotho projects.
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Key design parameters for the hot press are to allow moulds up to 60x60 cm size to be pressed into flat layers while maintaining a pressure of up to 6 MPa and a temperature of up to 200 °C (Waste for Life, n.d.-a). Industrial presses of this nature typically cost between USD 50,000 and USD 100,000 and require industrial-scale electrical circuitry. In contrast, the WFL hot press costs less than USD 3000 and utilises standard 220V circuits for heating (Baillie et al., 2011). The presses located in Buenos Aires and at the University of Western Australia have been produced by a local design engineer and a technician respectively, using the initial design, with changes to suit locally available materials (Waste for Life, n.d.-a).

2.6.4 Materials and Product development

According to Baillie et al. (2010) WFL works by sharing the knowledge and research (from university academics, other experts and designers) with partners on the ground. Students and professionals in the WFL network work together in creating new materials and product designs based on the needs and feasibility assessments in the local context (Baillie et al., 2010). Engineering students from the University of Buenos Aires, Queens University, the Rhode Island School of Design, Brown University and the University of Western Australia have all joined the WFL effort through a number of on-campus initiatives, the results of which are available on the WFL website – wasteforlife.org (Baillie et al., 2011; Waste for Life, n.d.-b).

2.6.5 Initial project assessments

Manzo (2000) states that “community development projects should be driven by the present needs and problems of the community targeted, not by an abstract or universal conception of basic human need” (p.288). This reflects the importance of addressing the needs of the intended beneficiaries. Thus significant background research - needs assessments, feasibility studies, stakeholder analysis and Social Impact Assessments (SIA) are carried out by WFL before any work is implemented (Table 2.2). These initial studies provide insight into the realities of the local environment and what may be expected from a project. The preliminary studies investigate the resources available that could be used for making NFCs and identifies the likely stakeholders in such a project, including members of cooperatives and community based organisations, NGOs, local authorities and the community (Baillie et al., 2010).
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Assessment | Importance | Reference |
--- | --- | --- |
Needs and Feasibility study | Needs and Feasibility studies are used to assess the technical, social, financial and environmental viability of a project. The findings can be used to make an informed decision about whether the project should be implemented. | Baillie et al. (2010) |
Stakeholder analysis | Department for International Development (1995) defines stakeholder analysis as “the identification of a project's key stakeholders, an assessment of their interests, and the ways in which these interests affect project riskiness and viability.” (p. 5) | DFID (1995) |
Social Impact Assessment | Social impact assessment is a preliminary process of assessing or estimating the social consequences that are likely to occur from specific policy actions or project development. | Burdge & Vanclay (1995) |

Table 2.2: Initial project assessments

2.6.6 Previous projects

Through previous projects in Maseru, Lesotho and Buenos Aires, Argentina, local cooperatives together with WFL are creating processes for transforming waste materials into natural fibre composites for products such as insulating roof tiles and wallets (Baillie et al., 2010). In Lesotho, plastic waste as well as crop residues, which comprised a large proportion of the waste generated in Maseru, were potential materials for composites (Thamae & Baillie, 2009). The needs and feasibility studies revealed that local people preferred ceiling panels as a product as these would moderate otherwise extreme winter and summer temperatures aggravated by iron roofs (Baillie et al., 2010). The United Nations Development Program Global Environment Facility funded the Maseru Aloe group in the development of the business.

In keeping with WFL’s goals of working with marginalised groups who aimed for the equal distribution of wealth, *cartonero* cooperatives were identified as key stakeholders for the Buenos Aires project (Baillie et al., 2010). After the initial needs assessments
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and stakeholder analysis, WFL identified some potential cooperatives, university and other research partners, and a microcredit organisation interested in developing a ‘hot press loan’ scheme (Baillie & Feinblatt, 2010). WFL spent two years, with locally based volunteers exploring various possibilities, following design ideas created by the international student support team. (Waste for Life, n.d.-b). The idea of using a hotpress for reinforcing plastic with fibre to make composite materials, continues to spread to many groups. These groups have taken the concepts and technology introduced by WFL in 2007 and have adapted that to suit their context, growing and spreading like a ‘rhizome’(Waste for Life, n.d.-c).

Students and academics who are working with WFL are continuing to feed into the ongoing development of WfL projects. The WFL network of voluntary support is continuously growing with many students and professionals getting involved in the project through carrying out research, materials and product development and designing and improving the machinery required by the project beneficiaries. This thesis is an outcome of a feasibility study conducted to assess WFL’s potential to fulfil its aim of social justice for informal waste workers in the Western province of Sri Lanka.

2.7 Research gaps

Most studies in the waste management field in Sri Lanka are project reports, policy documents and some individual research limited to environmental and health issues and management techniques. There is limited research that relates to the informal waste sector which supports small-scale waste recycling. None of this research is framed from a post- development, or other social justice lens.

This research was conducted as part of a feasibility study for Waste for Life to work with informal waste workers in the Western province of Sri Lanka. This is an interdisciplinary research that not only focuses on waste management in a developing country but uses a social justice lens to analyse the oppressions and inequalities that marginalise informal waste workers. In order to conduct the feasibility study, it was therefore important to critically examine how social, economic, political, and cultural processes in the Western province of Sri Lanka shape WFL’s approach.
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Based on an extensive literature review and fieldwork conducted in the Western province of Sri Lanka, the following were identified as important knowledge gaps to be addressed in order to produce a comprehensive feasibility study for the WFL Sri Lanka project.

1. As seen throughout the review, researchers worldwide have made a remarkable contribution to the waste management and informal waste sector research. However, in Sri Lanka, research on waste management is limited, as most has been carried out on an exploratory basis. Even fewer articles provide information about the informal waste sector in Sri Lanka. Data inadequacies are part of the problem in countries like Sri Lanka, and the lack of reliable data and information makes it virtually impossible to identify important stakeholders and their contributions.

2. Little attention has been paid to analysing the fundamental principles, discourses and practices of waste management through a lens of power, and a low priority is given to the exploration of its social and cultural dimensions. Particularly, the impact of unjust power relations on the informal waste sector, decision-making in waste management and the sustainability of waste management systems as a whole remains underexposed.

3. Supporting informal waste workers to be autonomous is a key priority for WFL. Therefore, understanding the perceptions of autonomy of informal waste workers can inform WFL’s approach in developing self-sufficient and creative solutions for social and environmental problems.

4. Only a limited number of studies provide information on how to empower informal waste workers to initiate businesses on their own from collected recyclables. Moreover, no applied research (except for the initial assessments conducted by WFL) could be found on manufacturing NFCs using waste plastics in Sri Lanka. Therefore, the availability of materials, markets and funding opportunities has not been evaluated.

2.8 Chapter Summary

This chapter presented a review of the literature used in this study. The literature reviewed demonstrated that waste management is not a mere technical challenge. The
environmental impact, socio-cultural, economic, institutional, policy, legal and political aspects are fundamental in planning, designing and maintaining a sustainable waste management system, particularly in developing countries like Sri Lanka. The informal waste sector plays an important role in waste management in developing countries. This project uses a socially just approach to frame its study of, and with, the informal waste sector. Social justice activists and authors are looking for alternative approaches to develop systemic change that reduces oppression of marginalised communities. The waste-based composite project offered by Waste for Life claims to have the potential to improve the current waste management practices, whilst creating an income stream for marginalised communities. This study assesses the feasibility of such a project, not only from a practical, financial and sustainable perspective but in addition it takes several critical lenses to assess the emancipatory potential of such a project. To do so, there is a need to identify the informal waste sector, their contributions to waste management, their autonomy and the power structures which hold them in place. Following the methodology chapter of this thesis, the subsequent chapters explain the findings that highlight each of these themes.

2.9 References


doi: http://dx.doi.org/10.1016/j.wasman.2008.09.012


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doi: [http://dx.doi.org/10.1016/j.wasman.2008.08.025](http://dx.doi.org/10.1016/j.wasman.2008.08.025)


doi: [http://dx.doi.org/10.1016/j.geoforum.2013.04.029](http://dx.doi.org/10.1016/j.geoforum.2013.04.029)


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Waste for Life. (n.d.-c). Who we are. Retrieved 05.03.2011, from [http://wasteforlife.org/?page_id=2](http://wasteforlife.org/?page_id=2)


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CHAPTER 3 | Research Design

Emotionless, passionless, abstract, intellectual research is a goddamn lie, it does not exist. It is a lie to ourselves and a lie to other people. Humans – feeling, living, breathing, thinking humans – do research. When we try to cut ourselves off at the neck and pretend an objectivity that does not exist in the human world, we become dangerous, to ourselves first, and then to the people around us.

Hampton quoted in Hodson (2013, p. 358).

3.1 Studying and interpreting the world

Describing research methodologies with different epistemologies\(^6\) is not easy in an interdisciplinary context. It is necessary to describe some basic tenets obvious to some but not all readers. This study is situated in the interpretivist paradigm unusual for engineering as a whole. Within the interpretivist paradigm, reality is viewed as a social construction, which means there can be multiple realities, or interpretations, of any event (Merriam, 2009). Thus, interpretivist qualitative research is a method of scientific enquiry that seeks to understand a particular problem or topic from the perspectives of the people it involves (Flick, 2006; Mack, Woodsong, Macqueen, Guest, & Namey, 2005; Merriam, 2009). Creswell (2012) provides a detailed definition for this:

Qualitative research begins with assumptions and the use of interpretive/theoretical frameworks that inform the study of research problems addressing the meaning individuals or groups ascribe to a social or human problem. To study this problem, qualitative researchers use an emerging qualitative approach to inquiry, the collection of data in a natural setting sensitive to the people and places under study, and data analysis that is both inductive and deductive and establishes patterns or themes. The final written report or presentation includes the voices of participants, the reflexivity of the researcher, a complex description and interpretation of the problem, and its contribution to the literature or a call for change (Creswell, 2012, p. 44, emphasis added).

\(^6\) Epistemology can be broadly described as ways of knowing, and will influence what can be studied and how and the ways in which we can analyse this and determine what constitutes knowledge in any domain.
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This definition highlights a number of key aspects of interpretivist qualitative research, in particular studying a social or human problem, giving a voice to participants, researcher reflexivity and calling for change. In this process, qualitative researchers collect multiple forms of data by analysing documents, field observations and conducting in-depth interviews (Table 3.1) (Patton, 1990; Willig, 2008). Conducting in-depth interviews, particularly using open-ended questions provide greater flexibility on what and how questions are asked (Merriam, 2009). These face-to-face interactions with the participants often occur at their natural setting or a place convenient for the participants. This leads to the interaction between the researcher and participant being less formal. Therefore, the data in qualitative research are descriptive and less structured than those generated through quantitative research, because “the data collection process itself is less structured, more flexible, and inductive” (Guest, Macqueen, & Namey, 2012, p. 6).

<table>
<thead>
<tr>
<th>Type of data collection</th>
<th>Method</th>
<th>Type of data</th>
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<tbody>
<tr>
<td>Interviews</td>
<td>Conducting open-ended, in-depth interviews</td>
<td>Transcripts and verbatim quotations</td>
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<tr>
<td>Observations</td>
<td>Direct observations</td>
<td>Detailed descriptions and field notes</td>
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<tr>
<td>Documents</td>
<td>Studying written materials</td>
<td>Official publications, reports, questionnaires</td>
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Table 3.1: Multiple forms of data collected in qualitative research

3.2 Research process

3.2.1 Desk research

There are only a limited number of journal publications and peer reviewed articles available on waste management in Sri Lanka. Hence, the required information was at times obtained through newspaper articles and other local publications. This information was later validated and updated during fieldwork. The initial desk research was useful in understanding the theoretical concepts that guided the research and to
identify the information and knowledge gaps (Flick, 2006) in waste management in Sri Lanka.

3.2.2 Ethics approval

Prior to developing contacts on the ground and commencing fieldwork, I obtained ethics approval from the University’s Human Research ethics committee (Approval No. RA/4/1/5075). This was renewed annually by submitting a progress report to the committee. I discuss the ethical considerations of this research in section 3.5.

3.2.3 Developing contacts on the ground

Developing contacts on the ground is an important initial step in fieldwork (Mack et al., 2005). Having worked in waste related projects in Sri Lanka prior to commencing my PhD proved useful in this process. Some of the connections I already had served as initial contacts on the ground. I made appointments in advance and details about the study were communicated to the potential informants in government offices, private organisations, environment organisations and universities via emails. Contacting informal waste workers through emails was not an option. They were contacted once the fieldwork commenced in Sri Lanka.

3.2.4 Data collection

Initial data collection on the ground commenced in December 2011 in the Western province of Sri Lanka. I conducted initial fieldwork over a three month period from December 2011 to February 2012. A second field visit was made in June-July 2012. This was followed by two shorter visits later in 2012 and again in 2013. During the first two field trips, I was accompanied by three research assistants – one female and two male university students who volunteered to help with my work. I conducted thirty-two in-depth interviews that lasted for one to two hours (Table 3.2). Eighteen out of the thirty-two were formal sector participants while fourteen were from the informal sector. Interviews were conducted at informants’ workplaces or a place convenient for them. Particularly, during my interviews with informal waste workers, all effort was taken to cause minimal disturbance to their work.
CHAPTER 3 | Research Design

The in-depth interviews generated valuable information and were used as the basis for the subsequent analyses. These were supplemented by a number of short conversations I had with informants from diverse backgrounds. In addition, during the initial stages of the study, a short questionnaire survey was distributed among twenty two commercial industries and seventeen recyclers to collect information about plastic waste generation and recycling. Further, I visited a number of government and private organisations to collect information. The specific details and type of information collected are tabulated in Chapter 7 under different sub-topics of the feasibility study. Often I was asked about my research during social or academic gatherings I attended and these conversations proved to be great platforms for knowledge sharing in addition to the above. While it was not practical to record these, I nevertheless acknowledge the ‘spontaneous unplanned’ discussions that led to generating rich information.

It is also important to note that, in some cases, gaining access to, and the consent of some informants proved to be challenging. In particular, some individuals did not want to be interviewed after I visited them even if they initially agreed to the interview. Occasionally, informants cancelled the interviews on my way to meet them. To avoid these practical issues, I made every attempt to use snowball sampling (Mack et al., 2005). In this method, informants with whom I had already made contact referred me to other people who could contribute to the study. This method also proved useful to identify ‘invisible’ populations, particularly informal waste workers who operated as home-based enterprises. For example, one informal waste worker kindly offered to take me to several small-scale home-based recyclers and product manufacturers. He took one whole day away from his work to voluntarily help me with my research and explained a great deal about informal waste recycling in Sri Lanka. Another informal waste worker invited other people in his network to come to his workplace on the day I visited him. These are a few examples of how people were supportive and offered to share their experiences.

3.2.4.1 Working in the home country

There are direct advantages in conducting fieldwork in the home country. Being a citizen of Sri Lanka and my education allows me to be receptive to the kind of issues
present in the country. I am aware of the political and cultural tensions and understand
the traditions, norms, languages and practices of the people. However, being a citizen is
not without its disadvantages. My status as a young woman reading for her PhD in
Australia places me in a different position to that of the people I was working with,
particularly the informal waste workers. Considering that the cultural hegemony and the
patriarchal society view a woman’s place as ‘a housewife and a mother’, some of the
interviewees might have been challenged by my presence. I have experienced this in
different ways during my interviews and every effort was taken to avoid any biases. The
interaction with the informal waste workers and in-depth discussions generated rich
material for analysis, while also in some ways helped to reduce the effects of
unfamiliarity in my relationship with them. However, I acknowledge that my efforts
might not have been sufficient to remove the biases entirely.

<table>
<thead>
<tr>
<th>Informant</th>
<th>Organisation/Area</th>
<th>Male/Female</th>
<th>Formal/Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>Environmental organisation</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Environmental consultant</td>
<td>Private company - Colombo</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Environmentalist</td>
<td>National Waste Recycling Programme</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Director</td>
<td>Sevanatha - NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Director</td>
<td>Arthacharya - NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Manager</td>
<td>Development bank - Maharagama</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Manager</td>
<td>Private waste management company</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>Central Environmental Authority -Waste Management</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Manager Research</td>
<td>Practical Action</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Practical Action</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>National Co-operative Council</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Co-ordinator</td>
<td>Environmental and Community</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Role</td>
<td>Name and Details</td>
<td>Sex</td>
<td>Status</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------------------------------------------------</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Development Project - Lunawa</td>
<td>Official National Solid Waste Management Support Centre</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>Waste Management Authority - Western Province</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>National Cleaner Production Centre (NCPC)</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>University lecturer</td>
<td>Engineering faculty - Moratuwa</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Local authority waste collector</td>
<td>Local authority - Gampaha district</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Local authority waste collector</td>
<td>Local authority - Gampaha district</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>President</td>
<td>Co-operative - Colombo</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Environmental activist</td>
<td>Moratuwa</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector A</td>
<td>Kalutara</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector B</td>
<td>Meethotamulla dump</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector C</td>
<td>Export Processing Zone (EPZ) - Katunayake</td>
<td>F</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector E</td>
<td>EPZ - Katunayake</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Waste collector – large</td>
<td>Colombo</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Home-based waste trader</td>
<td>Panadura</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Person-in-charge</td>
<td>Recycling company - Moratuwa</td>
<td>F</td>
<td>i</td>
</tr>
<tr>
<td>Recycler - Pellet manufacturer</td>
<td>Negombo</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Recycler - Pellet manufacturer</td>
<td>Maharagama</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Small-scale product manufacturer</td>
<td>Gampaha</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Small-scale product manufacturer</td>
<td>Panadura</td>
<td>M</td>
<td>i</td>
</tr>
</tbody>
</table>
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3.2.5 Data organising and management

I conducted most of the interviews in Sinhala language. Due to the sensitive nature of information and for accuracy, I myself transcribed and translated the interviews to English. Although this was time consuming, by the end of the process I was familiar with the content of each transcript. This proved to be useful during the analysis process.

As research projects evolve, data management becomes increasingly important (Patton, 1990). For this, I used a system of folders that collect together recordings in different forms, transcripts, and analytic notes. For ease of identification, participants were categorised into different groups and each participant was allocated a folder. Within a folder was video and audio recording files, the transcript, field observation notes and photos.

3.2.6 Data analysis and writing up

Silverman (2011) notes that the researcher should give readers enough information as to how the research was conducted to enable them to evaluate the findings and as such, the theoretical framework, methods used, and the findings are discussed in detail in each chapter. For data analysis, I have used distinctly different analytical approaches (Table 3.3).

<table>
<thead>
<tr>
<th>Method</th>
<th>Chapter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case study narratives</td>
<td>4</td>
</tr>
<tr>
<td>Foucauldian discourse analysis</td>
<td>5</td>
</tr>
<tr>
<td>Phenomenography</td>
<td>6</td>
</tr>
<tr>
<td>Feasibility study</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 3.3: Data analysis used in each chapter

3.2.7 Analytical methods used

1. Case study narratives
Chapter 4 comprises four case study narratives selected from the larger study. They present four different wastescapes that undergo different challenges within the informal waste economy. According to Kaun (2010) “Narratives are able to capture personal experiences through the imagination of the reader. Stories being told also encompass the emotional experiences of the storyteller, which are normally suppressed by objective, abstract methods” (pg. 138). Similarly, Booth (1999) argues that narrative methods could overcome the reduction of rich experiences of people’s lives to achieve generalisability by researchers.

A narrative case study approach was chosen to analyse the data in this study as it provides an effective means of showing the complexity and context of the informal waste workers. There is considerable variation in how to analyse and write a narrative, often linked to discipline (Kohler-Riessman, 1993). However, in general researchers who use narrative methods try to systematically ‘map out’ the story and give it a formalized structure. As they map the structure of a narrative sequence, the mapping operates as both a mode of data analysis and a type of explanation (Neuman, 2006; Patton, 1990). Thus case study narratives are a theoretical and an analytical tool that can be used to understand the complex issues of human behaviour. According to Reinsman (1993) what makes narratives important is that events are selected, organised, connected, and evaluated as meaningful for a particular audience.

The narrative case studies presented in Chapter 4 are creative reconstructions of information from in-depth interviews, field observations, and informal discussions, written from the perspectives of informal waste workers. In conducting in-depth interviews I have used techniques which foster storytelling, listening and dialogue. This provided the participants with the opportunity to tell stories about their experiences. In this way I was able to draw out their insights and current reflections on their identities and practices. The data were then analysed and organized into events and then placed in an episodic sequence to complete the narrative.

2. Foucauldian Discourse Analysis

I have used Willig’s (2008a, pp. 115-117) work on Foucauldian Discourse Analysis as the analytical guide for Chapter 5. This approach draws on Foucault’s ‘archaeological’
work (Foucault, 1972) which sets out the rules by which discourses are formed and operate, especially in their definition of subjects, objects, and practices. This was combined with Gramsci’s theory of culture and hegemony (Gramsci, 1971) to analyse power and privilege in the context of wastescape in the Western province of Sri Lanka.

**Stage 1: Discursive Constructions**

The first stage of analysis involves the identification of the different ways in which the discursive objects are constructed in the text, both directly and through shared meanings. Which discursive object we focus on depends on our research interest. Since we are interested in how people talk about waste management in Sri Lanka and with what consequences, our discursive object would be the “wastescape”.

**Stage 2: Discourses**

The second stage of the analysis places various discursive constructions of the wastescape within wider discourses. A discursive object can be constructed in diverse and contradictory ways according to different purposes within the same text. In this study, participants’ experiences placed “wastescape” within several discourses such as development, decision-making, methods and technologies, environment, socio-economic impact and expert/local knowledge.

**Stage 3: Action Orientation**

This stage requires analysis of the discursive contexts to facilitate a clearer understanding of what the various constructions of the discursive object can possibly accomplish within the text. Based on Willig’s approach (2008a), we need to ask; “What is gained from constructing the object in this particular way at this particular point within the text? What is its function and how does it relate to other constructions produced in the surrounding text?” (pg. 116).

**Stage 4: Positionings**

Having previously located the discursive subject within wider discourses, this stage identifies “subject positions” offered by various constructions of the “wastescape”, which deal with the identified discourses.
**Stage 5: Practice**

This stage examines the relationship between discourse and practice by considering the possibilities or limitations for action, via constructing particular accounts of the world and positioning subjects within the discourses in specific ways. In the analysis, we approach this in three different ways, 1) actions of the people who make the decisions, 2) actions of the people who deal with waste on the ground and 3) actions of the researchers as critical observers.

**Stage 6: Subjectivity**

The final stage traces the outcomes of adopting various subject positions by drawing links between discursive constructions and personal experiences. This is highly interpretive of the relationship between discourses and subjectivity. This stage in the analysis traces the consequences of taking up various subject positions for the participants’ subjective experience on waste management.

**3. Phenomenography**

Phenomenography is a qualitative research approach adapted for mapping the variation in which people experience and understand various aspects of their world (Bowden & Walsh, 2000; Mann et al., 2007; Marton, 1981). It was developed by Ference Marton and his team at the University of Gothenberg in Sweden. Phenomenography takes a second order research perspective in that it attempts to describe the world as seen through the eyes of the research participants (Marton, 1981).

Researchers have discovered that a phenomenon is conceptualised in a limited number of qualitatively different ways (Bowden & Walsh, 2000; Lamb et al., 2011; Mann et al., 2007). These different conceptions of the phenomenon are categorised and grouped, based on their similarities and differences. These are called ‘categories of description’. The ordering of the categories of description is known as an ‘outcome space’ (Akerlind et al., 2005; Ingerman & Booth, 2003). The categories of description and the outcome space are the main outcomes of the phenomenographic research (Marton, 1986).

As a research methodology phenomenography has generally been used in educational research (Marton & Booth, 1997; Yates et al., 2012) and has not been applied widely...
outside education and learning-related research. According to Dunkin (2000) phenomenography “respects the uniqueness of individual experience and subjectivities, as well as the diversity of influences shaping that experience, while at the same time providing a sensitive way of comparing and categorising across individual experiences.” (pg. 150). Hence, she refers to phenomenography as a research approach that has wider application than educational research. Similarly, Bowden infers that phenomenographic method can be applied to understand a variety of other issues in society unrelated to educational system (Bowden & Walsh, 2000).

Phenomenography, however, should not be confused with phenomenology. While phenomenology emphasises on individual experience, phenomenography is interested in the collective meaning. Phenomenography is a second-order research approach that aims to describe the world as it is understood rather than a first-order perspective as in phenomenology where the world is described as it is (Barnard et al., 1999).

Phenomenography is deemed appropriate for the study reported in Chapter 6 based on its non-dualistic perspective; that there is only one world, which is experienced and understood in different ways by people (Marton, 2000). A non-dualistic ontology suggests that “meaning derives from the relation between person and phenomenon” (Trigwell, 2000, p. 64). In other words, how people act is determined by the way they understand different aspects of their reality.

4. Feasibility study

Feasibility studies are structured ways to assess the technical, social, financial and environmental viability or practicality of a project and used to make an informed decision about whether the project should be implemented (Hofstrand & Holz-Clause, 2009; Karagiannidis et al., 2009). Feasibility studies are used by various organizations to assess development projects or programs. Implementing agencies often follow specific structures unique to each project to assess the feasibility. In chapter 7, I use a socio-technical methodology informed by critical theories to assess the feasibility of a potential Waste for Life project.
Feasibility studies conducted by AusAID focus on evaluating the manageability, technical and institutional feasibility, effect on poverty, social and cultural impact, and environmental impact of a project (AUSAID, 2005). In chapter 7, I have considered five different aspects for the evaluation – stakeholders and networks, availability of waste materials, technical feasibility, financial feasibility and availability of markets. Important information for each category were extracted from the different data collection tools – transcripts, video and audio recordings, photos, documents, field notes etc. The large volume of data collected was organised into five key themes which were then analysed separately and in relation to one another (Dey, 1993; Patton, 1990).

3.3 Ethical considerations

Chambers (2012) writes that with participatory research, methodologies and ethics are interwoven. I was in close contact with the lives of the interviewees, in particular with informal waste workers, during the fieldwork. I had to face decisions such as what to record and how to handle sensitive information. Reflecting on these issues was an important part of the study and enabled me to manage emerging concerns about the data collection, analysis, and findings in subsequent fieldwork.

I selected all the informants based on voluntary participation. Before an interview, informed written or verbal consent was obtained from each participant. I explained the purpose of my work to all participants before the interviews were conducted. I also asked for their consent to video and audio record the interviews and to take photos. Some participants requested not to record their interviews and I respected their decision. All participants were advised that there would be anonymity in the final document and possible subsequent publications. This was important as many interviewees disclosed information about political corruption, informal activities and other issues invisible to the public.

The main concern in reporting the findings is to preserve the privacy, anonymity, and confidentiality of the participants (Neuman, 2006). I have been careful not to disclose any personal information of the participants. They are either given a pseudonym or referred to as a contact person. In certain instances, I have not disclosed the names of institutions or organisations as it is easy to identify the informant through this. I have
also used photos in a manner sensitive to the wishes of the participants and ensured that individuals could not be identified.

Finally, based on my experiences working with people on the ground, I list certain criteria to work in a socially just participatory manner with research participants.

1. We need to take the responsibility for the ethics of our research. According to Neuman (2006), ethics should begin and end with the researcher. Ethical conduct should not be limited to obtaining an ethics approval for the project and following guidelines provided by an ethics committee.

2. We need to clearly explain the purpose of our study. The participants have a right to know how the information they provide is used.

3. Prior to our interviews, we need to obtain participants’ consent to participate in our work. We should understand their capacity to give informed consent, either in writing or verbally. We should obtain their willingness to be in photos, videos or to record their interviews.

4. We need to make every attempt to conduct the interviews at a location convenient to the participant. It is equally important to inform the informant prior to visiting them.

5. We should always respect that participants are allocating time from their work to assist us with our research. Being punctual is important and at the same time we need to respect the time constraints of the participants. Every effort should be taken not disturb their work.

6. We need to look after our safety and the safety of our research assistants. Depending on the context, it is important to be accompanied by a male or a female research assistant when conducting fieldwork.

7. We should avoid questions or methods that are uncomfortable to our informants. If they indicate that they would not like to talk about a certain topic any further, we need to respect their decision and should avoid asking probing questions.

8. We need to present ourselves in a culturally appropriate manner. The way we speak and even our attire determine the way our interviewees respond to us.
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9. We need to protect the confidentiality of the information they provide. Participants’ anonymity should be preserved unless otherwise they wish to disclose their details.

10. We need to pay attention to how we use the information in publications and other media. In particular, the sensitive political information can have negative consequences if presented in an incorrect way.

11. We need to promote and encourage co-creating knowledge.

3.4 Chapter Summary

This chapter summarises the research design I have adopted. An interpretivist qualitative approach was used as I was interested in the lived experiences of people within the wastescap in the Western province of Sri Lanka. Fieldwork conducted during 2011-2013 generated a wealth of information. Data were collected using a variety of methods, including in-depth interviews, short dialogues, participant observations, and document analysis. Data were analysed using methods drawn from different disciplines. Lastly, I have highlighted the ethical considerations of doing interpretivist qualitative research.

3.5 References


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CHAPTER 4

Making the invisible visible: Exploring the informal wastescape in the Western province of Sri Lanka

Publication:

4.1 Abstract

This paper draws on in-depth interviews with informal waste workers in the Western province of Sri Lanka. We aim to buildThis study examines the role of the informal sector in the urban waste economy in the Western province of Sri Lanka, conducted as part of a feasibility study for a potential waste recycling initiative supported by the organisation, Waste for Life (WFL). Waste for Life was founded by Professor Caroline Baillie in part to find ways of applying her materials engineering knowledge in ways which promoted social justice. In order to do this, WFL has created a complex approach drawing on post development paradigms to ensure their work did not recreate problematic yet typical colonial patterns of engineering to help. This elicited the need for a critical socio-technical feasibility study which would predate any potential implementation on the ground. This chapter summarises one element of such a study. It draws on in-depth interviews with informal waste workers in the Western province of Sri Lanka. We have presented a series of case study narratives to understand the ways in which these informal activities contribute to waste management and create livelihoods, thereby reducing poverty. The case study narratives describe detailed accounts of individuals in four different layers of the informal waste economy: a waste collector, a home-based waste trader, a small-scale recycler and a home-based product manufacturer. The paper explores findings are presented in two sections. First, we describe various aspects of informal waste workers’ lives, including social, economic, political and environmental, and presents each waste worker’s diverse world as a wastescape. Following the case studies, we extract key themes from the study and discuss their implications in the context of improving the livelihoods of the informal waste sector in developing countries. The main themes arising from the case analyses are categorised into 1) social, 2) resources and capacity development and 3) legal and political aspects. We conclude that, only with an improved understanding of all aspects of informal waste workers’ lives, can we to design programs, projects and policies which can effectively address the needs of the workers engaged in the informal waste economy. Engineers, policy makers, project developers and researchers need an improved understanding of all aspects of informal waste workers’ lives.
CHAPTER 4 | Making the invisible visible

4.2 Introduction

Waste management is one of the most vital urban environmental services. In many developing countries, rapid urbanisation, coupled with lack of resources, poor institutional management and lack of public awareness, has translated into an inefficient waste management system (Zurbrügg, 2003). Like many developing countries, Sri Lanka lacks a formal waste recycling system, in particular for plastic wastes. In lieu of a proper municipal recycling system in place in Sri Lanka, informal recycling has provided an alternative income strategy for a significant number of people (Perera, 2007; van Horen, 2004). Despite the informal waste sector's valuable contribution to waste management and the local economy, the recognition of informal activities as an efficient and effective system has not received adequate attention in the Sri Lankan context (Perera, 2007). This lack of knowledge about the informal waste sector has made their contributions largely invisible to the authorities, policy makers, and the society.

This study, which was undertaken in the Western province of Sri Lanka, is a part of a broader project aimed at establishing and applying poverty-reducing solutions for marginalised communities working with waste-to-waste problems (Jayasinghe & Baillie, 2012; Jayasinghe, Mushtaq, Smythe, & Baillie, 2013). This innovative project was developed by the not-for-profit organisation, Waste for Life (WFL) (Baillie, Feinblatt, Thamae, & Berrington, 2010; Baillie, Matovic, Thamae, & Vaja, 2011). WFL has developed a complex approach drawing on social justice and post-development paradigms to ensure their work did not recreate problematic yet typical colonial patterns of engineering to help (Nieuxma & Riley, 2010). The development agenda, as Ferguson (1990) points out, has become a machine that implements technical solutions to problems that are far from technical in nature. Project developers often do not attempt to understand the lives of local groups they work with, the intricate networks that exist in the local context and local people’s needs (Ferguson, 1990). The aim however of this work is to build manufacturing capabilities into communities whose members would normally be excluded from access to the necessary science and technology.

7 See http://wasteforlife.org/...
The technological knowledge needed for such manufacturing and, by so doing, ensure their economic autonomy whilst removing waste from the environment. The project’s most important outcomes are co-sharing knowledge, and the ability to reduce poverty and increase autonomy through the use of appropriate technology.

To avoid or minimise negative impacts caused by any project, Ursula Franklin, a Quaker, feminist and Emeritus Professor of Metallurgy (1992) suggests that technologies should be designed with the end-user in mind. This can be put into practice by continually asking ourselves the questions “Who benefits?” from our interventions and “Who pays the cost?” (Franklin, 1992). Then, it is important that we seek ways to make our interventions appropriate, effective and sustainable as possible, minimise any risks and ensure there will be no adverse negative impacts both to the community and the environment.

In order to achieve this, before any project can be implemented organisations like WFL first need to assess the feasibility of the project in detail so that the risks and challenges are identified beforehand and can be measured against any perceived benefits. The first stage of the feasibility study requires to build a general understanding of the socio-economic context and map the local territory (Baillie et al., 2010). It is important to find out who the primary stakeholders are, their activities and the challenges they undergo.

Therefore, the aim of this chapter is twofold. Firstly we aim to build a series of case study narratives to present descriptive accounts of the lives of informal waste workers in the Western province of Sri Lanka that will enable us to understand their working conditions and the socio-economic and political issues surrounding their activities. We have constructed the narratives around the idea of a wastescape. The term wastescape, which we will explain in detail in a later section is introduced to identify the social, cultural, economic and political environment of urban space related to waste management. The narrative case studies also describe how we entered into the complex maze of waste management in the Western province, working in a participatory way to identify existing power structures and possible avenues of collaboration. It is important

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8 WFL expertise in materials engineering, waste management, engineering education development, and participatory and sustainable development have yielded positive results in their two former project contexts: Lesotho and Argentina.
to note that there is a considerable volume of research conducted on the waste collectors’ role in the informal waste economy (Huysman, 1994; Medina, 2005b; Moreno-Sanchez & Maldonado, 2006; Sternberg, 2013). However, research is more limited in terms of issues surrounding informal waste workers in small-scale recycling and manufacturing businesses. As illustrated in the recycling value chain (Figure 4.2), informal workers in the waste hierarchy are intimately connected to each other. The second aim of the chapter is to highlight some of the critical challenges the informal wastescape undergo. The second aim is to highlight the critical issues in the informal wastescape using key themes drawn from the narratives. To ensure that the needs of the informal waste workers we work with are addressed through the proposed WFL project, we argue that it is essential to understand their daily activities and limitations of to work.

In the next section, we first briefly review the literature on informal waste recovery and recycling in developing countries. This will be followed by the methodology section and an overview of the waste management system in Sri Lanka. The remainder of the chapter is devoted to our empirical results. We conclude the chapter with a discussion of the key themes that emerged from the study and propose several options for improving that would inform the lives of the informal waste workers' decisions about WFL initiative in Sri Lanka.

4.3 Informal waste workers in developing countries

During the last two decades, the significant role of the informal sector in managing waste and creating livelihoods has captured the attention of researchers around the world (Huysman, 1994; Medina, 2005b; Mitchell, 2009; Nzeadibe & Anyadike, 2012; Rogerson, 2001; Sternberg, 2013; Wilson, Velis, & Cheeseman, 2006). Medina (2005b) draws examples from Asia and Latin America and describes how informal waste collection can provide a perfect solution for waste management, poverty reduction, and resource conservation. Similar studies are reported from around the world. The experience of the Zabbaleen waste pickers in Cairo has demonstrated the importance of

9 For the purpose of this study, the term ‘informal’ refers to those who make a living from solid waste but are not formally in charge or recognised for providing the service (Chikarmane & Narayan, 2009).
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developing the existing informal systems instead of investing in expensive technological solutions (Badshah & Perlman, 1996). Case studies of informal waste workers from India, the Philippines and Thailand, reported by Chikarmane and Narayan (2009) have demonstrated that informal waste workers are capable of improvisation and innovation, given the right opportunities.

Despite their valuable services to society by collecting and converting waste into a useful resource, informal waste workers are not fully recognised for their contribution to waste management (Do Carmo & Puppim de Oliveira, 2010; Nzeadibe & Anyadike, 2012). In many developing countries, local authorities and policy makers generally adopt prohibitive rather than accommodative actions towards the informal waste sector (Rogerson, 2001). In some other contexts, as in the case in Buenos Aires, urban governance has created new policies to regulate and discipline the informal waste sector (Sternberg, 2013).

Researchers call for more empirical research to promote the importance of informal waste activities as an effective waste management and livelihood strategy in developing countries (Medina, 2005a; Nas & Jaffe, 2004). Badshah and Perlman (1996) argue that giving a voice to informal waste workers can lead to the provision of help needed to improve and further their work, and transform small-scale practices to national and international levels. In another study, Rouse (2006a) notes the need to understand the informal waste workers so as to plan for a sustainable change in waste management, rather than judging them on how they continue their recycling activities. In fact, Nas and Jaffe (2004) call for more case studies and research to be conducted to validate and expand existing contextual models. These researchers argue that research can have a positive influence on society’s attitudes toward informal waste workers and assist development organisations working with informal waste workers to gain better insights and to recognise opportunities. This study fills this important knowledge gap about the informal wastescape in the Western province of Sri Lanka.

It is important to note that there is a considerable volume of research conducted on the waste collectors’ role in the informal waste economy (Huysman, 1994; Medina, 2005b; Moreno-Sanchez & Maldonado, 2006; Sternberg, 2013). However, research is limited
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in terms of issues surrounding informal waste workers in small-scale recycling and
manufacturing businesses. As illustrated in the recycling value chain\textsuperscript{10} (Figure 4.2),
informal workers in the waste hierarchy are intimately connected to each other.
Therefore, we argue that it is important to study the sector as a whole.

4.4 Research Methodology

4.4.1 Introducing the Wastescape\textsuperscript{11}

In this chapter, we employ the term wastescape to conceptualise the space(s) within
which informal waste workers operate. The concept of ‘scapes’ is based on Appadurai’s
(1990) analysis of global cultural flows. He uses the suffix “‐scape” to highlight two
aspects. Firstly, that the scapes are under constant change. Secondly, scapes gain their
shapes and meanings from the perceptions of the actors involved. This fits well with the
notion of waste.

1. Waste is a material under constant change. Waste is created and transported
through many channels, distancing it from the generators. A part of it is
discarded and the rest makes its way back to the system through recovery and
recycling.

2. Waste gains its meaning based on how people perceive it. For a majority, it is a
useless material, and for others it is a valuable resource.

The idea of a wastescape thus includes both waste as material, and as a social‐space
constructed by and (re)producing a set of social, cultural and political relationships.
Drawing on this, we introduce the concept of a wastescape as a space where social,
cultural and political aspects of waste management and its players operate.

4.4.2 Qualitative research

The study reported in this chapter was conducted to capture the rich complexity of the
informal waste workers’ experiences. To achieve this, a qualitative case study approach

\textsuperscript{10} Author’s own construct based on fieldwork in the Western province of Sri Lanka.
\textsuperscript{11} The term “Wastescapes” has been coined in other contexts. For example see
http://inhabitat.com/tag/wastescapes/.
was adopted. Since our main research aim deals particularly with looking at how informal waste workers are positioned and operate within the Western province of Sri Lanka, our research methods aimed to uncover the realities of those who are normally excluded from formal surveys and research. We used a qualitative research approach as it helps in making people's realities matter, facilitating the study of issues in depth and in detail (Patton, 1990; Silverman, 2011). The approach was descriptive because quantification was not essential for grasping the basic issues (Neuman, 2006). Quantitative data was limited to determining prices and volumes of recyclable items.

### 4.4.3 Fieldwork and Data collection

The fieldwork was conducted by the primary author in the Western province of Sri Lanka during the period December/February 2011-2012 and June/July 2012. Two more short visits were conducted in 2012 and 2013. Following participatory research, unstructured interviews were conducted with a range of stakeholders; formal and informal waste collectors, recyclers, community based organisations, government officials, private companies, professionals, NGOs, environmental groups and households. In-depth interviews with fourteen informal waste workers were conducted at a place convenient to them. The interviews with informal waste workers were conducted entirely in Sinhala language that lasted from a minimum of one hour to a maximum of two hours. Interviews were audio and/or video recorded and photographs were taken with the prior consent from the informants. These in-depth interviews helped to obtain undocumented information about informal waste workers’ lives and added depth, detail and meaning at a more personal level. Data were also collected through questionnaire surveys, field observations and a variety of secondary sources such as newspapers, government reports and other publications.

### 4.4.4 Data Analysis

A case study approach was used to guide the analysis of this study. The case study approach to qualitative analysis establishes a systematic method of collecting, organising and analysing data (Flyvbjerg, 2006; Patton, 1990; Yin, 2009). The unit of analysis or “case” in this study was the individual waste worker in the Western province of Sri Lanka. The data were analysed in two stages. The first stage involved within-case
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Analysis of four informants selected from the pool of in-depth interviews to represent each level in the informal wastescape. The second stage involved a cross-case analysis, which generated key themes from the case studies (Figure 4.1).

Figure 4.1: The process of data collection and analysis

4.5 Mapping the territory

4.5.1 Waste management in the Western province of Sri Lanka: An overview

Managing waste has become a serious environmental concern, particularly in the urbanised areas of Sri Lanka with high population densities and the unavailability of suitable lands for waste disposal sites (Bandara, 2008). Sri Lanka produces around 6,500 MT of garbage per day where more than fifty per cent of this is biodegradable (Ministry of Environment and Natural Resources, 2007; Visvanathan & Tränkler, 2003). There are no proper landfills to dispose the waste (Environmental Foundation LTD., 2007) and
therefore the local authorities are continuously struggling to manage more than 90 per cent of it. Currently, only ten per cent of the collected waste is recycled, and the rest is haphazardly disposed of (Mudugamuwa, 2013). The problem is most severe in the Western province of the country which has the highest population - about 29 per cent of the total population residing in the province.

Due to the lack of a fully controlled sanitary landfill, most local authorities in the Western province dispose waste at a number of uncontrolled open dumpsites (Bandara, 2008; Environmental Foundation LTD., 2007). Waste is also dumped in low-lying areas, marshlands and abandoned lands predominantly as a land reclamation measure (Bandara, 2008). The problem has become severe as wastes are not segregated and usually every type of waste such as industrial, slaughterhouse and hospital wastes are dumped in the same dumpsite, together with municipal solid wastes (Asian Institute of Technology, 2004; Visvanathan & Tränkler, 2003). The largest dumpsite, Meethotamulla\textsuperscript{12} is a 17 acre mountainous open garbage dump where more than 800 tons of garbage generated in Colombo are dumped daily.

4.5.2 Legal framework governing the wastescape

The notion of ‘who owns waste’ is pivotal in making decisions about informal waste activities. The legal framework pertaining to waste management in Sri Lanka is critical in many aspects as it limits who can collect and handle waste legally. In many countries waste is considered as a common property, thus making it available to be recovered by anyone and re-directed to the industries (Scheinberg, 2011; Scheinberg, Anschütz, & van de Klundert, 2006). However, the local governments’ laws of Sri Lanka - the Pradeshiya Sabha Act (sections 93 and 94), the Municipal Council Ordinance (sections 129, 130 and 131) and the Urban Council Ordinance (sections 118, 119 and 120) state that waste, once thrown out on the streets, is the property of the respective local authority (Van Zon & Siriwardena, 2000; Vidanaarachchi, Yuen, & Pilapitiya, 2006).

\textsuperscript{12} Several municipalities have rendered part of the area uninhabitable by dumping garbage on an abandoned paddy field, which used to be a bird paradise (Wipulasena, 2013). This dumpsite created nation-wide attention in 2012, when the residents of Meethotamulla, banding themselves together as the “People’s Movement against the Meethotamulla Garbage Dump”, protested, demanding that the municipal council immediately cease dumping garbage in the area (Wipulasena, 2013).
The local authorities have complete power to sell or dispose of all such matter, and the funds raised should be paid to the credit of the local authority fund.

In addition, municipal councils are empowered to enact by-laws, which are enforceable within the administrative boundaries of the councils. Colombo Municipal Council (CMC) has enacted by-laws in respect to waste management within the Colombo city, the commercial hub of the Western province. These by-laws enhance the local authority’s control over waste management within its city limits. For example, clause 33 in Chapter VIII under Ordinance 8 of 1901 states that, “…no person shall collect or remove any type of waste from any street or public place within the Municipality of Colombo, unless he is authorised to do so in writing by the Chairman.”

Although there are a number of ordinances and acts pertaining to waste management in the country, most of these are outdated; some even dating back to colonial times. This lack of an up-to-date, regulatory framework for end-of-life management of waste impedes the valuable contributions that informal waste workers can make to the waste management in the country. Despite this, an active informal sector in waste management has thrived over the years, particularly in the urban areas of the Western province. This chain of value addition to waste that operates outside the formal wastescape is an effective, yet a complex system with many actors playing different roles along the way.

4.5.3 The Recycling value chain
As mentioned earlier, our focus in this study is on informal plastic waste recycling. This section briefly outlines the complex recycling value chain observed during our fieldwork. Plastic wastes are generated at different points in the Western province, mainly within households and commercial establishments. There is no statutory requirement for separating waste at the source. Therefore all types of wastes are mixed together and these unsorted wastes are collected by local councils or private waste collection companies. Collected waste in most cases are then dumped at a dumpsite owned by the local authority. In some cases recyclables that have a good market are
collected at a local authority managed sorting centre. Recyclables collected by local authorities are given to recycling industries in the area – often to large scale industries who are willing to come and take the recyclables from the local authority centre.

Figure 4.2: The recycling value chain

The informal waste sector operates parallel to the above. There are three main types of waste collectors. The door-to-door waste collectors go from house to house collecting...
recyclables. Although this was a common practice a few years ago, it has now reduced greatly and only a few door-to-door collectors operate. The most common informal waste collectors are street and dumpsite collectors who collect waste from street side waste piles or waste dumpsites. Most door-to-door and street waste collectors sell their waste to home-based waste traders or small junk shops. Dumpsite waste collectors, in addition to the above, sell their waste to middlemen who come to the dumpsite. Apart from this, informal waste collectors sell directly to small-scale plastic pellet or product manufacturing businesses. A focus on large scale recycling and product manufacturing has resulted in a failure to note that there are many small-scale recycling and product manufacturing plants operating as home-based enterprises. Home-based traders and junk shops sell to these small-scale processors, but a majority of their good quality sorted materials are bought over by middlemen or brokers working for bulk dealers in Colombo or for large scale businesses.

Researchers have defined the role of the middlemen or intermediaries differently based on the local context (Medina, 2005b; Mitchell, 2009; Sasaki & Araki, 2013). Based on our fieldwork Similarly, in the Western province of Sri Lanka, we observed that the middlemen and brokers operate at different levels. Middlemen visit dumpsites and buy waste that is already sorted or have networks of people bringing in waste to them. Middlemen often work for larger waste collectors or bulk dealers. There are others who work for large scale recyclers or product manufacturers and engage in buying pellets and products from small-scale businesses. Essentially, in the Sri Lankan context the group that we term ‘middlemen’ add little to no value to the collected waste and engage primarily in reselling the items. Due to their connection with large industries who focus on maximising profit, middlemen also focus on maximising profit and pay low prices for informal waste workers they deal with. In this way middlemen exert power over informal waste workers.

The next section comprises of four case studies that selected to represent four diverse sectors within the informal wastescape in the Western province of Sri Lanka. These individual wastescapes undergo different challenges within the informal waste economy every day. It is important to note that the case studies presented here are creative
reconstructions of information from in-depth interviews, field observations, and informal discussions, forming its basis, are not explicitly referenced hereafter. It is important to note that we have used an approach where our own inferences are merged with the case description. Our own inferences and comments were a result of our experiences working with the informal waste sector, direct observations on the ground, informal discussions with a number of stakeholders and reviewing existing literature. Respondents in the case studies are given pseudonyms. The case study accounts are altered in small details to provide anonymity for the respondents. However, the substance of the account is not altered.

4.6 The informal wastescape: Selected case studies

As presented in Figure 4.2, informal waste workers work in different levels producing a diverse informal wastescape within the Western province of Sri Lanka. They can be broadly categorised into four main groups. The first three groups are the main contributors in the informal wastescape of Sri Lanka, thus considered for the case study narratives presented in this chapter.

1. Waste collectors – Consist of street collectors, dumpsite collectors and door-to-door collectors.
2. Waste traders – Consist of home-based waste sorting facilities and junk shops.
3. Small-scale waste processors/recyclers – A common term used for both plastic pellets and product manufacturers.
   a. Pellet manufacturers – Consist of small-scale recycling facilities manufacturing pellets.
   b. Product manufacturers – Consist of home-based industries manufacturing a specific product from pellets or crushed plastics.
4. Community based organisations (CBOs) – Small community organisations collecting and sorting waste.

Each group in the informal waste economy is enveloped and shaped by many social, political, economic and cultural factors. In what follows, this diverse space is presented as case studies. Each case study tells a story of an informal waste worker’s wastescape and their interactions with the other individual wastescapes. Although centred on the
case studies are presented as four individual informal waste workers' stories, they reflect the reality of many who make their living working with waste in Sri Lanka.

### 4.6.1 The wastescape of a waste collector

Waste collection is the lowest operational level in the informal wastescape. The major reason for being engaged in this type of work is reported as poverty and its related problems (Ezeah, Fazakerley, & Roberts, 2013; Medina, 2005b). The primary author met Saman, a young informal waste collector while he was collecting waste at the largest open dumpsite in Colombo, Meethotamulla dump (Figure 4.3). Saman works mainly on the dumpsite, but occasionally goes out in the streets to collect waste. Waste collectors are often categorised by what they collect or where they collect waste from. Their earnings and conditions of work are decided by this. Saman moves between these modes of collection due to a number of reasons; the main reason being how much he can collect per day. Based on this flexibility he has with his work, he identifies himself as engaged in the free collection of waste. He collects wastes from dumpsites, street-side waste piles and garbage bins, collecting anything he finds valuable; metal, plastic bottles, glass among many other items. The autonomy he has in deciding the hours and the places he can work is one reason he has remained in this work for many years. However, as we continue to explain, the various arrangements that govern the networks of waste exchange make his work far from being independent.

At the time of the interview, Saman was residing in a small settlement bordering the Meethotamulla dump (Figure 4.4). Around 100 families live in this settlement, some in less than one perch (approximately 25m²) of space; many of whom who were engaged in some kind of informal work. It is a common practice for informal collectors to position themselves as close as possible to their source of livelihood (Rouse, 2006b). Saman works at this open dumpsite salvaging recyclable materials under extremely hazardous conditions. Although he works on his own, often whole families are involved, including women and children. For them, the dumpsite provides a large source of recyclable materials. Around 800 tons of waste is dumped here daily.

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13 This dumpsite is overflowing, however no alternative sites or solutions were proposed at the time of the interview.
including hospital and slaughterhouse waste. According to Saman, informal waste collectors at the dumpsite are exposed to broken glasses, needles, sharp metal objects, foul odours of chemicals, mosquitoes and stray dogs all the time. He further noted coming across amputated body parts (which he believes to be from hospitals or mortuaries) among the waste.

The waste recovery at the dump has also captured the attention of many others. Our experiences on the ground indicated that political interference plays an active role within the wastescape including waste collection at dumpsites. Saman described that it has become difficult to work in the dump as some local politicians have assigned groups to collect waste. Saman is of the opinion that waste collection has become an organised business for those who are in power. The presence of a waste mafia is also alluded to. Through informal discussions at the site, we discovered that these politically appointed groups collect roughly 100,000 plastic bottles per day. One bottle is sold for 50 cents, and they earn a total of 50,000 LKR\(^{14}\) (approximately 400 USD)\(^{15}\) per day. These groups also collect more marketable waste types such as tyres, metal and iron. Individual collectors like Saman get what is left over from the trucks, creating competition and conflicts among the collectors. This is one reason for him to be engaged in street waste collection as it supplements his income from the dumpsite.

When Saman goes out collecting waste in the streets, his daily mode of transportation is by foot. Walking long distances is a routine activity in waste collection as public transport drivers usually do not allow waste collectors to travel in the bus with their waste sacks. In Saman’s words, “We are treated as social outcasts, even the beggars are treated better than us.” For this reason, he believes that door-to-door waste collection would have been a better option. Door-to-door collectors are the itinerant buyers who collect or purchase recyclables from households (Van Zon & Siriwardena, 2000). The materials are also of high quality as they are sorted at the source. Saman believes this to be a very dignified mode of operation, but feels he lacks self-confidence to deal with people face-to-face. This stems from the fact that many in the society view

\(^{14}\) Sri Lankan rupees.
\(^{15}\) Approximate exchange rate at the time of writing is 1 USD: 125 LKR.
street and dumpsite waste collectors as thieves and drug addicts. Moreover, in Sri Lanka, informal waste collectors are usually the first suspects if a burglary happens in the area. Saman too had been a victim of this misgiving in the past and had twice been taken to the local police station. In developing countries, waste collectors come from economically and socially marginalised backgrounds (Rouse, 2006b; Wilson et al., 2006), hence they are associated with negative perceptions (Do Carmo & Puppim de Oliveira, 2010). During fieldwork, we noted that a number of informal waste collectors are school dropouts, thus making it difficult for them to find ‘proper’ jobs in a society where education is considered as a status marker.

Whatever he collects, and wherever he collects it from, Saman goes to the same buyers to sell his recyclables. Saman earns about 300-500 LKR (approximately 2-4 USD) on average per day by selling the recyclables to two small junk shops or to a home-based waste trader. He stated that a few buyers come to the dump, but pay a very low price for the materials. Saman’s daily income fluctuates due to other reasons. Poor weather is the primary factor. Sri Lanka is a tropical country and heavy rain is a common occurrence in the Western province. According to Saman, during rainy days, it is impossible to collect waste and even if he does, it fetches a very low price due to being wet.

Most individual waste collectors prefer to sell their collection daily and the day’s earnings fulfil the day’s needs. Saman noted that he never earns enough given that he has to exert a considerable amount of effort for collection. Although the earnings are small, there is a sense of self-satisfaction that he has not resorted to begging. Some waste collectors we met also take pride in helping to reduce vector-borne diseases such as Dengue and Malaria by collecting waste and making the environment cleaner. Despite not being recognised, and belonging to the lowest level of the informal wastescape, informal waste collectors provide an important environmental service, as their activities are responsible for many times more waste recovery than municipal activities in Sri Lanka (Perera, 2007).

While it is clear that Saman’s work complements the municipal waste collection, there are conflicts among formal and informal waste collectors. Saman reported that the municipal collectors often shout at him if they see him collecting waste. Waste
collection is done within a milieu, which is highly competitive. Hence, arguments between the informal waste collectors and the municipal collection crew are not uncommon. However, Saman noted, “I understand them, they too are poor people. They too collect these and sell on their way. I know they shout at me because I am taking away their additional income”. Some of the municipal workers we interviewed reported that they have been working for the same council for more than seven years without having been made permanent. It is a common practice among the council collection crew to collect and sell recyclables to supplement their inadequate income.

Years of waste collection without proper safety measures has degraded Saman’s health substantially. He has cuts and wounds in his hands and feet and suffers from a skin rash. The disadvantages of waste recovery are numerous and usually related to the physical hardships involved in waste recovery. Observations on the ground as well as existing literature indicate that poor health is a common problem among all waste workers (Patwary, O’Hare, & Sarker, 2011). According to Saman, informal waste workers are not entitled to any kind of social support or medical benefit and rarely seek medical assistance for their health problems.

At the end of the interview, Saman mentioned that he is trying to move to a waste collection facility within an Export Processing Zone (EPZ) in the Western province of Sri Lanka. Waste collection facilities within industrial zones receive packaging materials and leftover fabric pieces from the factories; hence, the materials are of better quality. According to Saman, getting access however, is not as easy as he thought, because ‘inside contacts’ are needed to obtain the necessary approvals and an identity card to enter the premise. Saman has been introduced to a group of collectors who have started home-based industries making pillows, soft toys and rugs using what they called ‘garment factory waste’. There is a movement towards starting to view waste collectors as entrepreneurs in their own right, although this change is taking place slowly in Sri Lanka.

Waste collection is the first stage of the recycling industry and in that, informal waste collectors play the most vital role. However, no formal records or statistics are available on the number of waste collectors operating in the country. According to some of our
informants, the number of informal waste collectors has reduced, particularly in Colombo, due to the city beautification projects restricting their movements. Nevertheless, both waste traders and recyclers primarily depend on waste collectors like Saman for their materials. Hence, a waste collector’s wastescape is the foundation on which the whole informal waste economy is built upon.

Figure 4.3: Meethotamulla dump and a waste collector (circled.)
4.6.2 The wastescape of a home-based waste trader

Small traders run collection depots close to city centres or at their own houses, buying waste plastics from individual collectors. The waste has, to some extent, already been sorted, however, these traders usually do further sorting, to increase the value of materials. Anthony is a waste trader who runs a small home-based waste sorting centre in Panadura in the Western province (Figure 4.5). He has started this after the 2004 Tsunami where all sorts of plastics were washed up and stranded in front of his house. Anthony has visited a sorting centre to learn the basics about sorting and has started a waste sorting business at home with the help of his family.

Anthony mainly collects PET (polyethelyne tetrathalate), HDPE (high-density polyethylene) and LDPE (low-density polyethylene). At the beginning, he had to travel to other areas to sell the sorted materials. According to Anthony most home-based sorters spend considerable time and money on transporting their goods to buyers. To avoid this, he has created links with buyers in his area. He refers to some in this network as friends, thus the arrangements with regard to price, quantities and delivery are made on mutual terms. In addition, we found that large-scale buyers from Colombo have set up buying centres in other areas or have brokers buying materials for them. Anthony too sells sorted recyclables to a broker although he does not have any bargaining power in the process. He knows that the broker keeps a considerable profit margin, but chooses not to question this. The buying conditions are usually made by the broker. For example, Anthony gets 85 LKR (0.65 USD) per kilo for LDPE. To fetch that price, the material has to be thoroughly cleaned, and all stickers and labels must be removed. If the material is of low quality, the price is reduced accordingly.

Anthony does not keep any formal records as to how much he collects and sells. Earlier he used to do this to obtain a license from the municipality to collect and sort waste materials. He explained that if he needs to wash the materials, additional approvals are needed from the Central Environment Authority (CEA). Waste sorting centres and
recyclers are prohibited from releasing washing water to public drains. Treating wastewater is a costly process (Jayasekara, 2010), hence, many home-based waste traders try to collect only the clean materials. Anthony is of the opinion that there are many large industries polluting the environment, but the authorities prosecute only the small industries. The other main problem he has is the lack of space to store materials. Although he is a licensee, the local authority does not remove any waste plastics that he is unable to sell. When he made a formal request to the municipality about this, a local authority worker has said, “We burn the plastics we cannot sell, why you don’t do the same?”

According to Anthony, the local authority’s waste collection and sorting system is not managed properly. He noted,

they are doing it merely for the sake of doing it. There was a time they had allocated ten men on the job. When I went to see the progress in the evening, considering the amount they spend on wages for ten men and a supervisor – they have not even collected the amount to cover two men’s salaries. The main issue is that they do not know how to collect and sort plastics properly.

Anthony confirmed Saman’s statement that the municipal workers collect whatever is more valuable and keep it to themselves to be sold later. According to him, there is a hierarchy of people operating in this collection process, where the most powerful gets the best and so on.

Anthony has been operating as a waste sorter for nearly ten years and is well informed. Because of this, he is often asked to attend programs organised by government institutions dealing with waste management. Recalling one memory, he highlighted the inefficiency of the system.

We go on time, and wait about an hour until the chief guest arrives. An hour down the line again the meeting stops for a tea break. By the time the tea break finishes, it is about 11 o’clock. After another half an hour, the chief guest – who is either a Minister or an official – gives a speech and leaves. Then we are served lunch. All we really do is to eat that and come home.
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In Anthony’s opinion, the beneficiaries of these meetings were people who are doing recycling on a larger scale, as they were recognised as formal actors contributing to waste management. During one of his trips to a government institution, he had learnt that loans are available to improve waste recycling businesses. However, small-scale operators were not eligible to apply for the loans. Eligibility was evaluated based on the volumes of plastics collected per month and their monthly earnings. In addition, the ability to deal with banks was also considered. Providing financial assistance was a good idea to motivate people who are engaged in waste recovery and recycling. However, Anthony feels that help was not given to the people who needed it the most.

Anthony also stated that waste management has become a highly politicised business. During our fieldwork, we were able to identify several politicians and their relatives who are actively involved in the recycling business – although not publicly. Buyers, who are acquainted with a political figure, buy from factories and companies and sell the recyclables to waste traders for a higher price. Anthony further explained that they are not allowed to collect waste from an industrial zone in the area any more as a politician’s wife has taken the contract to collect all recyclable waste generated from this trade zone. He concluded the interview adding that, “In another four to five years’ time, all waste-related businesses will be operated and run by politicians.”

It was evident during our fieldwork that the large-scale operators do not usually go up to small waste collectors, sorters or recyclers and purchase recycling material. This mainly has to do with having a brand name to protect – because if they do, they will then be known to manufacture products from waste materials. Some large-scale operators buy recycled products, but not publicly. This buying process happens through a chain of intermediaries. Large companies are willing to sacrifice a small profit margin to maintain their confidentiality. On the other hand, small manufacturers often completely depend on materials collected and sorted by informal waste workers like Saman and Anthony.
4.6.3 The wastescape of a pellet manufacturer

Many small-scale industries prefer to use cheaper reprocessed pellets to reduce raw material costs in product manufacturing. Kumara is a small-scale recycler running a recycling plant in Gampaha district in the Western province. Before this, Kumara was a waste collector, collecting plastics and polythene to be sold to other recyclers. During 2009, a petroleum price drop in the market affected the informal recycling as the buyers stopped buying plastic waste. Kumara had undergone serious financial difficulties during this time. While he was looking at other alternatives, he was encouraged by an environmental organisation to take up a small recycling factory that had closed down. The factory did not have many recycling machines and those remaining were on sale for scrap metal. After a series of discussions with the Mayor, Kumara had been able to get the factory operating.

Kumara manufactures pellets; small plastic pieces made out of recycled plastics (Figure 4.6). He has repaired some of the old machines, an extruder and a compactor that were already there in the factory (Figure 4.7). These were second-hand machines imported...
from India. More advanced machines are available in the market, but Kumara does not have the required capital to purchase a new machine. As reported by Pacheco et al. (2012), a key problem for small recyclers appears to be the lack of initial capital and the lack of access to credit facilities necessary to buy equipment. Financing is mostly done through bank loans or high-interest loans from lenders, which increases the burden of debt. According to Kumara, once the business is set up, expansion is very difficult. New machines require relatively large investments; therefore, most recyclers buy old second-hand machines. Kumara sells his pellets to a businessman who owns a factory that manufactures motorbike helmets. He also hopes to move into product manufacturing, but noted that he does not have the financial capacity to expand his business.

Kumara has a network of collectors who bring him plastics and polythene. According to him, the environment is ‘flooded’ with plastic waste, but the exact type needed for production is not collected in sufficient amounts. The major problem is that people do not separate waste, dumping everything together and contaminating the recyclables. Kumara believes if recycling is to be successful in Sri Lanka, the local authorities and the CEA need to carry out awareness programs for source separation. In Kumara’s opinion, waste separation at the source could be successful to a greater extent, if local authorities maintain the strong position that they will not collect waste which is not properly sorted. Having said that, he added that the local governments are reluctant to take such measures, which could be very effective but would potentially reduce their popularity.

According to Kumara, despite providing a service to the community by collecting and recycling waste plastics and having obtained all the required licences, he is often harassed by the local police who suspect that he is engaged in an illegal activity. Kumara complained that waste collectors and recyclers who have political patronage operate without any licenses and with less trouble from authorities. Informal waste workers are vulnerable to the demands from police and it is a common practice in Sri Lanka to give bribes to police officers to avoid harassment.

Kumara does not have access to any facility to improve his business. Hence, he himself takes care of all the small maintenance in his factory. When there are technical issues
with his machines, he takes the parts to a nearby workshop. He is well informed to give instructions to the technician as to what needs to be done. Kumara has gained all this knowledge through experience. He is actively seeking opportunities to gain access to a program that will help him to improve his knowledge. During our fieldwork, it became clear that while a number of organisations exist in the Western province, opportunities for small-scale recyclers like Kumara are rare as they are working in the informal sector.

Kumara finally added that he would like to experiment with new ideas. One of his experiments was a tile made out of melted plastics mixed with sawdust and sand. Due to the lack of support for innovation, he has conducted his experiments using his own methods, thus exposing himself to serious health hazards and risks. For example, to make the tile, he has melted plastic in an aluminium vessel over a kerosene burner. He understands the dangers of using unsafe methods and believes if proper guidance is given he could experiment with new ideas using safe equipment. This is the main motivation behind his interest to work with Waste for Life.

Figure 4.6: Recycled plastic pellets
4.6.4 The wastescape of a product manufacturer

In many developing countries, the plastic reprocessing industry offers good prospects, mainly because of increasingly high consumption patterns (UNEP, 2009). The demand for plastic products is growing, and so are the amounts of plastic waste being generated as a result. This availability of waste materials in abundance has provided a good opportunity for small-scale businesses to emerge as home-based industries in the Western province of Sri Lanka. Waruna is a small-scale product manufacturer from Bandaragama. He had worked as a waste collector and then in a large product manufacturing plant prior to starting up his own business. Setting up an industry requires not only resources, but drive and determination. Therefore, Waruna identifies himself as an ‘opportunity seeker’. The whole production process runs in a small building adjoining his house. This set-up requires that family members take an active role in the work and largely reduces the labour costs in small-scale businesses.

Product manufacturing requires capital and technology to run effectively. The existing literature reveals that a serious drawback for small-scale entrepreneurs in developing countries is the non-availability of necessary technology and financial assistance to purchase machinery and equipment (Pacheco et al., 2012). Waruna too does not have
the financial capacity to afford brand new machines; hence, he usually buys old used machines sold in the second-hand market imported from China or India. Waruna had obtained a bank loan to purchase this machine. His first loan application was rejected from three different banks and finally he had mortgage the house they live in to buy the machine he needed. This signifies the hardships faced by product manufacturers in the informal economy in accessing formal credit facilities.

The second-hand machines available in the market are broken and often need to be repaired, which incur an extra cost. The other main problem is that these machines are designed for virgin raw materials. Hence, the machines need to be re-programmed to be able to process recycled materials such as pellets or crushed plastics. The obvious decision must be to look for the right source for technology and consult technical experts. Waruna mentioned that they do not have these facilities and have to rely on their own expertise acquired from previous working experience and trial and error methods. This, however, can cause the machines being used to operate at only 50 to 60 per cent of its production capacity.

Waruna manufactures different products depending on buyers’ requirements. This dependency on market forces limits the creativity and product innovation. During the time of the interview, he was manufacturing plastic tea cups (Figure 4.8). His production rate was 150 cups per hour using a hydraulic machine. He usually manufactures a variety of products including such as electric switch boxes, yoghurt spoons and small bottle caps. The production is a very tedious process where the operator has to do engage in the same routine work in an environment filled with plastics, loud machine operating sounds and a fine plastic dust. It was observed that the use of protective gear was also limited.

Waruna explained that each different product needs a different mould, which is the most expensive item in the production process. He himself designs the moulds for the product based on the buyer’s requirement. However, to get the moulds done from an industrial workshop, he needs to spend about 30,000-45,000 LKR (230-350 USD) or sometimes even 65,000 LKR (500 USD) per mould. The lack of technical assistance and access to
workshop facilities are considered a huge barrier to continue and improve small-scale plastic product manufacturing.

Waruna has few connections with outside markets. He finds it difficult to connect with markets as he feels he lacks confidence and marketing skills. He also fears that it will take valuable time out from product manufacturing. Due to these reasons, small-scale manufacturers find it easy to sell their products to brokers or middlemen. He has learnt that some large industries buy their products through brokers and distribute them out in the market under the company’s brand name. Formal industries often outsource their work to home-based workers in the informal economy. Small-scale product manufacturers do not question these complex arrangements due to fear of losing business.

Waruna does not maintain a close relationship with any government authority. He mentioned, “It’s better to operate unnoticed, we have less issues then”. According to him, many small home-based manufacturers operate in isolation. They fear that the authorities either will try to find faults and impose fines or will make them pay heavy taxes. Therefore, the exact number of industries in operation can vary to that of the available statistics. It was evident that a supportive mutual relationship between the authorities and home-based product manufacturers would go a long way in creating a win-win situation in this important industry.
Figure 4.8: Manufacturing plastic cups

4.7 Cross-case analysis

Key themes emerging from the case studies were categorised into three aspects; 1) social, 2) resources and capacity development and, 3) legal and political aspects. The
schematic representation highlights the interconnected relationship between the three aspects (Figure 4.9).

Figure 4.9: Cross case analysis

4.7.1 Social aspects

The negative perception of waste, due partly to the cultural and social hierarchy, has affected peoples’ attitudes towards both the formal and informal waste management sector, but mostly with regards to the informal sector in the Western province of Sri Lanka (Perera, 2007). Although social stigma of informal waste workers in Sri Lanka is slowly changing, we would nevertheless argue that it still remains a problematic issue. It was identified during fieldwork that informal waste workers, in particular informal waste collectors are not regarded as workers by themselves and others. This is partly due to the restrictions imposed by culture, which assigns a negative connotation to waste. The same trend can be seen in other developing countries (Do Carmo & Puppim de Oliveira, 2010; Ezeah et al., 2013; Nas & Jaffè, 2004; Snel, 1999), where in many societies waste is conceptualised as a negative element that threatens the symbolic social order, thus seen as an element that should be disposed of. According to Nas and Jaffè (2004), a UNESCO report published in 2001 has shown that this attitude has even been adopted by waste workers, considering themselves as a social category associated with “sub-human characteristics” (pg. 345). It was also evident that the informal waste workers’ unhealthy working conditions combined with their ascribed status lead to a negative self-perception and a lack of self-confidence as exemplified in Saman’s story.

Despite their service to the society, it was evident that social prejudices towards informal waste workers continue to date in the Western province. Research conducted in other developing countries report similar findings (Ezeah et al., 2013; Samson, 2003; Wilson et al., 2006). From the society’s point of view, those associated with waste take on the characteristics of waste; they embody it and become a metaphor for the identification of waste. They are automatically associated with activities such as crime, violence and misconduct. Societies often avoid ‘uncleanliness’ through acts of separation. These can be discursive as in the form of stigma (Snel, 1999), legal as in the formulation of laws to discriminate against waste workers (Pacheco et al., 2012), and
spatial in terms of physical exclusion (Rouse, 2006b). As marginalised people, they are often associated with negative images of filth, immorality, disorder (Douglas, 1966) and therefore quite literally considered as a group that needs to be kept at a distance from the society. This, when coupled with the fear of the authorities, the fear of harassment by police and the lack of self-confidence make informal waste workers even more isolated and invisible.

Informal waste workers need recognition as workers and an improved status. Access to better living conditions, improved working conditions and economic security are important concerns in achieving this status and autonomy. More pressure needs to be exerted on governments, authorities and citizens to acknowledge the service provided by the informal waste workers. Snel (1999) notes that NGOs and not-for-profit organisations have an important role to play in this. Another way of tackling addressing the low status of waste workers is to help them form co-operatives and CBOs and to add value to their collected materials (Baillie et al., 2010; Chikarmane & Narayan, 2009; Wilson et al., 2006). This form of grassroots development potentially could empower informal waste workers to challenge the hegemonic structures, increase their self-esteem, gain autonomy and improve their living conditions of the informal waste workers.

4.7.2 Resources and capacity development aspect

Researchers (Medina, 2005a; Rouse, 2006a; Wilson et al., 2006) argue that it is crucial to provide support and opportunities to improve informal waste workers’ conditions. Informal waste workers interviewed mentioned that in many instances they are locked out of accessing support and opportunities to improve their work, despite the innovation, creativity and resilience shown by them.

i. Lack of access to credit – Capital investment and access to appropriate financial loans sources is needed to overcome poor machinery, to support innovation and to expand their work businesses. However, as reported during the interviews, financial institutions and authorities are reluctant to provide assistance to the informal waste sector. According to Nas and Jaffe (2004) this hesitation stems
from the lack of modernity associated with informal systems. Introducing micro-lending programs tailored especially to the informal sector could be an effective solution to this.

ii. Lack of access to equipment and other basic resources – The presence of innovation, creativity, and initiative on the part of the small businesses, despite the lack of resources, is one of the most impressive realisations noted during the interviews. At the same time, it was also observed that many informal waste workers work in poor work environments under extremely hazardous health and safety conditions. Their working spaces or workshops are often small with inadequate storage, shelter, and other facilities such as adequate ventilation, access to water and sanitary facilities.

iii. Lack of access to skills training – Skills training is essential for people who are in or want to establish small-scale plastic recycling businesses. According to the interviewees, there are very few options available to informal waste workers to access training facilities and improve their skills and knowledge. Providing skills training and access to workshops for the informal sector has been largely ignored.

iv. Lack of access to markets – In many cases, informal waste workers do not have direct access to markets, which cause them to depend on middlemen for assistance. When it comes to selling their products, there are no opportunities for bargaining. As a result, informal waste workers do not get fair prices for their recyclables and products. This is augmented due to the competition with the formal sector over materials and markets.

During our fieldwork, we identified an organisation, the Godigamuwa Sanasa (co-op) bank that actively support informal waste activities by opening up savings accounts for informal waste collectors who bring in plastic waste to the co-op. Initiatives such as this need to be further studied and introduced to other financial institutions. Further, alternative systems should be developed to end exploitation by middlemen and provide informal waste workers with a better and a more secure access to credit, resources and markets. In light of this, Medina (2005a) notes that supporting the formation of co-ops and micro-enterprises could generate positive outcomes for the informal sector.
4.7.3 Legal and political aspect

As we have elaborated in an earlier section, the legal framework pertaining to waste management in Sri Lanka is outdated and the existing labour laws do not protect informal waste workers. It was found that the informal sector is not recognised in any waste management policy in Sri Lanka. This greatly impedes their safety and security, and their access and right to collect and recycle waste leading to harassment and coercion by police and local authority officials. The relevant laws should be revised to provide recognition and social protection for waste workers and to provide access to waste as a resource. As provided in the ILO Declaration on Fundamental Principles and Rights at Work, all workers, “irrespective of employment status and place of work should be able to enjoy, exercise, and defend their rights.” (International Labour Organisation, 2002, p. 57). To ensure that labour legislation affords rights and space to work, governments should be encouraged to review existing laws to identify and adequately protect all workers.

Waste has been commodified in the Western province of Sri Lanka. The current legal system ascribes ownership to it. Through that, politicians and state representatives easily gain access to waste and its management leading to unjust political involvement. A legal framework, which fails to protect the rights of the informal waste workers, leaves them vulnerable to political corruption. This affects their ability to earn a reasonable income from waste. The case studies described political representatives as one of the main reasons for waste related problems, as they have the power to facilitate or inhibit citizens’ access to public services. This position is clearly backed by evidence from the literature (Patwary et al., 2011; Rouse, 2006b). Politicians have a greater control over who gains access to waste resources either in dumpsites or within industrial zones. In addition, politicians have influence over markets, regulations and environmental licences. Eliminating political influence completely from the wastescape in a highly politicised context like Sri Lanka is a challenge. However, a more regularised mechanism is needed to see whether the decisions are carried out in a more transparent manner.
Although there is a continuous debate for the need for appropriate people-centred technology throughout the developing world, decision-makers in Sri Lanka seem to have underestimated its value. The top-down decision-making in waste management in Sri Lanka has not achieved any positive outcome according to a renowned Environmentalist, Dr. Ajantha Perera (Fernando & Hassan, 2005). She argues that the problem lies with the decision-makers who blindly follow the advice of foreign donors, privatising garbage collection and disposal operations. Therefore, a serious commitment is required from politicians, authorities and urban planners to acknowledge, embrace and recognise the contributions the informal sector make to waste management and poverty reduction in the country. The hegemonic power structures and how these shape the wastescape in the Western province of Sri Lanka will be further discussed in Chapter 5.

4.8 Conclusions

The complexity of problems in the global South such as poverty, social and environmental justice cannot be addressed only through technical solutions. These issues require alternative solutions deriving from the juxtaposition of knowledge from various disciplines. Social sciences have given us excellent tools of analysis and critique, and engineering has provided technological innovations and problem solving to develop innovative solutions. It is however, rare that the tools of social science and engineering domains are brought together to address serious global problems from a critical perspective. Bring these together with an understanding of waste management and we can perhaps develop alternative approaches to waste management which work towards social justice and which contributes to the reduction of poverty. This study presents one element of such an approach. The work described in this chapter demonstrates that informal waste workers experiences are context specific and it is important to ‘hear their voices’ to ensure that the needs of the people we work with are addressed through the proposed engineering project.

In this chapter, we have presented four detailed case studies, each representing a different level of the informal wastescape in the Western province of Sri Lanka; 1) an informal waste collector, 2) a home-based waste trader, 3) a small-scale pellet
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manufacturer and 4) a small-scale product manufacturer. By using case study narratives as a useful tool to present detailed information collected during interviews with informal waste workers, we have attempted to make their invisible stories visible. To the best of our knowledge, this is the first in-depth analysis of the informal wastescape of Sri Lanka. The existing studies are limited in both quantity and quality and focus primarily on informal waste collectors. We have further demonstrated that an in-depth analysis of the informal waste sector as a whole is important to understand how they operate, their links with each other and their contributions to waste management and the local economy.

By constructing the case studies within a framework of a wastescape, we have attempted to capture the socio-economic, cultural, political and legal aspects of waste management in the Western province of Sri Lanka. In addition, by focusing on individual wastescapes, this study aims to provide deeper insights into understanding informal waste management in the context of low-income urban cities more generally. We also note that, while this study provides a sector–specific conclusion, it has broader implications for other types of informal livelihoods in developing cities.

Themes emerging from the cross case analysis highlighted key issues in terms of social, resource and capacity development and legal and political aspects. These provide valuable insights in formulating policies and projects to address both poverty reduction and livelihood creation related to waste management in developing cities. The findings could be useful to a wider audience including engineers, local authorities, engineers, academics, community organisations, NGOs and researchers who are working with informal groups. This study however, did not look at gender specific roles within the informal wastescape. While it was observed that the informal wastescape is dominated by men, women play an active role in waste sorting. The gender differentiation and women’s role within the informal wastescape need to be further investigated in detail.

Finally, the analysis of the interview data revealed the presence of a distinct hierarchy within the wastescape that has been exacerbated by the presence of state representatives who are interested in profiting from the waste. As explained above, people in power have more access to waste and waste related decision-making. In
contrast, people who work with waste have less influence over decision-making, isolating them from the system. This system of power and its implications on the wastescape will be discussed in the next Chapter.

4.9 References


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CHAPTER 5

Waste, Power and Hegemony: A Foucauldian Discourse Analysis of the Wastescape in the Western province of Sri Lanka

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5.1 Abstract

This study explores the power dynamics that shape the wastescape in the Western province of Sri Lanka. Using critical theories of power and hegemony, we investigate how the discourses of ‘expert knowledge’ and formal waste management processes marginalise the discourses and practices of the informal waste sector. By analysing these discourses and practices, we demonstrate how ‘legitimate’ and ‘authoritative’ knowledge is constructed. The analysis uncovered five themes that frame the dominant model of waste management in Sri Lanka; the discourse of development, expert systems, political decision-making, coercion and alienation and removal of waste. We argue that informal waste workers possess valuable knowledge that should be included in decision-making processes related to waste management in the Western province. Small-scale informal waste management can be both a solution to Sri Lanka’s waste problem and a much needed income source for the poor. Thus, instead of alienation, coercion and exclusion, informal waste workers should be recognised as valuable contributors of the urban wastescape in order to create a socially just and sustainable wastescape.

5.2 Introduction

Managing waste in a socially and environmentally acceptable manner is a global challenge. The issue also presents significant economic challenges in developing countries, as waste management often consumes a significant proportion of municipal budgets (Visvanathan & Tränkler, 2003; Zurbrügg, 2003). As a result, local governments in developing countries, especially in high-density urban areas, struggle to provide acceptable waste management services to the public (Van Zon & Siriwardena, 2000; Zurbrügg, 2003). In lieu of an efficient formal system of waste management, these services are supplemented by an informal sector; men, women and even children who collect, sort and recycle waste to make an income (Huysman, 1994; Medina, 2005; Nas & Jaffe, 2004; Rouse, 2006a; Wilson, Velis, & Cheeseman, 2006). Studies indicate, however, that both corporate and State power influences who has access to waste, and who makes decisions about waste; effectively marginalising informal waste workers (Rogerson, 2001; Rouse, 2006b; Sternberg, 2013).
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The waste management system in Sri Lanka also has an informal waste sector (Jayasinghe et al., 2013; A. Perera, 2007). Despite providing a useful service, and achieving impressive results in waste recovery and recycling, they have been remain the unrecognised stakeholders of the urban waste landscape (A. Perera, 2007). Our experiences and that of others reveal the presence of a distinct hierarchy within the waste management system in Sri Lanka (Environmental Foundation LTD., 2007; A. Perera, 2007). In addition, there is also an increasing preference for large-scale waste management systems approaches, despite these projects typically failing (Berenger & Fazlulhaq, 2009; Fernando & Hassan, 2005; Q. Perera, 2014; Weerasinghe, 2009; Withanage, 2009). Large-scale waste management projects and top-down decision-making further marginalises informal waste workers. We argue that the hegemony of formal discourses of waste management in Sri Lanka has led to the subordination of informal waste worker claims to legitimate knowledge, and created a socially unjust waste management system.

The aim of this chapter is to explore the power dynamics that shape the waste management sector in the Western province of Sri Lanka. Using the theories of Michel Foucault (1972, 1980) and Antonio Gramsci (1971) we investigate how the more powerful discourses of ‘expert knowledge’ and formal waste management processes marginalise the discourses of the informal waste sector. By analysing these discourses and practices, we attempt to understand how ‘legitimate’ and ‘authoritative’ knowledge is constructed. Our analysis shows that dominant power relations have created structures of oppression that marginalise informal waste workers. We argue that informal waste workers possess valuable knowledge that should be included in decision-making processes related to waste management in the Western province of Sri Lanka. Small-scale informal waste management can be both a solution to Sri Lanka’s waste problem and a much needed income source for the poor.

In this chapter, we employ the term wastescape to conceptualise the social and physical space(s) within which power operates. The notion of ‘scapes’ is based on Appadurai’s (1990) analysis of global cultural flows. He uses the suffix ‘-scape’ to highlight two aspects. Firstly, scapes are constantly changing. Secondly, scapes derive meaning from
the perceptions of social actors. Researchers have applied this concept to notions of ‘landscape’ and ‘waterscape’ (Swyngedouw, 1999; Zimmer, 2011). The idea of a wastescape includes both waste as material, and as a social-space constructed by and (re)producing a set of unequal social, cultural and political relationships. Thus, a wastescape in this chapter is conceptualised as a space where hegemonic power operates to define ‘legitimate’ knowledge related to waste management.

The organisation Waste for Life (WFL)\textsuperscript{16} supports alternative approaches that value informal practices of waste management (Baillie, 2012). WFL’s mission is to “provide access to scientific knowledge and technology, usually circumscribed by privilege, to people living on society’s margins” (Waste for Life, n.d.). Understanding the implications of dominant ideologies in the Sri Lankan wastescape was critical in order to position the activities of WFL to achieve their emancipatory objectives\textsuperscript{17}. As a result, a three year feasibility study was conducted to explore the social, political and economic context in which the WFL programs might be developed.

We begin this chapter with a summary of Foucault’s and Gramsci’s theories of power. In the third section we provide a summary of the methodological framework adopted; a Foucauldian discourse analysis. Section four presents the contexts of formal and informal wastescapes in the Western province of Sri Lanka as a background to the discussion presented in section five. In section five we present our empirical research findings that show how legitimate and authoritative knowledge is created, marginalising alternative informal knowledge. In the final section, the implications of the research findings are discussed in a wider context.

\textsuperscript{16} This research is part of a broader project developed by the not-for-profit organisation Waste for Life (WFL), which aims at co-creating poverty reducing solutions for marginalised groups working with waste (Baillie, 2012; Baillie, Feinblatt, Thamee, & Berrington, 2010).

\textsuperscript{17} WFL’s vision: “Waste for Life believes that broad and equal access to society’s resources are the foundations of a just society. Our mission is to provide access to scientific knowledge and technology, usually circumscribed by privilege, to people living on society’s margins. We leverage our network to open up pathways towards autonomy and genuine economic security for people who need it most – those living at the intersections of waste and poverty. Our work is value-driven because it is based upon principals of solidarity, cooperative interchange, and social justice. It is political because we put our values into action” (See \url{http://wasteforlife.org}).
5.3 Exploring Power

This study employs theories developed by Michel Foucault and Antonio Gramsci to unpack relationships of power and domination in waste management processes in the Western province of Sri Lanka. We adopt the perspective that power and domination emerge through subjugating discourses, an ideational superstructure, and a cultural frame that operates to ‘naturalize’ inequality between social groups. The purpose of this study is to provide a ‘thick description’ of the lived experiences of inequality experienced by informal waste workers in Sri Lanka, and to represent the symbolic struggles, antagonisms and forms of resistance that underpin claims to legitimate knowledge. A theoretical lens through which to investigate the dynamics of power and domination in the context of a wastescape, and indeed one which emphasises the role of discourse is imperative. Whilst Foucault and Gramsci address power from different, yet we believe complementary perspectives, they can be used productively together to understand the operation of hegemonic power structures in society (Ekers & Loftus, 2008).

5.3.1 Power, Discourse, and Knowledge – The Foucauldian approach

Even after his death, Michel Foucault remains one of the most relevant and influential theorist of power. His ground-breaking, post-1976 understanding of power took the focus from the dominant Marxist model of power; a model in which the economic system is said to produce a form of inequality which plays out in class struggle. Foucault, however, proposed that power is much more diffuse and pervasive and resides more broadly in ‘relations of force’ (Foucault, 2003) - or repression - that preserve a particular distribution of power. He argues that power “never exists here or there, [it is] never in anybody’s hands…. [rather] it functions in the form of a chain” (1980, p. 98). In other words, power is nothing without its object; it can only exist and be nourished within a context of relations. According to Foucault, power resides everywhere, and repression can derive from anything which “circumscribes the actions of others” (Patton, 2013, p. 184). Power is the font from which springs what we believe to be ‘truth’, knowledge, and our ideas of what is right and wrong. Most importantly, it is a disciplining power which is produced ‘by multiple forms of constraint’ (Foucault in
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Rabinow, 1991). In this sense, ‘truth’, knowledge, concepts, institutions and practices are not neutral, objective or universal aspects (as they may appear) but simply the projections of power and domination (Arvanitakis, 2009).

Drawing on Foucault’s understanding of power we apply it to an analysis of the stakeholders involved in waste management in the Western province of Sri Lanka. These stakeholders operate in what we term a wastescape – a social space of competing discourses. A discourse is an established, coherent system of meaning, or to borrow Ricoeur’s term, a ‘world’ (Thompson, 1985). Foucault defines discourse as a combination of themes, concepts and statements that structure our experiences and perception of ‘reality’. Power emerges because discourses are principally organised around practices of exclusion. Strega (2005), for instance, points out that dominant or ‘legitimate’ discourses and subordinate or ‘illegitimate’ discourses are simultaneously constructed through “sanctioning, including, excluding, valuing, and devaluing of certain concepts, ideas, language, and worlds” (p.219) by those who have power. A discourse emerges from that which it excludes, and simultaneously the processes of exclusion create positively privileged groups who exercise power over those they marginalise. An identification of the discourses, their field of operation, and the subjects and objects constituted by them can be regarded as indicating how power is deployed and knowledge formed between social groups within a system. This forms the basis of our analysis of power structures within the wastescape of Sri Lanka.

Importantly, Foucault provides a method for analysing the subtle ways that power is exercised in society, and how knowledge becomes accepted as ‘truth’. Foucault’s history of social institutions, the prison for example, reveals this method; a method he refers to as the ‘archaeology’ of knowledge. By this is meant the tracing of the descent origins of knowledge, ideas and understandings of the world – collectively understood as discourse - with a particular focus on the formation of systems of exclusion and control. In short, Foucault suggests that we can understand what power is, and how it operates, through an understanding of where it comes from. In Foucault’s archaeology of power, discourse is the principle unit of analysis because it is the primordial force constituting subjectivity. Discourse operates to simultaneously create,
constrain, empower and limit individuals, and by so doing defines their field of possibilities.

5.3.2 Power and hegemony – The Gramscian approach

Antonio Gramsci is often described as a Marxist thinker, yet like Foucault, his work is best noted for its rejection of the simplistic economic determinism of Marxism. Gramsci’s most important theoretical contribution to the understanding of power is found in his notion of hegemony. His principle argument is that power emerges not only from the economic system, but also from political force, and an ideological apparatus to which the powerless consent. Thus, the hegemonic process, whilst not excluding Marx’s historical materialism, incorporates what Martinez-Guillem (2013) has described as a “coercion + consent formula” (p. 191). The coercion side of the equation relates to the state, which has at its disposal a formal legislative and judicial framework and a monopoly on the legitimate exercise of physical force. The emphasis on the consent side of the equation is the core of Gramsci’s notion of hegemony and the element that best reflects a Foucauldian understanding of power. Conceptualising ‘hegemony as discourse’ certainly enables us to employ these two theoretical lenses in our analysis of both formal and informal wastescapes in Sri Lanka. But how does the inclusion of a Gramscian perspective add to the robustness of our analysis, and more importantly how does it extend Foucault’s focus on discourse?

Firstly, a Gramscian perspective allows us to understand power as being linked to a political project, something which has become buried in Foucault’s understanding of power. Gramsci draws our attention to the ideational superstructure, those enterprises that emerge from and sustain a dominant ideology. These include not only the state, the government, and political parties – what we collectively call political society; but also the ‘private’ associations and groups we recognise as constituting civil society. As Buttigieg (1995) argues, Gramsci is concerned with relations of power that form at the intersection of society, economy and the state. If Foucault’s principle concern is the way discourse “privilege[s] those versions of social reality that legitimate existing power relations” (Willig, 2008, p. 113); Gramsci’s is with the apparatuses of power that define and reinforce these discourses of power.
Secondly, Gramsci points specifically to the role of culture in sustaining power relations. Culture acts as the social cement that binds political and civil society, and the economy, into a hegemonic bloc. Culture is the ‘taken for granted’ view of the world that bolsters powerful social groups through a body of ideas that legitimises subordination and oppression. Race, caste and class, for example, are social stratifications which are ‘normalized’ through a body of accepted ideas (a discourse) that surrounds and subordinates – differentiates - particular social groups. Whilst individual acts of discrimination are often enacted through negative representations which ‘position’ a person in society, engrained ideas about social difference can also become institutionalized within such things as the labour and housing markets, further intensifying a subordinate group’s alienation and consolidating existing power hierarchies. Culture, in the Gramscian perspective, acts to mask power, yet Gramsci suggests it is also a potentially revolutionary terrain in which to resist and transform hegemony. This chapter employs Gramsci’s theory of culture to examine, in the context of waste management in Sri Lanka, the symbolic dimensions of power and privilege.

5.4 Methodology

5.4.1 Justification of the methodology

For the purpose of this project, a Foucauldian discourse analysis was selected as the appropriate method. A Foucauldian discourse analysis goes beyond a textual discourse analysis, seeing by conceptualising discourse as a reflection of wider social and cultural processes, including its structures. These social and cultural processes include those of inequality and domination (Landertinger, 2011; Mushtaq, 2011). In this chapter we critically analyse those structures and actors that marginalise informal activities waste workers.

Researchers have rarely explained in detail their Foucauldian discourse analytic method. Berg (2009) notes that “some of this reticence comes from Foucault’s own distaste for outlining his methods, but it also comes from a post-positivist sensibility that is itself wary of the idea of a simple list of methods that can be applied to discourse analysis.” (p.218). Nevertheless, we argue that it is important to explain our methodology in
more detail, and allow greater accessibility to transparency in the analytical process, for those unused to epistemologies and approaches very different from our own, including those involved in waste management.

5.4.2 Data collection

An ethnographic approach was adopted for data gathering which employed open-ended, in-depth interviews and ethnographic fieldwork conducted in the Western province of Sri Lanka. We conducted interviews with a range of stakeholders including formal and informal waste collectors, recyclers, community based organisations, government officials, private companies, professionals, NGOs, environmental groups and households. Interviews were conducted in Sinhala, or a mixture of Sinhala and English, depending on the respondents’ preference. Interviews were audio and/or video recorded with the participants’ consent. A variety of textual data were also used, including newspaper articles and official publications.

We analysed the content of the transcripts and other materials to extract the ‘truth claims’ and underlying assumptions held by the participants. We focused on the discourses of the dominant groups as well as the marginalised groups. By doing so we have included counter-narratives and forms of resistance. We have further highlighted the justifications that are informed by socio-political assumptions (which are usually not explicitly stated) about waste management in Sri Lanka.

5.4.3 Analysis

Willig’s (2008, pp. 115-117) work on Foucauldian Discourse Analysis was adopted as a guide for this paper (Figure 5.1). This approach draws on Foucault’s ‘archaeological’ work (Foucault, 1972) which exposes the ways through which discourses are formed and operate, especially in their positioning of subjects, objects, and practices within hierarchical relationships of power. This was combined with Gramsci’s theory of culture to examine the symbolic dimensions of power and privilege in the context of wastescape in the Western province of Sri Lanka.
Figure 5.1. Stages of Foucauldian Discourse Analysis (Adopted by Willig, 2008, pp. 115-117)
5.5 Context setting: Formal and informal wastescapes in the Western province of Sri Lanka

The institutional framework related to waste management in Sri Lanka can be distinguished at national, provincial and local government levels. At the national level the Ministry of Environment and Natural Resources is the main policy making body for environmental management, including waste management (Ministry of Environment and Natural Resources, 2007). The National Environment Act (NEA) established in 1980 was amended in 1988 to instate the Central Environmental Authority (CEA) (Premakumara, 2011). The CEA has the authority to issue directives to the local councils to act to ‘protect and manage’ the environment. Whilst the CEA has overarching responsibility for developing waste management policy in Sri Lanka, the immediate responsibility for the management of waste lies with local councils, as stipulated by the respective legal enactments (the Municipal Councils Ordinance, Urban Councils Ordinance, and the Pradeshiya Sabhas (rural) Act) (UNEP & South Asia Co-operative Environment Programme, 2001; Vidanaarachchi et al., 2006). These ordinances and acts state that waste collected by local councils remains the property of the councils. As a consequence, the council has sole right to sell or dispose of waste at designated sites.

At the local government level the responsibility for waste management generally falls to the Public Health Department, under the supervision of the Public Health Inspector (PHI) (Premakumara, 2011; UNEP & South Asia Co-operative Environment Programme, 2001). The PHIs are responsible for several public health and sanitation related duties, one of which is solid waste management. Under the supervision of the PHI, most local councils independently operate waste management services, whilst some councils, including the Colombo Municipal Council, have outsourced waste collection and disposal to the private sector companies. The challenge of waste management, in particular waste disposal, is most pressing in the Western province and so recently the Western Provincial Council established a separate authority – the Western Province Waste Management Authority - to manage waste in their administrative area. Other organisations such as universities, environmental
organisations, and private consulting firms also provide services and undertake research on waste related issues in Sri Lanka.

The Ministry of Environment and Natural resources, the CEA, Western Province Waste Management Authority, local councils, consulting firms, private organisations and, at times, the environmental organisations and the universities exist as collectively constitute what Giddens (1991) terms the expert systems that define the policies, practices and legislation governing the wastescape in the Western Province of Sri Lanka. Politicians, government officials, experts and professionals in these institutions who have the formal authority to make decisions related to waste management constitute the decision makers.

Despite these formal regulatory frameworks for managing waste, poor waste management remains the most serious environmental problem in the Western province. The widespread method of waste disposal in the urban centres of the Western province still continue to be open dumping (Bandara, 2008) - the disposal of waste without measures to control leachate, harmful gases or odours. The majority of these open dump sites are situated in low lying areas and abandoned land; in which solid waste is dumped as a means of in-filling land. In this method waste is not sorted. All waste, including hazardous waste from industry and hospitals, are dumped alongside other municipal waste causing serious social, environmental and health issues (Environmental Foundation LTD., 2007).

Decision makers formally responsible for managing waste come up with ‘solutions’ to the waste problem time to time. Consequently, in response to these issues a number of large scale waste management projects have been proposed, introduced and implemented to address the waste problem (Auditor General’s Department, 2003). In 2008 the largest nation-wide solid waste management programme called ‘Pilisaru’ (The word Pilisaru means regaining the usefulness in Sinhala) was launched by the Ministry of Environment & Natural Resources of Sri Lanka at a cost of 5.675 billion Sri Lankan Rupees. The motto of the programme was ‘Towards waste free Sri Lanka by 2012’ (Edirisinghe, 2008). The Pilisaru project was the largest fund allocation for a waste
management programme in Sri Lanka. The program was implemented for a period of 3 years and was coordinated by the CEA. It included (Dassanayake, 2011);

1. Preparation of a national waste management policy.
2. Capacity building and awareness creation for those involved with waste management.
3. Provision of technical assistance and resources to local councils to improve ongoing waste management programmes and to develop new initiatives.
4. Monitoring of waste management programmes throughout the country.
5. Taking legal actions as an approach to address non-compliance by responsible parties.

Whilst the Ministry of Environment & Natural Resources and the CEA claim that the project has had satisfactory results (Dassanayake, 2011) our observations on the ground and the continuation of unmanaged open dumps such as Meethotamulla and Karadiyaana in the Western province indicate that the project has not returned value for money. Despite the Pilisaru project having funds allocated for provisioning technical assistance and resources to local councils, our interviews revealed that most local councils lack well-managed waste recovery and recycling systems to date, particularly for plastic wastes.

Waste recycling has the advantage of significantly reducing the volume of waste that ends up in disposal sites. When recyclable wastes are not removed from the waste stream a large volume of waste (sometimes the entire volume) generated within an area must be dumped, as is the case in many local councils in the Western province of Sri Lanka (A. Perera, 2007). This places even greater pressure on waste management; and because it is difficult to find appropriate disposal sites, existing ones are often over-filled, leading to waste being accumulated in large quantities over short periods of time. Over-filling of large waste disposal sites such as the Blomendhal, Meethotamulla and Karadiyaana sites has had negative environmental and social impacts including water and air pollution and associated health issues (Berenger & Fazlulhaq, 2009; De Silva & Jayamanne, 2008; Jabbar, 2013; Wipulasena, 2013).
In the absence of well-organised and effective formal waste recovery and recycling systems, additional services are provided by an active informal waste sector in Sri Lanka. This sector consists of workers who are not associated with public or private organisations yet depend on waste for their livelihood. They independently provide an important service by recovering, sorting and recycling plastic waste. Informal waste workers in Sri Lanka include:

1. Waste collectors who collect waste from houses, roadsides and waste dumps.
2. Waste sorters who operate junk shops or home based industries. They collect waste independently and/or buy from waste collectors.
3. Waste processors who use machines to turn waste materials to make intermediate (plastic pellets) or end-products.
4. Community based organisations that collect and sort waste.

These informal waste workers add value to waste by collecting, sorting, cleaning and aggregating materials into commercially viable quantities and manufacturing simple consumer products. There are also middlemen operating at each level of the informal waste economy who buy sorted wastes, pellets or end products and sell it to interested parties. Our fieldwork suggests that these middlemen pay low prices for recyclables or manufactured products to the point where they often exploit informal waste workers.

Due to the nature of WFL’s waste-based composite project, our main focus in this chapter is on plastic recycling. Plastic recycling in Sri Lanka is primarily dependent on the informal waste sector (A. Perera, 2007; Van Zon & Siriwardena, 2000). Our study shows that informal waste workers are highly knowledgeable about the plastics recycling industry. Waste collectors and waste traders know precisely what types of plastic materials to collect; where to collect them from; and how to identify different plastic types. Furthermore, small scale waste processors know what recyclable materials are suitable for making different intermediate and end-products and have creative ideas about new products. Some small-scale waste processors even have the skills to design specialised equipment to use in the manufacturing process.
With these skills, knowledge and an extensive industry network, the informal waste sector benefits the country’s economy in several ways (A. Perera, 2007; van Horen, 2004; Van Zon & Siriwardena, 2000). Fore mostly, the informal sector creates livelihoods for the poor. Whilst collecting, sorting and processing waste may generate relatively small financial returns, it nevertheless provides an income source for poor families and contributes to poverty reduction. In addition, the informal waste sector reduces waste collection and management costs for local councils, and through the provision of raw materials provides cost savings for the plastic manufacturing industry. Some collected recyclables, such as PET bottles, are exported to India, generating foreign income. Moreover, small scale processors manufacture low-cost, affordable products made from recycled materials suited to the local market. These products range from simple household items (cups, plates, buckets, basins, toys, bags etc.) to industrial items (construction polythene, plastic containers, brush handles etc.). Informal waste collection also renders significant environmental benefits by reducing the amount of wastes that need to be collected, transported and disposed of. Further, recycling materials saves energy, water and generates less pollution than obtaining virgin materials contributing to environmental conservation.

Despite these positive economic and environmental contributions to society, informal waste workers and the knowledge and skills they possess are marginalised. This marginalisation takes several forms. In Sri Lankan society informal waste workers are routinely identified with the polluting substances with which they deal, and are subject to cultural representations which construct them as both hostile and ‘threatening’. Sri Lankan society seeks symbolic processes of separation to exclude informal waste workers. They exist as a ‘pariah group’ – one which suffers various forms of discrimination. Because informal waste workers operate within a hierarchy of inequality that brings about social restrictions and deprivations, they are routinely denied recognition for the skills and knowledge they have, even if these, as we argue, have the potential to make a positive contribution to shared and valued social goals. An investigation of these mechanisms of exclusion allows for a better understanding of positively privileged groups who exercise power within the wastescape of Sri Lanka.
5.6 Exploring hegemonic power and discourse within the wastescape

5.6.1 The discourse of development

Economic and infrastructure development is a priority for government policy in Sri Lanka, a country aspiring to be an important economic hub in South Asia (Mahinda Chinthana, 2010). With the end of the 30-year long civil war in 2009, the government revamped their initiated plans to carry out city beautification programs. Colombo, the commercial hub of both the Western province and the entire country, was given special attention, as Colombo, the commercial hub of the country, is located within the Western province. During the time of our fieldwork, a number of development projects were in progress. These included refurbishing colonial buildings, re-paving roads and sidewalks, landscaping roundabouts and cleaning waterways. Moreover, jogging tracks, new highways and recreational areas were constructed as part of the city beautification programs. Yet rather than tackle the main issue of ‘developing’ cities, the efficient management of waste problem, the local councils have simply relegated waste to the outer areas of the cities. While the big cities are now clean and revamped, the fringes of the cities struggle with growing garbage dumps.

‘Development’ is a prominent discourse in Sri Lanka, even in waste management. The discourse of development has a significant impact on waste policies and practices and has been given a higher priority over competing discourses. For example, discourses relating to the environment, social impact, and informal knowledge have less influence on waste related decision-making. The impact of the discourse of development is twofold. Firstly, it directs the decision-making process in relation to waste management and determines who makes those decisions. Secondly, it subjugates and regulates the informal waste collection and processing activities within the city.

The ‘science of waste management’ is part of a dominant discourse monopolized by expert-systems whose recommendations are routinely adopted by decision-makers within government, private organisations and local councils. A common desire among decision-makers and expert systems is to replicate waste management systems that have been implemented in developed countries. For instance, decision-makers interviewed in this study stressed that Sri Lanka requires the technology to ‘catch up with’ waste
management systems in Japan, Australia and Europe. In relation to our study, a senior official from a government waste management authority asked;

Why implement a project for informal waste workers? Haven’t you visited any waste facilities in Australia? Those are the kinds of project we need here, not some small-scale project for informal workers.

Perera (2007) has demonstrated that ‘blindly copying the North’ has led to unsuccessful projects and an inefficient waste management system in the Western province of Sri Lanka. The dominant ideology of waste management, as a system that needs to be imported from developed countries, has also created tension between the public and decision-makers, as seen with several public protests staged against proposed landfill projects (Withanage, 2009).

It was also evident during our fieldwork that the city beautification projects in the Western province have promoted regulations to ensure streets remain ‘safer’ and ‘cleaner’. Decision-makers highlighted the importance of ‘clean cities’ to attract new commercial investments, promote tourism and enhance the aesthetic appeal of new infrastructure developments. Waste is seen as an element that threatens the image of the ‘new city’. Those whose livelihood depends on waste, specifically informal waste workers, who embody poverty and disorder, threaten the purity of the imagined ‘clean city’. Decision-makers see informal waste sector as an embarrassment and frequently attempt to relegate them to the margins of the city, especially when foreign delegations are visiting the country for important events. This was evident during the Commonwealth Heads of Government (CHOGM) meeting held in Colombo in 2013 where the city authorities prevented informal waste workers from carrying out their work or removed or blocked informal waste activities from city limits. By representing waste as a polluting substance, the development discourse consequently subjugates and marginalises informal waste workers.

In this environment, a recurrent theme emerging from our interviews with decision-makers was the ambition to ‘improve’ the lives of informal waste workers by integrating them into the formal waste management system – essentially to provide...
them a job with a government or private waste management company. Conversely, informal waste workers stressed the value of autonomy, independence and working outside the formal waste management system. Many informal waste workers also stressed the value of helping each other, a better social life, links to wider social networks and more public recognition for their contributions. This challenges the discourse of development and the assumption of decision-makers that ‘proper’ and valued employment can only be achieved within the formal wastescape and through wage labour.

5.6.2 Expert systems

‘Expertise’ is a normative trope driving discussions of waste management in the Western province of Sri Lanka. These discussions are dominated by the contributions of people who have acquired a particular type of knowledge and skill-set. It was evident that decisions relating to waste management are based on the knowledge produced by expert systems, and take into account factors such as the established waste hierarchy, budgetary constraints, access to technology and human resources. These decisions are further strengthened through a superstructure which reflects the hegemony of the capitalist economy, the government and civil society.

In contrast, the knowledge and skills of informal waste workers is not accepted as legitimate knowledge within the formal wastescape. They receive no recognition for their practical contributions to waste management, or for their valuable insights into how waste management programs could be more effective. One informal waste worker who attended a meeting at a government waste management organisation lamented the fact that:

I had some good things to share, but everyone was busy listening to what the ‘experts’ had to say. The only good thing I got from attending was a piece of cake and a cup of tea.

If these forums are organised in a sensitive and a locally grounded manner, they could serve as effective spaces to co-produce knowledge, as these are the forums where both formal and informal groups come together. Our interviews with both formal and
informal groups in waste management, however, confirmed that both groups hold contrasting priorities and, as a result, maintains a distance between each other that prevents the possibility of effective communication happening. While formal groups are interested in politics, large-scale solutions and financing, informal groups seek opportunities to improve their small-scale waste businesses.

The dominance of experts in processes of waste related decision-making rests on their fluency within and commitment to the discourses of science & bureaucracy. During our interviews, experts relied on the assumed efficacy of technology, published research, statistics and other forms of ‘scientific evidence’ to legitimise their recommendations to decision-makers. Recourse to statistics and figures to quantify the performance of waste programmes was common, albeit with little or no reference to how the data were collected, or the figures calculated. Most of this research was undertaken by independent research consultants or publically-funded universities. Waste management decisions were then made based on their findings. Experts were reluctant to question their own assumptions or criticise current practice.

It was also accepted commonly accepted among both the decision-makers and the public that experts consider all potential impacts of waste management practices and can be trusted to provide the best outcome. Typically, outcomes are thought to be successful when waste management programs maximise human use of the environment. The inference is that the environment has no intrinsic value beyond human use. Despite arguing that decisions are made to safeguard the environment and the greater good of the public, experts assume it is ‘unavoidable’ that large waste management projects will have negative environmental and social impacts, simply ‘because they take up more space, funds, and resources’. There is a notion of ‘sacrifice’ (in terms of willingness to cause environmental and at times social damage) that exponentially increases with the size of the project. For example, on the topic of siting a large scale waste disposal site outside Colombo, one official from a private organisation stated that, “[t]here will always be someone who will have to bare the negative impacts and that is inevitable”. They went on to justify these ideas by employing terms such as ‘risk matrices’;
In the discourse of expert systems, the environment becomes subject to calculation and objectification. Informal waste workers who do not have access to this vocabulary, nor subscribe to an ideology which sees development as being contingent on environmental and social risk, are excluded from decision-making processes. This demonstrates the manner in which alternative ‘truths’ are alienated and disempowered. Often, these scientific discourses are deployed to further the interests of different parties, where, for instance, the government and the private sector promote certain discourses on large projects in order to further their own interests.

5.6.3 Political decision-making

Political decision-making plays an important role in the wastescape of the Western province of Sri Lanka. It was evident that like in many developing countries (Rouse, 2006b; Sternberg, 2013) decision-making related to waste management in Sri Lanka takes a top-down approach. As a result, the potential of the informal waste sector and their contributions to the wastescape in the Western province in terms of livelihood creation, waste reduction and environmental conservation remains unrealised. During our fieldwork, it was noted that decision-makers realise the informal waste sector’s potential to carry out recycling efficiently in the Western province, but they were nevertheless dismissive of their contribution. One reason for this could be the lack of knowledge and incomplete information about the informal waste sector in the Western province of Sri Lanka (A. Perera, 2007).

It was also evident that the focus of decision-makers is not on the process of managing waste prior to disposal — through for instance encouraging waste sorting and recycling —, but trying to find solutions after waste has been disposed of. They focus on large investments to construct disposal facilities, with the assumption that a lasting solution to the waste problem can only be found by constructing landfills. Officials used terms such as ‘most effective’, ‘sustainable’, and ‘large-scale’ to highlight the importance of
landfills. For example, regarding the Meepe landfill, a high-ranking official was of the opinion that:

The most effective option available to solve the garbage issue in a sustainable manner in the Western province is immediately implementing the landfill site at Meepe. No other measure will bring the desired results.

Political decision-making often fails to take into account the concerns of informal waste workers and local communities. In fact, it is clear that decision-makers often insert their own personal priorities into projects and make decisions based on vested interests such as monetary gains from large contracts and opportunities for foreign visits. These decisions often contradict the desires of local communities and informal waste workers.

Informal waste workers are excluded from decision-making and policy development related to waste management. One social activist believed it is important to include informal waste workers, as co-creators of knowledge in waste related policy-making, as they play an active role in waste management. Yet they are the people who are the most alienated from contributing to knowledge creation and policy-making. Perhaps this is why in our interviews informal waste workers rarely mentioned the success or failure of official waste programmes; preferring instead to narrate their personal stories. Some long term informal waste workers did give their views on why they think particular waste projects failed and what could have been done differently. Yet such feedback is rarely acknowledged by decision-makers. The value of consultation between decision-makers and informal waste workers is often overlooked.

Our interviews also revealed that decision-makers occupying positions in government and local councils routinely change. This has a negative impact on the governance of waste management. One example is the disruption to, or terminating of, a project; or the revision of an ongoing project due to political or administrative change. One government official, reflecting on his own experiences of a terminated waste project, stated that:
The project was good, we could see good results. However, we were asked to discontinue it. The new Minister did not want to go ahead with the project. You know how things work here, I think he was afraid that the previous Minister [who was from the opposition political party] would get all the credit.

5.6.4 Coercion and alienation

Both As mentioned earlier, both our research and existing reports suggest that some of the large-scale waste management solutions implemented by local councils and the government have proven to be inefficient or unpopular with the public (Auditor General’s Department, 2003; Fernando & Hassan, 2005; Wipulasena, 2013). They have also led to public protest, as in the case of the Meethotamulla dump, whereby the neighbouring community mobilised to form the ‘People’s movement against the Meethotamulla garbage dump’. Despite public opposition, however, decision-makers have maintained these strategies, with plans now to use abandoned limestone quarries in Puttalam to dispose of waste from the Colombo district. Decision-makers have, in fact, increasingly taken coercive measures to ensure their waste management projects are implemented, or current disposal practices continued, either by ignoring public protests, or in some cases prosecuting the protestors.

Those informal waste workers interviewed believed that political involvement and vested economic interests has aggravated current waste management problems. The privatisation of waste management in Sri Lanka is a case in point. Privatisation served as a means for companies to assert ownership over waste and profit from the disposal process. According to one informal waste worker, most informal waste collectors have been forced to abandon this income producing activity as it is too difficult to compete with private waste collecting companies. He further stated that, where the informal waste workers had previously had free access to waste access to the entry to dump sites and waste disposal areas. Another informal waste collector stated that:
Now we are not allowed to collect waste materials from factories within a trade zone in this area. All waste is taken by a private contractor. We were told that a Minister’s wife handles it. We cannot fight them.

As previously explained, when it comes to implementing waste management projects, consulting informal workers and the public, knowledge sharing or participatory approaches are often ignored. Any fora which may be described as inclusive are generally designed to ‘educate’ local communities and informal waste workers. This translates into a one-directional approach to knowledge sharing— from ‘experts’ to ‘non-experts’. The purpose of conducting open meetings and discussions is merely to sustain a veneer of public consultation; or they are used as opportunities to present results, answer questions, or simply show they ‘want to listen’. The scientific and technical vocabulary used during these meetings alienated informal waste workers, preventing them from engaging in any form of meaningful dialogue. Moreover, during fieldwork, the primary author attended a number of discussions and public presentations on waste management. These were often conducted in English, which served as a barrier to those who are not fluent in this language. In this way, the discussions privileges those with a particular professional educational background, namely those designated as “experts” in formal waste management practices.

When asked about knowledge co-creation with informal waste workers, decision-makers often pointed to training programs, meetings, and workshops organised for informal waste workers. Decision-makers highlighted the importance of disseminating information to informal waste workers to ‘improve their quality of life’. As a result, programmes organised by government and private waste management organisations lean toward encouraging informal waste workers to take up jobs in the formal waste sector. One government official explained that programmes do exist to assist informal waste workers. She emphasised the success of these programmes, despite the fact that no formal evaluation on the usefulness of the programmes was conducted. Conversely, the informal waste workers interviewed - particularly informal waste collectors - stated they were unaware of, or did not have access to, these programmes.
In our discussions with informal waste workers we found that financial security was one of their principle concerns. Although many informal waste workers reported earning a daily income which exceeded the national poverty line, they live in poor quality housing and often cannot afford basic services. Informal waste collectors live and work in difficult conditions, yet even formal waste collectors working for councils or private waste firms reported similar living and working conditions. During fieldwork, it was observed that waste collectors in both the formal and informal sector have poor working conditions, including small work spaces with poor ventilation and lack of safety equipment.

Informal waste workers’ living conditions, and the nature of their work, have placed them in a lower position in Sri Lankan society, making them victims of social stigma and exclusion. During fieldwork, it was observed that even the small-scale recyclers and product manufacturers have poor working conditions, including small work spaces with poor ventilation and lack of safety equipment.

Sri Lankan society is of the opinion that waste workers are ‘unclean’ and will work with waste under any conditions. These misconceptions are promoted through discourses which promote the view that waste related work is exclusively the domain of the poor. Due to overarching social and cultural perceptions of waste, waste is considered to be a category that “includes all the rejected elements of an ordered system” (Douglas, 1966, p. 35). From the society’s point of view, those associated with waste take on the characteristics of waste. For example, it is a common belief among people in Sri Lanka that it is a ‘bad omen’ to meet a waste collector when leaving the house. This negative social and cultural attitude toward informal waste workers, in combination with a repressive political system, low income and exploitation from middlemen who pay low prices for recyclables, has a detrimental impact on informal waste workers. As a result, many informal workers explained power in a traditional sense, as linked to a capacity – having more money, social status or political power.
5.6.5 Removal/Dumping of waste

An increase in the volume of waste being generated in the Western province of Sri Lanka is offered as justification for the establishment of large-scale waste disposal projects, especially landfills. Decision-makers’ focus on volume or tonnage targets has ensured that large-scale waste projects are now the most common method for dealing with managing waste. In fact, the question of “how much waste can you process per day using your machine?” was common during our discussions with experts. The desire for waste to be ‘disposed of’ is thought to be the most pragmatic solution. The result is that waste is treated as residue which needs to be disposed of somewhere beyond the margins of economically important cities. Politics plays an important role here, for instance in the making of decisions as to where landfills should be sited, and what waste management projects need to be implemented. This was evident in the siting of Meethotamulla dump and Meepe landfill. It is important to note here that if a person throws waste in a public place, they are prosecuted and fined (Environmental Foundation LTD., 2007). An activist stated during an interview, “the local councils are free to throw garbage anywhere they want. It looks as if local councils are above the law.” Current waste management practices in Sri Lanka demonstrate that the ‘out of sight, out of mind’ attitude amongst decision-makers is the norm. The result is that waste needs to be disposed of somewhere beyond the margins of economically important cities. Politics plays an important role here, for instance in the making of decisions as to where waste dumps and landfills should be sited, and what waste management projects need to be implemented. This was evident in the siting of Meethotamulla dump closer to a residential area in Kolonnawa. The court has initially granted permission to the Colombo Municipal Council to use only 3 acres of the land for waste disposal until they find a suitable place. However, political power has surpassed the judicial direction and today Meethotamulla is an 18-acre open waste dump.

The dominant discourse of waste as a ‘disposal problem’ and large-scale waste management projects as a necessity disenfranchises small-scale, community based solutions and alternative technologies in waste management approaches. Small-scale,
informal waste management practices are not recognised for the important contributions they make to waste management in Sri Lanka. Even the economic benefit of waste collection and processing as income generating activities for poor people is not given adequate recognition. The hegemony of expert systems and decision-makers operating in the formal wastescape who design, build and manage large-scale waste management projects has elevated the discourse of ‘waste as a crisis’ to devaluing the discourse of ‘waste as a resource’ (Figure 5.2).

Figure 5.2. Dominant ideology of the formal wastescape

5.7 Conclusion

By analysing the competing discourses within the wastescape in the Western province of Sri Lanka we have demonstrated that the hegemony of the formal wastescape, dominated by ‘decision-makers’ and ‘expert systems’, has led to the subordination of informal waste worker claims to legitimate and useful knowledge. Not only is informal waste worker knowledge unrecognised, there is also a cultural resentment which positions informal waste workers as ‘abject’. This situation has created a socially unjust waste management system, in fact one that reproduces inefficiencies through the unquestioned commitment to large-scale projects.
WFL’s mission is to “…open up pathways towards autonomy and genuine economic security for people who need it most – those living at the intersections of waste and poverty.” Understanding the implications of dominant ideologies in the Sri Lankan wastescape was critical to position the activities of WFL in working towards a more socially just, environmentally friendly and economically viable waste management approach in the Western province of Sri Lanka. We have argued that acknowledging and privileging the contributions that informal waste workers’ make to waste management will result in a more sustainable waste management system that will challenge the hegemonic powers of development and expert discourses.

As long as poverty, waste and inadequate formal waste management systems exist, so too will a marginalised informal waste worker sector (Do Carmo & Puppim de Oliveira, 2010). Decision-makers and expert systems should recognise the value of innovative, efficient, small-scale waste management practices and use these to create a more holistic and sustainable waste management system (Nas & Jaffe, 2004). The movement towards a socially just waste management system rests on the recognition of valid contributions from all parties. Change requires recognition of not only the limitations and inefficiencies of the ‘top down’, science-development model of waste management, but also the harmful ideologies that view ‘sacrifice’ (of the environmental and community wellbeing) as inevitable consequences of ‘removing’ waste.

Informal waste workers, their organisations and practices have proven to be capable of creativity and flexibility in difficult conditions (Medina, 2005; Rogerson, 2001). In this process, they create livelihoods contributing to poverty reduction, reduce waste collection and management costs for the local councils, provide cost savings for manufacturing industries, create low-cost products for local consumers and contribute to environmental conservation. Thus, instead of alienation, harassment and exclusion, informal waste workers should be recognised as valuable contributors to the urban wastescape. It is equally important to note that while many researchers report on integrating the informal waste sector to the formal wastescape, the informal waste workers interviewed value their autonomy and independence. They do not want to be part of a formal waste management system. Thus, alternative systems need to be created
that support informal waste workers to improve their living and working conditions and maintain their autonomy. We propose an inclusive system where informal waste workers are recognised and supported and their contributions to both waste management and poverty reduction are valued.

5.8 References


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CHAPTER 6

Autonomy of informal waste workers: A phenomenographic analysis of the wastescape in the Western province of Sri Lanka

Publication:
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6.1 Abstract

This study investigates how people working in waste management in the Western province of Sri Lanka conceptualise autonomy of informal waste workers and how these conceptions progress toward resisting dominant structures of power. In-depth interviews conducted with thirty individuals working in both formal and informal waste sectors in the Western province of Sri Lanka were analysed using qualitative research approach called phenomenography. Phenomenography is a qualitative research approach used to discover and organise the variation in which people experience and understand various aspects of their world. Six qualitatively different conceptions on how individuals within the wastescape of the Western province conceptualise autonomy of informal waste workers emerged from the analysis. These conceptions are mapped into a phenomenographic ‘outcome space’. The conceptions include 1) autonomy of informal waste workers cannot exist in the dominant discourse 2) autonomy as freedom to act within specific boundaries 3) autonomy as the capacity to act 4) autonomy as benefiting both self and others 5) autonomy as broadening horizons and 6) autonomy as a transformation. We argue that understanding how social phenomena are perceived by people that we work with could facilitate in making informed decisions and developing meaningful projects that will yield better outcomes.

6.2 Introduction

Informal waste management is an important part of urban wastescapes in developing countries (Huysman, 1994; Medina, 2005; Nas & Jaffe, 2004; Rouse, 2006). Despite providing a valuable service to the society by recycling waste, informal waste workers are marginalised in many ways. Increasingly, informal waste workers within urban...
wastescapes are struggling to create alternative survival strategies, economic practices and social relations to resist the structures that marginalise them (Chikarmane & Narayan, 2009; Millar, 2008). One important concept highlighted and echoed in these struggles is the significant interest in gaining and maintaining autonomy by the informal waste workers.

Autonomy of informal groups and local communities around the world is explained by researchers in different ways such as freedom from external control or influences, independence and the right of self-government among others (Esteva & Prakash, 1998; Tonkinson, 2007; Williams, 2008). In this study, rather than assuming a common conception about autonomy, we explore the variation of conceptions of autonomy of informal waste workers expressed by people working in both formal and informal wastescapes in the Western province of Sri Lanka. In order to do this, we have used the naturalistic qualitative inquiry method, phenomenography (Bowden & Green, 2005; Marton, 1981). In phenomenography, conceptions emerge from data rather than depending on established definitions. This provides the opportunity to move from traditional meanings to discover other largely unexposed diverse aspects of a phenomenon. In this way, phenomenography focuses on the social construction of reality by individuals who live within that social context (Marton, 1986).

This study is part of a larger research to investigate the feasibility of a novel waste-based manufacturing project to improve the lives of informal waste workers by allowing them to convert waste plastics into useful products. This project concept is developed by the not-for-profit organisation Waste for Life\(^\text{19}\) (WFL) which aims “to open up pathways towards autonomy and genuine economic security for people who need it most – those living at the intersections of waste and poverty” (Waste for Life, n.d.). We argue that understanding different conceptions of autonomy of informal waste workers, and how that relates to power, could provide the basis for co-creating meaningful projects that supports them.

The aim of this study is twofold. The first is to investigate how a social phenomenon - in this case the autonomy of informal waste workers - is conceptualised by both formal and informal waste workers in the Western province of Sri Lanka. The second aim is to

\(^{19}\) See [http://wasteforlife.org](http://wasteforlife.org).
present phenomenography as a useful methodology to analyse social phenomena. Phenomenography as a methodology has not been applied widely outside education and learning-related research (Bell, 2001). This study delves into this space to show that phenomenography can be used to analyse complex social phenomena. The following research question was formulated to guide the analysis:

*What are the qualitatively different ways people in waste management – both formal and informal - conceptualise autonomy of informal waste workers in Sri Lanka?*

The findings describe six qualitatively different conceptions of autonomy of informal waste workers presented as a hierarchy in an outcome space. Before discussing the findings in detail, we first present a brief discussion on autonomy and power which guided the analysis.

6.3 Theoretical framework

6.3.1 Power, resistance and autonomy

The word autonomy stems from the Greek words – *autos*, meaning ‘self’ and *nomos*, meaning ‘law’ or ‘rule’ (Oxford Dictionaries, 2014). Following this, in the literal meaning of the term, ‘being autonomous’ would mean ‘being free’ from any influence of power and having a self-government. Social movements often stress the importance of autonomy in this way, by which they mean independence from political parties and their power-seeking agendas. There are others who explain autonomy in terms of communities or groups having freedom of choice and an economic independence (National Sample Survey Office, 2009).

Autonomy is a popular concept in the struggles against dominant powers and oppression. Vieta (2012), drawing from Marxist traditions, states that the concept of autonomy points to the fact that “workers can and do…. struggle against the valorisation process while still being within it” (p.110). Researchers have written extensively on autonomy in relation to different groups who are marginalised in the society, i.e. the informal workers in India (Watson, 2009); activists in the Larzac plateau in France (Williams, 2008); Indian groups in Mexico (Esteva & Prakash, 1998); Aboriginal people in Australia (Tonkinson, 2007) and the worker-recovered enterprises movement in Argentina (Vieta, 2012). In these different contexts, scholars refer to
different forms of autonomy - individual autonomy, collective autonomy, autonomous movements, cultural autonomy, economic autonomy etc. Although termed differently, these different forms collectively emphasise the ongoing struggles of marginalised people against their exploitation and alienation, as well as their efforts in creating better, alternative solutions to their problems.

The way groups conceptualise autonomy is different. Tonkinson (2007) notes that the way governments and others interpret autonomy and how it is understood and used by local communities differ greatly. Tonkinson (2007), referring to the autonomy of Aboriginal people in Australia states that autonomy is a “slippery notion” (p.42). He further explains that while Aboriginal people value autonomy highly, their definition of the concept does not resonate commonly held ideas of the authorities. While politicians and bureaucrats view autonomy as taking responsibility for actions and outcomes, Aboriginal people view autonomy differently including freedom from dominant structures (created by the settlers) and having access to resources. Similarly, Esteva and Prakash (1998) argue that the struggle for autonomy of Indian groups in Mexico is not about separatism, fundamentalism or the decentralisation of the government, but a struggle for recognition and respect for what they already have.

The post development scholars Escobar (1995) and Esteva and Prakash (1998) while critiquing the processes of absorption or integration of local systems by the state, argue that autonomy is part of a much broader fight against state power, hierarchy, inequality and capitalism. This notion of autonomy as part of struggle is highlighted by many scholars. Williams (2008), offering an ‘ethnographic critique’ of autonomy, argues that autonomy is produced in the process of resisting through particular social practices. She further argues that “resistance involves a struggle over autonomy – over the power to choose, to act independently, to be free of ideology, domination and dependency” (p.67). Thus, it is clear that resistance plays an important role in cultivating autonomy.

It is important to note here Foucault’s critique on power and resistance. Foucault argues that power and resistance are intricately connected in that resistance towards power must exist for power to be exerted and power must be exerted for resistance to occur (Foucault, 1982, 2003). If power restructures the field of actions for a subject, then resistance is the possibility that the subject can move through the field of possible
actions in unpredictable ways. By choosing to move through the field of actions in this way, subjects start to challenge the ability of power to limit them (Foucault, 1982). Resistance, then, is the means through which subjects can attempt to reshape some of the power relations exerted on them.

We also refer to VeneKlasen and Miller (2002, p. 39) who distinguish four types of power.

1. Power over: The dominating form of power where people who have power use it to control, repress, force or penalise others who are less powerful than them.
2. Power to: The potential and capability of every person to change their world.
3. Power with: The collective power where people come together and through mutual support, collaboration and organisation act together to achieve better outcomes.
4. Power within: The power of self that includes the ability to recognise individual differences while respecting others.

Autonomy then is the ability to move from ‘power over’ to ‘power with’ while recognising ‘power within’. By attempting to resist dominant structures, autonomy presents a desire for social justice and attempts to achieve a just world through forms of resistance and alternative approaches. Thus, autonomy is something social justice activists aim to promote and support.

### 6.3.2 Autonomy and informal waste workers

The informal economy allows for the possible development of economic activities where workers have more autonomy, flexibility and choice than the formally employed (Millar, 2008). In fact, it is evident from studies in Argentina, India and other parts of the world that informal groups value autonomy, flexible working hours and freedom of choice that are related to their work status (Baillie, Feinblatt, Thamae, & Berrington, 2010; Huysman, 1994; Vieta, 2012).

Scholars write that being autonomous allows informal waste workers an exit from exploitative, low-status work in favour of self-employment in small-scale businesses or as members of cooperatives (Vieta, 2012). The strategy of self-employment has long been practiced as a poverty alleviation and empowerment strategy and as an effective means to permit economically marginalised groups flexibility to be autonomous.
CHAPTER 6 | Autonomy of informal waste workers

Chikermane and Narayan (2009) note that enabling informal waste workers to be autonomous can result in their livelihood development, poverty alleviation, and environmental protection. Similarly, Baillie (2012) notes that supporting the autonomy of informal waste workers is a way to improve not only their income and freedom from exploitation from middlemen, but a way towards a more socially just system.

Social movements, local communities and individuals resisting dominant power, grow slowly and gradually while developing connections with each other in their quest to fight oppressive power and achieve greater autonomy. We argue that it is important to identify, support, and encourage these struggles for autonomy – individual, collective, cultural or economic - that resist oppressive structures and challenge the status quo. We need to work with local communities and marginalised groups to build new autonomous systems that resist dominant power relations. However, if we are to co-create projects that support autonomy of informal waste workers, having an understanding of how autonomy of informal waste workers is conceptualised by different people within the wastescape is important. We apply phenomenography in this study to uncover these conceptions, examined empirically through analysing the interviews conducted with individuals within both formal and informal wastescapes in the Western province of Sri Lanka.

6.4 Methodology

6.4.1 Phenomenography

Phenomenography is a qualitative research approach used to discover and organise the variation in which people experience and understand various aspects of their world (Bowden & Walsh, 2000; Mann, Dall'Alba, & Radcliffe, 2007; Marton, 1981). This approach was developed by Ference Marton and his team at the University of Gothenberg in Sweden. Phenomenography takes a second order research perspective in that it attempts to describe the world as seen through the eyes of the research participants – the way they view the world (Marton, 1981). Thus, phenomenography should not be confused with phenomenology. Phenomenology is a first-order perspective where the world is described as it is (Barnard, McCosker, & Gerber, 1999). Furthermore, while phenomenology emphasises on individual experience, phenomenography is interested in the collective meaning. Phenomenography also
CHAPTER 6 | Autonomy of informal waste workers

follows a non-dualist perspective that there is only one world, which is experienced and understood in different ways by people (Marton, 2000). Following this, in this study, we aim to understand how people in the waste management sector in Sri Lanka conceptualise autonomy of informal waste workers.

Researchers have discovered that a phenomenon is conceptualised in a limited number of qualitatively different ways (Bowden & Walsh, 2000; Lamb, Sandberg, & Liesch, 2011; Mann et al., 2007). Phenomenography is an approach that identifies different conceptions, and discovers a logical relationship between those conceptions (Akerlind, Bowden, & Green, 2005). The conceptions of the phenomenon are categorised and grouped, based on their similarities and differences. These are called ‘categories of description’. The ordering of the categories of description is known as an ‘outcome space’. Most outcome spaces show some form of hierarchical relationships among categories based on their increasing complexity and some categories being inclusive of others (Akerlind et al., 2005; Ingerman & Booth, 2003). The categories of description and the outcome space are the main outcomes of the phenomenographic research (Marton, 1986).

An important consideration in phenomenography is that a person’s view about a phenomenon is related to the context. Researchers argue that participants’ conceptions can vary with the context in which they find themselves (Akerlind et al., 2005; Marton, 1981). Thus, we cannot assume which conception of a phenomenon an individual will hold. Furthermore, different and even conflicting conceptions can be held by the same respondent at the same time (Wilson, 1991).

As a research methodology phenomenography has generally been used in educational research (Marton & Booth, 1997; Yates, Partridge, & Bruce, 2012) and has not been applied widely outside education and learning-related research. We demonstrate that phenomenography can be used in other disciplines and research areas to analyse complex social phenomena. Phenomenography is deemed appropriate for this study based on its non-dualistic perspective. A non-dualistic ontology suggests that “meaning derives from the relation between person and phenomenon” (Trigwell, 2000, p. 64). In other words, how people act is determined by the way they understand different aspects
of their reality. This understanding was important as we aim to support informal waste workers gain and maintain autonomy.

6.4.2 Method

a. Participants and data collection

Interviews of thirty individuals working in waste management in the Western province were used for this study (Table 6.1). It was important that the individuals had diverse experience and knowledge of waste management in Sri Lanka. This helped demonstrate the range of views that exist about waste management in general, and it also helped to explain their views on autonomy of the informal waste sector.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Organisation/Area</th>
<th>Male/ Female</th>
<th>Formal/ Informal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Environment consultant</td>
<td>Private company - Colombo</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Environmentalist</td>
<td>National Waste Recycling Programme</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Director</td>
<td>NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Manager</td>
<td>Development bank - Maharagama</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>Central Environmental Authority</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Manager Research</td>
<td>NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Project Manager</td>
<td>NGO</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>National Co-operative Council</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Co-ordinator</td>
<td>Environmental and Community Development Project - Lunawa</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>National Solid Waste Management Support Centre</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>Waste Management Authority - Western Province</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Official</td>
<td>National Cleaner Production</td>
<td>M</td>
<td>f</td>
</tr>
</tbody>
</table>
A purposeful sampling technique was used for the initial data collection. This involved contacting NGO groups that have carried out community waste management projects, government officials and environmentalists based on their reputation in working with waste. Snowballing sampling was used to collect data from the informal waste workers as it was difficult to approach small waste sorting and recycling businesses operating as home based enterprises. Some of the waste collectors and the recyclers invited others.

### Table 6.1: Details of interviewees

<table>
<thead>
<tr>
<th>Role</th>
<th>Location</th>
<th>Gender</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre</td>
<td>Public university</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Local authority waste collector</td>
<td>Local authority - Gampaha district</td>
<td>M</td>
<td>f</td>
</tr>
<tr>
<td>Local authority waste collector</td>
<td>Local authority - Gampaha district</td>
<td>F</td>
<td>f</td>
</tr>
<tr>
<td>President</td>
<td>Co-operative</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Environmental activist</td>
<td>Moratuwa</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector A</td>
<td>Kalutara</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector B</td>
<td>Meethotamulla dump</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector C</td>
<td>Export Processing Zone (EPZ) - Western province</td>
<td>F</td>
<td>i</td>
</tr>
<tr>
<td>Informal waste collector D</td>
<td>EPZ - Western province</td>
<td>F</td>
<td>i</td>
</tr>
<tr>
<td>Waste collector - large scale</td>
<td>Colombo</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Home-based waste trader</td>
<td>Panadura</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Person-in-charge – Recycling plant</td>
<td>Moratuwa</td>
<td>F</td>
<td>i</td>
</tr>
<tr>
<td>Recycler - Pellets</td>
<td>Negombo</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Recycler - Pellets</td>
<td>Maharagama</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Home-based product manufacturer</td>
<td>Gampaha</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>Home-based Product manufacturer</td>
<td>Panadura</td>
<td>M</td>
<td>i</td>
</tr>
<tr>
<td>President</td>
<td>CBO - Colombo</td>
<td>F</td>
<td>i</td>
</tr>
</tbody>
</table>
working with them to be present at the day of the interview; some workers recommended other people as possible subjects to interview and offered to take the research team to visit them. We could not have visited these home based enterprises that operate in isolation, if not for the generous support of some of our participants.

As an introduction to the interview, the key researcher, Randika Jayasinghe described the project and the purpose of the interview to each participant. Interviews were conducted mainly in Sinhala. The data collection consisted of open-ended, in-depth interviews, conducted with each of the participants at a location convenient to them. The interviews were audio-recorded with permission. Later, all the interviews were transcribed and translated verbatim by the key researcher. Translating the interviews by the key researcher proved useful as most of the interviews were conducted in the local language. These transcriptions and field notes served as the basis of the phenomenographic analysis.

6.4.3 Analysis

The interviews were conducted with the broader aim of analysing the informal wastescape in the Western province of Sri Lanka as part of a feasibility study. The specific research question for this study has been formulated on the assumption that a phenomenographic analysis of the data would provide valuable insights to the overarching aim of the research this study is a part of. Phenomenographic analysis is an inductive way of working from the data to the results. Researchers should be open to the fact that different people view the same phenomenon in different ways. Further, the focus of a phenomenographic analysis is on describing qualitative similarities and differences across the transcripts. Hence, the outcomes do not necessarily show the richness of the data, only variation for which there is clear evidence from the transcripts (Akerlind et al., 2005).

Researchers use different approaches for phenomenographic analysis. These approaches vary from using transcripts as a whole or selecting excerpts or quotes representing particular meanings related to the phenomenon (Bowden & Green, 2005). When using phenomenography as a methodology for social research, the researcher should be able to make a judgement of what approach is best to analyse the data in hand. This depends on how many interviews are conducted, the nature of the interview, the content and
what the researcher is aiming to find out. For this study, the second approach, using selected quotes from interviews was deemed appropriate as we used interviews conducted for a larger study.

First, the transcripts were all read and re-read so as to become familiar with each transcript. As a transcript was read through, the statement ‘Autonomy of informal waste workers is…’ was kept in mind and quotes which represent some aspect of the participants’ understanding of the phenomenon was highlighted. This first step involved moving constantly back and forth between the audio tapes and transcripts. Field notes were also used to clarify statements that were not clear. Post-it notes were used at this stage to make notes from interviews and field notes.

Then the highlighted quotes were separated by cutting them out into pieces and all the excerpts and post it notes (herein refer to as excerpts) were combined into a common pool of meaning. Next, the excerpts were categorised according to the similarities and differences between them. Excerpts with similar individual meanings were grouped, with the similarities within and differences between the groups clarified. At this point, a description of each category was written on a post-it note. These descriptions formed the preliminary categories for the pool of data. The excerpts were re-arranged and re-grouped several times during this process.

At the end of the analysis process, all of the transcripts were sorted into individual categories of description. The categories themselves had clearly defined statements of what they are, backed up with illustrative quotations from the transcripts. The relationships between the categories of description revealed categories that are more comprehensive than others. The categories were then arranged into a hierarchy based on their increasing comprehensiveness. At this stage, how the conceptions moved from structures of dominance to resistance was taken into consideration. This hierarchical representation of the categories of description is the outcome space of the analysis.

The following section presents the results of the phenomenographic analysis – the categories of description and the outcome space.
### 6.5 Results

#### 6.5.1 Categories of descriptions

The phenomenographic analysis of data identified six qualitatively different conceptions of how people within the wastescape in the Western province of Sri Lanka view autonomy of informal waste workers (Table 6.2). It is important to note that, due to the complexity of the phenomenon under study, different aspects of the conceptions are expressed by the interviewees. Each category of description is supported by three to five illustrative quotations that represent key aspects of each category. As all excerpts cannot be presented here, only a few selected sample excerpts are presented.

<table>
<thead>
<tr>
<th>Categories of descriptions</th>
<th>Summary</th>
<th>Key aspects highlighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category 1: Autonomy of informal waste workers cannot exist in the dominant discourse.</td>
<td>Autonomy of informal waste workers is a false expectation. Informal waste workers need to be integrated to the formal waste sector. Privatisation is the win-win strategy.</td>
<td>Privatisation Integration Unrealistic expectation</td>
</tr>
<tr>
<td>Category 2: Autonomy is freedom to act within specific boundaries.</td>
<td>Autonomy is having the ability to work and earn an income within certain boundaries.</td>
<td>Making choices Ease of entry Income generation</td>
</tr>
<tr>
<td>Category 3: Autonomy is having access/capacity to act.</td>
<td>Autonomy is the capacity to accomplish goals using resources, skills and knowledge.</td>
<td>Resources Technology Products and markets</td>
</tr>
<tr>
<td>Category 4: Autonomy is benefiting both self and others.</td>
<td>Autonomy is not only about self, but also valuing others and the environment.</td>
<td>Valuing socio-environmental aspects Providing a service Appreciating local knowledge</td>
</tr>
</tbody>
</table>
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### Category 5: Autonomy is broadening horizons.

Autonomy is the capacity to achieve better outcomes through systematic improvement and creativity and sharing that knowledge with others.

<table>
<thead>
<tr>
<th>Systematic improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning process</td>
</tr>
<tr>
<td>Sharing knowledge/helping others</td>
</tr>
<tr>
<td>Being creative</td>
</tr>
</tbody>
</table>

### Category 6: Autonomy is transformation.

Autonomy is altering attitudes and practices to do things differently and challenging the status quo.

<table>
<thead>
<tr>
<th>New initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating networks</td>
</tr>
<tr>
<td>Local leadership/ownership</td>
</tr>
<tr>
<td>Changing systems</td>
</tr>
<tr>
<td>Taking up challenges</td>
</tr>
</tbody>
</table>

Table 6.2: Categories of description

**Conception One: Autonomy of informal waste workers cannot exist in the dominant discourse.**

Interviewees who held this conception believed autonomy of informal waste workers cannot exist in the dominant discourse. Some interviewees showed no or little understanding of the phenomenon throughout the interview. Within this group, there were individuals who understood the meaning of ‘autonomy’, but were not comfortable relating the concept to informal waste workers. As a result, they questioned our intention to work with informal waste workers. One interviewee working for a formal waste management authority asked,

**WPO:** Why do you want to implement a small-scale project for informal waste workers?

Another interviewee questioned the intention of the process.

**EJ:** Feasibility studies and stakeholder analysis are conducted only for larger projects. Why do you need all that if you are planning to work with informal waste workers? You do not have to ask them how to plan the project.

Informality is seen as a problem and informal waste workers having autonomy was related to negative practices by some interviewees in the formal sector.
There were other interviewees who described the autonomy of informal waste workers in relation to having a ‘proper’ job. Both the privatisation of waste management and the integration of informal waste workers to the formal wastescape through contracts were explained as ‘best’ models.

VW: Privatisation is good. Waste management needs to put the ‘private sector’ thinking hat on. We need to make the entire system privatised, especially the informal sector recycling. End of the day everyone will benefit. Waste will be collected and recycled, and they get to work for a company. This is the best model. I have seen this in US and UK.

WO: Local authorities recruit informal waste workers on contract basis. Some are working for local authorities now. It’s good to have a proper job, right?

On the contrary, some interviewees in the informal sector explained autonomy as an unrealistic expectation and that they would not be able to escape their situation because of their low socio-economic standard.

IWC: We are poor. This is why we are in this position. This is our karma. There’s no coming out of this.

Conception Two: Autonomy is freedom to act within specific boundaries.

In contrast to the first conception, in this category interviewees demonstrated a general understanding of the phenomenon based on the meaning attributed to the word ‘autonomy’ in the local context, i.e ‘autonomy is being free’. However, the focus here is on the notion of ‘what this provides for me’, rather than the principle of freedom. This category was the most commonly expressed conception about the autonomy of informal waste workers.
CHAPTER 6 | Autonomy of informal waste workers

Some interviewees described the phenomenon in terms of having an opportunity to earn an income, either as a livelihood or as an additional income to supplement informal waste workers’ earnings.

PM: I will continue to do this because this is the only income I have. I have been doing this for some time now.

AP: Informal waste activities provide an income generation activity for women who are usually at home. It’s an opportunity to support their families financially. They gain some kind of independence within their families that way.

For some, the phenomenon was linked to the nature of informal work, i.e having no barriers to engage in work such as age, education or gender.

EPZ 1: Anyone can come here. There are people of all ages working here. The oldest is a woman from Ja-ela, and she is in her 70s.

EPZ 2: I have studied till the 8th grade. But that’s not enough even to find a job as a labourer. So I come here to work. The only place no one asks about my qualifications.

The freedom informal waste workers have in deciding time, place and the mode of work was highlighted by some interviewees.

JK: I collect from shops and supermarkets. I have my own collection method. I visit some shops at around 5 am in the morning. My home town is Negombo. I am renting a place here in Galle, so that it’s easy for me to go and collect things and come.

SK: I started collecting waste in my bicycle and travelled from Wattala to Pettah. I was only able to do one trip, it was not easy to cycle that far. Now I have a small tractor. I can collect more stuff now.

Conception Three: Autonomy is having access/capacity to act.

This conception could be seen as an extension of conception two. It encompasses the basic understanding that autonomy is being free, and takes it further by relating the
phenomenon to other factors that can enable informal waste workers to operate on their own. In this sense, autonomy of informal waste workers was described in relation to having access to resources, technology, products and markets and the capacity to accomplish goals using their skills and knowledge.

JK: We do not have an end product. If we do, it would be easy to market and we will be able to do more than what we are doing now.

SM: We can make any machine in Sri Lanka, we truly can. We have everything here. There are people who can do things better than they are doing now, machines are available, materials are there. Funding is our biggest problem.

JK: Even when ICUN offered to help, I asked them to provide me the required machinery. If I have the machines, I can run the recycling operation on my own. If that’s in place, I am ready to even take a small loan and repay it.

CP: We need a mould for each product. I design my own moulds, but to get it done, I need to spend something like 30,000 to 45,000 rupees or sometimes even 65,000 rupees per mould.

Conception Four: Autonomy is benefiting both self and others.

In this conception, interviewees are beginning to view autonomy as a process that can benefit both themselves and others. For some, this outward focus expanded their understanding of the phenomenon to include broader socio-environmental aspects. Therefore, the conception included valuing the environment, using local resources, creating networks and providing a service to the society as important factors of their understanding of the phenomenon.

CS: Sometimes we get large bottles made out of PVC. People do not know to look for the identification code on the bottom of bottles. There is a number. I don’t consider collecting these a loss. I see a problem if these items are not recycled because then it will end up in a dumpsite somewhere.
AR: We are happy if a new project can be introduced. We can earn an extra income. In the long run others will benefit as well. If polythene bags can be used, that is great, isn’t it? Look around Colombo, polythene bags are all over the place. It’s not only about what we earn - this is a huge problem for Sri Lanka.

SR: The households are supportive because I am providing a service to them. I feel that as waste collectors we help to reduce the Dengue threat more than anyone. This is my only income, but I feel happy that I am doing a community service to the best I can.

SM: People make their own machines here. There are workshops that can make much better machines using local materials. You can buy any part from Panchikawaththa. They are making good machines. They have a very good knowledge. If you know the right people and where to go to buy the parts, you don’t need to pay large amounts for broken machines that come from India and China.

Conception Five: Autonomy is broadening horizons.

In this conception, interviewees explained autonomy in terms of broadening their horizons. The emphasis here is on achieving better outcomes through systematic improvement and creativity, and sharing that knowledge with others. Some interviewees view autonomy of informal waste workers as a learning process and setting an example for others to do the same. The notion of sharing knowledge and ideas is an important aspect highlighted in this conception.

JK: I started as a polythene collector. I used to collect polythene and plastics and supplied to other recyclers. During that time, I met a person from IUCN and he mentioned about this factory, so I came to see it. This was owned by an NGO. It was closed and the machines were on sale for scrap metal. After much trouble I was able to get this up and running. I worked hard. I know I can do better. It’s about improving things every day, even by a little. I started with one extruder. Now I have a compactor and a shredder too…….I am working with a local women’s group who collect waste plastics from their community.
JK: The only thing we know is recycling—making pellets…but I always try to come up with new ideas. I tried making a tile once. I melted plastic and poured it on a tray. The first prototype was not successful. I then added saw dust and sand to improve its properties. I always wanted to develop building materials from plastics…I talked to a few other recyclers I know, about this…We can even make office partitions if we have the right equipment.

RJ: I worked on a construction site. After that, I didn’t have a job. I always wanted to start something on my own. I started this in 2004 after the Tsunami. All sorts of things from the area washed in to my garden on that day. After a few days owners started to come and claimed their items. Only the plastics were left in the end. These items were there in my garden for some time. One day my brother-in-law visited us and told me about industries buying plastics for recycling. So I went to a place where plastics are sorted and I observed the process. I learnt the basics and came and started it here. Now it has been eight years. I still go and observe local authority people sorting waste, recycling plants, product manufacturing, all that. I share what I know and I continue to learn. Now I can easily tell what plastic category each of these materials belong to. If you too are interested I can take you to visit some recycling and manufacturing places.

CW: I am happy to learn something new. I can ask other small-scale recyclers in the area to come here and I can share what I learn with them.

Conception Six: Autonomy is a transformation.

In this conception, interviewees described autonomy of informal waste workers as a process of transformation. Here, the emphasis is on taking initiatives or leading action to do things differently that will bring in better outcomes. Interviewees also emphasised altering individual’s attitudes and practices in this process. In this conception, autonomy is seen not simply as development, but as a process that could lead to challenging the status quo. Therefore, interviewees’ understanding of the phenomenon is strongly facilitated both by the process and the purpose of one’s actions.
For some of the interviewees, the idea seemed to involve the capacity for independent decision-making and the ability to direct changes on their own.

CW: I am able to work from home, at my own pace. My family helps with the business. I am my own boss...yes, I am my own boss.

One interviewee within this group described how he took the challenge of doing something that he felt was right when everyone else questioned his decision. He explained that it was a challenge to convince others, but was a necessary step to achieve a far greater outcome.

GS: I did another thing related to waste collection. I collected cell phone batteries. I know they contain very toxic chemicals. I asked Dialog Company to come and collect them – they didn’t pay money for this, but we were not trying to earn anything. It’s a good service – it needs to be done. Now I collect CFL bulbs – which have become a huge problem. I heard Orange Company take these, so I have contacted them – again not for a profit but as a service. People question why I go through all the trouble. I even had to explain this to the members of the cooperative. What I told them was although we are a cooperative, we have to do our part for the society. It’s not only about money.

Some interviewees critique the current system and even emphasised changing the current system in order to achieve a sustainable outcome.

SJ: Privatisation in Sri Lanka is terrible. When you privatise you have to give full autonomy to them.

JK: There are waste dropping centres called Eco-kiosks set up in different places in Colombo. I do not think this is a successful project. I myself inspected few. People have put everything into that...It is hard to change the adults now. The only thing we can do is to try and change the attitude of the school children. So with permission, I conduct awareness programs for school children. My first group was the year five scholarship classes. I explained to them the importance of sorting our household garbage and as a practical exercise asked them to bring recyclable polythene/plastic items to school on a certain day. I had to take my
van twice to transport the lot. We can send the message to parents and adults through them - that waste needs to be sorted at home. You have to do at least something small. Then there will be a lasting result. Maybe not today, not even tomorrow, but some day.

Others explained the autonomy of informal waste workers as a collective action – being part of a network and taking up new initiatives. This was also linked to promoting local leadership in order to facilitate local groups having the ownership of what they do.

BC: Our municipal council fails to collect waste regularly and some days waste was piling up in streets. People understood that this is our problem and we had to find a solution for this, not anyone else. We were motivated to do something and that’s how we started this waste collection centre. We set up this small CBO. We have a leader. But the leadership role changes after a period, so everyone – male female it doesn’t matter – anyone who would like to take the responsibility get a chance.

WR: It will be good to start a new project like this here because we have enough waste. If we can use a production method and make items we consume every day, there will be a good market. I do not have to stop recycling. I can do this as an alternative production method….This will allow me to go one step ahead than just making pellets. I can make a good sellable product. People have bad experiences trying to do new things, so some are scared to take risks. But you need to take risks, that’s how you grow, right? I know that because I started from the very bottom…..I am willing to take part in a pilot project.

SP: I was very pleased to have been introduced to this CBO. These people work together and do things for their community and their environment within their capacity. If we were to go and introduce a new concept they will be astonished. Without that sort of a network it will not be possible to implement something like this. It doesn’t matter how good your planning is, having a good network is important.
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AP: Informal waste collectors have a better say now. When I first met them they wouldn’t even look at me. They now send their children to school so that children will get a better education. They now talk about their rights.

6.5.2 The Outcome space

The six conceptions explained above demonstrate the qualitatively different ways people working in waste management conceive autonomy of informal waste workers. The outcome space for the analysis is given in Figure 6.1.

The categories of descriptions were presented in a hierarchical manner in the outcome space, from weak conceptions to strong conceptions. Importantly, the conceptions clearly demonstrated two main dimensions based on the respondent’s focus on the phenomenon (excluding conception 1). The two dimensions are: 1) perspectives emphasising self and motivation and 2) perspectives emphasising social influences and relationships.

The conceptions were mapped in relation to structures of power – moving from structures of dominance to structures of resistance. We discuss this in detail using VeneKlasen and Miller’s (2002, p. 39) discussion on power. The variance of expressions within each category of description is presented to create a more descriptive outcome space. The conceptions were organised and constructed into an outcome space by the researchers and should not be seen as the only way to organise the conceptions.
Figure 6.1: The outcome space

1. Non-existent in dominant discourse
   - Integration
   - Privatisation
   - False expectation

2. Freedom to act within specific boundaries
   - Making choices
   - Ease of entry
   - Income-related

3. Having access/Capacity to act
   - Resources
   - Technology
   - Process
   - Products and markets

4. Benefiting self and others
   - Valuing socio-environmental aspects
   - Providing a service
   - Valuing local knowledge

5. Broadening horizons
   - Systematic improvement
   - Learning process
   - Sharing knowledge/helping others
   - Being creative

6. Transformation
   - New initiatives
   - Creating networks
   - Local leadership/ownership
   - Changing systems
   - Taking up challenges

Strong conceptions

Perspectives emphasising self and motivation.

Perspectives emphasising social influences and relationships.

Lack of understanding

Structures of oppression/dominion

Structures of resistance
6.6 Exploring the outcome space

The outcomes of this work included six different ways of conceptualising autonomy of informal waste workers: autonomy as 1) a phenomenon that cannot exist in the dominant discourse, 2) freedom to act within specific boundaries, 3) equal access/capacity to act, 4) benefiting both self and others, 5) broadening horizons and 6) transformation. These conceptions, along with the relationship among them and relationship with power, shaped the outcome space. The outcome space represents a hierarchy of how the conceptions move from weak to strong conceptions and through structures of dominance to resistance. The ordering of the outcome space is a construct of the researchers, framed by the theoretical framework used.

The conceptions were also categorised into two main domains. Perspectives emphasising self and motivation attribute autonomy to processes linked to self. Perspectives emphasising social influences and relationships attribute autonomy to external processes, giving priority to relationships and acting as a whole.

**Conception One: Autonomy of informal waste workers cannot exist in the dominant discourse.**

The first conception, autonomy of informal waste workers as a phenomenon that cannot exist in the dominant discourse mirrors findings reported in a number of studies on informal waste workers. Informality is often assigned negative connotations (Do Carmo & Puppim de Oliveira, 2010). The formal waste sector view informality as problematic and therefore does not value the contribution of the informal sector to the economy or waste management (Medina, 2005; Rouse, 2006; Scheinberg, 2008). For this reason, for some interviewees it seemed impossible that autonomy is considered along with informality. As a result, they demonstrated a considerable lack of understanding about the phenomenon in question or ignored it altogether. Similarly, the literature reports that the informal waste sector views their work and poverty as a problem and do not see ways of escaping it (Huysman, 1994).

This conception lies within the structures of dominance, demonstrating ‘power over’, where the formal sector desires to privatise and integrate the informal sector into formal work and the informal sector accepts those conditions that marginalise them.
Interviewees, both formal and informal did not acknowledge the importance of autonomy of informal waste workers within this category. Their conclusion was that the autonomy of informal waste workers can be improved only through a formalising approach, i.e., through introducing approaches where informal workers are given jobs. These approaches do not consider what kind of government or corporate intervention informal waste workers want. The underlying assumption is that external intervention will ultimately have a positive influence on informal livelihoods and reflect the wants of the informal sector. Conversely, in a recent study on cartoneros in Argentina, Sternberg (2013) demonstrates that regulating informal waste activities “does not entail giving the waste pickers an opportunity to become central actors in the future of urban waste management in the city” (pg. 187).

**Conception 2: Autonomy as freedom to act within specific boundaries.**

In this conception, autonomy of informal waste workers is seen as the ability to be in charge of their lives in some way – to make choices, to see options and have control of what they want to do. This highlights a certain functional freedom that exists within certain limits. The phenomenon as explained here gives freedom in certain respects but not in others. It is important to note the static nature of both first and second conceptions.

Most informal waste workers begin working in the informal sector because they are unable to find a job in formal employment, not because they directly refuse the conditions of wage labor. However, Millar (2008) explains that once having worked in the informal sector, the experience of autonomy becomes a motivating factor to continue working. Informal work offers a degree of freedom that cannot be experienced in wage labour as demonstrated by the comment, “the only place no one asks about my qualifications”. The ability to work the way they want at their own pace, and ease of entry make informal waste work attractive to people who are unemployed, “a choice taken by those who no longer wish to endure certain working conditions in the formal labor sector” (Millar, 2008, p. 27).

In this conception, the interviewees primarily focus on self, describing the phenomenon as the ability to gain something for themselves. However, it was evident during
fieldwork that earning an income, having control over where, what and how one works and ease of entry may not necessarily translate into autonomy or resistance. These are governed by other external factors such as the presence of middlemen, political influence and market forces. It is important to examine other aspects which are likely to be important, such as social recognition, better working conditions and processes by which a sustainable livelihood can be achieved (Agarwal, 1994).

Conception three: Autonomy as access/capacity to act.

In this conception, interviewees refer to autonomy as something that can be achieved if informal waste workers have access to resources and markets and the capacity to act to ensure this access can occur. Autonomy, in this conception has a greater emphasis on self and motivation to improve one’s life, thus resembling the beginning of what might be a change. In this way, this conception reflects the capacity of ‘power to’ - the potential and capability of a person to make choices, ability to decide and take action to change their world. However, the structural conditions that will bring about this change are not explained.

A number of scholars report that providing access to resources, products and markets can enable informal waste workers to improve their lives (Chikarmane & Narayan, 2009; Gonzales, 2003; Nas & Jaffe, 2004). Lack of resources is one main factor that hinders improvement in the informal waste sector. During the interviews, it was reported that informal waste workers do not have access to funds, training and technical assistance. Moreover, informal activities and their production are distant and disconnected from accessing market avenues. This leads informal waste workers to depend on middlemen and brokers to sell their products for low prices. The need to access resources and expand their products and markets demonstrate the informal waste workers’ desire to move away from these dominating structures.

Conception four: Autonomy as a process benefitting both self and others.

In this conception, the dynamic structure of the phenomenon is coming into view. Therefore, the focus is not only on self or personal autonomy. The different aspects of this conception move from prioritising internal needs and self to valuing the surrounding environment and others. Thus, autonomy here is seen as an approach that
can benefit both self and others to gain better outcomes. The conception goes beyond earning an income, freedom of choices, and having access to resources to include social aspects of cultivating relationships, valuing the environment, and appreciating local knowledge. Interviewees holding this conception have navigated into resisting dominant power through opening up the possibilities of ‘power with’ – the collective power of acting together and for the benefit of both self and others. Understanding the ways in which this collective interaction could contribute to gaining autonomy however is still incomplete.

Existing studies report that while informal waste workers value personal autonomy, they help each other in times of need and act collectively in difficult situations (Chikarmane & Narayan, 2009; Millar, 2008). This is clearly evident among informal waste workers working in dumpsites. In addition, the literature reports that some informal waste workers cultivate better relationships with households and hence gain better mobility in neighbourhoods. According to Medina (2005), this is possible because informal waste workers have a better knowledge of the local context and are able to work through the challenges it presents using their local experiences and knowledge. This conception demonstrates that informal waste workers take pride in their ability to contribute in some way to the society, while earning an income. The notion of informal waste workers valuing the environment and others is rarely reported in studies and often goes unrecognised by the formal waste sector.

**Conception five: Autonomy as broadening horizons.**

In this conception interviewees express autonomy as an integral part of informal waste workers’ lives, demonstrating both ‘power with’ and ‘power within’. Informal waste workers are seen as using their local knowledge and social relationships discussed in conception four to improve creativity and innovation and share that knowledge with others. Autonomy here is seen as a process of systematic improvement and a learning process that leads to development and creating social ties. This conception also focuses on autonomy as the ability to achieve both individual and collective goals, but without implying the need to compete with others.
Interviewees holding this conception believed that informal waste workers experience a learning process which enables them to acknowledge the limits and possibilities of their work which they systematically attempt to improve on. The literature reports that some informal waste workers move up the waste hierarchy from waste collection and sorting to setting up small waste-related businesses (Gonzales, 2003). Understanding this hierarchical movement, in the context of the triggering processes and the challenges involved, could provide valuable insights in assisting other waste workers in the informal wastescape to set up small waste businesses.

**Conception six: Autonomy as a transformation.**

In this conception the interviewees perceive the phenomenon as clearly demonstrating both ‘power with’ and ‘power within’. Here, the emphasis is on informal waste workers transforming themselves and their wastescape through earning recognition, freedom, equity and working for their rights in their own capacity. Interviewees who expressed this conception believe that change is achievable within the wastescape in Sri Lanka. Informal waste workers are seen as functioning in a participatory way, sharing leadership and creating local networks to enable a transformation that leads to achieving autonomy. The interviewees also highlighted the pride informal waste workers have in their ability to function by themselves without external intervention. This conception – autonomy as a transformation into new forms, spaces, and types of work - demonstrates a holistic understanding of the phenomenon.

Marginalised groups transforming their lives through autonomous movements are found in different parts of the world (Esteva & Prakash, 1998; Vieta, 2012; Williams, 2008). In these movements, the autonomy of marginalised groups are produced through organising, educating, networking, critiquing, shifting systems and initiating alternative mechanisms. They adopt innovation which is transformative – reshaping social and power relations to steer their lives in new directions. In this way autonomy is created in the process of resistance, where new spaces for alternative economic practices and social relations are created. According to Foucault (1982) and Gramsci (1971), this is how the hegemonic power structures and mechanisms creating those are challenged.
6.7 Discussion

This phenomenographical study illustrates that both formal and informal waste workers understand and hold different conceptions about informal waste workers gaining and maintaining autonomy in their work. In order to plan meaningful projects to support autonomy of informal waste workers, researchers, development organisations and activists need to understand the nature of the phenomenon from the perspectives of those who are working with waste, both formally and informally. The informants in this study explain autonomy of informal waste workers in qualitatively different ways that could not be simply categorised as freedom or being independent. This is in line with Marton’s (1986) argument that by using phenomenography, we could “discover and classify previously unspecified ways in which people think about certain aspects of reality” (p.35).

Although categories arise from the pool of meaning provided by the interviews, we could see the individual informants within the categories. Given that a heterogeneous group of interviews are used for this study, we could further investigate which groups or individuals expressed different conceptions. While some interviewees moved back and forth between the conceptions, some interviewees from government and corporate institutions expressed only the first conception. They believed integration and privatisation are the best options for informal waste workers. Autonomy as freedom to act within certain boundaries is the conception held by most of the interviewees. A few interviewees in the informal sector who had moved from waste collection to starting up small businesses, held the last two conceptions, autonomy as broadening horizons or autonomy as transformation.

The findings reveal that the individuals who view autonomy as broadening horizons or transformation, attempt and actively work towards resisting dominant powers and creating alternative structures. This movement towards a new direction is important according to the co-founder of WFL, Eric Feinblatt:

> When marginalised people have access to knowledge and technology, they start to think of themselves as engineers who might take their lives in directions they never imagined. This ontological shift in how one sees oneself and one’s possibilities is really essential to what we are doing (Feinblatt in Hart, 2011).
While it is clear that it would be much easier to work with informal groups that believe a change is possible and would want to gain more autonomy, it is equally important to create systems that support informal groups in the first three categories to gain autonomy. The findings are also useful to policy makers and waste management authorities to reconsider their policies and approaches to create a socially just wastescape in the Western province of Sri Lanka.

6.8 Conclusions

By analysing a complex social phenomenon using a phenomenographic analysis, we have demonstrated that people working within the wastescape of the Western province of Sri Lanka conceptualise autonomy of informal waste workers in qualitatively different ways. These conceptions ranged from the notion that autonomy cannot exist in the dominant discourse to autonomy as a transformation. This study also shows that phenomenography, a methodology predominantly used in education research could be used effectively to analyse complex social phenomena.

As a result of our findings, we argue that it is important to expose a socially constructed view of autonomy and understand what aspects of autonomy people on the ground highlight and how social relations are created around them. In fact, Williams (2008) argues that it is important to explore what autonomy means, “rather than treating it as a theoretical abstraction” (p.80). Understanding different conceptions of autonomy of informal waste workers could facilitate in making informed decisions and developing meaningful projects that will yield better outcomes. As Marton (1986) describes ‘a careful account of the different ways people think about phenomena may help uncover conditions that facilitate the transition from one way of thinking to a qualitatively “better” perception of reality”(p.33).

Phenomenography is a useful methodology for researchers to reflect on their own understandings of complex social phenomena such as power, social justice and rights. This study illustrated that there is no one “right” way of understanding a social phenomenon. People we work with can have different views based on their experience, the context in which they live, political opinions, culture and social status. Broadening the understanding of the conceptions of social phenomena held by local groups is an
important learning outcome for researchers engaged in cross-cultural collaborations. A phenomenographic analysis could assist researchers to reflect, and if needed, to change their approaches and projects. As researchers and activists, it is only when we become aware that our commonly held views and definitions can differ or may not provide a complete understanding of the situation, are we able to support local groups and co-create meaningful alternative approaches.

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6.9 References


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CHAPTER 7

Engineering with people: A participatory needs and feasibility study - The case of Waste for Life Sri Lanka

Publication:

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7.1 Abstract

Waste for Life (WFL) is a not-for-profit organisation working with marginalised groups who depend on waste. WFL aims to assist informal waste workers to become more autonomous and economically self-sufficient by processing and upcycling waste. This paper explores the practical feasibility of implementing a WFL project in the Western province of Sri Lanka by analysing the stakeholders and networks, availability of waste materials, funding sources, availability of technology and potential products and markets. Results of the study indicate that a WFL project in the Western Province is practically feasible.

7.2 Introduction

Recycling of solid waste in developing countries relies largely on the recovery of materials carried out by the informal sector (Ezeah, Fazakerley, & Roberts, 2013; Medina, 2005; Nas & Jaffe, 2004). This paper presents an alternative approach that uses small-scale technology to upcycle plastic waste developed by the not-for-profit organisation, Waste for Life (WFL).

WFL’s approach is centred on transforming locally sourced fibres and waste plastics into low-cost composite materials and products that informal groups can sell at a higher price than waste alone (Baillie, Feinblatt, Thamae, & Berrington, 2010). Waste-based composites or natural fibre composites (NFC) are developed by mixing natural fibres with thermoplastics using a simple hot press that can be manufactured locally (Baillie, Matovic, Thamae, & Vaja, 2011). In this process, the waste is upcycled into a material with higher strength than its counterparts. The use of a simple technology and already available materials makes a perfect combination for informal waste workers and local groups to convert waste into useful products, as exemplified by WFL’s previous projects in Lesotho and Argentina (Baillie et al., 2010).

The aim of this study was to find out whether WFL’s NFC project is viable and useful to informal waste workers and marginalised communities in the Western Province of Sri Lanka. Prior to any work conducted on the ground, WFL engages it is important for any organisation to engage in thorough needs and feasibility studies as “community development projects should be driven by the present needs and problems of the
community targeted, not by an abstract or universal conception of basic human need” (Manzo, 2000, p. 288). This chapter goes into more technical details to assess the practical feasibility of a WFL project. The initial context mapping and power structures were ascertained in Chapters 4, 5 and 6. In light of these, it is important to know we have analysed who the stakeholders are, what materials are available, who will fund the project, what products can be made and what markets are available.

7.3 Methodology

7.3.1 Theoretical conceptual framework

Framing a lens through which to view a project such as Waste for Life and its feasibility in the Western province of Sri Lanka is of primary importance. The theoretical conceptual framework leading to the development of a socio-technical methodology that could be followed by engineers and project developers doing participatory feasibility studies is given in Figure 7.1.

![Figure 7.1: Theoretical conceptual framework](199)
Step 1 – Being informed by the different theoretical lenses – post development, social justice, power, hegemony and autonomy - in order to understand the social, political and cultural forces in the context where the projects will be developed. This is exemplified by Chapter 1, Chapter 2 and Chapter 3 of the thesis.

Step 2 – Having understood the theoretical framings, conduct field work to collect data through in-depth interviews and questionnaire surveys with various stakeholders. Analyse the data by looking through the theoretical lenses. This is exemplified by,

- Chapter 4 - Narrating personal stories of informal waste workers
- Chapter 5 - Analysing power and hegemony using a Foucauldian Discourse Analysis
- Chapter 6 - Conceptualising the autonomy of informal waste works using phenomenography

Step 3 – Assessing the technical and practical feasibility which is described in this last chapter, Chapter 7. The technical and practical feasibility study is throughout informed by Step 1 and 2. The theoretical and conceptual framework described here enable each attribute of the feasibility study to be viewed from a bottom-up, socially informed approach. Examples of such choices will be given in italics throughout this chapter.

7.3.2 WFL’s commitments

The reason WFL was selected for this study is because it claims to work within a social justice paradigm. The following commitments are declared by WFL.

1. WFL works within a post-development framework.

WFL works within a post-development framework and enact that which Escobar espouses “instead of searching for grand alternative models or strategies, what is needed is the investigation of alternative representations and practices in concrete local settings” (p.19). Before any project is implemented, WFL conducts initial studies to understand the local context, community needs, the politics surrounding particular social issues and the resources available. WFL claims not to go to a community
planning to ‘help’ or ‘develop’ but to support movement toward local empowerment and autonomy (Baillie et al., 2010).

2. **WFL supports social justice.**

WFL states that its main approach is to use engineering, science and technology for social justice, poverty alleviation and to reduce waste in the environment (Waste for Life, n.d.-b). To do this, WFL uses low-threshold and low-cost technologies to add value to waste in order to help communities that rely on waste as a source of income (Baillie et al., 2010). It aims to improve social inclusion of marginalised groups working with waste, co-create knowledge, and provide access to manufacturing opportunities to alleviate poverty (Baillie et al., 2010; Waste for Life, n.d.-b).

3. **Sustainability is a key priority for WFL.**

Researchers (Baillie et al., 2010; Chambers, 2012; Ferguson, 1990) argue that it is not enough for development organisations to say that they could not predict how the community uses the project and therefore the potential impact it creates or the longevity of the project. Therefore, WFL constantly questions what the project will look like beyond their participation - whether the project will create a sustainable income for the informal waste workers and will it be self-sustaining.

4. **WFL adopts a participatory approach.**

When deciding on a project, Franklin (1992) asks engineers to question who benefits and who pays? WFL works in a participatory way to first understand the local context, identify potential stakeholders and whether they are interested in a WFL collaboration. Then the technical details are considered to assess the feasibility of the project (Baillie et al., 2010). WFL’s needs and feasibility studies are premised on the importance of understanding the marginalised groups and local communities’ real experiences shaped by WFL’s values and principles.

The technical and practical feasibility study is conducted bearing in mind these commitments of WFL and the theoretical frameworks discussed above. As such the needs and feasibility study conducted for this research is not a mere technical analysis. The questions asked, the approach used, the data collected and the analyses are all...
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informed by the project’s emancipatory objectives and the previous studies described in Chapters 4, 5 and 6.

7.3.3 Fieldwork and Data collection

Fieldwork for the study was conducted during the 2011-2013 period in the Western province of Sri Lanka. The primary researcher, Randika Jayasinghe worked on the ground identifying people, interviewing them, and collecting important information for the needs and feasibility study. The following questions were formulated as the fieldwork progressed on the ground (Table 7.1). This served as a valuable guide for data collection. The questions were categorised into five different areas that constitute the key elements of the feasibility study.

1. Stakeholders and local networks

- Who are the project’s stakeholders? How have they been identified? How are they organised?
- What relationship do the stakeholders have with each other? How do their interests correspond or differ?
- Who will be the ultimate beneficiaries of the project (primary and ancillary)? What are those benefits (monetary; capacity building; social inclusion; network building, etc.)? What voice do they have in how the project evolves?
- What support networks are available to help people move from collection and sorting to manufacturing? Are these in place? If not, what steps are necessary to put them in place?
- Is local manufacturing, designing and marketing expertise available?
- Who will participate in materials/product research and development? Will the local universities be willing to participate in the project? If so, what long term commitment are they willing to make towards the project?

2. Waste materials

- What are the existing sources of plastic waste and natural fibre? Are the sources reliable and sustainable?
- Is there a steady supply of plastic (HDPE and LDPE) available for processing? What collection methods are available?
Is there a steady supply of natural fibres available for processing? How can these be sourced from the generation points?

Are any other potential new sources of plastics and natural fibres identified?

3. Funding

How will the project be funded (grants, loans etc)?

Where will seed funding come from – internal (self-funding, fundraising etc) or external (grants, gifts, loans etc)?

If loans are available, what will be the terms of those loans?

Are micro-credit options available?

What is an anticipated budget for a pilot project? Who will manage the funds?

4. Appropriate technology

Can the hotpress be manufactured and maintained locally? Are the parts available?

Who will manufacture/maintain the hotpress?

Will it be useful to provide a user manual for the operators?

What safety measures are in place? Can safety equipment, first aid kits and safety gear be provided?

What industrial standards need to be followed?

Where will the hotpress be located? Is there a place - a warehouse or a community centre available to house the hotpress?

Is electricity consistently available for this place? Is the place adequately ventilated and free from potential fire hazards?

Can this place be locked when not in operation to avoid equipment being stolen and/or vandalised?

5. Products and markets

What products can we anticipate producing with the hotpress? Will these be for domestic consumption or for community use, or both?

Is there a market? Who will buy/use the produced goods?

Who will be in charge of marketing, pricing and distribution?

What existing market avenues are available?
Table 7.1: Data collection guide

1. In-depth interviews
Thirty two in-depth interviews were conducted with different stakeholders working in waste management in the Western province of Sri Lanka, including informal waste workers, government officials, environmental activists, NGO representatives, and private organisations. Stakeholders were identified using different methods - using databases, checklists, introduced through other organisations and stakeholders and through self-identification (Chevalier & Buckles, 2008). The interviews were audio and video recorded with the consent of the informants. Photographs were also used to record observations on the ground.

2. Other forms of data collection
Field observations were used as an inquiry method and detailed field notes were taken. A short survey was distributed among twenty two commercial establishments to collect information on waste generation volumes as part of a preliminary study (Smythe, 2011). A second short questionnaire was distributed among seventeen recyclers to collect information on waste recycling volumes. The primary author also visited a number of government organisations to collect information related to the project. Follow up emails and phone calls were used when additional information was needed from private or government organisations. In addition, short interviews were conducted with households, students, private organisations to collect specific information for each category. A variety of documents were also analysed to obtain useful information.

During fieldwork in Sri Lanka, a piece of paper/plastic composite material was shown to the interviewees to find out possible products they thought could be made using a composite material. In the second part of the study, more focus was given to finding out whether there are viable markets available for some of these products ideas. Photos from the Waste for Life blog (See http://wasteforlife.org/) were used as additional guidance.

Data collection methods used to collect information for each category are given in Table 7.2, 7.3, 7.4 and 7.5.
<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Data collection method</th>
<th>Source</th>
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<tbody>
<tr>
<td>Plastic waste</td>
<td>Interviews</td>
<td>Informal waste workers</td>
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<td>Households</td>
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<td>Skype interviews</td>
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<td>Questionnaire survey</td>
<td>Commercial establishments</td>
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<td>(conducted for a preliminary study (Smythe, 2011))</td>
<td>Recycling industries</td>
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<td>Document analysis</td>
<td>Municipal solid waste statistics report 2005</td>
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<td>Fabric waste</td>
<td>Interviews</td>
<td>Informal waste workers at the Katunayake EPZ</td>
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<td>Quality control supervisor at a leading garment factory</td>
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<td>Paper and cardboard</td>
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<td></td>
<td>Telephone interview</td>
<td>Contact person from Neptune (Pvt) Ltd.</td>
</tr>
<tr>
<td></td>
<td>Document analysis</td>
<td>Reports</td>
</tr>
<tr>
<td>Natural fibres</td>
<td>Skype interview, E-mail</td>
<td>Contact person from the Planation Ministry of Sri Lanka.</td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td>Households</td>
</tr>
</tbody>
</table>
Table 7.2: Data on waste materials

<table>
<thead>
<tr>
<th>Funding type</th>
<th>Method</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>Interviews</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>President of a co-operative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact person from Seeduwa youth group</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact person from Maharagama women’s association</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact person from Leo’s club Nagoda</td>
</tr>
<tr>
<td>External</td>
<td>Interviews</td>
<td>Contact person from Gemidiriya project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact persons from NGOs – Arthacharya and Sevanatha</td>
</tr>
<tr>
<td></td>
<td>Telephone</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td></td>
<td>interview</td>
<td>President of a co-operative</td>
</tr>
<tr>
<td></td>
<td>E-mails</td>
<td>Contact person from AusAID</td>
</tr>
<tr>
<td></td>
<td>Document analysis and web search</td>
<td>Project reports – Sevanatha, Arthacharya and Gemidiriya</td>
</tr>
</tbody>
</table>
## Table 7.3: Funding sources

<table>
<thead>
<tr>
<th>Information related to existing technology</th>
<th>Method</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local workshops</td>
<td>Interviews</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td>Machine importers</td>
<td>Document analysis</td>
<td>Newspapers, web search</td>
</tr>
<tr>
<td>Self-assembly</td>
<td>In-depth interviews, Observations</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td>Formal channels</td>
<td>Emails, phone calls</td>
<td>Contact person NERD</td>
</tr>
<tr>
<td></td>
<td>Short discussions</td>
<td>Contact person IDB</td>
</tr>
</tbody>
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## Table 7.4: Availability of technology and machines

<table>
<thead>
<tr>
<th>Information related to products and markets</th>
<th>Method</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product ideas</td>
<td>Interviews</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NGOs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design student from University of Moratuwa</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Architect</td>
</tr>
<tr>
<td>Markets</td>
<td>Field visits</td>
<td>Local gift shops</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Local markets</td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td>Informal waste workers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contact persons from private organisations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NGOs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households</td>
</tr>
<tr>
<td></td>
<td>Document analysis</td>
<td>Local newspapers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exhibition brochures</td>
</tr>
</tbody>
</table>
Table 7.5: Products and markets

7.3.4 Data analysis

Feasibility studies are structured ways to assess the technical, social, financial and environmental viability or practicality of a project and used to make an informed decision about whether the project should be implemented (Hofstrand & Holz-Clause, 2009; Karagiannidis, Wittmaier, Langer, Biliewski, & Malamakis, 2009). Feasibility studies are used by various organizations to assess development projects or programs. There is no one method or a well-defined structure for a feasibility assessment; rather implementing agencies follow a specific structure unique to each project.

For the purpose of this study we have considered five different aspects based on the project attributes and the local context. These are: (1) stakeholders and networks, (2) availability of waste materials, (3) technical feasibility, (4) financial feasibility and (5) product development and availability of markets.

Important information for each category were extracted from the different data collection tools – transcripts, video and audio recordings, photos, documents, field notes etc. The large volume of data collected was organised into five key themes which were analysed separately and in relation to one another (Dey, 1993; Patton, 1990).

The participatory needs and feasibility study of the WFL Sri Lanka project is briefly explained in the following chapters and structured according to the categories listed in Table 7.1 - stakeholders and networks, availability of waste materials, availability of funds, appropriate technology and products and markets. A schematic diagram of the approach is presented in Figure 7.24.
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7.4 Results

7.4.1 Stakeholder analysis

The first step of a feasibility study is to identify the stakeholders. Stakeholders are “key persons, groups or institutions with an interest in a project or programme” (Snel & Ali, 1999, p. 4) and “can influence or be affected by a certain problem or action” (Chevalier & Buckles, 2008, p. 165). A stakeholder analysis focuses on identifying these actors, and how they are affected. It was clear from the initial interviews that a WFL project was welcome by many different groups. The following groups were identified as important stakeholders for the WFL Sri Lanka project. All stakeholders who contributed, or expressed their interest for a potential collaboration with WFL, are listed
here. They are grouped into three categories – primary, secondary and external stakeholders (Snel & Ali, 1999).

7.4.1.1 Primary Stakeholders

Primary stakeholders are the individuals or groups directly affected, either positively or negatively by a project.

1. Informal waste workers

Informal groups interviewed were interested in working with waste, the idea of a NFC project. Particularly plastic pellets recyclers and small-scale product manufacturers expressed the most interest in working with WFL. This, we believe, is due to them already having some knowledge of processing waste and hence were feeling confident taking up a new product manufacturing technology. Conversely, waste collectors and small-scale waste sorters, although interested, were wary of the idea of moving from waste collection and sorting into manufacturing. Some highlighted the importance and the necessity for training and technical support in this transition. This is identified as one aspect that the project needs to take into careful consideration. While introducing new low-cost technology is important for informal waste workers, WFL needs to be aware of what skills the people they are working with already have. If technical skills are not available, a system training facilities and programs should be developed to provide support for people who need specific skills training. This would ensure that a large group of people will benefit and the project will be sustainable.

2. Communities in low-income settlements

According to the 2002 Poverty Profile conducted by Sevanatha, a local NGO, there are 1,614 low income or squatter settlements in the Colombo district (MercyCorps & Sevanatha, 2007). It has also been reported that youth in these low income settlements are easy targets of substance abuse (MercyCorps & Sevanatha, 2007). During our interviews with Sevanatha, the idea of implementing small-scale waste-based manufacturing projects in low income settlements was considered. A WFL project could help the youth to be involved in an income generating activity which can lead to improving their social status, self-esteem and make them feel responsible for the well-being of their families and the community. Sevanatha suggested the community
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...centres were identified as a suitable place to house the hot press and other equipment.

3. Women

We observed that women play an active role in waste sorting centres and community based organisations (Figure 7.3). A WFL project could be developed as an income generating activity for women, particularly for single mothers, women who have been abandoned by their husbands, women whose husbands are substance abusers and older women who cannot find other work. This could help them to achieve a sense of autonomy as exemplified in Chapter 6.

Figure 7.3: Women working in waste recycling businesses

4. Local universities

All of WFL materials research and technology development are handled by the universities WFL collaborate with in US, UK, Argentina, Australia, Italy, and Lesotho (Baillie et al., 2011). Similarly, local universities in Sri Lanka could therefore play an important role in developing and testing materials and products. During this study, two local universities within the Western province - the University of Moratuwa and the University of Sri Jayewardenepura, expressed their interest in collaborating with WFL.
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The University of Moratuwa is the leading engineering university in Sri Lanka. The engineering programs currently underway at the University of Moratuwa include polymer processing, business development and creative innovation, however the university expressed their interest in developing plastic recycling and waste-based manufacturing programs. It already has a student group ‘Nature Team’ that collects waste plastic for local community groups to sort and sell. The University of Sri Jayewardenepura has recently started a Centre for Sustainability and expressed their interest in supporting community led initiatives.

Materials and product research at local universities has proven essential to WFL’s efforts. In particular, working with locally available natural fibres relies on local material research. We propose developing a centralised system or a training centre within a university that allows access for informal waste workers. This will could be an interesting good learning space as it would enable to explore how the formal-informal sectors co-create knowledge in an equitable manner within a local university. This would also address some of the formal-informal power structures discussed in Chapters 5 and 6.

7.4.1.2 Secondary stakeholders

5. NGOs – Sevanatha, Arthacharya and Practical Action

There are currently a large variety of NGOs doing work in impoverished communities throughout the Western province. During our fieldwork, several NGOs expressed their interest in working with WFL. Many others There are many NGOs working in Sri Lanka that operate mostly within neoliberal institutions and their policy agendas, with little interest in social justice or progressive social change. Many others were often criticised NGOs for misuse of funds. Detailed discussions were carried out with three local NGOs who expressed interest in working with WFL – Sevanatha urban resource centre, Arthacharya and Practical Action – and who were not criticised or were generally supported.

Sevanatha urban resources centre mainly works with urban poor communities to improve their housing, livelihoods and waste management. Sevanatha with the Sri Lanka women’s development services co-operative society Ltd (Women’s co-op) has
initiated a collaborative partnership to implement a housing and livelihoods improvement program for the urban and rural poor in Sri Lanka. These existing networks and links could be useful in identifying women’s groups who are already working with waste or who are interested in starting a small business.

Arthacharya Foundation is a local NGO working mainly in the areas of microfinance, environmental sustainability and poverty reduction. Arthacharya has carried out a number of participatory waste management projects throughout Sri Lanka. Their WFL could learn from their experiences, lessons learnt and existing networks.

Practical Action, or ‘Janathakshan’ promotes the use of local technology and already has strong local networks. Practical Action has carried out a number of projects including waste management, housing, and infrastructure development in Sri Lanka. During our interviews, Practical Action suggested that WFL’s low cost technology could be useful to develop composite roof tiles for ongoing housing projects in the post war areas (Northern and Eastern provinces) of Sri Lanka.

NGOs that seek social justice should be able to challenge the dominant structures, in funding priorities and selecting communities to work with, in order to support marginalised communities and create social change. It is important that NGOs understand their role in the post development process as they are in a better position to use their influential role to work on alternative approaches with at-risk communities to facilitate change as discussed in Chapter 4.

6. National Cleaner Production Centre (NCPC)

The National Cleaner Production Centre works closely with UNIDO and UNEP to promote the adaptation of resource efficient and cleaner production methods, technologies and systems in the country. NCPC was interested in WFL’s idea of using the hot press technology to convert waste materials into useful products. NCPC is carrying out different projects in both urban and rural areas in Sri Lanka. At the time of the interview, NCPC was planning to introduce small-scale household and community projects for women, most of whom are single mothers in an area called Monaragala. WFL could work with NCPC believes that to develop small-scale manufacturing
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7. Private organisations

a. Private organisations with Foundations working on environment-related activities

There is an increasing interest from private organisations in Sri Lanka in supporting local community initiatives and being engaged in environment-related activities as part of their corporate social responsibility (CSR). Several private organisations were interested in the WFL project. The most interested group was Dilmah Conservation, the environment arm of Dilmah Tea Company. Dilmah Conservation approached WFL as they were interested in supporting a local community group to set up a waste based manufacturing project. Their initial idea was to provide a hotpress and waste packaging materials to a local community to manufacture partition boards; Dilmah would then buy these boards, thus providing an income stream for the community.

Before any collaborative project work commenced however, important questions such as who would own the machines or resulting intellectual property, what would happen if the company stops providing packaging materials, or purchasing the finished products, and who decides the price of the products. Local groups, especially need to be considered. A possible intervention should not lead to local communities or informal waste workers could be suspicious about ending groups having to end up ‘working for a company’ or having to compromise their autonomy.

b. Private waste management companies

The second group of private organisations are the private waste management companies in Sri Lanka. Waste collection in some councils in the Western province are privatised. For example, Burns Environmental Ltd and Abans (Pvt) Ltd are conducting waste collection in the Colombo municipal council. In addition, there are private companies that use waste materials as alternative fuel and raw materials in their production processes. For example, Geocycle, the waste management arm of Holcim Lanka Ltd. currently collects a large volume of discarded plastics, rice husks, and saw dust for cement kiln co-processing in their manufacturing plant in Puttlam.
Due to its emancipatory objectives WFL does not partner with private profit making companies, therefore no further actions were taken at this stage.

8. Government authorities

A number of Government authorities play a key role in projects being implemented on the ground. The Sri Lankan government issued a new regulation in 2014, stating that any country or an organisation planning to work in Sri Lanka should first obtain written approval from the External Resources Department of Sri Lanka. In addition, at the national level, the Ministry of Environment and Natural Resources and the Central Environment Authority, and at the provincial level, the Western province waste management authority, are interested in any waste management related project being implemented in the Western province.

At a more local level, the local councils expressed their interest in managing and reducing waste in their respective areas. Working with local authorities have been avoided in Argentina by WFL due to the need of the local communities to be independent. Similarly, during our fieldwork in Sri Lanka, a number of informal waste workers stated that they prefer not to work with local authorities. An environmental expert interviewed proposed working with a few local authorities who are actively engaged with their communities in managing waste. However, it is important to find out whether the local authorities have a willingness and commitment to work with informal waste workers. This idea needs to be investigated further given that local politics can influence how a project is run and who ultimately benefits as discussed in detail in Chapter 5.

9. Waste generators – households and commercial establishments

Households and commercial establishments are the primary waste generators in Sri Lanka. Currently, households and most of the commercial establishments do not sort their waste. This has a significant impact upon the recycling value chain. Recovery of waste could be improved greatly if source separation is carried out (Bandara, 2008; Van Zon & Siriwardena, 2000). According to a survey carried out in 2011 by the research team, supermarkets and large shopping complexes produce a considerable volume of packaging materials (Smythe, 2011). These are usually clean and hence ideal for recycling. However, a considerable amount of packaging materials are discarded with
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other waste. Some supermarkets and commercial establishments were willing to provide plastic waste free of charge for a NFC project. Some explained that there are company policies that restrict providing waste for outside parties. These factors need to be taken into consideration when analysing sources of waste plastic. According to Smythe (2011), it was expected that many commercial establishments would be willing to provide waste for a WFL project; however this would be more likely if the establishment was not already earning an income by selling their waste. *If waste buyers, particularly middlemen and brokers are interested or already collecting waste from these sources, this could create a competition as exemplified in Chapter 4.*

7.4.1.3 External stakeholders

10. Research and Development organisations

During our interviews with informal waste workers, it was highlighted that some of the major constraints in setting up or improving small-scale businesses is the difficulties experienced in sourcing funding, lack of infrastructure facilities and the lack of skills training *as described in Chapter 4*. Our investigations confirmed that the necessary institutional set up to support small-scale businesses are in place in Sri Lanka, although these services and facilities have not reached the informal waste sector. A waste based product manufacturing project could open up new paths for individuals and groups working with waste to access these facilities and opportunities.

Local research and development organisations could assist WFL in identifying locally available technology and materials. The following institutions were identified and contacted during our fieldwork. Their role in Sri Lanka and the potential importance to a new waste based project is listed in Table 7.6.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Role in Sri Lanka</th>
<th>Potential importance to a waste-based project</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Engineering Research and Development Centre of Sri</td>
<td>Promote direct and indirect mechanisms of technology transfer to improve industries in Sri Lanka. Design, manufacture and test</td>
<td>The department of design fabrication and consultancy to industries provide training and machining technologies to small and medium scale plastic recycling</td>
</tr>
<tr>
<td>Organization</td>
<td>Services Provided</td>
<td>Relevant Information</td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Lanka (NERDC)</td>
<td>Prototype machinery. Offer engineering consultancy services to local industries, and undertake research to promote local technology.</td>
<td>NERDC’s experience in working with local industries and fabricating machines using locally available materials could be valuable knowledge for a WFL project.</td>
</tr>
<tr>
<td>Industrial Technology Institute (ITI)</td>
<td>Provide research and testing services to industries and research projects.</td>
<td>The technical services division has a state-of-the-art materials laboratory that is capable of providing testing services for plastics and plastic based products. The local universities could collaborate with ITI to improve their materials testing facilities.</td>
</tr>
<tr>
<td>The Ministry of Traditional Industries and Small Enterprise Development</td>
<td>Promote, finance and sponsor small and medium enterprises and promote entrepreneurial activities at the small and medium level.</td>
<td>The Ministry conducts exhibitions and trade fairs for the promotion of local products. These could provide opportunities to market NFC products.</td>
</tr>
<tr>
<td>The Industrial Development Board (IDB)</td>
<td>Assist small and medium entrepreneurs in product and market development, innovation and new technologies. Conduct engineering workshops and provide entrepreneurship development training.</td>
<td>IDB has set up industrial estates with basic facilities. The appropriate technology research and development centre (ATRDC) at Pannala fabricate machines for small and micro industries. Their annual exhibition, SMIDEX (Small and Medium Industrial Exhibition) can be a good platform to market NFC materials and products.</td>
</tr>
<tr>
<td>The National Design centre</td>
<td>Assist small and medium businesses in market oriented designs and product</td>
<td>The National Design centre provides common facility services to small-scale businesses at the</td>
</tr>
</tbody>
</table>
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| National Enterprise Development Authority (NEDA) | Promote, and facilitate small and medium enterprise development in Sri Lanka. | NEDA facilitates access of entrepreneurs to finances required for enterprise development through the programme ‘Gamata Obina Vyapara’ (‘Enterprises suitable for the local context’ in Sinhala). |

Table 7.6: Research and development organisations

7.4.1.4 Possible trajectories

The following pathways were identified as possible trajectories for WFL to work with local groups in the Western province of Sri Lanka.

1. Directly working with the informal waste sector
   a. Working with small-scale recyclers or product manufacturers – A pilot project could be launched with a few informal waste workers or groups who have abundant access to plastic waste and fibre needed to manufacture composite materials, and who already have experience in small-scale plastic processing. Informal As discussed in Chapter 6, informal groups’ willingness to share any new knowledge with others is an important aspect observed during our fieldwork. As it is not possible to approach everyone, a ‘train the trainers’ approach can reach and benefit a larger group. This could ensure informal waste workers demonstrating ‘power with’ them and enhance their autonomy in co-creating knowledge and sustainable businesses.

   b. Organising informal waste workers to form co-operatives. The co-operative movement is a resilient well-established movement in Sri Lanka. However, there are no co-operatives working on waste-based income generating activities in the country. A novel product
manufacturing project could encourage some existing informal waste networks to form co-operatives and to be autonomous organisations that work collectively to run viable businesses. WFL could support co-op development.

2. Working with other local community groups
   a. Working with low income communities – Sevanatha has established a sorting and collection centre in one of the low income communities in Colombo. The project was not sustainable due to number of reasons, one reason being that they did not have a steady market. A product manufacturing could add value to their sorted waste and open up new markets. Similarly, the National Cleaner Production Centre has expressed their willingness to work with WFL on community-based projects, centred on a community collection centre or a local community managing their own waste.

   b. Working with community organisations – During interviews we identified a number of community organisations operating within local communities - youth organisations, welfare societies, women’s organisations. These groups take responsibility and volunteer their time to run different community projects for the betterment of their community. One youth organisation expressed their interest in starting up a waste based business that has dual benefits for the community – an income source and a cleaner environment. In addition, there are a few examples of CBOs collecting and sorting waste. A small-scale project could be a viable opportunity for an already organised group working with waste.

   Based on the previous studies reported in Chapters 5 and 6, co-creating projects with informal waste workers and other local community groups could help to transform their lives. It could provide them the ability to gain autonomy by moving away from social and political structures that dominate them.
7.4.2 Availability of waste materials

Natural fibre composites (NFCs) or waste based composites discussed in this study are made of thermoplastic as a matrix and fibres as reinforcement (Baillie, 2004). Their low cost, light weight and environmental benefits, make NFCs much more attractive than composites made out of glass and other synthetic fibres. This section discusses the availability of waste materials in Sri Lanka: plastic waste, pre and post-consumer waste fibres and potential natural fibre sources. Recent research conducted by Tan (2014), Chuang (2014) and Tadjoudine (2014) for WFL investigated the feasibility of manufacturing NFCs with the hot press using coir, sawdust and textile waste. This research confirmed that viable materials can be produced using plastic and fibre waste.

7.4.2.1 Plastic Waste

Sri Lanka imports annually a considerable amount of plastic raw materials and finished products. A major portion of these remain as post-consumer plastic waste in the environment. According to the Sri Lanka Customs data base, Sri Lanka imports between 150,000 – 200,000 metric tons of plastics every year (Sri Lanka Customs, 2014). However, plastic entering the country in the form of packaging materials and finished goods do not get taken into consideration. Hence, the actual volumes of plastic within the country is expected to be higher than the volumes reported.

The most common disposal method for plastics is throwing away the unused or unwanted items. These usually end up in open dumps or in waterways and this is considered a major health and environmental threat in Sri Lanka. Discarded plastic items collect rain water which provide ideal habitats for disease spreading vectors, especially mosquitoes (Van Zon & Siriwardena, 2000). Moreover, blocked drains and waterways due to polythene and other non-degradable waste is one of the major reasons for causing flash floods in urban areas, particularly in Colombo. Another popular disposal method is to burn plastic items. It was reported during interviews that in some households, polythene bags are used as an ignition material in traditional cooking stoves that use fire wood. Currently, Geocycle, the waste management arm of Holcim use co-process a portion of waste plastic in their cement kiln co-processing.
In Sri Lanka, it is not mandatory to have plastic identification codes in products. This poses difficulties in identifying and sorting materials for recycling. There are between 20 and 25 types of plastics in use, but not all types of plastics are recycled. The most common types recycled are; High-Density Polyethylene (HDPE), Low density polyethylene (LDPE), Polypropylene (PP), Polystyrene (PS), Polyvinyl Chloride (PVC) and Polythene Terephthalate (PET). The actual volumes recycled are not known.

Previous WFL projects have utilised LDPE and HDPE plastics. WFL Sri Lanka could use LDPE, HDPE, and Tetra Pak reinforced by paper, cardboard or textile in the initial project. Agriculture waste and dedicated fibre could be incorporated in future projects after conducting local materials research. WFL avoids using PVC and PS as these can produce harmful gases when heated. Using PET is not encouraged as it already has a good recycling market in Sri Lanka. Currently PET bottles are bailed and exported to India.

HDPE and LDPE plastics are already widely used in existing recycling facilities in the Western Province. According to informal waste collectors interviewed, polythene bags, lunch sheets, straws, small spoons and sachet packets are typically difficult to collect, store and clean, thus there is no demand for these. In addition, prices for materials are determined by the weight. If the waste product is light in weight, a large volume needs to be collected to gain a considerable weight. Thus, waste collectors avoid collecting these materials. In the Western Province, approximately 1270 tonnes of plastic bags enter the waste stream annually (Jayasekara, 2010). According to a report by the Central Environment Authority, thin plastic shopping bags (Sili-sili bags) are the most problematic plastic products in Sri Lanka (Lakmali & Dissanayake, 2008). However, due to its thinness and low weight none of the informal waste collectors interviewed collect these. Due to their abundance, difficulty in recycling using conventional methods and being a problematic product, plastic bags have significant potential for use in a WFL project.

A number of sources to collect plastic waste for a potential WFL project were identified, during our interviews. Informal waste workers or local groups working with WFL can collect waste directly from households. This would be easier if the groups are organised and select different areas to collect waste from. It is reported in previous
studies that low and middle income houses are more supportive providing waste to informal waste collectors compared to high income families (Van Zon & Siriwardena, 2000). Collecting plastic waste before it enters the municipal waste stream would mean that waste would be relatively clean and require little sorting. If the community could be made aware and involved in source separation it would not only improve the quality of waste collected but also the social recognition of the informal waste workers.

Industrial and export processing zones generate good quality plastic waste in the form of packaging materials. During field visits at the Katunayake export processing zone, it was observed that plastic materials, in particular clear packaging material and plastic cones were collected in large volumes. Collection from commercial establishments – retail shops and supermarkets is another possible source identified. Supermarkets in the Western Province, such as Cargills, Keels, and Arpico generate large amounts of plastic waste in the form of plastic wrappings. These packaging materials could be an excellent source of plastic for a WFL project as this waste would be very clean, homogenous, and generated continuously in large amounts. Supermarkets cater mainly for middle and high income families. Most people do their daily shopping in small retail shops. The plastic waste produced in retail shops include plastic bags, rice bags, food packaging, straws and yoghurt cups. Currently, informal waste workers collect from these shops and their existing networks could be useful for a WFL project.

7.4.2.2 Fibre sources

1. Pre-consumer waste - Textile waste

NFCs made with fabric have excellent mechanical properties. When impregnated with plastic the long, woven fibres of textiles can result in very strong and flexible NFCs (Baillie et al., 2011). Textile or fabric waste is considered as ‘pre-consumer waste’ - a by-product of the apparel industry that includes trimmings, cuttings, damaged lines and other fabric wastes.

Sri Lanka’s apparel manufacturing sector has been an export-oriented industry for over two decades. Currently around 800 companies in Sri Lanka produce a wide range of apparel products, most of them catering to the international market, comprising 45% of exports from the country (Asian Development Bank, 2008). According to
Aparakkakankanamage (2005), the waste generated at two of the largest Export Processing Zones (EPZs) in the country located in the Western province - Katunayake and Biyagama comprises 60% and 52.3% textile waste respectively.

During our fieldwork, a quality control supervisor from a leading apparel industry in Sri Lanka mentioned that factories often order more fabric than they need for production. Moreover, with the use of mechanical cutters and blocks, it is inevitable that some fabric is wasted. The disposal of unsold or damaged stock and textile waste is a concern for garment factories in Sri Lanka as they are not allowed to sell branded items in the local markets. Our interviewee stated, “A brand loses its uniqueness if everyone wears it. We have to destroy the rejects to maintain exclusivity”. However, with a trend to promote Sri Lanka’s garment industry as a green and an ethical business, companies now are actively seeking for alternative practices.

Textile mills and finishing plants that supply existing apparel exporters or export directly overseas produce an equal amount of fabric waste as trial and error. It was found out that a fabric mill which produces three million metres of fabric a month discard about eight per cent of that as waste. Contracts with multinational companies do not allow these to be re-used, hence a large volume of fabric gets destroyed.

Textile waste could produce NFC materials with vibrant colours and designs that can be used for different artistic purposes. Our informant proposed the ‘feeder cloth’ as a good waste material for manufacturing composite materials. This is fabric that is fed through the printing machine to ensure all the printing heads are running properly. Once it is confirmed that the design is being printed correctly, the feeder cloth is cut off. A feeder cloth can be long as 30 meters and gets reused couple of more times on both sides before been discarded. Because of the prints of brand logos, feeder clothes are usually incinerated. However, the companies are looking at other alternative options. A fabric material that has different prints and colours could create a unique composite material.

Textile waste has a strong potential for use in a WFL project, due to high generation at EPZs and the excellent mechanical properties of composite materials made with fabric. Textile waste is already collected by informal waste pickers at EPZs for home-based industries producing door mats, carpets, cotton rags, soft toys etc. Small scale waste
collectors at the Katunayake EPZ expressed their interest in being involved in a WFL project. *It must be ensured that collection for a WFL project will have no negative impact upon these informal workers.*

2. **Post-consumer waste - Paper and cardboard**

Paper and cardboard, are two common fibre sources used for NFC production (Baillie et al., 2011). According to the Ministry of Environment and Natural Resources solid waste database (2005), paper products comprise 6.47 percent of the waste collected in Sri Lanka; the greatest contributor to the waste stream after short-term biodegradable waste. Paper recycling is practiced widely in Sri Lanka, through informal sector, private companies as well as in home-based industries (Bandara, 2008). During our fieldwork we found out that the largest recycler, Neptune collects good quality paper and exports to India. However, due to large volumes of waste paper and cardboard available in the country, using these waste for a WFL project will not create competition with other users.

3. **Other plant-based natural fibres**

Sri Lanka is a tropical agricultural country. As a result a large volume of agricultural by-products and other natural fibre sources are available in the country. However, much of the potentially useful agricultural crop residues are dumped or burnt due to lack of alternative uses. In addition, there are a number of natural fibre-producing plants people have processed locally for many generations. Today, these traditional manual practices are mostly confined to rural areas of Sri Lanka. The processing of fibre has declined over the years with more artificial fibre materials becoming cheaper in the market.

i. **Agricultural fibre**

The potential agricultural fibre sources are tabulated in Table 7.7, 7.8 and 7.9. These are categorised into three groups.

1. Plants that are widely used for fibre extraction.
2. Plants that have the potential for fibre extraction, but currently used for other purposes.
3. Plants that have the potential for fibre extraction, but currently discarded after harvesting the yield.

ii. Wood fibre – Saw dust and wood flour
Wood fibre – in particular saw dust and wood flour are by-products of wood processing and furniture manufacturing. Exact volumes of saw dust and wood flour are difficult to determine as small and medium scale furniture manufacturing industries are scattered around the country. According to an environmental activist from the Environmental Foundation Ltd, sawdust and wood flour pose great environmental risks as manufacturers dump these in waterways or burn sawdust to reduce waste accumulation. Saw dust, like rice husks is widely used as a fuel. Many studies have shown the potential for saw dust and wood flour to be used in NFCs. Recent research conducted by Tadjoudine (2014) for WFL investigated the feasibility of manufacturing NFCs with the hot press using sawdust and thermoplastics.

iii. Dedicated fibre plants
A number of plants in the Agave family are used for their fibre around the world. Although, Agave americana (Sinhala: Pathok hana) and Agave sisalana (Sisal) are found extensively in Sri Lanka, they are grown mainly as ornamental plants. Sansevieria zeylanica or Ceylon Bowstring Hemp (locally known as Niyanda) is another fibre producing plant. It is not used for its fibre in Sri Lanka, but popular as an ornamental plant. Crotalaria juncea or Sunn hemp (locally known as hana) is extensively cultivated for fibre in other parts of the world. In Sri Lanka however, it is used as a green manure and the dried leaves, bark and boiled seeds are fed to cattle.

Fibre extraction from these plants have declined and is limited to rural villages in Sri Lanka. One interviewee mentioned about a village called Henawela, where the villagers use agave fibre stained with plant dyes to weave mats. Since above plants are not commercially grown in Sri Lanka, or are not used widely for fibre extraction, data are not available or difficult to find. There is a potential to use these plants for NFCs if sources could be identified.
<table>
<thead>
<tr>
<th>Natural fibre</th>
<th>Extracted from</th>
<th>Area</th>
<th>Hectares or number of plants</th>
<th>Uses</th>
<th>Existing literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coconut fibre products (Coi fibre and coir dust)</td>
<td>Outer fibrous layer of the coconut fruit ((Cocos nucifera)). Known as ‘Kapruka’ (Tree of bounties in Sinhala).</td>
<td>Mainly in the coconut triangle – Gampaha, Kurunegala, Puttalam districts and in the South - Galle and Matara districts.</td>
<td>Grown extensively covering 394,836 ha.</td>
<td>Sri Lanka is a main producer of coir in the world. Products include; Chips, Coir ropes and twine, Coir mattresses, mats and carpets, Geo textiles, Brushes and brooms, Potting media in horticulture, Soil conditioner</td>
<td>Coir fibre processing industry in Sri Lanka. Coir fibre composites used in automobile seat production (International Natural Fiber Organization, n.d.).</td>
</tr>
<tr>
<td>Palmyrah</td>
<td>Long, hard fibres from the basal sheath of the leaf.</td>
<td>Grows extensively in the North and Eastern parts of Sri Lanka.</td>
<td>11 million plants around the country.</td>
<td>Known as the ‘Katpaha Viruchcham’ (Celestial tree in Tamil) because all of the plant can be utilised.</td>
<td>A well-established palmyrah fibre industry is present in Sri Lanka (Plamyrah Development Board Sri Lanka, n.d.).</td>
</tr>
<tr>
<td>Kitul</td>
<td>Nearly one meter long black bristle fibres from the leaf base.</td>
<td>Found in home gardens in the wet zone of the country.</td>
<td></td>
<td>Produce better quality strings and brooms than coir fibre. Used to make ropes, brushes, baskets, fishing lines.</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.7: Plants that are widely used for fibre extraction.
<table>
<thead>
<tr>
<th>Natural fibre</th>
<th>Extracted from</th>
<th>Area</th>
<th>Hectares or number of plants</th>
<th>Uses</th>
<th>Disposal method</th>
<th>Existing literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rice straw</td>
<td>Remaining residues after harvesting paddy.</td>
<td>Polonnaruwa, Ampara, Kurunegala, Anuradhapura, Matara and Hambantota districts.</td>
<td>Rice is the staple food in Sri Lanka. Grown in 708,000 ha.</td>
<td>The remaining residues are left in the paddy field to dry and is reused as organic manure. Used as a mulching material and as livestock feed.</td>
<td>A large volume is burnt in the fields.</td>
<td>Rice straw is a fairly brittle material but has the potential to be used in composite materials (Grozdanov et al., 2006).</td>
</tr>
<tr>
<td>Rice husks</td>
<td>Hard outer cover of the rice grain.</td>
<td></td>
<td></td>
<td>Used as a fuel in rice mills and bricks and roof tiles industry. Used to produce husk briquettes. A good plant growth substrate and mulching material. Some industries (i.e. Geocycle) use rice husks in their cement kiln co-processing.</td>
<td>Dumped in waterways or burnt, if not used.</td>
<td></td>
</tr>
<tr>
<td>Sugar cane bagasse</td>
<td>Fibrous by-product that remains after the juice is extracted from sugar cane.</td>
<td>Ampara and Moneragala</td>
<td>16,910 ha</td>
<td>Used as a fuel in sugar mills, as animal feed, and to distil alcohol.</td>
<td></td>
<td>Used to produce NFCs (Verma, Gope, Maheshwari, &amp; Sharma, 2012).</td>
</tr>
</tbody>
</table>

Table 7.8: Has the potential to extract fibre. Currently used for other purposes.
### Table 7.9: Has the potential to extract fibre. Currently discarded after harvesting the yield.

<table>
<thead>
<tr>
<th>Natural fibre</th>
<th>Extracted from</th>
<th>Area</th>
<th>Hectares or number of plants</th>
<th>Disposal method</th>
<th>Existing literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banana fibre</td>
<td>Banana stem</td>
<td>Most widely cultivated fruit crop covering approximately 55% of the land area grown under fruits.</td>
<td>48,044 ha</td>
<td>The plant is cut down and discarded after harvesting the fruit. Banana fibre extraction is carried out in Jaffna.</td>
<td>A source of fibre, particularly in high quality textile production in countries like Japan, Nepal (Prasad et al., 2012) and India (Preethi &amp; Balakrishna Murthy, 2013).</td>
</tr>
<tr>
<td>Pineapple fibre</td>
<td>Leaves</td>
<td>Gampaha, Kurunegala and Puttlam districts.</td>
<td>4,782 ha</td>
<td>The remaining parts are burnt or thrown away.</td>
<td>Widely used in other countries, particularly in India and Philippines (Kannojiya, Gaurav, Ranjan, Tiyer, &amp; Pandey, 2013).</td>
</tr>
<tr>
<td>Areca nut fibre</td>
<td>Outer fibrous husk</td>
<td>Found in home gardens in many parts of the country.</td>
<td>500,000 plants</td>
<td>The husk is discarded after removing the nut.</td>
<td>In India, husk fibres are used for making hard boards and paper (Rajan, Kurup, &amp; Abraham, 2005).</td>
</tr>
<tr>
<td>Corn straw</td>
<td>Remaining residues after harvesting.</td>
<td>Mainly in Monaragala and Anuradhapura districts.</td>
<td>26,340 ha</td>
<td>Remaining plant materials are usually burnt or thrown away. In a few cases, the dried materials are used as organic matter for paddy fields.</td>
<td>Used in NFC production in other countries (Thamae, Marien, Chong, Wu, &amp; Baillie, 2008).</td>
</tr>
</tbody>
</table>

Table 7.9: Has the potential to extract fibre. Currently discarded after harvesting the yield.
7.4.3 Sources of funding to support set up costs

The availability of funds and how the funds are managed are important factors for the success of any project. Funding and managing finances is a sensitive topic in development work (Harcourt, 2006). Mismanagement of funds by anyone involved with a project can instigate mistrust and even damage the unity of a group, CBO or a network of informal waste workers. If possible, all funding sources need to be free from any biases, external influences and government and corporate interests. However, this may not be practical. Therefore, while being aware of the existing issues, the funding sources currently available and other sources proposed for the project are discussed below.

Based on how the funds are sourced, we have categorised funding into two main groups.

7.4.3.1 Internal funding

Internal funding is when the primary stakeholders work out ways to generate funds to establish, maintain or develop the project. Some informal groups and local communities state that they prefer to source funding on their own to avoid relying on government and other organisations for financial support. In particular, fund raising is explained as a method that provides a sense of autonomy.

1. The most common method reported during interviews for acquiring seed-funding to start up a business or expand existing businesses is to mortgage an asset (usually the house they live in) or take a loan from a financial institution. In addition, informal waste workers rely on their buyers or money lenders for financial assistance in times of need. According to an informal waste worker some money lenders charge interest rates as high as 20 per cent which makes it impossible to repay the loan on time.

During our interviews some informal waste workers expressed their willingness to obtain a bank loan to start up a pilot project. This was not encouraged by WFL as accumulating more debts is neither sustainable nor appropriate given that most of them are already struggling with their businesses. According to an interviewee who works at a co-operative, the following financial...
institutions provide loans for small and medium entrepreneurs for a very low interest rate. However, to apply for a loan, a guarantor is required which proved to be difficult for many informal waste workers.

- People’s Bank
- Sanasa Development Bank
- Seylan Merchant Bank
- Central Bank of Sri Lanka
- Wayamba Development Bank
- Bank of Ceylon

2. Seettuwa is a traditional system of savings and credit, widely practiced in Sri Lanka, mainly by women. The participants in a mutual group contribute an agreed sum of money to a pool on a weekly, fortnightly or monthly basis. The pooled amount is awarded to one member of the group at a time, either in an agreed order or by drawing lots. This enables people who find it difficult to secure credit through other formal ways to gain access to a lump sum of money which they would otherwise not be able to acquire.

A number of informal waste workers reported participating in seettu with other people known to them. In the words of one female informal waste collector, “sometimes even though we try so hard we are not able to save anything, but in this way we are committed to give money for that 10 or 12 months. It is better than going to a money lender.” Seettuwa has been practiced both as a money saving mechanism and a source of seed-funding for small businesses. While it is not practical to use this method of source funding to purchase a hotpress, it could be a useful mechanism of funding once a project is initiated.

3. Fund raising is a popular method used by many local groups and organisations to source funds for project activities in Sri Lanka. It is common for local communities to conduct small fund raising activities during festive seasons for their community projects. However, fund raising is not practiced by the informal waste sector. This could be a potential method if the informal waste workers are organised into co-ops or CBOs and this would in turn enhance their autonomy.
and security. This method is also suitable for local environmental or social groups, women’s societies and youth groups who would like to start up a waste based project in their community.

4. Micro credit – Gemidiriya and Gama Neguma projects

Micro finance institutions have succeeded in reaching low-income households with saving and credit services and have showed a wide variety of operations. These are often given as very low interest loans to groups of people (rather than to individuals) who take collective responsibility to repay the loan.

The Gemidiriya project (now in its second phase as Gama Neguma project) is a livelihood improvement project in Sri Lanka. The project is based on the Community Driven Development (CDD) approach, which aims to improve the livelihood of local communities through the formation of self-governed village institutions with a direct funding facility (De Silva, Seneviratne, & Galappattige, 2010). The village saving and credit organisation (VSCO) is the financial arm of the village organisation. It is formed by aggregating small groups and acts as a community bank. The VSCO activities are managed by the VSCO committee, those who are selected by the village community (F. Jayasinghe, 2011). This system provides greater autonomy to small community groups in terms of managing their own livelihood projects.

7.4.3.2 External Funding

When an organisation applies for competitive external funding programs, it becomes difficult to be flexible and adhere to participatory approaches. These type of schemes are structured with rigid timelines and within these timelines it might not be possible to consult all the stakeholders. The terms and conditions are also not decided by the participants or even by the development organisation. In this way, funding bodies can exert ‘power over’ recipients, both the development organisations and the local groups they are working with. While external funding programs are attractive and often provide sufficient financial support to run a project, the above factors need to be taken into account.
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1. Grants

Grants are a major source of funding for waste management related community development projects in Sri Lanka, although very few projects have the informal waste sector involved. Grants are competitive programs and require submission of detailed proposals often in English, specifying aims, objectives, project plan, outcomes and a budget. Hence, informal waste workers and local communities are unable to apply directly for these programs. It is development organisations and NGOs that usually apply for grants to work in an identified local area. *This again creates a power imbalance which the project aims to address.*

Previously funded projects

a. Funding organisations

Based on the data collected from various organisations listed in Table 7.3, the funding organisations listed in Table 7.10 have funded community development and waste management projects in Sri Lanka in the past (in alphabetical order).

<table>
<thead>
<tr>
<th>Asian Development Bank</th>
<th>Ford Foundation</th>
<th>Oxfam GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Americas</td>
<td>Human Help Network (Rhineland Palatinate)</td>
<td>Rabobank Foundation</td>
</tr>
<tr>
<td>Asia Foundation</td>
<td>Intermediate Technology Development Group (ITDG)</td>
<td>Stromme Foundation</td>
</tr>
<tr>
<td>AusAID</td>
<td>JAICA</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>CHA</td>
<td>Japan Bank International Corporation (JBIC)</td>
<td>USAID</td>
</tr>
<tr>
<td>CHF (USA)</td>
<td>Konrad Adenauer Foundation</td>
<td>The World Bank</td>
</tr>
<tr>
<td>CIDA</td>
<td>New Zealand AID</td>
<td>World View Foundation</td>
</tr>
<tr>
<td>European Union</td>
<td>Norad</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.10: Funding organisations - waste management projects
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Government Partnerships for Development grant (GPFD)

GPFD is a competitive funding program by the Department of Foreign Affairs and Trade Australia (DFAT) which provides funds to eligible Australian public sector organisations to collaborate with public sector organisations in developing countries. At the time of writing, the University of Western Australia and the WFL team has been successful in receiving this grant for the proposed WFL Sri Lanka initiative as a direct result of this feasibility study.

2. Corporate funds

Small-scale projects also receive funds from corporate sponsors, particularly through their corporate social responsibility projects. While any type of funding is welcome by most groups, some interviewees stated that they feel uncomfortable and feel suspicious about corporate funds. In the words of one environmental activist explained that, “companies are willing to give funds, but the problem is 99 percent of the time, they come with strings attached.” As noted earlier WFL does not work with profit making companies. Therefore corporate funds are not considered for the proposed project. During fieldwork several private organisations expressed their interest about the proposed project. The terms and conditions of these collaborations need to be discussed with all parties involved and carefully considered before moving ahead. This is important to avoid corporate organisations exerting “power over” other stakeholders due to them providing the financial capital.

3. Donations and gifts

Donations and gifts are usually provided by philanthropic trusts, individuals and by private organisations. It is observed that funding from these sources are rarely given to waste related projects in Sri Lanka. Mostly, the funds are given to popular projects such as animal rights and ecological and conservation projects. Creative product ideas that would incorporate animal rights and environmental themes could be a good market avenue for small-scale product manufacturers who wish to start up composite product manufacturing businesses.
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7.4.4 Appropriate technology

Waste for Life has designed a hotpress to produce 60x60cm composite sheets (up to 1.2 cm thick) of fibre reinforced plastic that can be used ‘as it is’ as interior ceiling or floor tiles, post-formed into 3-dimensional objects, or cut into shapes and assembled into a variety of consumer products. The press performs the functions of similar commercial hotpresses - heats up to 200°C and it presses up to 6 MPa - at a fraction of the cost of commercial machinery (Baillie et al., 2011). Aside from the flat panels, WFL have successfully made wallets, garbage bins, coasters, bags, watch bands, chairs and drain gutters among many other products (Baillie et al., 2011; Waste for Life, n.d.). The specifics of what is manufactured is determined by local needs, local markets, local design capabilities, and the properties that can be achieved from the particular types of plastic and fibres used to produce the base composite sheets.

In any project context, WFL aims to work with informal waste workers, local workshops and support personnel from local universities, to manufacture the hotpress and other ancillary equipment (i.e. shredders, compactors, extruders), conduct materials testing and design prototyping. First, it is important to assess the existing technology of the local context. The following section details the existing machine manufacturing capabilities and material research facilities in the Sri Lankan context.

7.4.4.1 Local technology

Local knowledge is instrumental in identifying where the machines could be built or the existing purchasing channels. We identified both formal and informal systems of technology development during fieldwork. This demonstrates that informal waste workers utilise different methods to source machines. Their knowledge and networks, although informal, could be useful in manufacturing recycling equipment locally. Supporting local small scale businesses by commissioning them to manufacture the equipment, thereby enhancing their own autonomy would add to the emancipatory objectives of the project.

1. During our interviews with informal waste workers, we learnt that identified a number of small and medium scale workshops manufacturing extruders, pelletisers, die cutters for small-scale recycling industries operate in the Western
province. Small-scale recyclers and product manufacturers contact these workshops and get the machines manufactured according to the specifications required. According to one informal waste worker who works closely with a workshop in Wattala, the technologies used in the machines are in principle the same as those used by large industries, although most machines are made using locally available spare parts. Our effort to visit this small-scale workshop was unsuccessful. Another informal waste worker explained that most of the small-scale workshops only deal with customers known to them and are suspicious of outsiders visiting them. Hence, if WFL is to work with local workshops, building trust and approaching them through a known entity will be important.

2. We also identified a number of large-scale buyers who bring down second-hand machines, mainly from China and India. According to a small-scale product manufacturer, these machines are usually either outdated or broken. As the second-hand machines are much cheaper compared to brand new machines, small-scale processors buy old machines and get them repaired.

3. We visited two small-scale entrepreneurs who got their machines assembled part by part. One small-scale recycler explained this process in detail. He gets from scratch. In order to build the machines required, they get the screw bar done by a lathe workshop. Then he gets the gear box is made using parts bought from Panchikawatta, a small area in Colombo specialised in selling spare parts. The heater bands are made by another person. Finally, a welder is brought in to assemble all the parts together and an electrician to complete the electric work and wiring. According to him, the self-assembled extruder costs about 2000 AUD.

4. According to the contact person from the National Engineering and Research Development Centre (NERD), they help small-scale industries with machine manufacturing for a very reasonable price. Similarly, we found out that the Industrial Development Board has set up machine fabrication facilities in their industrial parks.

5. Some of the existing WFL hotpress designs are from its university network. Similarly, local universities in Sri Lanka could also contribute to research,
design and innovation of machines—through their mechanical engineering departments.

7.4.5 Products and Markets

Identifying appropriate products and distribution channels is an important part of a needs and feasibility study. The potential products and markets identified during fieldwork are summarised below.

7.4.5.1 Potential product ideas

The Sri Lankan market is saturated with plastic products. Due to their ease of use and low cost, most items for domestic consumption are made out of plastics. During the initial needs assessment interviewees came up with a range of products they thought possible to manufacture using NFCs. A list of some of the items proposed and reasons provided for their suggestions are summarised in Table 7.11.

<table>
<thead>
<tr>
<th>Potential Product</th>
<th>Reasons</th>
<th>Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collapsible crates to transport tea and agricultural products</td>
<td>Sri Lanka loses more than 175 million dollars per year due to improper packing methods used in transportation of fruits, vegetables and tea leaves - often transported in gunny bags. The government brought in a new law to make compulsory transporting of vegetables and fruits in plastic crates in 2011. Farmers and the traders protested as the price of a crate is expensive (8-10 USD).</td>
<td>A cheaper crate that has a simple design could be made using NFCs the hot press.</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Material Type</th>
<th>Description</th>
<th>Proposed Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roof and ceiling tiles</strong></td>
<td>Most low income houses use thatched coconut roofing, or tin roofs. <strong>Asbestos is a popular material used in both roofs and ceilings.</strong> There is a demand for alternative materials due to the carcinogenic properties associated with asbestos.</td>
<td>Roof or ceiling tiles made out of plastic and fibre was proposed as a good alternative.</td>
</tr>
<tr>
<td><strong>Partition boards for offices</strong></td>
<td>Partition boards are usually imported and are expensive.</td>
<td>These could be made from used to make flat panels using locally manufactured/available waste materials. These lightweight composite materials boards can be used for partitioning.</td>
</tr>
<tr>
<td><strong>Floor boards</strong></td>
<td>Plastic and saw dust or rice husk composite material can be used to make durable floor boards.</td>
<td></td>
</tr>
<tr>
<td><strong>Furniture</strong></td>
<td>Plastic furniture are popular in Sri Lanka. <strong>Parts of furniture such as stool tops can be made out of a composite materials that could be sold for coffee shops and eco-hotels.</strong></td>
<td>Furniture can be made out of plastic and saw dust composites.</td>
</tr>
<tr>
<td><strong>Gutters and pipe fittings</strong></td>
<td>Gutters and pipe fittings are made out of PVC.</td>
<td>An eco-friendly plastic/natural fibre composite was proposed as an</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Alternative</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>Carts/trolley (frame)</td>
<td>The use of push carts are popular among itinerant informal traders, who sell food, vegetables, fruits, toys and small household items. The frame is made of steel or wood which makes it difficult to push.</td>
<td>A much lighter material would be beneficial for these traders.</td>
</tr>
<tr>
<td>Waste bins</td>
<td>Communal waste bins are made out of concrete or steel—and these are difficult to clean when filled.</td>
<td>A lighter composite material could be an alternative.</td>
</tr>
<tr>
<td>Compost barrels</td>
<td>Commercially available compost barrels are made out of plastics.</td>
<td>A composite material could be used for a better eco-friendly design.</td>
</tr>
<tr>
<td>Reusable nursery pots/bags</td>
<td>Currently nursery plant pots and bags are made out of a black sturdy polythene. These are usually thrown away once used.</td>
<td>The simple design of the pot bag, makes it an ideal product design using NFCs.</td>
</tr>
<tr>
<td>Outer coverings for cloth cupboards</td>
<td>In most low income households cloths cupboards are made out of a metal frame covered with a thin plastic covering.</td>
<td>This outer covering could be made with a more durable composite material.</td>
</tr>
<tr>
<td>Book covers/ file covers</td>
<td>In Sri Lanka it is common to use a polythene cover as a protective layer for books, particularly for text books provided by the government as these need to be returned to be used by the students the year after.</td>
<td>Attractive book covers using plastics, paper or textile waste was proposed as a suitable product.</td>
</tr>
<tr>
<td>Outdoor and indoor leisure</td>
<td>Due to its low cost, most leisure activity and sports equipment such</td>
<td>Composite materials could be used as an</td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>activity equipment</th>
<th>as indoor board games, cricket bats are made out of plastics.</th>
<th>alternative.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flower pots and vases</td>
<td>There are many eco-hotels that buy environmentally friendly products. Flower pots and vases are proposed as simple products suitable to be made using NFCs.</td>
<td></td>
</tr>
<tr>
<td>Souvenirs (Photo frames, key tags, coasters, decorative items etc)</td>
<td>Sri Lanka is a popular tourist destination. Souvenir items made out of local materials are popular and have a good market.</td>
<td></td>
</tr>
<tr>
<td>Women’s wallets and purses</td>
<td>Women, in particular housewives use small purses made out of a thin plastic material to carry money.</td>
<td>These can be made out of plastic fabric composite materials.</td>
</tr>
</tbody>
</table>

Table 7.11: Potential product ideas

These are few initial product ideas collected during the interviews. As the project evolves, and more material testing is conducted using natural fibres available, more products could be developed.

7.4.5.2 Potential markets

There exist a good market for low-cost consumer items in Sri Lanka due to a larger population of low-income consumers. Within low and middle income families, the demand for low-cost products are generally greater than for products made of more expensive virgin plastics.

Locating the best market for a product is critical for the sustainability of the project business. Small businesses could use several different channels for the distribution of a product. Products made for both domestic consumption or community use can be directly sold in the local market through local shops that are willing to purchase products. Weekly local markets in an area are another avenue and flea markets are other avenues to sell products. These are usually situated within a town and local
manufacturers come from different areas to sell their products. Small household items made out of plastic are a common product available in these markets. Direct selling of products to consumers without intermediaries could generate better income for informal waste workers thereby enhancing autonomy.

Other potential market avenues identified during fieldwork are given in Table 7.12. It is important to make sure that informal In specialised markets such as local handicraft shops, hotels, and tourist centres the focus should be more on telling the story of the small scale product manufacturers and the material than the actual product itself. Some private organisations are interested in purchasing waste-based composite products as part of their Corporate Social Responsibility (CSR) projects.

<table>
<thead>
<tr>
<th>Potential market</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local handicrafts shops (Laksala and Laknipayum Sales &amp; Display Centre)</td>
<td>Dedicated to selling local items, thereby provide opportunities for local products to enter the commercial market. Coordinate buyers and manufacturers and provide ideas for new products and their improvement.</td>
</tr>
<tr>
<td>Hotels and restaurants</td>
<td>Interested in buying locally made eco-friendly products including furniture, artworks and simple stationery items.</td>
</tr>
<tr>
<td>The tourism industry</td>
<td>One of the major income streams in Sri Lanka. Souvenirs made out of local materials are popular among tourists. Products that has cultural motifs need to be considered.</td>
</tr>
<tr>
<td>Private organisations (i.e Dilmah)</td>
<td>Interested Dilmah conservation is interested in products that can add value to the organisation’s ‘eco-friendly, socially responsible’ product manufacturing processes. Some</td>
</tr>
</tbody>
</table>
organisations are interested in simple corporate gifts made out of composite materials.

| Farms and plant nurseries | Agriculture and forestry are the largest sectors in the economy. These sectors use a wide range of products made out of plastics. |

Table 7.12: Potential market avenues identified

7.5 Discussion

This study presents an approach and findings of a participatory needs and feasibility study by drawing on the case study of Waste for Life Sri Lanka. Two goals define Waste for Life projects - to reduce the damaging environmental impact of plastic waste products and to promote autonomy and economic security for marginalised populations who depend upon waste as a livelihood. These goals require a long-term commitment from all who are involved with the project, a strong local support network that helps project beneficiaries achieve independence and social inclusion, and processes that are locally appropriate and replicable to ensure that stakeholder efforts do not simply result in a ‘one-off’ project. The success of the project should be measured not only by statistics and evaluation methods but by whether people benefited and feel they are better off as a result of the project.

Overall the findings of this study indicate that a WFL project in the Western Province of Sri Lanka can be considered feasible. Nevertheless, actual implementation of the project could present many challenges and much further work needs to be done. Identifying the correct groups to work with is the first major challenge. Most people interviewed were interested in the idea of manufacturing NFC materials and products as this is a novel idea to Sri Lanka. However, it was clear that different groups have different values and interests. It is possible that conflict and tension could arise in any development project. We recognised that competing needs and disagreements could be managed through networking and communication to a greater extent. However, when there are differences in our values and the stakeholders’ values, a compromise is much more difficult. For example, while WFL’s priority is to work with informal waste workers
and local groups, authorities are reluctant or avoid working with informal waste workers altogether. Hence, during discussions authorities focused only on the technical aspect and the waste reduction potential of the project. Working with informal workers were not considered a priority. It is important to identify these tensions and differences at the outset.

We were also able to talk to a broad range of governmental and educational institutions as well as independent agencies, who are willing to devote resources to a WFL project. Depending on the local context, support from these organisations would be important for the project. However it is equally important that any assistance is allowed in a way that will have no negative impact on the informal or local groups. If WFL to collaborate and work with other organisations, being aware of the power dynamics is important.

There is a lack of contribution for real-life project based research and design and service learning programs at local universities. Most universities work on novel ideas, but only on laboratory experiment scales. There is limited knowledge sharing with the public, creating a distance between the academic and public domains.

In order to address the issues identified, projects should be co-created with the local community groups that will ultimately benefit. Communication and networking provide essential tools for this. Through communication, the strengths and limitations of the people must be made known upfront before a project begins. All partners, and what they are interested in gaining from the project, should be clearly identified.

It is important to note that, having a good product is not sufficient. A thorough market analysis that includes an assessment of actual production costs and time to do the required work need to be conducted. This might require conducting more field work and spending time with the local community working on product manufacturing.

WFL shares the technology with informal waste workers and local groups and once they are familiar with the manufacturing process and have an idea of the market avenues, WFL leaves. Therefore, informal groups’ autonomy, economic security and the ability to maintain, repair or improve technology are key factors in the sustainability of the project. Sustainability and participation should be strengthened by collaboration, communication, flexibility, needs, feasibility and power analyses and ethical practice to
create productive and socially just projects. Finally, development organisations should give space and time for projects to evolve on their own, while continuing to work with them from a distance.

### 7.6 Final Thoughts

By looking through a socially just lens, we can reframe how we do development work – by redressing power imbalances, from reducing poverty to enhancing autonomy and self-sufficiency; creating jobs to sustainable livelihoods; and managing waste to creating waste-based upcycling businesses. The process discussed in this chapter appears to be straightforward, but much work remains to be done. The information we have collected and analysed has generated the need for more information. There are more knowledge gaps to be filled; new questions to be answered and novel research to be conducted. Nevertheless, this gives insights to the local context and lays the foundation for a WFL project in Sri Lanka. We also hope that the questions asked, methods followed, issues identified and information collected in this study will provide a framework for planning similar projects and engaging with informal and local communities in developing contexts.

The findings of this study and the research conducted by a group of undergraduate students (Chuang, 2014; Hann, 2014; Samineeni, 2013; Smythe, 2011; Stephen, 2012; Tadjoudine, 2014; Tan, 2014) have contributed to a grant by the Department of Foreign Affairs and Trade, Australia. The WFL Sri Lanka project will be implemented in collaboration with three local universities in the near future.

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CHAPTER 7 | Engineering with people


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CHAPTER 8

General Discussion and Conclusion
8.1 Discussion

I introduced this thesis with a personal account of growing up in a country that was experiencing a protracted civil war. I mentioned how the war played itself out against a backdrop of widespread political corruption and social injustice; making the situation even more unbearable for the people of my country. I also explained my desire to contribute, at least in a small way, to changing a system that has failed to meet the needs and aspirations of so many Sri Lankans. What has emerged is a thesis that advocates an alternative approach for informal recycling, and one that attempts to promote the emancipation of informal waste workers.

In this investigation I used the not-for-profit organisation Waste for Life (WFL) as the case study to investigate informal waste practices and their potential to contribute to a more efficient waste management system in the Western province of Sri Lanka. My purpose in this study was to see whether WFL’s approach can at least in part help informal waste workers to achieve emancipation by gaining access to the structures and resources which they have traditionally been denied.

In this study I have conceptualised the spaces within which both formal and informal waste workers operate as a wastescape - a space that consists of both waste as material, and a space constructed by and (re)producing a set of social, cultural and political relationships. In mapping this wastescape and by understanding the lived experiences and everyday struggles of informal waste workers within the wastescape, I exposed the hierarchical positioning of informal waste workers in a broader framework of power relationships. Giving a voice to informal waste workers within this wastescape, allowing them the opportunity to narrate what is important to them, was an empowering, emancipatory experience. In part it exposed their desire to resist the hegemony of official and formal expert knowledge as seen in the analysis in Chapter 5. This desire on the part of informal waste workers was also one of the drivers which informed the needs and feasibility study presented in Chapter 7.

Chapter 5 expanded on the narratives presented in Chapter 4 and provided a ‘thick description’ of the lived experiences of inequality experienced by informal waste workers in the Western province of Sri Lanka, and exposed the symbolic struggles, resentments and forms of resistance that underpin claims to legitimate knowledge. The
dominance of expert systems and decision-makers operating in the formal wastescape – those who design, build and manage large-scale waste management projects – marginalises small-scale, informal waste practices. This dominance has led to the devaluing or subordination of informal waste workers’ practical knowledge about waste recovery and recycling. Another aspect of their subordination is the fact that culturally they are seen as ‘pariahs’ – outcasts of society who are subject to a number of negative representations which are affirmed by their association with waste.

Informal waste workers are routinely identified with the polluting substances in which they deal and are subject to cultural representations which construct them as both hostile and ‘threatening’. Thus, contributing to their marginalisation within the wastescape are wider cultural representations (or hegemonic discourses) which position them as abject, even outside the limits of their operation within the wastescape. Because informal waste workers operate within a hierarchy of inequality which brings about restrictions and deprivations, they are denied recognition for the skills and knowledge they possess. As I have argued, these informal workers have the potential to make a positive contribution to shared and valued social goals.

The official discourse of ‘development’ defines informal waste practices within urban cities. This discourse further subjugates informal waste workers, as they have come to embody the kind of poverty and disorder which is thought to threaten the image of the ‘clean’ city, leading in turn to discussions of privatisation of waste management and integration of informal waste workers into the formal system. This corresponds to the weakest conception of autonomy as expressed in the interviews with people working in waste management in the Western province, and conceptualised in the phenomenographic outcome space discussed in Chapter 6. This conception of autonomy is incommensurable with a discourse that expresses the need to integrate or privatise the informal waste workers’ activities. Uncovering how these mechanisms of exclusion work allows a better understanding of positively privileged groups and how they exercise power within the wastescape of Sri Lanka. This also provided direction in analysing different elements of the practical feasibility study in Chapter 7, in particular which stakeholders to work with and how funding sources are used.
Actors in the formal waste sector in the Western province of Sri Lanka either ignore or adopt prohibitive policies towards informal waste workers. As a result, the potential of informal waste workers to positively contribute to the wastescape, in terms of poverty alleviation and waste reduction, remains unrecognised. This neglect and lack of recognition has led to informal waste workers being denied access to support mechanisms and locked out of opportunities to improve their working conditions.

A recurrent theme emerging from this study, particularly in Chapters 5 and 6, is the desire of decision-makers to ‘improve’ the lives of informal waste workers by integrating them into the formal waste management system. Conversely, informal waste workers stressed the value of autonomy, the value of helping each other, a better social life, links to wider social networks and more public recognition for their contributions. This challenges the hegemonic assumption of the society that ‘proper’ and valued employment can only be achieved within the formal system and through wage labour.

Despite the lack of official resources, the presence of innovation, creativity and initiative on the part of informal waste workers was one of the most impressive realisations emerging from this study. The study also identified informal waste workers’ upward mobility, or their progression from waste collectors to small-scale waste processors. This transformative potential is conceptualised in Chapter 6 where autonomy of informal waste workers was seen as broadening horizons or as a transformation – the ability of informal waste workers to move away from dominant power (power over) to developing resistance (power with), while recognising their ‘power within’.

Chapter 6 also exposed the relative autonomy of informal waste workers and the potential for even greater autonomous activity within the wastescape. At one end of the dimension of variation within the outcome space, the autonomy of informal waste workers was non-existent terminology, overridden by discussions of integration and privatisation. At the other end of the outcome space autonomy had a transformative potential whereby informal waste workers could take ownership of their lives or participate in collectively defined initiatives. By gaining autonomy informal waste workers could improve their earning potential, receive recognition for the knowledge
and practices and the contributions they bring to the wastescape in the Western province of Sri Lanka. WFL was introduced as a potential intervention.

In this study I have explored the innovative combination of technology, design and recycling; how these operate within the wastescape; and, using a number of critical theories, analysed the internal power dynamics. In this thesis I go one step further. I maintain that understanding the social injustices experienced by informal waste workers and providing insights into how the wastescape works, is only one part of the process. The real struggle lies with developing activities that resist the inequalities and challenge the demands of that system, by providing alternative examples of economic productivity and social relationships. I have attempted to address this by conducting a participatory needs and feasibility study, taking WFL Sri Lanka as an example, as shown in Chapter 7.

The participatory needs and feasibility study followed a comprehensive approach to investigating the practical feasibility of the WFL’s project. In light of the first three studies described in Chapters 4, 5 and 6, I have critically examined the groups that were interested and which could support the project (stakeholders), the involvement of the local universities (knowledge sharing/co-creating/technology), the building of links between different groups (networks), availability of materials, funding sources, potential products and availability of markets.

The dominant discourse of waste as a ‘disposal problem’ and large-scale waste management projects as a necessity disenfranchises small-scale, community based solutions and alternative technologies in waste management approaches. This situation has created a socially unjust waste management system and in fact one that reproduces inefficiencies through the unquestioned commitment to large-scale projects. Change requires recognition of not only the limitations and inefficiencies of the ‘top down’ model of waste management, but also the harmful ideologies that treat informal waste workers and their waste recycling practices as problematic.

I believe that a movement towards a socially just waste management system rests on the recognition of valid contributions from all parties, including the informal knowledge base. Therefore, I propose an inclusive system where informal waste workers are
recognised and supported and their contributions to both waste management and poverty reduction are valued. It is important to note that by an inclusive system I do not mean integrating or assimilating informal waste workers into the formal wastescape. I suggest the development of alternative approaches such as that of WFL, which supports informal waste workers in the development of manufacturing capabilities whilst maintaining their autonomy. This will ultimately transform not only the informal waste workers themselves, but the very wastescape itself.

8.2 Contribution to knowledge

Each empirical chapter in this thesis makes a specific contribution to knowledge. In chapter 4, as an entry point to the work described in this thesis, I identified, investigated and mapped the complex wastescape in the Western province of Sri Lanka. There is a lack of reliable information available about informal waste workers in Sri Lanka as the existing studies are limited in both quantity and quality. This lack of knowledge about informal waste workers has made their contributions largely invisible to decision-makers and the public. To fill this gap in knowledge, and to make their invisible stories visible, I developed a series of case study narratives in chapter 4. I maintain that informal waste workers experiences are context specific and it is important to ‘hear their voices’ to ensure that the needs of informal waste workers we work with are addressed through alternative projects. By considering four different sectors (waste collectors, waste traders, small-scale pellet manufacturers and home-based product manufacturers) operating within the informal waste hierarchy, I demonstrated that an in-depth analysis of the informal waste sector as a whole is important to understand how they operate, their links with each other and their contributions to waste management and the local economy. To the best of my knowledge this is the first in-depth analysis of informal waste workers in Sri Lanka.

In Chapter 5, I used Foucauldian discourse analysis to analyse the complex power dynamics and hegemonic discourses that govern the wastescape in the Western province of Sri Lanka. It provided a ‘thick description’ of the lived experiences of inequality of informal waste workers, and exposed the symbolic struggles, antagonisms and forms of resistance that underpin claims to legitimate knowledge. I have combined Foucault’s (1972, 1980) theory on power, discourse and knowledge with Gramsci’s (1971) concept
of hegemony in my analysis. I argued that whilst Foucault and Gramsci address power from different (although I believe complementary) perspectives, they can be used productively together to understand the operation of hegemonic power structures in society. Using a critical lens through which to investigate the dynamics and discourse of power and domination in the context of a wastescape, especially in the context of Sri Lanka, is a novel approach in and of itself but in combination with the other elements of this work - moving towards a practical outcome - it is unique.

In Chapter 6 I exposed qualitatively different ways in which people conceive of autonomy of informal waste workers in the Western Province. I demonstrated that understanding the varying socially constructed views of a phenomenon is important in order to develop meaningful alternative approaches. A methodological contribution of this study demonstrated that phenomenography, a methodology emerging from the field of education, can be used effectively to analyse complex social phenomena in other domains.

In Chapter 7 I presented a comprehensive approach to conducting a participatory needs and feasibility study. The critical studies described above enabled the production of substantive insights and guided the direction of the analysis which could not have emerged had I conducted only a technical feasibility study. Thus, this study presents a holistic approach to a needs and feasibility study (Figure 8.1).
In combining these approaches I have demonstrated that the ‘whole is greater than the sum of its parts’. This is the elegance of the *composite material* which forms the basis of Waste for Life’s recycling approach, that the materials being made by combining and *upcycling* different waste sources, are stronger and more useful than their counter parts alone. It is also true that in combining the social critique more usual to the social sciences with the technical problem-solving skills of engineering, enables us to create alternative, more just systems and processes which are appropriate to context. Merging critique and creation of alternatives within the same study is a necessary and yet rare step forward. It is a model that could be used to critically analyse any complex socio-technical system and develop alternatives, which have practical feasibility and yet which are emancipatory in their enactment. The major scholarly contribution of this study is thus the development of a *critical socio-technical methodology*.

### 8.3 Future work

Due to the time constraints, funding restrictions and scholarship requirements, I did not have the capacity or resources to interview a large informal waste worker cohort in the Western province. I believe a future study using a mixed-method approach, aiming to survey a larger informal waste worker population, could complement the findings of this work.

It was evident during fieldwork that women play an active role in the informal wastescapes. However, my study did not investigate gender specific roles within the informal wastescapes. An in-depth analysis of women’s experiences in the informal wastescapes could provide valuable insights about the specific challenges faced by women working with waste. Similarly, though I interviewed waste collectors working officially for local authorities, I did not explore their experiences in detail. It was evident to me that these waste collectors, especially the workers on contract basis, are
8.4 Closing remarks

With this thesis, I am contributing to a body of knowledge that aims to deconstruct the discourses of development by demonstrating that alternative approaches, which do not depend on the subjugation of informal waste workers, exist and are viable. I argue that deconstructing hegemonic discourses to reveal the underlying assumptions is only part of the struggle. Creating a socially just wastescape also entails working towards more ‘practical’ outcomes and developing alternative approaches.

It is my hope that this thesis is not only understood as an academic work, but also on a more practical level as a catalyst for ‘change’. I believe the findings of this research can be a resource for practitioners, researchers and development organisations working or aiming to work, with informal groups and local communities anywhere in the world. It may also be significant for policy makers who wish to change existing policies and create alternative policies to support informal waste workers. In this thesis, I do not reject the idea of formal and informal waste sectors working together, yet I believe it is important this collaboration occur in a manner where informal waste workers are not oppressed. This thesis, however, will not be useful to decision makers who simply want to integrate the informal sector to the formal wastescape, or wish to privatise the waste management system.

At the same time, I also challenge the development approaches often embraced by engineers that reach informal communities and offer quick non participatory solutions.
complex issues. My argument is that viable solutions can only be found in working collaboratively with local groups. As I have argued, waste is not merely a ‘disposal’ problem or a management issue. It is a complex space comprising of many related parts and diverse actors. It is a space that includes both waste as material, and as a social-space constructed by and (re)producing a set of social, cultural and political relationships. Therefore, all these elements need to be considered when working to improve waste management and the lives of people who depend on waste.

As I have demonstrated in Chapter 6, at the heart of transformative change is the ability of informal waste workers to retain a sense of autonomy over their working lives. This, however, is yet to become a reality for many who inhabit the bottom echelons of the wastescape. Autonomy of informal waste workers cannot be established in a meaningful way within the dominant discourse and hegemonic social and cultural structures that assign a negative connotation to waste and treat it as a ‘valueless’ element. There is a need to implement strategic ways to improve and alter the current system. Opportunities and potential are there in the context of local initiatives within the rapidly changing urban wastescape in the Western province. There is a need to acknowledge and create alternative support interventions to assist informal waste workers. There are more questions that need to be answered and more research to be conducted. This thesis, which draws from the case of Waste for Life, is one small step in this direction.

8.5 References

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