



**Western Cape
Government**

Environmental Affairs &
Development Planning



A Guide to Separation of Waste at Source

September 2019

PREFACE

Many millions of tonnes of valuable materials are currently going to waste in municipal landfills each year. Yet separating recyclable materials at the point of generation maintains their value and diverts them into the recycling economy.

There they can be beneficiated and remade into new products thereby creating employment, saving natural resources and energy, while lengthening the life of landfills. This is increasingly being acknowledged and prioritised by government and industry.

Separation-at-source however, is a complex operation. It involves public awareness and education, separate collections, sorting and Material Recovery Facility (MRF) management, as well as off-sale of the secondary materials for remanufacture.

This guide has been compiled to give municipalities, waste managers, contractors and others a comprehensive understanding of separation-at-source, including legal frameworks, where and how it is working, awareness and behaviour change, risk management and more. It concludes with a set of practical steps to put a separation-at-source system into operation.

Our intention is to have the guide widely available as a useful resource for contributing to the socio-economic development of the Western Cape and the country.



Director: Waste Management

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Published : August 2019

Cover Photo by Hermes Rivera on Unsplash

Copy Editing: GreenEdge Communication

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LIST OF ACRONYMS

CSIR	Council of Scientific and Industrial Research
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
EPR	Extended Producer Responsibility
EPWP	Expanded Public Works Programme
IWMP	Integrated Waste Management Plan
MRF	Material Recovery Facility
NEMA	National Environmental Management Act, 1998, (Act No. 108 of 1998)
NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NWAS	National Waste Awareness Strategy
NWMS	National Waste Management Strategy
S@S	Separation of Waste at Source
WCIWMP	Western Cape Integrated Waste Management Plan

DEFINITIONS

Extended Producer Responsibility means measures that extend a producer's financial or physical responsibility for a product to the post-consumer stage of the product, and includes:

- waste minimisation programmes
- financial arrangements for any fund that has been established to promote the reduction, re-use, recycling and recovery of waste
- awareness programmes to inform the public of the impacts of waste emanating from the product on health and the environment
- any other measure to reduce the potential impact of the product on health and the environment

Expanded Public Works Programme is one of the government's key programmes aimed at providing poverty and income relief through temporary work for the unemployed. The programme provides an important avenue for labour absorption and income transfers to poor households, in the short to medium-term.

EXECUTIVE SUMMARY

Separation of waste at source (S@S) refers to the practice of setting aside post-consumer waste materials at the point of generation to prevent them from entering the waste stream destined for landfilling. The recyclable separated waste can then be diverted and benefited. This is important due to the following benefits:

- conserving natural resources by re-using the waste for the manufacture of new items instead of using natural resources
- saving landfill airspace so that landfill sites can last longer and do not need additional land which can be used for other purposes
- reducing methane emissions to global warming (landfill gas)
- saving energy: the production of products from recycled material uses less energy than the production of the same product from raw materials
- creating employment: the involvement of people in the recycling value chain creates additional job opportunities

In the Western Cape, 76% of municipalities have a S@S system in place while 24% of municipalities do not. Some municipalities have pilots that do not cover all areas. Overstrand Municipality is the only municipality in the province where all the areas are covered.

This guide gives an overview of S@S globally and in the Western Cape. It also describes different systems that can be implemented and how awareness, communication and the management of risk play an important part within the bigger system. It includes a wealth of practical information for any waste manager.

Finally, the document presents users with a step-by-step process to assist municipalities to implement their own S@S system.

1. INTRODUCTION

Currently, the world generates approximately 1.3 billion tonnes of Municipal Solid Waste (MSW) per year. This is expected to increase to 2.2 billion tonnes by 2025 (World Bank, 2012).

MSW management is a service that a municipality must provide to all residents to ensure the health and well-being of residents and the environment. Effective MSW management is generally evaluated on the performance of waste collection and transportation processes for disposal.

According to the United Nations (UN), the waste management process is one of the costliest urban services in developing countries (UN Habitat, 2010). It was shown that 20 – 50% of local government budgets are spent on this service (UN Habitat, 2010). Furthermore, waste generation and the management thereof is "considered to be one of the most immediate and serious problems confronting urban cities in most developing and transitional economies", (UN Habitat, 2010).

MSW management collection services and disposal infrastructures have historically given little focus to household, commercial and industrial efforts to reduce or minimise waste and increase reuse and recycling (Mbiba, 2014).

Challenges that remain at the forefront of waste management are: the lack of education and awareness within the waste sector, and of operational costs for the delivery of the waste hierarchy model in the order of preference of waste avoidance and reduction, reuse, recycling, recovery, treatment and finally disposal. Other challenges are the lack of support for waste reduction at municipal level, availability of suitable land for waste disposal, and structured incentives for the minimisation, reduction and recycling and/or the reuse of waste (Jaarsveldt, 2016).

As part of a national strategy to respond to the environmental issue of overfilled landfills, S@S also eases the strain on South Africa's natural resources, and contributes to the Green Economy by re-introducing a secondary resource into the economy, while creating or

formalising existing jobs and business opportunities in the waste sector (Oelofse, 2018). Most municipalities are not well equipped with the required logistics for waste segregation and separate collection of recyclables (CSIR, 2018).

S@S generally refers to the practice of setting aside post-consumer waste materials at household, commercial and industrial level, from a generally mixed waste stream through the use of a split bag system (e.g. a wet/dry two-bag system), while other methods of S@S can also be employed by municipalities.

The purpose of this investigation into S@S is to highlight all potential S@S systems, from split bag options to systems such as drop-offs, buy-back centres, swap shops, or mobile buy-back centres, with the aim of improving diversion rates from landfill in the Western Cape and elsewhere.

S@S practices implemented as an integral part of waste management will make a major impact on the effectiveness of waste management systems, bringing about substantial changes in the quantity and quality of recyclable waste (Pitchayanin Sukholhaman, 2016).

The recycling sector in the Western Cape consists of a recognised and well-organised formal sector with an extensive informal sector that plays a very important role in source recovery. It is argued that "an estimated 80 – 90 per cent (by weight) of post-consumer paper and packaging is recovered by informal waste pickers, feeding into a growing local recycling economy that diverts 52.6 per cent of the 3.39 million tons of packaging consumed in South Africa (in 2014), from landfill", (CSIR, 2018).

In their 2016 Market Intelligence Report on the Waste Economy, GreenCape confirms that South Africa's waste industry still focuses primarily on refuse collection and landfilling, with inadequate recycling efforts. The Western Cape Government, through various green economy policies and strategies, also sees the waste and recycling economy as a job creator (GreenCape, Waste Economy: Market Intelligence Report, 2016).

CSIR environmental scientist Dr Suzan Oelofse states, "If we want to introduce waste separation at source in municipalities, the service needs to meet the needs of the community especially in the manner in which it is implemented; such as creating effective awareness campaigns, access to the relevant material and ensuring a reliable service delivery", (Oelofse, 2018).

The benefits of S@S include clean recyclables not contaminated by other waste, easier and more efficient collection of such waste and less chance of rejection by recycling processors because the waste is cleaner and thus has higher value. It is also a boost to the recycling economy, facilitating the creation of jobs (Ndlangamandla, 2017) and the development of business opportunities in the waste sector.

The inclusion of informal waste pickers in S@S programmes will create support for an informal sector that has been of significant value to the recycling sector over the years.

1.1. PURPOSE

The purpose of this guide is to focus on practical solutions to help municipalities to implement S@S. Its main aim is to explain the nuts and bolts of how various existing S@S programmes and systems work. The guide presents advice on implementing programmes and systems, providing knowledge from other municipalities, costing needs, and unpacking challenges and successes.

Additionally, the guide aims to help municipalities to meet national and provincial priorities and targets to divert waste from landfill through effective S@S strategies and action plans, and primarily to mainstream S@S throughout the Western Cape.

2. REVIEW OF GLOBAL S@S SYSTEMS

The purpose of the following literature review is to provide an overview of the practice and status of S@S in both developed and developing countries. Potential solutions can be identified to improve the performance of local municipalities in implementing S@S programmes in their communities, and increase the diversion of waste from landfills. This will help municipalities to achieve the first objective of the current National Waste Management Strategy (NWMS).

Separate collection of individual waste materials is seen as a pre-condition for fostering high quality recyclate and high recycling rates (BIPRO/CRI, 2015). S@S involves the separation of a variety of waste types; demolition waste which includes concrete, bricks and timber; organic matter including food and garden waste; reusable items such as clothes and accessories, household items and appliances; packaging and paper including cardboard, glass, plastics and aluminium cans; and toxic and hazardous wastes including paint, batteries, chemicals and biomedical items (see Figure 1 below).



Figure 1: Different waste types (<https://www.vectorstock.com/royalty-free-vector/waste-management-concept-segregation-separation-vector-14939109>)

S@S can be achieved by applying different models. These include using separate bin services, kerbside collections, or direct delivery of specific wastes to drop-off facilities (Department of Environmental Affairs [DEA], 2003). It should be noted that different systems are more effective for different communities as is illustrated in Figure 2.

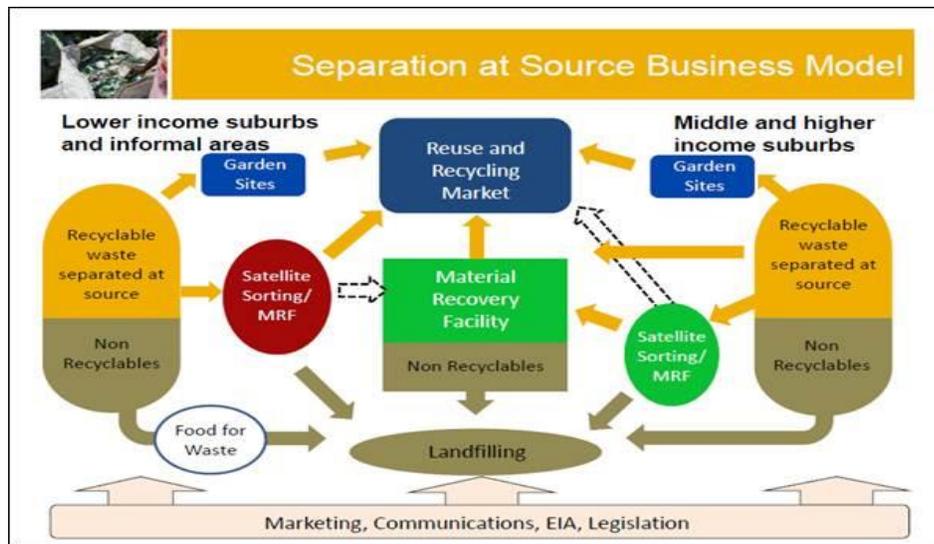


Figure 2: S@S Business Model (City of Johannesburg & Pikitup).

Figure 2 above shows different models for S@S in South Africa and in the City of Johannesburg in particular. For lower income areas and informal settlements, S@S can create jobs by establishing local community-based buy-back/sorting facilities. In order for S@S to be successful in these areas, a localised marketing and communication strategy needs to be developed, along with training for cooperatives/NPOs and the involvement and formalisation of waste pickers. It is also important to consider existing recycling facilities when planning sorting/buy-back facilities. For middle and higher income areas, driver/owner schemes, private buy-back/sorting facilities, and the continued involvement of existing recyclers is suggested (Beer, 2015). In most cases, the S@S business model illustrated above is applicable throughout South Africa's municipalities.

According to a 2018 report by the DEA (DEA, 2018), municipalities must consider and integrate a number of factors in order to implement appropriate collection methods and support S@S. These factors are illustrated in Figure 3 below.

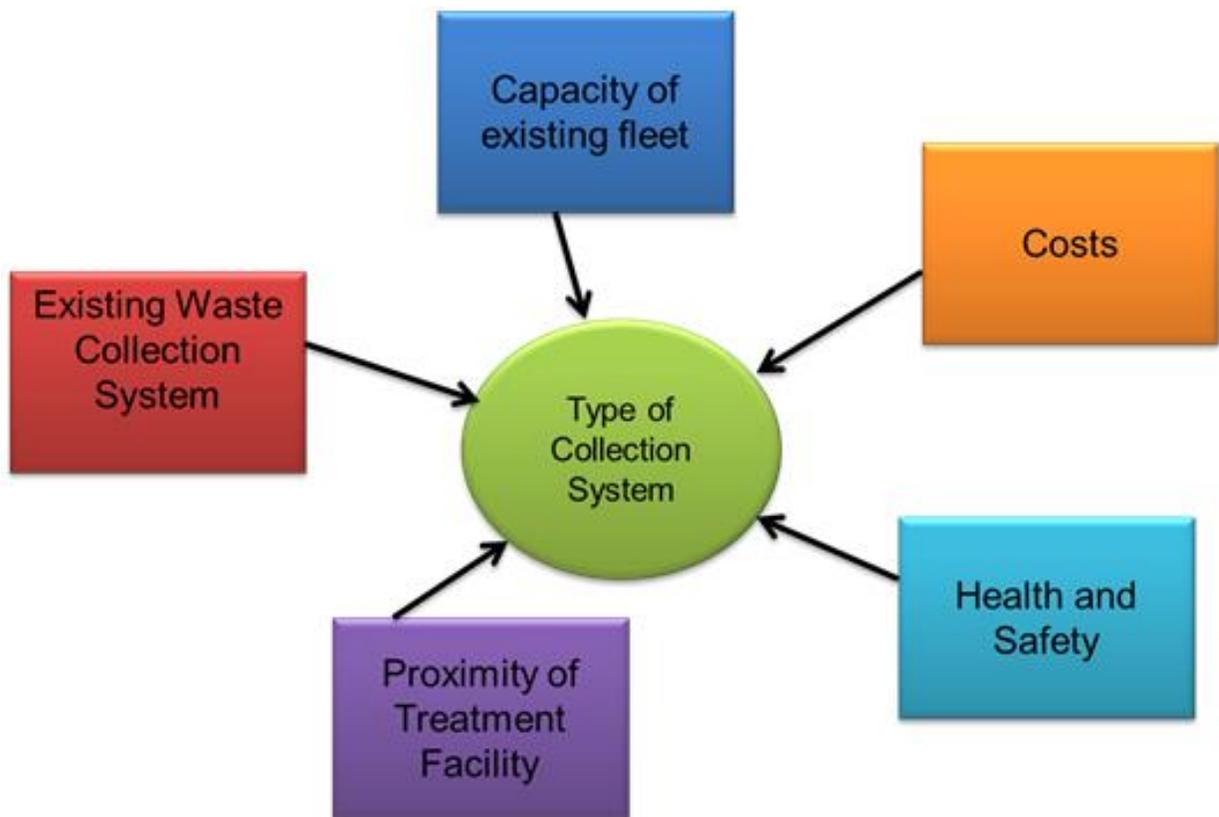


Figure 3: Factors required to support the collection and separation of waste at source (Seati et al., 2013).

2.1. BARRIERS TO IMPLEMENTING S@S

In order for a S@S programme to be successful, the participation and involvement of householders is a key factor (DEA, 2018). Community participation is regarded as one of the pillars of success towards a positive outcome of the project. Research indicates that there are several barriers that need to be recognised to ensure a programme is conducted successfully. These include:

- **Lack of access to or inadequate facilities**
 - Informal recycling systems prevail in most developing countries due to lack of recycling infrastructure provided by government and private sector.
- **Inconvenience and lack of knowledge**
 - In Ireland, one main reason residents did not recycle was the cited inconvenience of sorting recyclables into multiple bins, as against the convenience of putting all waste into one bin.
 - In Mexico and UK, lack of space to store recyclables or items for re-use was a major barrier.
 - In Canada, lack of knowledge on what to recycle was a dominant barrier.
- **Government policies and public mistrust of authority**
 - Lack of government policies, incentives, and enforcement is a barrier to waste diversion.
 - Lack of trust between public and authorities was a barrier in Ireland.
 - In the UK, a perception that recycling is done only to benefit government impedes recycling.
- **Expense of waste minimization and diversion**
 - Municipalities decide to subsidise recycling programmes to avoid the social cost of disposing it (USA, Japan and Europe).
 - New York City's recycling programme was found to cost more in labour and transportation than the income received through the sale of recyclable materials, and the materials collected. The frequency of collection was therefore reduced.

2.2. COMPARING S@S SYSTEMS IN DEVELOPED AND DEVELOPING COUNTRIES

2.2.1. Developed countries

To assess the challenges and potential for the Western Cape to implement S@S, research was undertaken into systems in developed countries including the USA, Sweden and France as well as developing countries including Brazil and China.

2.2.1.1. United States of America

With the world's highest gross domestic product (GDP), the USA generates substantial MSW compared to the average waste generation per capita in other developed countries (World Bank, 2012). To manage its waste challenges, the USA has adopted policy solutions to reduce household waste to landfill by encouraging separation into recyclable and/or compostable components. S@S been widely adopted, and the recovery rate for recycling (including composting) has been steadily increasing, reaching 35% in 2011 (Australia, 2014). In the USA, the pay-as-you-throw policy is also implemented.

2.2.1.2. Sweden

In Sweden, a leader in industrial innovation, 50% of all municipal solid waste is converted into energy, while less than 1% ends up in landfills. Sweden also now has a ban on landfills. Some 53% of the biogas produced in Sweden is used as vehicle fuel (DEA, 2018). With regards to S@S, Sweden has numerous waste systems for households including food waste that is also separated and collected at source (see Table 1 below).

Table 1: Systems used in Sweden for source separation at household level (DEA, 2018).

	Two compartments	Multi-compartment	Optical sorting
Common bin	Sizes 140L, 190L for houses	370L for apartment buildings 370 L and 240L for houses Not available for apartment buildings	Same as prior to source separation

Sorting equipment	Bag holder of plastics or wire rack, often ventilated	Bag holder of plastics or wire rack, often ventilated	Optional bag holder
Bags	Paper, bio-plastic, (plastic)	Paper, bio-plastic	Plastic, but other alternatives can be investigated
Vehicles	One and two compartment vehicles, side or rear loaded	Multi-compartment vehicles	regular vehicle
Common collection intervals	Houses: every second week. Apartment buildings: every week	Food waste: every 14 days, other bins: from every 14 days to every 6 weeks	Same as prior to source separation
Suitable areas	House areas, apartment buildings, industries	House areas, smaller industries	House areas, apartment buildings, industries
Work environment	Collection staff might be exposed to heavy bins, transporting bins, microbial dust	Collection staff might be exposed to heavy bins, transporting bins, microbial dust	Does not change the working environment. Plastic bags decrease the risk of exposure to microbial dust
Continuous quality control	Visual control during collection and delivery to treatment facility	Visual control during collection and delivery to treatment facility	Visual control during collection and delivery to treatment facility
Other	The most common system today	Sorted and collected fractions give an income	The system demands an optical sorting facility

2.2.1.3 France

France has strict regulations concerning landfills, resulting in 244 sanitary landfills in 2010 in France (BIPRO/CRI, 2015). In the last ten years, 150 landfills were closed, which shows that the country is clearly improving its waste management. These sanitary landfills received 19.6 million tonnes of waste in 2010, the first year that less than 20 million tonnes of waste were sent to landfill. According to the DEA (2018), collection schemes in France are shared between municipal services and private contractors in varying systems. The waste streams currently collected from households are as follows:

- door-to-door separate collection: collection of glass

- door-to-door co-mingled collection: collection of plastic, metal and paper/cardboard
- bring-point collection points: glass and bio-waste
- bring-point amenities sites: paper, glass, plastic, metals

2.2.1.4 European Union Countries

According to BIPRO/CRI (2015), the European Union (EU)'s economy is one of the five largest in the world. Within the EU, numerous developed countries implemented S@S to divert waste from landfill. Table 2 below was taken from a study conducted by the EU on a variety of ways to collect different waste streams across 28 member states. The study covers all separate collection systems that collect one or more of the five waste streams from residual waste/mixed municipal waste at source. This includes strict separation and co-mingled collection systems, door-to-door, bring-point collection and other systems.

Table 2: Assessment of separate collection schemes in 28 capitals of the European Union.

Capital City	Door-to-door separate collection 	Door-to-door comingled 	Bring-points 
Amsterdam	Paper/cardboard: biweekly (pilot) Bio-waste: weekly		Paper/cardboard, Plastic, Packaging, Glass
Athens	Bio-waste: biweekly	Paper/cardboard, glass, plastic, metal: daily	Paper, glass
Berlin	Paper/cardboard: varies Glass: 3/4-weekly Bio-waste: biweekly	Plastic, metal: weekly/biweekly	Glass
Bratislava			Paper, glass, plastic
Brussels	Paper/cardboard: biweekly Glass: on demand Bio-waste: weekly	Plastic, metal, composites: biweekly	Glass
Bucharest			Paper, glass, plastic, metal
Budapest	Paper/cardboard: weekly/4-weekly Bio-waste: weekly	Plastic, metal: 4-weekly	Paper, glass, plastic, metal

Copenhagen	Paper/cardboard: biweekly/4-weekly Glass, metal, plastic, bio-waste: on demand		Glass
Dublin	Glass: weekly/bi-weekly. Bio-waste: monthly	Paper/cardboard plastic, glass, metal: weekly/biweekly	Paper, glass, metal
Helsinki	Paper/cardboard: on demand Glass, metal: 4/8-weekly Bio-waste: varies		Paper/cardboard, glass, metal
Lisbon	Paper/cardboard: weekly Glass: 1-3 days per week Bio-waste: daily Plastic: N/A		Paper/cardboard, glass, plastic, metal
Ljubljana	Bio-waste: daily/weekly/biweekly Paper/cardboard: weekly/3-weekly	Plastic, metal: weekly/3-weekly	Paper, glass, packaging
London	Paper/cardboard: weekly/biweekly Glass: weekly/biweekly Plastic: weekly/biweekly Metal: weekly/biweekly Bio-waste: weekly/biweekly	Paper/cardboard, glass, plastic, metal: weekly/biweekly	Paper/cardboard, glass, plastic, metal
Luxembourg	Paper/cardboard: weekly Glass: weekly Bio-waste: weekly	Metal, plastic, composite: biweekly	Paper, glass, biowaste
Madrid	Paper/cardboard: N/A	Plastic, metal, drink cartons	Paper/cardboard, glass, packaging
Nicosia	Paper/cardboard: weekly	Plastic, metal, drink cartons: weekly	Glass
Paris	Glass: weekly	Paper/cardboard, plastic, metal, composite: 2 times per week	Glass, bio-waste
Prague			Paper/cardboard, glass, plastic
Riga	Paper/cardboard: weekly Glass: weekly Plastic: weekly		Paper, glass, plastic, metal
Rome	Paper/cardboard: weekly Glass: monthly Plastic: weekly Bio-waste: monthly	Plastic, glass, metal: varies	Paper/cardboard, glass, plastic, metal
Stockholm	Paper/cardboard: on agreement Glass: on agreement Plastic: on agreement Metal: on agreement Bio-waste: weekly/biweekly		Paper/cardboard, glass, plastic, metal
Tallinn	Paper/cardboard: 1-2 times per week Bio-waste: 1-3 times per week	Mixed packaging waste under EPR scheme	Paper/cardboard, glass, plastic, metal
Valletta	Glass: monthly	Paper/cardboard plastic, metal: weekly	Paper/cardboard, glass, plastic, metal

Vienna	Paper/cardboard: weekly Glass: 4-weekly Plastic: biweekly Metal: biweekly Bio-waste: weekly/biweekly		All five fractions
Vilnius	Paper/cardboard: biweekly Glass: biweekly Plastic: biweekly Metal: biweekly		Paper/cardboard, glass, plastic, metal
Warsaw	Glass: monthly Bio-waste: monthly	Paper/cardboard, plastic, metal: weekly/monthly	
Zagreb	Bio-waste: weekly		Paper/cardboard, glass, plastic, metal

2.2.2. Developing countries

2.2.2.1. Brazil

Brazil has various different programmes in place for S@S including the following:

The Permanent Selection Collection Programme (PSCP)

This programme is implemented to support reversing the logistics of waste. The informal workers or waste pickers, together with the formal sector, began to encourage separate waste collection through the establishment of PSCPs. The requirements for PSCPs are (Barros et al., 2013):

- recycling collectors for indoor and outdoor areas
- adequate human resources
- an area adequate for a composting yard
- an action plan with short, medium and long-term objectives

An alternative was to create different centres for collection and separation of recyclables. The successful implementation of such centres was seen to require:

- technology for effective collection, separation and recycling
- environmental education to comply with the technology applied
- a market for the recovered material

Recycling Separation Centre Programme (CSR)

The CSR was established in Rio de Janeiro with the objective of creating employment and generating income. Successful S@S involved the implementation of the CSR, a public-private joint stock corporation within the state of Rio de Janeiro wherein the controlling shareholder is the state itself. The CSR changed the previous model of cooperatives and waste pickers into an organised door-to-door collection system of selected recyclables, with the role of waste pickers formalised through labour laws. This public-private collaboration had no obligation towards remuneration, but subsidies for collection trucks and environmental education and awareness programmes were provided to waste pickers.

According to Carvalho et al., (2011), the CSR improved social conditions amongst waste pickers and gave rise to new trends such as:

- increased migration of waste pickers towards the CSR
- weakening of scrapyards and cooperatives
- increased guaranteed supply to recycling industries
- improved functional and operational structures
- improved sales channels for recyclable materials

The establishment of the CSR resulted in an Integrated Recycling System as per Figure 4 below.

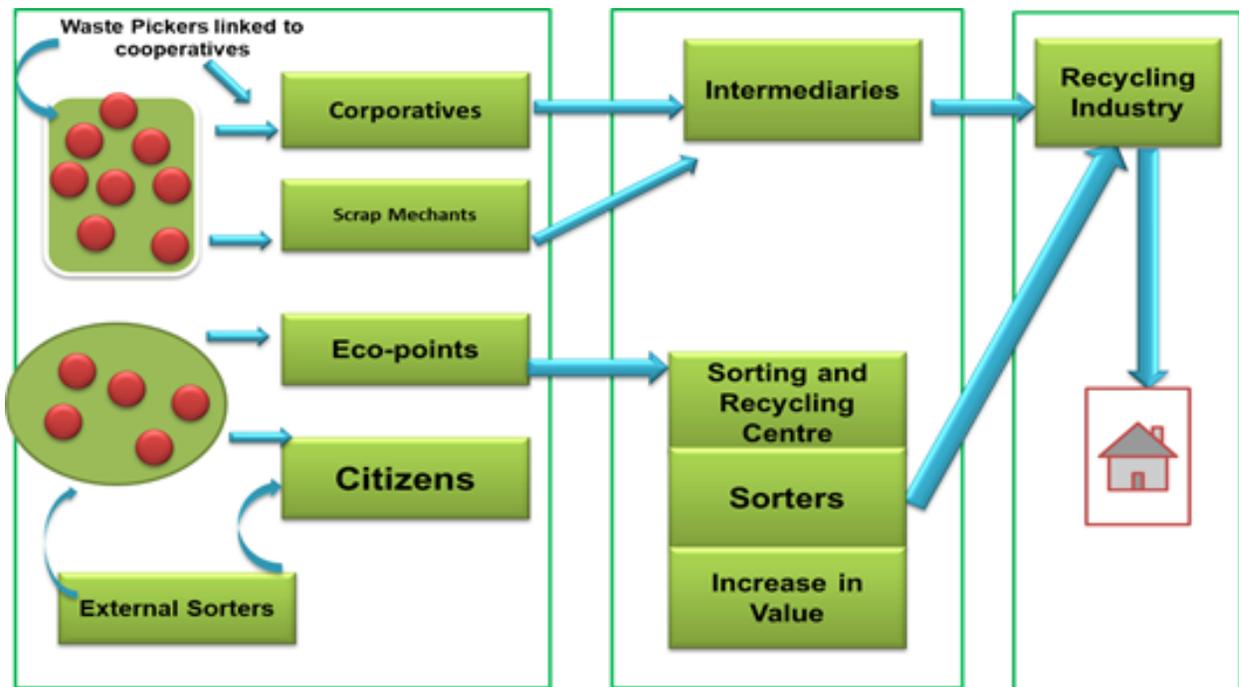


Figure 4: Integrated Recycling System (Carvalho et al., 2011).

2.2.2.2. China

There has been a rapid increase in waste generated in China, triggered by fast economic growth, increased population and accelerated urbanisation. China's economic growth has resulted in a shift in terms of waste generation to high volumes of recyclables such as plastic and glass (Zhuang et al., 2008). S@S is still in its early implementation stage in China, and is challenged by long standing practices of mixed collections of household waste, living standards and specific lifestyles. The first S@S initiative in China started in 1997 in Shanghai, the second largest municipality. Residents were required to separate household waste into combustible materials, glass and harmful waste. The Shanghai initiative was followed by an initiative in the city of Xiamen. The Xiamen initiative requires households to sort household waste into recyclable, non-recyclable and harmful waste.

Another Chinese initiative for household waste separation required residents to separate food waste, dry waste and harmful waste into corresponding containers.

Key stakeholders involved in implementing S@S included households, residential committees, real estate companies, recyclers and the environment and sanitation department, each with defined roles and interests. Awareness and publicity campaigns about the implementation of the programmes were conducted through various media, including handbooks, leaflets and CDs. The model used for selection in the S@S programmes is illustrated in Figure 5 below.

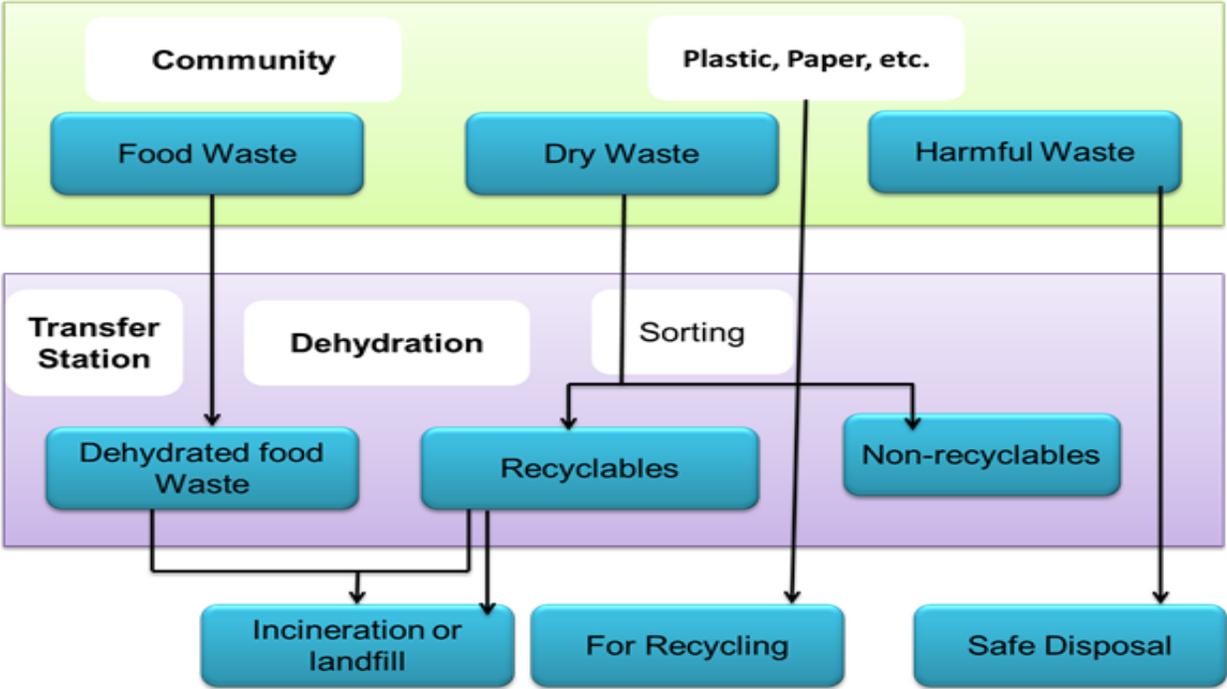


Figure 5: Appropriate separation at source programme selection model (Zhuang et al., 2008).

Since 2000, the implementation of S@S programmes has spread, with some eight cities participating in a pilot study initiated by the Ministry of Construction (Meng et al., 2016). In 2015, the Ministry of Housing and Rural Development chose 26 cities in China and classified them as National Household Waste Separation classification pilots recycling mainly paper, metal, plastic and fabrics (Fei et al., 2016). China's "Overall Plan for Reform

of Eco-Civilisation System", including the recovery of "Domestic Recyclable Resources" and "Disposal of Clean-up Waste" initiatives is depicted in Figure 6 below.

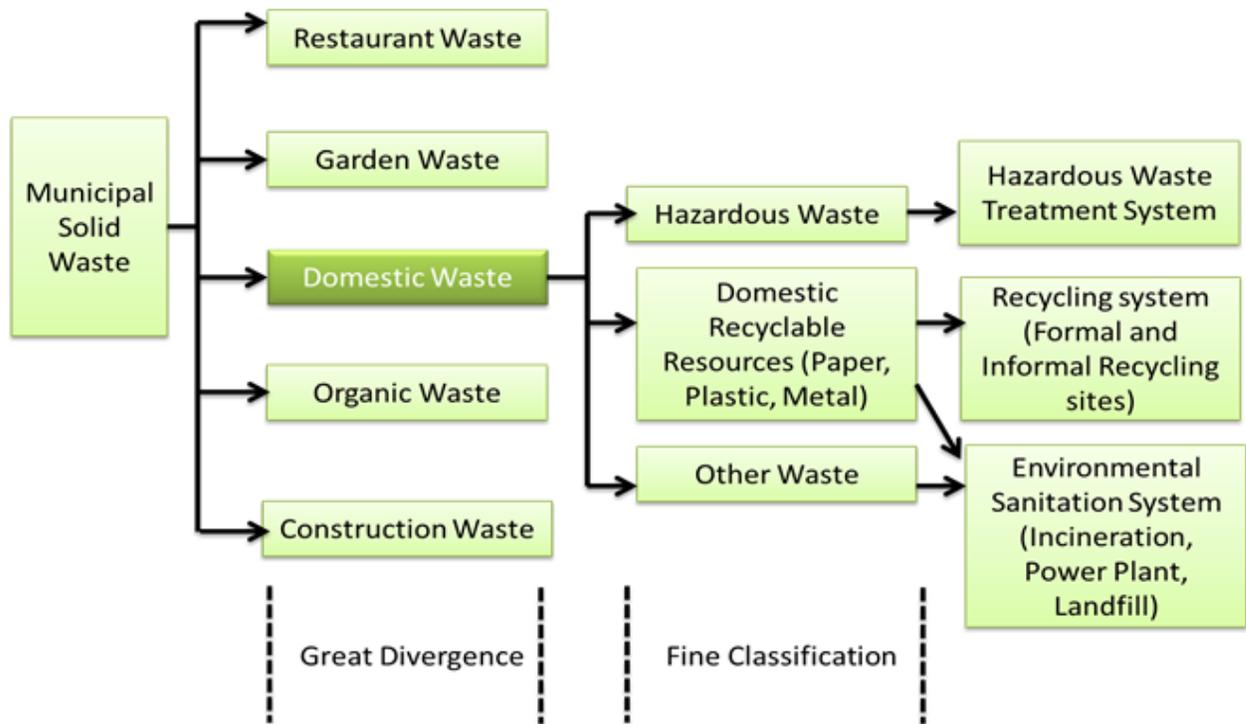


Figure 6: Recovery of Domestic Recyclable Resources and Disposal of Clean-Up Waste (Meng et al., 2016).

According to Meng et al., (2016), on 21 September 2015, the Central Committee of the Communist Party of China and the state council announced the "Overall Plan for the Reform of Eco-Civilisation System" that highlights the importance of waste recycling industries and renewable resource industries.

2.3. RECYCLING BEHAVIOUR IN SOUTH AFRICA

According to the Institute of Waste Management of Southern Africa (IWMSA) (2016), the 2010 and 2015 national surveys on household recycling behaviour conducted by the CSIR provided valuable insights into recycling behaviour in South Africa (CSIR, 2016). The surveys demonstrated that an increasing number of households are starting to recycle

their household waste, although at a slower pace than envisaged given the current policy environment and the activities of the public and private sectors.

The number of households that show dedicated recycling activity (recycling a fair number of recyclables on a frequent basis) almost doubled – from 4.0% in 2010 to 7.2% in 2015. While these household recycling participation rates are low, South Africa's paper and packaging recycling sector continues to grow. This is due to a large and productive informal sector that collects an estimated 80 – 90% of all paper and packaging recycled in South Africa (IWMSA, 2016).

Although not a guarantee for change in behaviour, the willingness of households to separate and recycle holds promise for positive household recycling trends in the future.

Over the period 2010 – 2015, the percentage of households participating increased for all four recyclable materials (plastic, paper, glass and metal) (CSIR, 2016). Recycling of plastics showed the biggest increase in the percentage of households recycling (6.1% – 10.0%), followed by glass (4.7% – 8.1%) and metal (2.8% – 6.2%). However, the percentage of paper being recycled did not show a similar growth over time. The demand for certain types of plastic and its high reuse value are two reasons given for its increased recycling rate, according to the CSIR (2016).

3. LEGISLATIVE FRAMEWORK FOR S@S



Figure 7: Legislative Framework for S@S.

3.1. CONSTITUTIONAL RIGHTS AND RESPONSIBILITIES

Section 24 of the Constitution states that everyone has the right to an environment that is not harmful to their health or wellbeing and to have the environment protected for the benefit of present and future generations. According to Schedule 5 of the Constitution, local municipalities are responsible for managing refuse removal, refuse dumps and solid waste disposal.

3.2. NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act (NEMA), 1998 (Act 107 of 1998) is the main environmental legislation in South Africa, and Section 28: Duty of Care Principle applies in all circumstances. It imposes a general duty on all persons to take reasonable measures to avoid, or to minimise and rectify, significant harm to the environment.

3.3. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

The National Environmental Management Waste Act (NEM:WA), 2008 (Act 59 of 2008) governs the management of waste in South Africa. Various strategies and plans flow from the NEM:WA, such as the National Waste Management Strategy (NWMS), Municipal Integrated Waste Management Plans and Industry Waste Management Plans (IndWMPs). The NEM:WA is also the legislation that provides the platform for setting regulations, norms and standards, strategies and guidelines on how to achieve the environmental rights provided in the Constitution.

Section 2 of NEM:WA promotes the rights enshrined in the Constitution to an environment that is not harmful to health and well-being, and the protection of the environment for present and future generations by providing measures for:

- minimising the consumption of natural resources
- avoiding and minimising the generation of waste
- reducing, re-using, recycling and recovering waste

- treating and safely disposing of waste as a last resort

Some of these objectives encourage S@S as part of a municipality's duty to ensure responsible waste management.

Section 9(1) of NEM:WA also re-iterates this duty, while taking into account the implementation of waste minimisation, re-use, reduce, recycling and recovery. This includes S@S, the implementation of extended producer responsibility (EPR) and the regionalisation of waste management.

3.4. NATIONAL WASTE MANAGEMENT STRATEGY

The NEM:WA makes provision for a NWMS to achieve the objectives of the NEM:WA. The second NWMS Management Strategy has been developed and is in the process of being approved.

Table 3: Goals of the NWMS Management Strategy and Links to S@S.

Goals of NWMS	Objectives of each goal	Application of NWMS Goals to S@S and Programmes that can Support S@S
Goal 1: Promote waste minimisation, re-use, recycling and recovery of waste.	Focuses on implementing the waste management hierarchy, with the aim of diverting waste from landfill.	S@S is an important link in the recycling and recovery of waste. To ensure that the amount of waste recovered for recycling is high, an effective separation system is required.
Goal 2: Ensure effective and	Promotes access to basic level of waste services: integrates	Building on basic waste services, S@S is the next step in ensuring effective and efficient delivery of waste services.

efficient delivery of waste services.	the waste hierarchy into waste services, including S@S.	
Goal 3: Grow the contribution of the waste sector to the green economy.	Emphasises the social and economic impact of waste management, and situates the waste strategy within the green economy approach.	S@S results in larger amounts of better quality uncontaminated materials being available for re-use and recycling. This creates more income and job opportunities and boost the waste economy that results in a larger green economy.
Goal 4: Ensure that people are aware of the impact of waste on their health, well-being and the environment.	Seeks to involve communities and people as active participants in implementing a new approach to waste management.	Education and awareness programs are an integral part of any S@S system. It is essential to educate the community on the importance of participation as they provide the recycled materials needed.
Goal 5: Achieve integrated waste management planning.	Creates a mechanism for integrated, transparent and systematic planning of waste management activities at each level of government.	S@S forms part of the planning of integrated waste management planning.

Goal 6: Ensure sound budgeting and financial management for waste services.	Provides mechanisms to establish a sustainable financial basis for providing waste services.	Implementing sustainable S@S models while at the same time applying full cost accounting to them. This enables comparison with outdated waste management models and make a stronger case for initiating S@S programmes.
Goal 8: Establish effective compliance with and enforcement of the Waste Act.	Ensures adherence to regulatory requirements for waste management and builds a culture of compliance.	Compliance with and enforcement of the NEM:WA especially around the management of waste facilities linked to S@S.

3.5. NATIONAL DOMESTIC WASTE COLLECTION STANDARDS

The purpose of the National Domestic Waste Collection Standards is to ensure that all South Africans receive a service that complies with health and safety regulations without changing current initiatives, and to deliver a well-functioning service that is of an acceptable standard to all households. The Standards describe various aspects that affect S@S including:

- **S@S**
S@S must be encouraged and supported, and be co-ordinated with industry waste management plans. Community involvement in recycling must also be encouraged.

- **Collection of recyclable waste**

The municipality must provide an enabling environment for households to recycle domestic waste. An enabling environment could include kerbside collection and/or well-kept drop-off centres within easy reach. Where the municipality does not provide for kerbside collection of the recyclable component of source-separated waste, it must co-operate with the recycling sector to ensure the provision of facilities where recyclables can be dropped-off for collection by service providers.

- **Drop-off centres for recyclables**

- The availability of drop-off centres is crucial to S@S and therefore easy access to drop-off centres must be facilitated
- drop-off centres must be easy to use, cause minimal nuisance and be clean and user friendly

- **Waste Management Officer**

The municipality's Waste Management Officer is designated to deal with general communications and awareness raising regarding waste. The officer is also responsible for handling all complaints and resolving such complaints within a set period.

- **Awareness creation and guidelines to inform the households**

The municipality must create awareness, provide information and educate households about all aspects of the services provided and what is expected of them. The following must be communicated: waste and recycling collection services, why and how to separate at source, the benefits of composting, consequences and costs concerning littering and illegal dumping, how illegal dumping and littering influences tariffs and advantages to reporting illegal waste disposal. Awareness raising and guidelines must be communicated at regular

intervals to ensure that all households receive feedback and are kept well informed.

3.6. WASTE BY-LAWS

The Western Cape Government views the waste sector as an important contributor towards South Africa's economic growth as well as to the creation of green jobs. However, a study conducted by the CSIR on behalf of the Department of Science and Technology (DST) (DST, 2013) showed that legislation is the second most cited barrier, by both the public and private waste sectors, to waste innovation in South Africa. It is therefore important that waste by-laws are established and/or amended, and aligned to the NEM:WA to encourage S@S and recycling. In addition, these by-laws must be drafted in a manner that supports the development, growth and innovation of industries in the waste sector. For this reason, the DST has drafted a standard model waste by-law for municipalities to use, to improve compliance and the recovery of recyclables within the municipalities.

3.7. PROVINCIAL ORGANIC WASTE BAN

As part of the Provincial Waste Management Plan, the DEA&DP has set targets for organic waste diversion for the Western Cape. The policy will seek a 50% diversion of organic waste from landfill by 2022 and a ban on organic waste to landfill by 2027. A strategy to achieve the ban is currently in operation through the Variation of the Waste Management License for landfills within the Western Cape.

In order to maximise the diversion of organic waste from landfill, municipalities will need to ensure that they implement a S@S system that removes organic waste from the general waste stream. The City of Cape Town has already rolled out a programme encouraging households to compost their organic waste on-site. Municipalities are obliged to set annual targets and identify procedures to be implemented from 2018 to meet these targets for the diversion of organic waste from municipal landfills.

3.8. NATIONAL PRICING STRATEGY FOR WASTE MANAGEMENT

The National Pricing Strategy for Waste Management (NPSWM) will be the basis and guiding methodology used for setting waste management charges and funding for:

- implementation of industry waste management plans for those activities that generate specific waste streams
- re-use, recycling or recovery of waste in previously disadvantaged communities
- identification, further development and promotion of best practices in the minimisation, re-use, recycling and recovery of waste
- implementation of approved guidelines, norms and standards for the minimisation, re-use, recycling and recovery of waste
- monitoring the implementation and impact of industry waste management plans
- creation and the monitoring of the impacts of incentives and disincentives for the minimisation, re-use and recovery of waste
- management of disbursements of incentives for the minimisation, re-use, recycling and recovery of waste

The NPSWM gives effect to amongst other things, the polluter-pays principle that drives the costs of managing waste generated. The polluter pays-principle covers direct and indirect costs including collection, treatment and disposal costs of waste, as well as health and environmental costs.

The NPSWM is aimed at correcting market failures and eliminating landfill disposal as the 'cheapest' waste management option. Once this objective is realised, S@S programmes should become the preferred option for waste management. This would contribute to the South African economy and unlock a major share of the estimated R25.2 billion worth of resources currently lost due to the disposal of waste to landfill.

3.9. NORMS AND STANDARDS

The NEM:WA: National Norms and Standards for the storage of waste, amended 29 November 2013, aim to set a standard national approach for the management of waste storage facilities, ensure best practice, as well as set minimum standards for the design and operation of new and existing waste storage facilities.

They provide a baseline for the operation of waste storage facilities exceeding 100m³ for the continuous storage of general waste, and exceeding 80m³ for the continuous storage of hazardous waste. This eliminates the necessity to engage in the administrative process of applying for authorisation through the waste management licensing process. The Norms and Standards for the Storage of Waste gazette does therefore not apply to facilities below the thresholds.

The NEW:WA National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste amendment was passed to provide a uniform national approach relating to the management of facilities that sort, shred, grind, crush, screen, chip or bale general waste. These norms and standards apply to a waste facility that has an operational area of 100m² and more. Only section 4(4) of the Norms and Standard amendment applies to a facility with an operational footprint of less than 100m². The aim of these norms and standards is to reduce the administrative burden for all parties concerned and adopt a standardised approach to the management of the applicable facilities.

The following applies in terms of the National Norms and Standards for the Sorting, Shredding, Grinding, Crushing, Screening or Baling of General Waste amendment:

- Facilities of over 100 m² are required to register with the competent authorities and are also subject to mandatory monitoring, auditing and reporting requirements.
- Waste facilities of less than 100 m² will only be required to register with the competent authority and to comply with the prescribed environmental duties of care.

- New facilities must register within 90 days before any construction takes place (GreenCape, 2018).

4. SUMMARY OF S@S SURVEY IN THE WESTERN CAPE

Current S@S practices in municipalities throughout the Western Cape were investigated as part of researching this guide. A questionnaire (See Annexure A) was sent to the City of Cape Town metro and all 24 municipalities. Face-to-face interviews were held with Stellenbosch, Overstrand, Breede River Valley and Drakenstein as well as the City of Cape Town. The information was also verified by telephone and email.

Thirteen of the 24 local municipalities and the City of Cape Town responded to the survey. The response to Question 1 of the questionnaire showed that 12 out of the 14 respondents have implemented a S@S system or programme in one form or another.

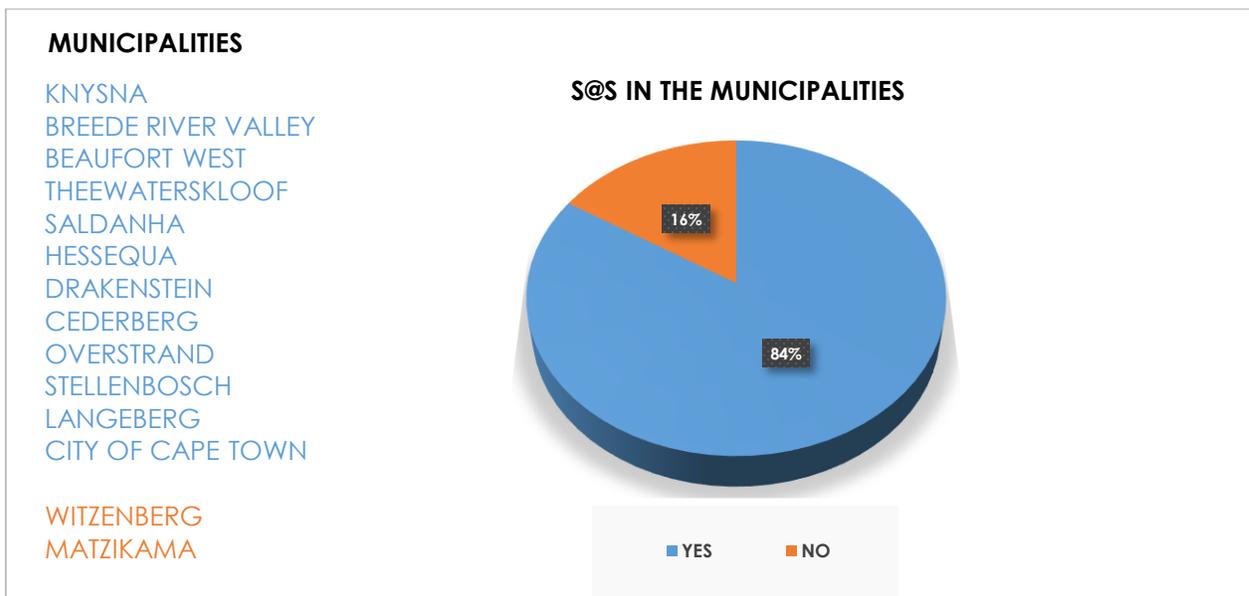


Figure 8: Municipalities who responded to the survey question as to whether S@S is taking place within the municipality.

76% of municipalities in the Western Cape have a S@S system in place, while 24% municipalities do not.

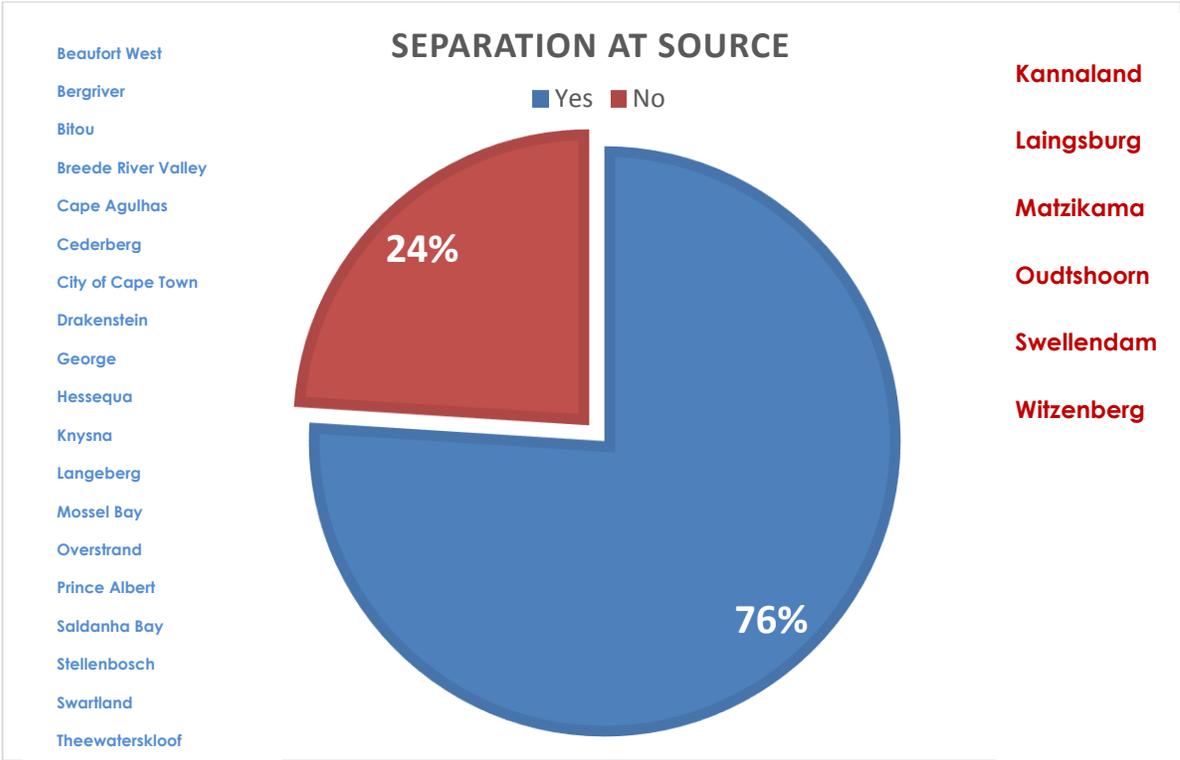


Figure 9: S@S within Western Cape Municipalities.

Municipalities indicated that a variety of S@S systems are being implemented, from two bag and split bag systems, to drop-offs, swop shops, and buy-back centres. It was concluded during the various interviews that a majority of waste managers felt that a municipality should not run the S@S initiatives, but should build the infrastructure required and contract out running S@S initiatives to well-qualified contractors. Most waste managers also thought that municipalities should play a facilitating role and make recyclables available to recyclers. Waste managers often saw these responsibilities as an additional burden, adding to their already full work schedule. The contractor would then be responsible for all operational challenges and crises, allowing waste managers to continue their work mandate to ensure service delivery needs.

The survey revealed that where S@S had been implemented, this rarely covered the entire municipality. Municipalities usually implement the split bag system in higher income areas first as pilots, as part of a phased-in approach, which in some cases later become permanent programmes. Out of all the municipalities in the Western Cape that participated in the research, Overstrand is the only municipality whose S@S is implemented throughout the municipality.

Most S@S systems and programmes are either managed by a contractor on behalf of the municipality or managed in partnership. These partnerships and contracts vary from municipality to municipality.

For an informative summary of the municipalities' contexts and methods, see Annexure C.

5. THE NUTS AND BOLTS OF S@S

This section looks at how S@S systems work to ensure that optimum quantity and higher quality (uncontaminated) recyclables are gathered for reprocessing.

Municipalities should (together with their recycling contractors if they have them) determine guidelines for consumers, households, commercial and industrial businesses on how and what to sort, and then collect the separated waste either through existing collection systems or with the assistance of contractors/partners. It is important that the S@S system provided should be as simple and convenient as possible, as it has been found that if there are too many rules; households are more reluctant to participate.

5.1. S@S SYSTEMS

While S@S is largely associated with a two bag/wet-dry or split bag system, it must be noted that this system is not always appropriate for all situations. In addition, budgetary constraints may not permit full-scale implementation of this system in municipalities and alternatives are often employed. The split bag system and various alternatives to recover waste at source are considered in further detail below.

Split bag system

Waste is split into streams and placed in different bags according to waste type or a mixture of waste types to ensure that recyclables are kept separate from the general waste.

In some instances, municipalities use a two or three bag system for separating recyclables from general waste. Where two bags are used, one is for general waste and the other for recyclables. Some municipalities have a limit of one general waste bag with no limit to the number of bags for recyclables. This tactic is an encouragement to citizens to separate more of their waste.



Figure 10: Separated waste in a two bag system.

In three bag systems, the third bag is often used for garden waste. The collection vehicle can vary from a truck with a caged back as well as trailer to more conventional waste collection vehicles.

Where the municipality collects the recyclables bags in the same truck as waste destined for landfill, they must ensure that the recyclables are kept separate from the waste. Residents should also be reassured that this is happening, as they may become discouraged if they see their recyclables being put in the same truck as general waste.

A variety of coloured bags is normally used in such two or three bag systems. Black bags are mostly used for general waste, clear or orange bags for recycling and green or blue bags for garden waste. In many cases, the municipality provides free bags to households for the recyclables.

As part of preparations to implement S@S systems, residents and communities must be included in thorough awareness and communication programmes. These should be

designed to ensure that communities understand the need for the programmes, and their own responsibility towards waste minimisation. Once started, ongoing feedback on progress with households contribute to the success of programmes.

Involving the private sector can be beneficial to such systems, and can minimise costs to municipalities through subsidising awareness communications or bag provision. Private recycling companies can also collect recyclables as part of a business or voluntary initiative.

MRF

A MRF plays an important role in split bag systems. Here the bags of mixed recyclable materials are received, opened and further sorted into the different waste streams such as glass, tins, paper and plastics. This is done using either an automated system or, as in most cases, a manual system.

In manual systems, workers along a table or conveyor belt handpick the different recyclables types. The sorted types are then baled and sold on to recycling companies.



Figure 11: Sorting in a MRF.

MRFs are generally built by municipalities and then outsourced to be operated by contractors. MRFs can be operated as clean, dirty or wet MRFs.

A **clean** MRF receives and processes only recyclable materials that have already been separated from non-recyclable waste by households in the MSW stream.

A **dirty (or wet)** MRF on the other hand accepts unsorted mixed and mostly wet or household waste that often includes food and contaminated waste materials. These are then separated into recyclable and non-recyclable waste. A dirty MRF is not part of a

true S@S system, as the waste is not separated at the point of generation. Waste from dirty MRFs is usually of lower value.

An important factor to consider are market requirements and prices based on recyclables' quality, cleanness and contamination. Some buyers and markets do not accept, or will pay low prices for contaminated waste.

Location is a vital consideration in the siting of a MRF. Generally, MRFs are noisy, generating unpleasant odours, and with vehicular activity, can contribute to traffic congestion and air pollution. However, if the facility aims to be accessible to nearby residents, then it also cannot be too far from the community.

Buy-back centres

These are enterprises in roadside locations that buy recyclables from waste pickers, residents, collectors, reclaimers and others. This collection method draws a steady stream of clean recyclable packaging as well as bulky waste such as metal, furniture, fridges and stoves. The materials procured are then sold to re-processors. In some instances, materials are repaired and resold.

Recycling companies that are contracted by municipalities to run their S@S programmes often set up buy-back centres too. These are viable social responsibility projects as part of the contract. Buy-back centres can also be funded by government, or by product responsibility organisations (PROs) such as Collect-a-Can or PETCO.

Waste drop-offs

Drop-off sites are municipal facilities that give businesses and the public the opportunity to drop off recyclable waste free of charge or in some cases at a minimum cost. These facilities are also beneficial in efforts to reduce illegal dumping of waste.



Figure 12: Different waste bins at a drop-off site.

Facilities at different locations allow for various types of waste to be dropped off, including but not limited to: clean garden waste, paper, cardboard, glass, plastics, electronic waste, garage waste, motor oil, cans and metals, clean builder's rubble and polystyrene.

The sites are normally located close to communities to accommodate those with and without private transport. Certain municipalities at holiday destinations provide small drop-off facilities that are open on weekends so that visitors can easily drop off their waste and recyclables on their way out.

Public Place Recycling

Public Place Recycling (PPR) is a system for S@S used in public areas where large numbers of people gather, pass by or visit. PPR can be viewed as an extension of S@S at home or at the office. When people are part of a S@S system that works well, they begin to anticipate the opportunity 'to be able to recycle in other places they visit, including public places.'



Figure 13: General and co-mixed recyclable streams at a PPR.



Figure 14: Recycling domes at a taxi rank.

Retail parking areas, festivals, recreational and tourist sites as well as commuter facilities such as taxi ranks, bus stops and rail terminals are ideal sites for PPR. These can take many forms including strategically placed recycling domes, bins or cages. These create important 'recycle away from home' opportunities and can be used to educate more people about recycling.

Swap shops



Figure 15: Residents queuing to swap waste.

Swap Shops are well-suited S@S initiatives in low income and informal communities. They also enable communities to realise the value of waste through recycling.

People bring in clean, dry, recyclable materials and are given vouchers that they can exchange on site for essentials such as clothes, toiletries, blankets and food.



Figure 16: Mobile swap shop.

Many municipalities are seeing increased use of mobile swap shops. These travel around and open up at different areas on certain days and times of the week. Their popularity spreads fast.

Swap shops are also good platforms for environmental education and awareness raising within the municipality, as well as having a potential for addressing socio-economic issues. If set up at or near schools, they form an important part in educating young people while providing essential school supplies and related items.

Events recycling

Events bring people together to share experiences where food and beverages are also enjoyed. Clear information about how and where to recycle packaging these



consumables come in should always be provided. This will enable recyclable materials to be collected while also educating people about correct separation of waste and recycling.

Figure 17: Poster promoting recycling at an event.

5.2. MATERIALS FLOWS OF THE VARIOUS S@S SYSTEMS

The diagram on the following page shows different materials flows from various waste generators in a rural town's S@S system. Households and businesses generally have a similar flow of materials and are grouped together. The diagram is divided into households, including informal settlements, and farms. In all cases, residual waste is taken to a landfill and recyclables are taken to recycling centres.

Households and businesses

Recyclables are either collected from households by private collectors (formal and informal) or municipal contractors. After collection, recyclables are taken to a recycling

centre or to a central point for further processing. Green waste can also be separated and collected. This is a service generally provided by the municipality.

Households or businesses can also take their recyclables to a drop-off facility from where recyclables are taken either to transfer stations for sorting, or to buy-back centres.

Informal settlements: Here materials are gathered by informal collectors who then sell to buy-back centres or take them to swap shops.

Farms: Farms produce general waste and organic waste. The general waste is either dealt with on the farm or it is taken to drop-off facilities. Green waste can be taken to drop-off centres, or be composted on the farm.

It should be noted that these S@S systems are often complementary and can be used in conjunction with each other within a municipality. Different systems also work better in different socio-economic areas.

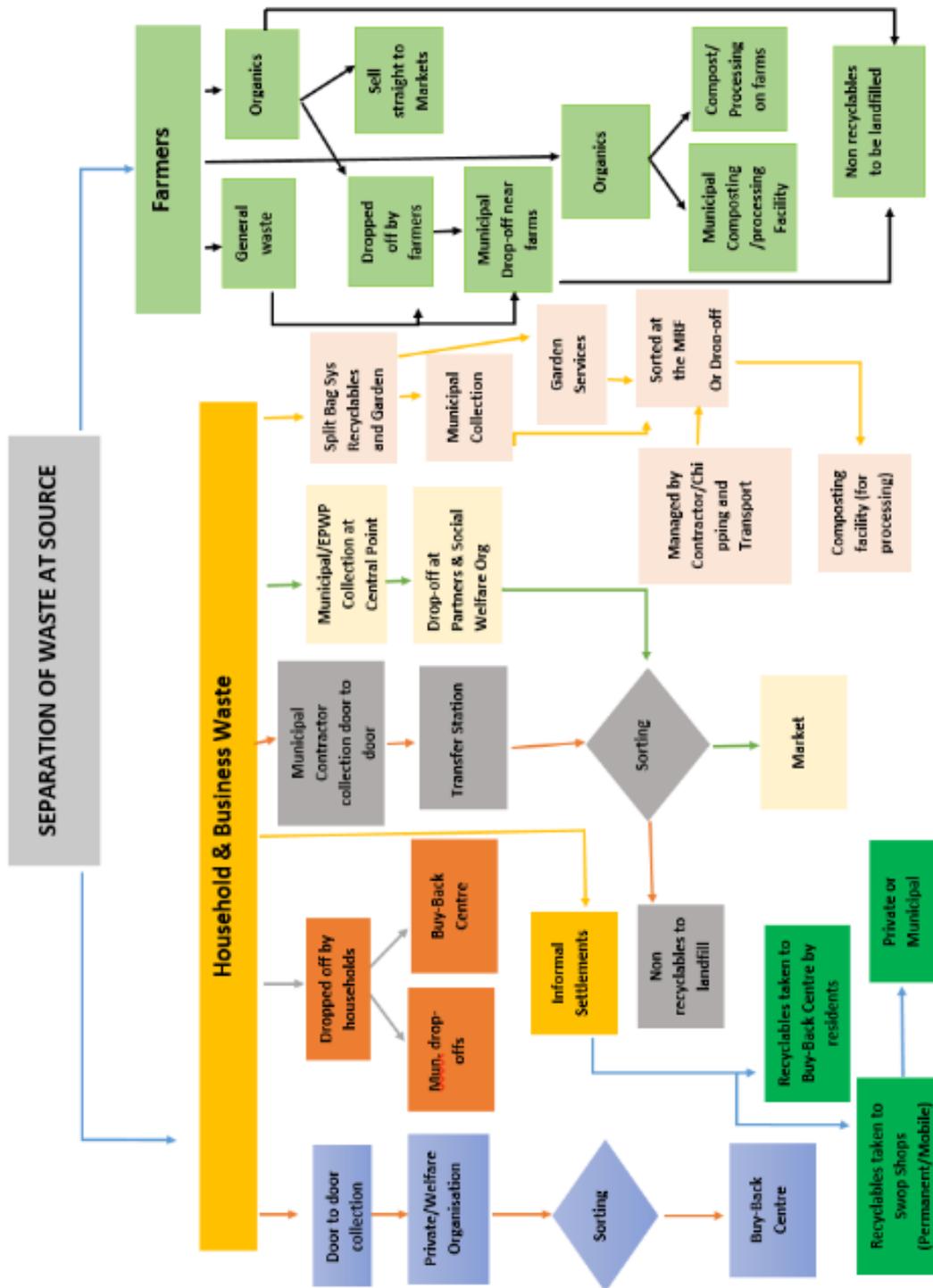


Figure 18: Materials flows from different waste generators in a rural town's S@S system.

5.3. APPLICATION OF S@S SYSTEMS IN THE WESTERN CAPE

In many developed countries, three or more bin S@S systems are used. Where such systems are in place, more than 50% resource recovery rates are achieved. In many developed countries EPR is implemented, and PROs play a prominent role in supporting the recovery of packaging material and setting up the required infrastructure to recover recyclables. The costs of implementing efficient waste management systems are also partially or completely recovered from households who are generally willing to pay for the service.

In South Africa, the focus of S@S systems has mainly been on a two bag system in which waste is separated into recyclable and non-recyclable bags at source. In some cases, a third stream is collected i.e. garden waste. Existing S@S systems implemented by the different Western Cape municipalities who participated in the case study research are summarised below. Relevant feedback and knowledge received during the research about challenges and successes of S@S is also summarised.

The Cape Town Metro S@S system.¹

The City of Cape Town employs two bag kerbside recycling collections as well as drop-off systems. It has around 25 drop-off facilities located within a 7km radius of the residential communities served by the facilities. The drop-off facilities accept green waste, garage waste, builder's rubble, plastics, paper, cardboard, metals and other recyclable waste at no cost.

Separated materials from the two bag system are further separated and sorted at a MRF. The City's 'Think Twice' programme provides a separate dry waste kerbside collection service mostly to residential properties. The City provides clear bags in certain areas for

¹ From DEA's Status quo and policy options for separation of waste at source Status Quo Report, December 2017.

mixed dry recyclables limited to paper, cardboard, tin, glass and plastics. In some suburbs, 130 litre wheelie bins for recycling have been introduced.

The 'Think Twice' S@S programme falls under the City of Cape Town waste minimisation programme. It has financial cost accounting and budgeting support, solid waste contract management support, public awareness specialists and data analysts. Awareness and education is included as a requirement in all S@S contracts.

Recyclables are collected and managed by contractors. No revenue is generated by the City for the sale of recyclables, which become the property of the service providers once collected and sales are for their own gain.

Participation by residents in the kerbside collection system is voluntary and the City has no financial incentives or disincentives in place to encourage S@S. The willingness of households to participate in the programme is essential for the success of the programme. This makes behavioural communications and promotions a key component. Improving the availability of storage space at household level can also be beneficial to participation in the programme.

Alternative options such as drop-off facilities, swop shops and buy-back centres complement existing kerbside S@S programmes, especially in areas with low participation rates or where no kerbside collection services are provided. Various civil groups, commercial and industrial businesses, SMEs and informal waste pickers also provide S@S services in various forms.

Other important role players are the recycling industry PROs such as PETCO and Polyco, recycling processors and a range of suitably experienced service providers.

Theewaterskloof

Theewaterskloof municipality uses a two bag split bag S@S system. The municipality has initiated a pilot in Villiersdorp and will be extending the pilot to other towns in the municipality subject to council approval.

The municipality appoints a recycler on contract who distributes recycling bags provided by the municipality to households. The contracted recycler collects the full recycling bags from residents on refuse collection day. The recycler employs sorters at the municipal-owned transfer station for the sorting and baling of recyclables. The service is mostly provided to higher income households although some informal households make use of the system. The municipality is investigating the viability of a buy-back centre for lower income areas. Implementing the system in business and industrial areas as well as farms remains a challenge for the municipality. Due to their remote locations, farms make municipal collection services costly.

Breede River Valley

The Breede River Valley municipality also uses a split bag S@S system. For each filled bag of recyclables households place out for collection, they receive one free bag. On collection day EPWP workers go door to door to collect bags and place them along a designated route where a municipal truck and team collects the bags. The municipality supports three non-profit organisations who derive an income from the



Figure 19: EPWP Workers moving bags of recyclable waste.

recyclables. The municipality has three collection days split equality amongst the non-profit recipients. The collection vehicle takes the recyclables to these organisations on their respective days. The system is provided in higher income areas as larger amounts of recyclables are forthcoming and in these areas, there is greater participation. There is also a swop shop managed by an NGO that operates in the informal area of Avian Park.

Table 4: Staff requirements for Breede River Valley Municipality.

The municipality's staff requirements for their S@S programme
One vehicle per area
A permanent driver
6 EPWP workers on the vehicle

Knysna

Knysna municipality uses a three bag system. Black bags are for general waste, clear bags are for recyclables and blue bags for garden greens. The municipality appoints a recycling contractor to manage the system. They collect from households and provide free bags. There are also five active swop shops within the Greater Knysna Municipality. These are located at Rheenandal, Seven Passes, Freshstart (Smutsville), Fraaisig School (Hornlee), and Love Life Centre.

Beaufort West

In Beaufort West, the municipality operates a split bag S@S system. In the higher income areas, e.g. Hospital Hill & Lande, recyclables are separated into a blue bag. A recycling company collects the bags, which are taken to the Beaufort West Recycling Depot for processing. The municipality provides the plastic bags and rents the depot premises from Transnet. These are the only costs for the municipality. The contractor is not paid but is allowed to utilise the recycling depot for free.

Witzenberg

Witzenberg municipality uses a split bag S@S system, using black bags for general waste and green bags for garden refuse. The bags are collected on different days according to the collection schedule. This S@S system is implemented in all areas of Witzenberg (Ceres, PA Hamlet, Bella Vista, Wolseley and Tulbagh) and provided to both lower and higher income areas.

Saldanha Bay

In the Saldanha Bay municipality's split bag S@S system, recyclables are placed in a clear bag and collected separately on the same day as the general waste collection. The system is currently aimed at formal housing areas only, both high and lower income.

The municipality appoints a contractor to collect from households and to manage the MRF, which is owned by the municipality and situated at the landfill. The contractor sells the recyclables for his own account.

A specialist service provider is sub-contracted to the recycling contractor to manage awareness and behaviour change communications to raise household participation in S@S. The municipality's website, pole posters and flyers, together with schools help promote recycling. Regular articles in the local newspaper provide ongoing feedback about S@S participation rates in the various towns making up the municipality.

Political buy-in right from the start is essential for success, using the council, portfolio and sub-committees processes (Sec 79). Earlier on, during the municipality's IWMP approval process, the council was asked to make funding available for recycling, based on a plan that clearly stated the budgetary needs and targets. This provided political and financial backing for the programme to go ahead.

Hessequa

The split bag S@S programme in Hessequa covers 70% of all households and business areas within the municipality. The municipality employs a private contractor who collects recyclables from houses and businesses. Drop-offs are available in rural areas.

All recyclables are transported to the MRF for further processing i.e. sorting, baling and storing. The service providers are contracted for three years, and as well as collecting and processing the recyclables, they conduct environmental education at schools and community halls. The recycling budget is R880 000 per annum. The operational budget for Solid Waste Management is R15.8m. This covers personnel, vehicles and maintenance, disposal management, and infrastructure requirements including bins.

Langeberg

The Langeberg split bag S@S programme covers all towns and has been rolled out to 40% of the municipal area, mainly to higher income, and commercial and industrial areas. It is run by the municipality's Solid Waste Management department, which employs two supervisors to oversee the programme. They use three drivers and 12 general workers who are permanently employed by the municipality.

Recyclables are collected and taken to the municipal MRF where they are sorted, baled, and sold directly to recyclers. The income generated from the sale of the recyclables is revenue for the municipality's Solid Waste Management department. To ensure a high participation rate, the municipality provides educational programmes at schools and to residents. The municipality also makes use of a drop-off system.

Mossel Bay

The Mossel Bay S@S programme comprises a three bag system: blue bag for recyclables, green bag for green waste and black bag for domestic waste. The blue bags are being rolled out in phases to middle and upper income households based on the amount of waste generated and their willingness to recycle. Green bags for garden waste are

implemented throughout the municipality. The municipality also uses systems such as drop offs, swap shops, transfer stations and the composting of green waste.

The S@S programme covers up to 80% of households in the municipal area with a participation rate of approximately 80% for the blue bag system which costs R0.35/household per month. The cost to the municipality to implement the green bags is R6.20/household per month. The municipality contributes around R40 000 per annum to purchase goods for the swap shop.

The municipality also allows individual waste pickers to reclaim waste material from municipal waste sites with permits for six months to do so. The municipality sees waste pickers as micro- recyclers who can collect recyclable material within communities and sell their recyclables to the municipal swap shop.

Drakenstein

In the Drakenstein split bag S@S system, clear bags are distributed to participating households. These bags are placed next to the bin on refuse collection day and taken to a MRF for sorting and baling. Drop-offs are available in all rural areas and at the waste disposal facility in Wellington.

At the municipality's offices a paper recycling project is in operation where all office paper is separated from the general waste and sent for recycling.

A swap shop is also available in a low-income area. This is an initiative between the municipality and an NGO, whereby recyclable waste is exchanged for non-perishable goods, educational toys, clothes, and sporting equipment. The municipality is the facilitator and assists by providing transport in some cases.

Initially the S@S programme was implemented in the higher income areas due to the good yield of clean recyclable waste and the willingness to participate in the programme. All new residential developments are now required to participate in the

programme. The programme has since been extended to middle income areas as residents have become more conscious of waste minimisation.

Overstrand

Responses from the survey at the time were that the Overstrand split bag S@S system also uses clear bags for recyclables, and serves households in upper, middle income, commercial and industrial areas. Even with an awareness programme in those lower income areas who wanted a S@S system implemented it, it did not work. Swop shops and buy-back centres are more suited for these areas.

Composting forms a big part of the municipality's separation of green waste at source. Drop-offs are provided throughout the municipality where garden waste can be dropped off by the community. Green waste is managed by a contractor who chips and transports it to a composting facility for composting. 600 tonnes of green waste are chipped per month.

There is a successful buy-back centre run by the contractor servicing upper and lower income, and informal areas. It accepts a variety of recyclables including lead batteries, pipes, old cars, furniture. It also serves as a second-hand shop.

Municipalities should encourage NGOs and private individuals to run swop shops and buy-back centres. Recyclables are exchanged mainly by children and women for clothing, food, stationery, and toys. Municipalities cannot approach companies for supplies for exchange in swop shops but they can assist with awareness-raising and transporting recyclables gathered at swop shops to recyclers.

Some tenders include a social responsibility clause, and it is up to the contractor to decide how it wants to achieve such a contractual requirement through supporting buy-back centres or swop shops.

Table 5: Departmental and Staff requirements for S@S in the Overstrand Municipality.

Overstrand: Department and staff
Department: Community Services - Responsibilities:
Collections/running of transfer stations/infrastructure/planning and management of all contracts/landfills/MRFs. Also oversees all administration.

Staff requirements:

6 People on vehicle/trucks. (4 Trucks: each for different areas).

2 People to move the recycling bags to end of road for later collection.

MRF is run by contractor staff.

EPWP workers were used for keeping towns clean. The programme has ended. They were not involved in S@S.

5.4. SUMMARY OF S@S SYSTEMS IN THE WESTERN CAPE

The following table is a summary of S@S within different municipalities in the Western Cape. (See also Appendix C).

Table 6: Summarised representation of S@S within different municipalities in the Western Cape.

Municipality & Towns	Percentage Roll out of Split bag S@S	High, Middle or Low Income Areas	Municipal Human Resources	Private Recycler Arrangement	Method and Frequency of Split Bag Collection	System for Sorting and Storage	Other S@S Systems Employed	Awareness and Communication	Costs of the Systems/s
Theewaterskloof: Villiersdorp - pilot	4% of households	Higher/middle income areas	Operations and technical department	Contractor manages transfer station/ distributes bags and collects	Weekly on collection day	Contractor's facility	None	Municipality and contractor	R633.46 p.a. R52.79/month
Mossel Bay: Throughout the entire municipality - permanent	+80% of households with 80% participation rates for the blue bag system	Blue bag in upper and middle income areas. Green bag throughout the whole municipality	Waste Management and Pollution Control Department	Contractors manage the programme	Weekly collection	Contractors	Drop off sites; Swop shops; Transfer stations (garden waste); Composting (waste water treatment sludge and green waste)	Municipality	Green bags: R6.20 / household per month Blue bags: R0.35 / household per month

Breede River Valley: Worcester and Rawsonville	10% of formal households	Higher income areas	One truck and 6 EPWP workers	No private contractor. System run by municipality	On collection day, three times a week	NGO facilities	Swop shop in Avian Park	Municipality	Not available
Knysna:	30 – 40% within the Greater Knysna area	High and low income areas, businesses, industrial areas, some farms, bosbou dorpies	Various departments, municipality's Youth Desk, CWP's, CDW's	Contractor appointed for collection and transport of recyclables from businesses	Collection takes place on the current refuse collection day	Contractor's facility	Five active swop shops used	Municipality	A tender was advertised for a one-year contract with the option of renewal for further 2 years at R 600 000.00
Beaufort West:	% not available	Higher income areas Nearby farms and businesses	Six staff members	Informal partnership between municipality and recycling company	Bags are collected by municipality	Municipality rents facility from Transnet	None	Municipality	Not available
Saldanha: Implemented in all towns	65% of all formal	High, middle and lower income areas and commercial premises	All work is done by the contractor	Contractor appointed to manage the programme	Clear bags are collected on collection day	Municipality owns MRF	Drop-off	Sub-contracted to awareness and marketing specialist	R120 000 pa for Marketing and Awareness costs Cost of bags: between R1.20 and R1.80 quality dependent

Hessequa:	70%	All households and business areas	N/A	Three year contract with private contractor	Contractor collects recyclable waste from houses and business premises	Municipality owns MRF	Drop-offs are used to service rural areas	Contractor does some environmental education at schools and at community halls for residents	Recycling budget: R880 000 per annum
Drakenstein:	% not available	High, middle and lower income areas	Waste minimisation officer, 25 x general workers, 8 EPWP beneficiaries, & 8 x general workers	No contractor at present	Bags collected with separate truck synchronised with normal refuse collection	Municipality owns MRF	Drop-off's, Swop shops	In house	2015/2016 cost was R33,39 per household pm
Overstrand:	73%	High and, middle income areas, commercial and industrial areas	Students during the high season. Various Departments	Contractor manages the processing of recyclables at MRF	Municipality collects recyclables on collection day.	Municipality owns MRF	Drop-offs Swop shops Buy-back Centre	Municipality	Approximately R1800 to R2000 per ton. (collections, the running of MRF, maintenance)
Langeberg:	40%	High and middle income areas, commercial and industrial areas	Solid Waste Management department	Municipality	Municipality collects bags Municipality sells recyclables to the market	Municipality owns MRF	Drop-offs	Municipality	Not available

City of Cape Town:	% not available	High and middle income areas, one low income area, commercial areas.	Solid Waste Management department	Two types of contracts: split bag - wet waste/dry recyclables; wet and recyclables mixed together	Contractors collect. Currently testing weekly versus fortnightly collection	Municipality owns MRF	Drop-offs, swop shops, buy-back centres, free home composters, events recycling	City of Cape Town	Not available
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5.5. COSTING

A critical aspect of S@S is understanding the costs involved in implementing such a system. In most cases S@S systems incur additional costs to the municipality. Added to this is the cost of developing extra infrastructure and supplies to store and separate recyclables further, awareness and behaviour change campaigns, and the costs of operating and maintaining the system. Some well-resourced municipalities are in a position to absorb these costs into their operational budgets, but many do not have the available budget to fully implement S@S systems, and have to find creative solutions to circumvent these high costs.

Furthermore, the allocation of budgets is often still based on a costing model for the old “hump and dump” (collect and landfill) system that is not aligned to the new mandates assigned to municipalities in the NEM:WA. These budgets are often for outdated non-compliant waste management practices that do not take into account the full costs of managing compliant facilities, or the future costs of rehabilitating closed disposal facilities. In other words, no full cost accounting has been done.

Legislation such as the Municipal Systems Act (MSA) and the Municipal Finance Management Act (MFMA) also make it difficult to factor in full cost accounting to allow a case to be made for the long-term savings to the municipalities resulting from S@S systems, such as landfill airspace savings. Subsequently “access to funding for projects remains a challenge for municipalities due to the lack of guidance ... on new municipal waste management rules and regulations and on appropriate cost structures that consider diversion efforts from landfill to support revenue generation” (GreenCape, 2018)

The main cost components of any S@S programme include:

- collection and transport
- MRFs
- receptacles/bags or bins

- awareness and communication
- human resources

These costs will vary considerably between different municipalities due to local context and which S@S model they choose to implement.

Collection and transport

One of the most expensive parts of a S@S system are vehicles to transport the recyclable material, their maintenance and fuel. The choice of vehicle affects the overall budget due its cost, fuel efficiency and the distances it needs to cover.

An easy way to decrease the distances travelled is to move the recyclables onto main roads or to a central collection point. Collection can take place on the same day as the municipal refuse collection schedule or on different days, and by the municipality or contractor. In some instances, the municipality could consider using the services of waste pickers.

Municipalities can also consider a fortnightly collection. This would result in a saving on costs. Some municipalities have opted to utilise EPWP funds to employ workers to collect recyclable waste from households.

MRFs

These facilities could be small and in central locations, decreasing the distance that recyclables must be transported. Depending on the volumes coming into the system from households, low or appropriate technology facilities work well.

For larger towns and cities, higher technology automated processes can better assist with managing the greater volumes that come into the facility.

Awareness and Communication

The importance of a well-run and well-funded awareness campaign to support S@S systems cannot be over-emphasised. Awareness, media and behavioural communications are essential not only to encourage enough residents to adopt the household routines that make S@S systems a success, but also to keep them using the system. Without sufficient participation, the economics of the system may not work because not enough recyclable waste materials are coming through for eventual sale.

A large portion of the budget for public education is required for the launch phase to prepare communication materials, media and activities, after which smaller ongoing promotions should follow.

Public education campaigns are not one off costs and ongoing feedback on amounts recycled, participation rates and general progress is vital.

Receptacles/Bags or Bins

A two bag system can be cheaper to implement than a two bin system as most bins will require specialised collection trucks. A system can comprise two or more bags taking various recyclables.

However, it is vital that bags are distributed regularly and reliably. At the same time, bins can be used for many years, as compared with the constant need to provide new bags, so this cost implication has to be weighed up.

Human Resources

All the cost factors already mentioned also require personnel to distribute, collect or sort the recyclables amongst many other tasks. Staffing is therefore a crucial part of the system and must be properly budgeted for.

Benefits and Savings

An important consideration when costing a S@S programme is to take into account both the direct and indirect benefits and savings associated with the programme:

- decrease in the costs of landfilling
- decrease in the cost of transporting waste to the landfill
- income generated from the selling of recyclables
- landfill airspace savings which extend the lifetime of the landfills, and indirectly save on the many legal and other costs of developing new landfills (e.g. completing the environmental impact assessments and legal fees against any appeals and legal reviews)

Cost considerations must also look at:

- impacts of informal collectors on the viability of the S@S programme
- impacts on employment and livelihoods (including formal job creation and livelihoods)
- additional/avoided greenhouse gas emissions from collection and transport
- avoided social and environmental externalities from landfill disposal
- full value of landfill airspace savings and increased landfill lifespan (Nahman & Oelofse, 2018)

The choice of which S@S system should be implemented may vary greatly according to the type of municipality. There is no 'one size fits all' S@S system, as for example metros with large urban populations will have significant capital and collection costs. (Nahman & Oelofse, 2018).

6. SASCOST MODEL

The SASCOST Model – a Decision Support Tool for Implementing Municipal Waste Separation at Source – is being developed by the CSIR (Nahman, 2018).

The model is based on determining different S@S costs depending on different categories of municipalities, as illustrated in Table 7 below.

Table 7: Different municipal definitions (per category).

	The Constitution initially determined two categories of municipality:
Category A	is a municipality that has exclusive municipal executive and legislative authority in its area (Constitution, 1996)
Category B	is a municipality that shares municipal executive and legislative authority in its area with a Category C municipality within whose area it falls in (Constitution, 1996)
	A system of categorisation was later introduced to more accurately understand the differentiated challenges facing municipalities: (COGTA 2009):
A	Metros: Large urban complexes with populations over 1 million
B1	Local Municipalities with large budgets and containing secondary cities
B2	Local Municipalities with a large town as a core
B3	Local Municipalities with small towns, with a relatively small population and significant proportion of urban population but with no large town as a core
B4	Local Municipalities which are mainly rural with communal tenure and with, at most, one or two small towns in their area

Table 8: Potential Costs of various S@S Options to Different Municipal Categories.

		Cost ² of each Separation at Source Option							
		Post Separation		Truck and Trailer		Separate Vehicle		'Rich Bag'	
Category	Municipality	R/t of waste recovered	R/household/month	R/t of waste recovered	R/household/month	R/t of waste recovered	R/household/month	R/t of waste recovered	R/household/month
A	Mun 'a'	3 355.99	9.64	N/A	N/A	5 916.15	17.00	5 201.78	14.94
A	Mun 'b'	3 907.98	11.23	N/A	N/A	5 993.58	17.22	5 753.77	16.53
A	Mun 'c'	3 555.49	10.21	N/A	N/A	6 472.91	18.60	5 401.28	15.52
B1	Mun 'd'	2 950.36	8.48	N/A	N/A	8 110.22	23.30	4 796.15	13.78
B2	Mun 'e'	5 168.03	14.85	6 653.80	19.12	10 659.26	30.62	7 013.82	20.15
B3	Mun 'f'	11 582.44	33.28	11 202.56	32.18	14 436.21	41.48	13 428.23	38.58
B4	Mun 'g'	14 774.43	42.45	13 776.64	39.58	20 762.37	59.65	16 620.23	47.75

Source: Nahman, A & Oelofse, S, 2018. Implementing the waste management hierarchy: Applying the SASCOST model to determine indicative costs of separation at source.

Table 8 above provides insights from the SASCOST model on indicative costs of implementing S@S. These results should be used with caution to inform decision making as they are based on a test version using hypothetical data. (The 'rich bag' noted above is when householders place recyclables in a separate bag in the top of their refuse bin for informal pickers to collect for their own gain.)

It is always possible that a S@S system could increase the overall costs to waste management. The main challenge for a S@S programme is the collection of the

² Notes: (a) Results are based partially on hypothetical data and should therefore be treated with caution. Total cost takes into account vehicle/collection costs, communication costs, container costs, costs of sorting at the MRF, and costs of transporting the residual fraction from the MRF to the landfill. Benefits and savings are dealt with in a later section of the paper.

(b) N/A refers to cases where the truck and trailer option is not applicable (e.g. in the case of municipalities using compactors/rear-end loaders).

separated materials and how best to do it. A collection system will have to consider use of either separate vehicles, multi-compartment vehicles, the truck and trailer system, and/or incorporating the informal sector with varying cost implications. The different implications for the different collection options are financial, socio-economic and environmental. These include costs and benefits related to capital and operating costs, job creation, impacts on the livelihoods of informal collectors, and environmental impacts associated with transport, such as CO₂ emissions (Nahman & Oelofse, 2018).

Factors such as waste types and quantities generated and collection and transport distances will have an impact on costs and benefits of various systems with different effects on municipalities. Specific contexts relating to population, socio-economic profile, waste generation rates, waste composition and location can provide further variation between suburbs within a municipality.

It is important that municipalities consider a tailored approach for each area. Ideally, initial programmes should concentrate on 'low-hanging fruit,' such as middle and high-income areas where the bulk of the recyclables are generated and where efficient and cost effective collection systems can be implemented. Easy access to markets is also an important consideration to ensure that economies of scale are achieved (Nahman & Oelofse, 2018).

Due to different local contexts and challenges in which municipalities operate, a decision support tool such as the SASCOST Model can be particularly useful in assessing the trade-offs between collection options, and finding suitable options for implementation.

Currently, the model focuses on paper and packaging waste from households and compares four options:

1. post-separation at a dirty MRF
2. separate collection of general waste and recyclables with a truck and trailer
3. collection of source-separated recyclables in a dedicated vehicle
4. financial costs and benefits of the options using two versions

Version 1 of the model focuses on:

- communication costs
- container costs
- costs of collection and transport to MRF
- cost of sorting at the MRF
- cost of transporting the residual fraction from MRF to landfill
- income from sale of recyclables
- savings from reduced collection, transport and disposal to landfill

Version 2 of the model focuses on:

- impacts of informal collectors on the viability of a S@S programme
- impacts on employment and livelihoods
- additional/avoided emissions from collection and transport
- avoided social and environmental externalities from landfill disposal
- landfill airspace savings and increased lifespan

It is envisaged that the model will be developed further to include a greater range of collection options, more waste sources and streams such as organic waste, as well as various downstream technology options for each waste stream, so as to broaden the decision-making tool for wider use.

7. RECYCLING INDUSTRY SUPPORT FOR S@S

Most recycling industry players are represented by organisations in the paper and packaging sector who collect, transport, and recycle/beneficiate waste materials through voluntary initiatives as part of their EPR efforts. The Waste Act requires producers to take responsibility for aspects of a product's management beyond the point of sale.³

The paper and packaging industry's PROs broadly include:

³ http://wastepolicy.environment.gov.za/home/nwms_v1/3/10

- glass (represented by The Glass Recycling Company [TGRC])
- paper and board (represented by FibreCircle/RecyclePaperZA)
- metals (represented by MetPac-SA and Collect-A-Can)
- polyolefins (represented by Polyco)
- polyethylene terephthalate (represented by PETCO)
- polystyrene (represented by the Polystyrene Association of SA [PASA])
- vinyl (represented by South African Vinyl Association [SAVA])

The two main types of EPR initiatives are voluntary, which account for the majority of EPR schemes in South Africa to date, and mandatory, which are initiated or implemented through government regulation (currently under consideration).

Whilst industry is encouraged to run voluntary schemes, in some instances these need to be augmented by government regulatory support. Norms and standards may be developed to require industries to participate in recycling activities as part of their EPR.⁴ The following table shows recycling industry PRO associations and their contact details:

Table 9: Recycling Industry Associations (GreenCape, 2018).

Material		Industry Association	Contact information
Paper		FibreCircle/ RecyclePaperZA (Paper Recycling Association of SA)	Anele Sololo 011 803 5063 info@pamsa.co.za http://recyclepaper.co.za/
Plastics		Plastics SA	Anton Hanekom 011 653 4784 Karen Wichman 011 653 4784 Karen.Wichman@plasticssa.co.za Reception: 011 314 4021
	PET Beverage bottles	PETCO (PET Recycling Company)	Cheri Scholtz (021) 794-6300 cheri.scholtz@petco.co.za Belinda Booker (011) 615- 8875 belinda.booker@petco.co.za Janine Osborne (021) 794-6300 Janine.osborne@petco.co.za www.petco.co.za
	PET Thermoform		
	PE-LD	POLYCO	Mandy Naude 021 531-0647 mandy@polyco.co.za https://www.polyco.co.za/
	PE-DH		
PP			

⁴ See note 1

Material		Industry Association	Contact information
	PVC	SAVA (South African Vinyl Association)	Adri Spangenberg ceo@savinyls.co.za T: 087 087 0418 C: 072 820 2506
	PS	PASA (Polystyrene Association of SA)	Adri Spangenberg adri@polystyrene.co.za T: 087 087 0418 C: 072 820 2506
Glass		TGRC (The Glass Recycling Company)	Innocent Gobo 011 463 5644 innocent@tgrc.co.za www.tgrc.co.za
Metal (Cans)	Other	METPAC-SA	Kishan Singh 082 880 9580 ceo@metpacsa.org.za
	Aluminium	Collect-A-Can	Melanie Adams 031 700 5935 0834077355 MelanieA@collectacan.co.za
e-Waste		SAEWA (South African E-waste Alliance)	Susanne Karcher 021 706 9829 071 859 0829 envirosense@xsinet.co.za http://sa.ewastealliance.co.za/
		EWASA (E-waste Association of SA)	Keith Anderson 031 5357146 Info@ewasa.org
Tyres		No industry association	The IndWMP of the Recycling and Economic Development Initiative of South Africa (REDISA) was withdrawn by the Minister of DEA in 2017. The Waste Management Bureau will manage waste tyres until a new plan has been put in place
Organic Recyclers		ORASA (Organic Recycling Association of SA)	Name: Melanie Ludwig Tel: 083 696 5138 Email: melanie@zlorganics.co.za Website: www.zlorganics.co.za
<u>Umbrella body for the Packaging Industry:</u>			
Packaging SA Exec Director: Shabeer Jhetam Tel: 012-001-1914 shabeer@packagingsa.co.za www.packagingsa.co.za P.O. Box 131400 Bryanston 2021			

The Minister of Environmental Affairs gazetted a call on the paper and packaging industry, electrical and electronic industry and lighting industry to submit IndWMPs for approval in terms of the NEM:WA. Producers are required to register with and subscribe

to at least one IndWMP. This registration and subscription is a voluntary process (RSA, 2017).

The Paper and Packaging IndWMP will increase available funds to grow recycling activities, including the plastics sector. This includes both the supply (access to feedstock) and demand (development of market) aspects of the value chain. Registering with the PRO responsible for delivering the IndWMP is expected to provide existing businesses with opportunities for growth, while providing a platform for new entrants to access feedstocks and tap into support (GreenCape, 2018).

The benefit of the implementation of the IndWMP for municipalities will be that more SMEs in the waste sector will potentially become available as contractors. This will enable pricing of tenders at affordable rates to municipalities and discourage anti-competitive behaviour in the waste services sector. The secondary effects of this will be growth in the Western Cape economy, stimulation of the waste circular economy and increased waste diversion.

Municipalities can be assisted in their S@S initiatives by industry partners such as PROs, material specific organisations and recycling companies in the following ways:

- savings experienced through industry partner awareness initiatives can be channelled into operational aspects, to reach a broader audience or to focus on a different aspect of waste awareness
- improved skills at SME level can increase the footprint of these enterprises and lead to improved diversion volumes, economic growth in the municipality, reduction in unemployment figures, reduced illegal disposal of recyclable materials
- increased transport cost savings for the haulage of recovered material
- increased productivity through the provision of sponsored equipment and resultant higher income potential
- increased revenue through existing markets

According to the GreenCape Market Intelligence Report (2018), industry associations currently fall within the following categories:

- **PROs**

Generally, non-profit organisations with a national footprint and primarily funded by producers (manufacturers/brand owners/converters/refurbishers) of a product.

- **Material specific organisations:**

Generally, non-profit organisations with a national footprint and primarily funded by material producers.

- **Recycling organisations:**

Primarily funded by recycling companies. Currently, membership and financial contributions to the industry associations are voluntary. However, this will probably change with the implementation of the planned IndWMPs.

The recycling industry contributes towards job creation through materials collection and the sorting of waste. Indirect job opportunities are created for informal collectors who sell the waste they collect to buy-back centres. The recycling industry also presents opportunities for establishing new enterprises. There is a need for further research into the recycling industry to better understand and estimate its potential for job creation and poverty eradication.

The private sector is the main driver of the local recycling economy in South Africa. The current status of recycling is the result of the work done by the private sector with assistance from the informal sector, according to Dr Susan Oelofse of the CSIR (Oelofse, 2018).

Dr Oelofse also sees private recyclers as the group that most benefits from any improved recovery of resources in waste streams, as they receive cleaner, high quality materials to

process (Oelofse, 2018). However, local demand for recycled material needs to be created in order to advance the recycling industry and value chain as a whole.

8. MANAGING INDUSTRIAL & COMMERCIAL S@S

The commercial and industrial sectors are mostly responsible for managing their own waste collection services for generated waste, which includes safe disposal. This service is usually outsourced to private waste management contractors. Alternatively, the generators may request the service from a municipality at a service fee. Various legal and regulatory requirements must be met, whether they are waste generators or waste handlers (GreenCape, 2018).

Municipalities implement various measures to encourage waste minimisation. Two of these measures are the implementation of fixed increased tariffs, and pay-as-you-throw systems. Traditionally, the costs of waste collection and disposal have been covered by property taxes or through annual or monthly fixed tariffs charged to each household.

With pay-as-you-throw systems, the fee charged for collection and disposal increases with the amount of waste disposed. This provides a financial incentive to reduce waste, which can in turn lead to lower transportation and disposal costs for the local municipality (Vermont Agency of Natural Resources, 2015). Pay-as-you-throw tariffs include:

Fixed increased tariffs: Container services tariffs are based on the size of the container and frequency of removal as well as tonnages for disposal (City of Ekurhuleni, 2018).

Set tariffs: Waste collection based on container size are flat monthly payments unrelated to the quantity (volume or weight) (City of Ekurhuleni, 2018).

These tariff systems can incentivise businesses to participate in S@S programmes in municipalities. They can be effectively used as an incentive in the case where the

Good Practice: Breede Valley Municipality has utilised a successful pay-as-you-throw system. Many businesses have reduced the number of bins because fewer bins means a lower tariff is paid. This is a direct incentive to the business. The reduced tariff is only applicable where the business recovers its waste for recycling and so diverts it from landfill.

business is charged less for reduced waste generation, or a disincentive where the business is charged more for increased waste generation.

A municipality can reward individual businesses because of the direct benefits experienced by the municipality such as savings of landfill airspace, the cost of waste haulage (transportation) and the potential revenue stream for either the municipality, its contractor, or the SMEs that it supports. Municipal support of SMEs stimulates the local recycling economy and has a positive effect on socio-economic conditions.

The Western Cape Industrial Symbiosis Programme (WISP) provides a free platform to facilitate business opportunities utilising unused or residual resources such as materials, energy, water, assets, logistics and expertise (DEA&DP, 2015).

The platform is used by beneficiaries to advertise what materials or waste they have available or what they require. A 'partner' beneficiary can then indicate their interest or that they can supply the required item. It is an effective system for the exchange of wanted and unwanted materials.

Municipalities can utilise this programme to reduce the disposal of bulk waste items or other priority waste streams by organising beneficiaries to join WISP and facilitating the

exchange with the assistance of GreenCape. This is already being done in the City of Cape Town and has now expanded to other provinces.

9. MANAGING RISK

It is important that municipalities manage and plan for any risk within their jurisdiction that could impact on a S@S system. These could include plans for:

- loss of equipment and/or facilities
- downing of tools by staff
- low participation rates
- managing informal waste pickers
- vandalism

10. AWARENESS AND COMMUNICATION

A public awareness and communication campaign is essential to support the implementation of S@S in a municipality. Prior to rolling out a S@S programme, such a campaign should research information about residents, and what their barriers and incentives to participate are. It should also identify communication messages, materials and media that that will work best to reach the residents. A communication strategy may consist of several steps, as outlined in Figure 20 below.

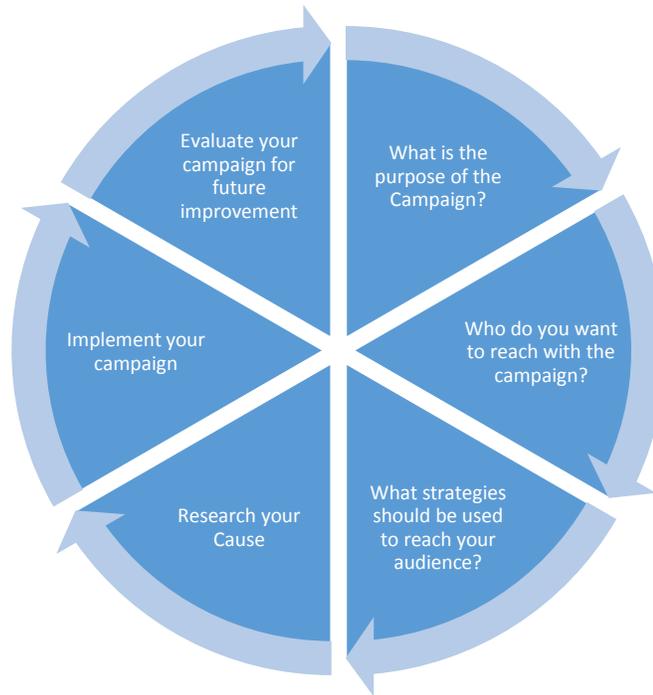


Figure 20: Communication Strategy Steps (DEA&DP, 2017).

Figure 20 summarises steps to be considered when developing a communication strategy (for more information on the steps see Annexure B). A communication strategy clarifies who the target audience is, what media the audience is best reached through, and what information about the whys and hows of taking action to recycle at home will be most useful and effective.

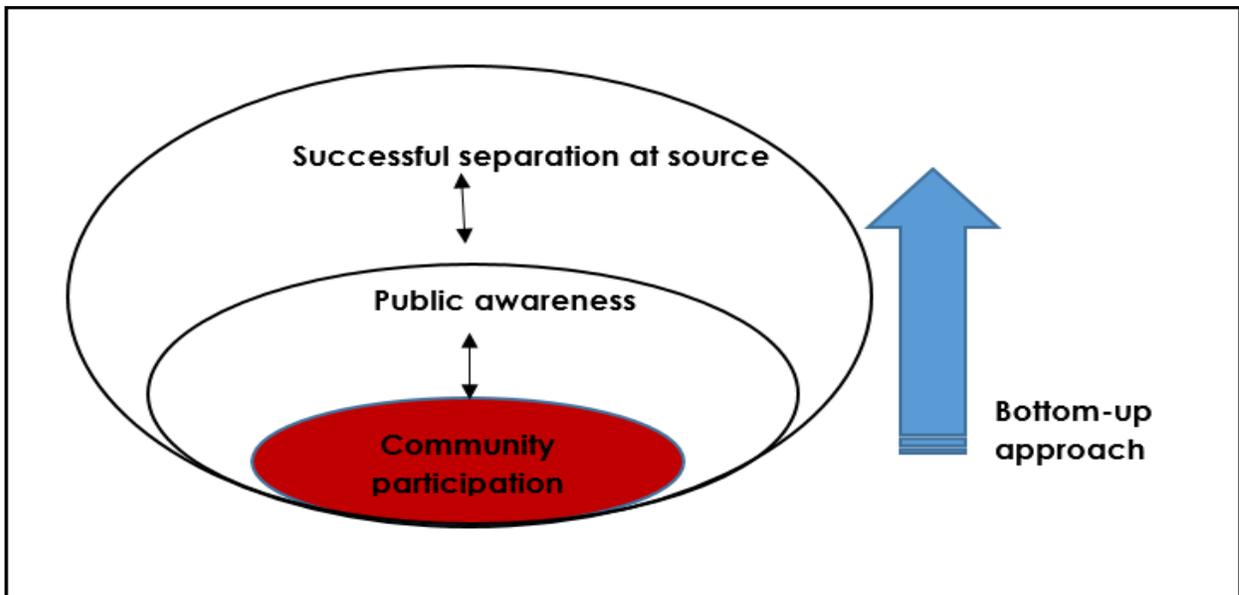


Figure 21: S@S community buy-in

Early community support and buy-in for a S@S programme will assist its launch. Through ward committee or public meetings, residents can share their views about the project and explain what works for them. This will increase their motivation to give S@S projects the voluntary support and participation that is key to S@S systems' success.

10.1. EXAMPLES OF WASTE AWARENESS INITIATIVES

10.1.1. BEHAVIOUR AND S@S

As set out in their article 'Considering behaviour towards sustainable Source Separation' (Rousta, Bolton & Dahlen, 2016) increasing participation rates are a major challenge in S@S programmes. Sweden has been operating S@S since the early 1990s with different collection models and the recovery of recycling material at source has more than doubled since then.

A procedure called recycling behaviour transition (RBT) was designed as part of their waste management system, which aims to continually improve and increase household separation participation.

The system consists of:

- evaluating current sorting behaviour
- identifying appropriate interventions
- implementing the interventions
- assessing the quantitative effect of the interventions

Other frameworks were developed to explain how different factors affect recycling behaviour. A motivation-ability-opportunity-behaviour model indicates that motivation is necessary but not sufficient for environmentally friendly behaviour – ability and the opportunity to behave in the desired way are also required.

Situational factors such as convenience and easy access to recycling stations are further opportunities to improve and increase source separation of household waste. It is vital to both understand households' past experiences and habits of sorting, and to ensure that households have the ability and knowledge of why and how to sort waste, if a S@S system is going to attract and retain sustainable levels of participation.

10.1.2. RECYCLING BEHAVIOUR CHANGE: IT'S A PROCESS

Experiences with the City of Cape Town's Think Twice programmes in designing campaigns for middle and upper income suburbs led GreenEdge Communication's Hugh Tyrrell (Tyrrell, 2019) to develop a model for community-based pro-recycling behaviour communications. It is based on the premise that behaviour change is a complex process over time that differs according to personality type.

In addition, awareness, information and education are essential but not sufficient to influence the behaviour change of people around separating waste at source. Ongoing feedback and building a 'success narrative' are also key factors.

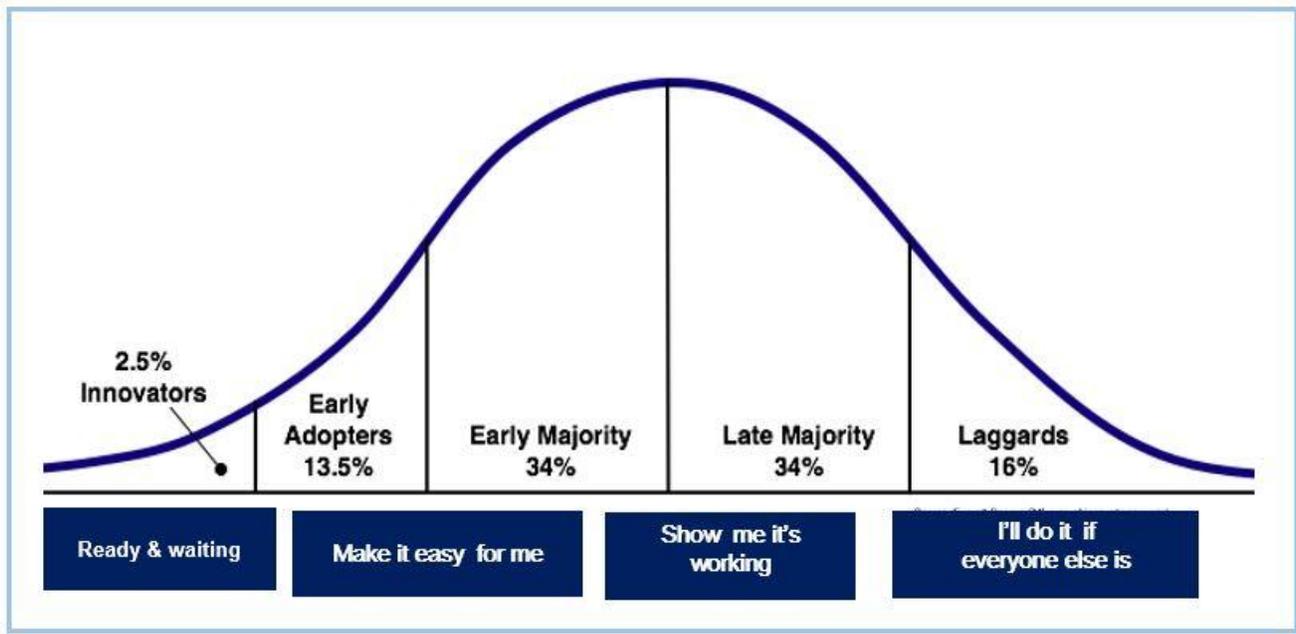


Figure 22: Community Participation Process in Recycling Over Time (Hugh Tyrrell/GreenEdge.co.za).

The diagram above follows the social diffusion of technology adoption curve and demonstrates the behaviour of groups of people towards recycling over time, depending on their personality type. Innovators and early adopters are ready and open to change and will take on the desired behaviour first. The early majority will adopt it if the system is made simple and convenient for them to use. The late majority need positive feedback that the system is working, for them to join in. Laggards change their behaviour if they feel socially marginalised after seeing that the rest of their community is participating.

This shows the importance of sequencing the communications messages in local media according to the process phase. Convenience – e.g. free bags and weekly collections at the doorstep – is key, as is building a story of success by regularly reporting back to the community on progress, so that they see the positive impact of their voluntary time and energy in making the system work. The end aim of communications should be the

response from the community about separating at source that: "It's what we do around here." Recycling has become the social norm.

10.2. SWOP SHOPS AS PLATFORMS FOR WASTE AWARENESS

In lower income and informal communities, swap shops can be effective platforms to communicate the value of recyclable waste and instil recycling practices. This can be seen as a social behaviour change strategy that is incentive-based.

People can separate their recyclable waste at home or find it alongside roads and take it to swap shops to exchange for useful goods such as food, clothing, toiletries, school stationery etc. The municipality can support this together with community, non-profit or faith-based organisations who manage the initiative.

Information should be shared with the neighbouring community before the project starts – about how it works and what it offers. Word soon spreads that items that had previously been thrown away as worthless can now be collected and exchanged for valuable goods.

Swap shops can be set up various ways. Visit the original Hermanus swap shop website for full details on how to set up and run them visit www.recycle-swap-shop.co.za. At a suitable location on a particular day and time, community members bring bags of separated recyclables such as plastic, paper, cans and glass to the shop (which can for example, be a mobile trailer or refurbished shipping container). There these are weighed and exchanged for a voucher/card based on the value by weight of the recyclables. The voucher/card can then be swapped for home/school goods at the swap shop, or even through a local supermarket.

One key aim of swap shops is to introduce young people to recycling at an early age so they grow up practicing recycling as second nature, and give them the knowledge that used materials have value as secondary materials in the recycling economy.

Primary and high schools in the community are good partners to help market swap shop projects. With children motivated to recycle, they not only learn to practice recycling and earn for themselves, but can also be strong influencers in their family's decision to get involved in S@S, turning around negative perceptions of waste.

11. TENDER DOCUMENTS

Municipalities may use the services of contractors to ensure the effective management of S@S systems. Clear specifications for contractors must be presented by the municipality when tendering for the services. The specifications should clearly include the aims of the service; the scope of work needed for the management of waste, infrastructure, equipment, and other resource requirements on site; payment and invoicing methodologies; operating times; staffing needs and compliances with regard to the operational needs of facilities. Communications, marketing and publicity is often also brought into the contractor's specifications and can be sub-contracted out to a specialist.

The tender specifications must set out the requirements for day-to-day on-site operations, weekly collections, site and equipment maintenance, requirements for marketing methodologies, and accreditation requirements. Below are some examples of specifications to include in tender documents:

Tender Contract
<u>Definitions</u>
Clearly provide definitions of important terms used in the tender to minimise confusion over meanings.
<u>Objective of the contract</u>
<ul style="list-style-type: none"> • Include the intention of the municipality, the current situation, the overall objective e.g. diverting recyclable waste from being disposed of in a landfill

- and creating socio-economic benefits through employment creation.
- Describe clearly the minimum output targets of existing and required infrastructure and services and what calculations were made to achieve this output.
- Describe briefly the municipality's IWM Plan and IDP, the municipality's IWM Policy if it has one, its Waste Minimisation Strategy and any legal requirements in terms of the National Environmental Management: Waste Act of 2009 (NEM:WA).

Scope of Works

Ensure that the scope of works specify what is required from the contractor and that the specifications allow the contractor to demonstrate without ambiguity, their ability to do the work required.

Important items (not limited to these) to consider:

- Collections – clearly describe what is to be collected and from where, e.g. domestic households, the socio-economic status of the collection area/s, whether commercial and industrial areas are included. Clarify if the project is the continuation of an existing project or a new one.
- Infrastructure provision – describe what infrastructure the contractor is to provide and where e.g. a chipper for green waste materials. In addition, if owned or rented by the municipality, how its operation and maintenance will be managed.
- Transport – describe what needs to be transported where, how often, with what vehicles, how these will be staffed.
- Operations and maintenance – describe what will be operated and need maintenance e.g. MRF, who owns it, its location, plant and running equipment.
- Marketing and publicity – define what needs to be created, for example, a comprehensive awareness, marketing and publicity campaign to educate residents about S@S to ensure that participation rates are maximised. There may be targets set and incentives or penalties if these are not reached.
- Commencement and period of contract – clearly highlight the starting date and the duration of the contract in months e.g. 36 months.

<u>Deliverables</u>
<ul style="list-style-type: none"> • Specifications must specify deliverables for facilities and the various aspects of the facility relating to recycling. • A maintenance schedule must accompany the contract outlining maintenance needs. • If a contractor is required to do collections then the specifications must outline what the municipality expects from the contractor, where it needs to collect, the number of collection points per area etc.
<u>Waste Quantities and Reporting</u>
<ul style="list-style-type: none"> • Recyclable waste quantities from the S@S programme must be monitored and reported on. • Reporting requirements on the management and off-sale of recyclables must be clear. • A schedule must outline requirements for the provision of records, data and ongoing information.
<u>Contractor Obligations</u>
<p>The contractor shall prepare and submit to the municipality a business plan in respect of the provision of the services to be provided:</p> <ul style="list-style-type: none"> • Clear and detailed operational needs and requirements. • All aspects of collection including sourcing of local staff, vehicle requirements, how spillages should be dealt with, managing service complaints and enquiries. • Awareness, marketing and publicity campaign plan. • Management plans for facilities and equipment. • Service standards, conditions and service level agreements. • Invoicing and payment methods must be defined.
<u>Employer's Obligations</u>
<p>This section provides clarity about what the municipality's obligations, as the contractor's employer, are.</p>
<u>Pricing Information</u>
<p>The specifications must indicate where the tenderer should allow for:</p> <ul style="list-style-type: none"> • operating of infrastructure e.g. MRF • servicing and maintenance of buildings, fixed plant and equipment • provision of records, data and Information to the municipality • collection service • awareness, marketing and publicity campaign

Figure 23: Tender document template.

An on-site (often compulsory) briefing is recommended to ensure prospective contractors have an opportunity to ask questions and clarify uncertainties in the tender.

12. PRACTICAL STEPS TO S@S

If you have decided to embark on a S@S system within your municipality, here is an easy schematic to plan the way forward.

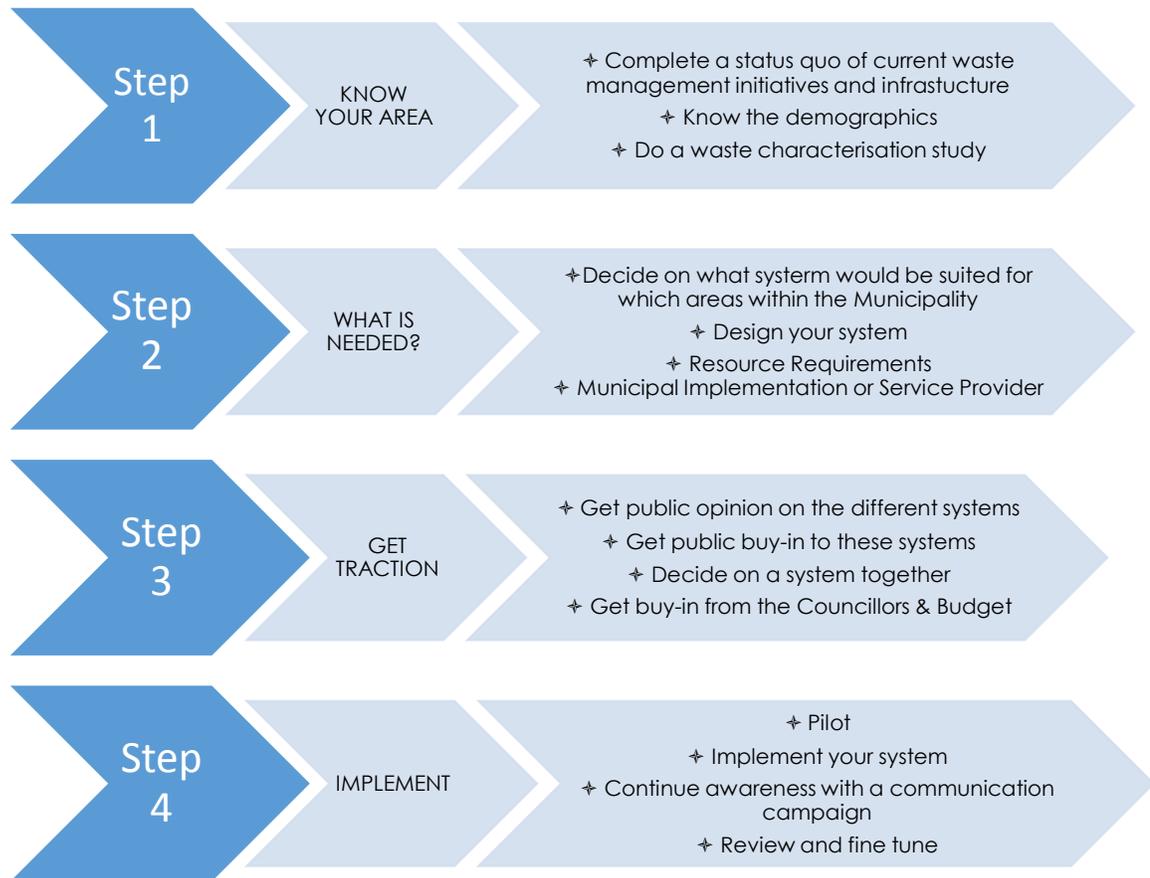


Figure 24: Practical Steps to S@S.

12.1. STEP 1: KNOW YOUR AREA

It is important that municipal officials embarking on the S@S process first make sure that they are knowledgeable about their current context, which includes waste practices,

demographics, waste infrastructure and the distribution of residential, commercial and industrial areas.

With this information, it will be easier for the officials to see what is needed and where, as the most viable waste management options differ depending on numerous factors, as has been highlighted elsewhere in this document.

12.1.1. Status Quo of Waste Management

The status of waste management within the municipality must be assessed, which includes the current infrastructure. This information will highlight shortcomings in the current system, areas that can be improved and areas that are working well. These steps will identify where more infrastructure and human resources might be needed or expanded. It is also useful to look into information on illegal dumping within the municipality as this can reveal areas where dumping is prevalent and what waste types are being dumped. A departmental study of the Municipal Integrated Waste Management Infrastructure in 2016 looked at the following:

- compliance with existing waste management licences
- determining additional infrastructure required to achieve the diversion from landfill target of 20% by 2019
- determining additional infrastructure required to remain compliant up to 2030

This document is available for municipalities on request from the Western Cape government Waste Directorate.

12.1.2. Demographics

The demographics of an area are important, as these will affect systems that need to be implemented and their success. Remember, although a system may work in one area within a municipality it may not work in another area with a similar demographic due to

different economic and social factors. It is recommended that pilots be conducted before a new system is entirely adopted, which will be discussed further below.

A valuable resource could be <https://wazimap.co.za/> that shows the 2016 Community Survey data up to ward level. This can give you a lot of additional information about your area that could be useful.

Understanding the demographics also requires knowing where the residential, commercial and industrial areas are, and understanding their impact on waste management, as they require different systems and collection methods. For example, restaurants create a lot of food waste while residential areas can be further divided into low, medium and high income areas.

12.1.3. Waste Characterisation

Waste stream analysis involves a systematic approach to obtaining and analysing data on one or more waste streams. This provides an estimate of solid waste quantities, types and composition, which can be done for household waste, commercial waste, industrial waste and waste entering the landfill.

This information is valuable and can inform whether a two bag or three bag system should be implemented and what waste types within the stream should be targeted. The waste stream analysis will also indicate expected amounts of the different waste types, which will help with designing appropriate collection and sorting infrastructure and systems.

12.2. STEP 2: WHAT IS NEEDED?

Now that you understand the existing waste systems in your area, the demographics and the estimated types and quantities produced, you can start designing your S@S system and plan the resources that are needed.

12.2.1. Decide on a S@S system

As mentioned earlier in this document there are different systems that can be applied:

- **Split bag:** Different waste streams are placed in different bags or containers according to waste types or a mixture of waste types in a bag. Often it is simply a two bag, wet waste/dry mixed recyclables system.
- **Buy-Back Centres:** Generally fixed centres where clean, sorted recyclables are purchased.
- **Swop Shops:** Most suitable for use for S@S in low income and informal communities.
- **PPRs:** Separate bins for different materials, especially glass, are placed in public areas to encourage recycling.
- **Events:** Similar to public place recycling but bins are placed at event venues to promote and encourage recycling.
- **Waste Drop-offs:** These sites allow businesses and the public to drop off recyclables and other types of waste for free, or a fee.
- **MRFS:** Facilities where waste is received and sorted into different waste streams by an automated or manual system, or both.

All of these systems have different strengths and weaknesses and work better in different socio-economic circumstances. Split bag systems are suited to higher income areas. Swop shops are best in informal and lower income areas. A drop-off is ideally located where it is convenient for higher income communities to drop off recyclable materials without being paid for them.

Buy-back centres should be located close to commercial/industrial areas where a good percentage of recyclables from packaging are in the waste stream. They also work well

if they are accessible to lower income communities as they create economic opportunities for the exchange of recyclables.

The timing of collections must be also be considered. This can be weekly for recyclables, green waste or general refuse. Fortnightly collection of recyclables can save the contractor or municipality money but residents must know how and when to fit in.

12.2.2. Design Your System and Resource Requirements

There are many ways to plan the implementation of a S@S programme, and its requirements will depend on local conditions. The following will need to be considered for both larger and smaller municipalities in this example:

Table 10: Factors in designing a S@S system.

STEPS TO CONSIDER		IDEAS AND EXAMPLES	COST PER ANNUM
1. SELECT SUBURBS/AREAS		No "one size fits all" Suburbs and potential industrial/commercial areas	No Cost
2. ESTABLISH NUMBER OF SERVICE POINTS		00,000 service points	No cost

<p>3. ESTABLISH DISTANCE FROM FACILITIES</p>		<p>Collection from service points to a distant facility</p> <p>Instead of taking recyclables to a distant facility, partnerships can be established with recyclers within the community who can take the recyclables (so shorter distance to transport)</p> <p>Establish central collection centres and then transport to distant facilities</p>	<p>00000 Km</p>
<p>4. TYPE OF VEHICLES REQUIRED</p>		<p>The potential use of existing vehicles</p> <p>Cage trucks (various tonnage)</p> <p>Bakkies + cage trailer combinations</p>	<p>4 x 4 Ton Cage Trucks = R000000.00</p> <p>3 x 1 Ton Bakkie + 1.8 Ton Cage Trailer Combination = R000000.00</p> <p>1 Back-up vehicle = R000000.00</p>
<p>5. NO. OF COLLECTION ROUNDS REQUIRED PER AREA</p>		<p>Use of same day collection: current municipal refuse collection schedule</p> <p>Different days by the municipality or contractor</p> <p>Consider using the services of waste pickers</p> <p>Consider fortnightly collection as a cost saving option</p> <p>On collection day municipal and EPWP workers go door to door to collect bags and place them along a designated route where a municipal truck and team collects the bags as a cost saver</p>	<p>Once a week</p>

<p>6. FUEL CONSIDERATIONS</p>		<p>Volatile nature of the fuel price must be taken into consideration</p> <p>To estimate the fuel cost for a trip you must know:</p> <p>The trip distances</p> <p>The average per litre cost of fuel</p> <p>Vehicle's fuel consumption</p> <p>Divide the trip distance by 100</p> <p>Multiply the result of this by the fuel consumption</p> <p>Then multiply this figure by the cost of fuel/litre</p>	<p>R00000.00</p>
<p>7. STAFF REQUIREMENTS FOR COLLECTION SERVICES</p>		<p>Establish salary needs according to function e.g. manager, driver, assistant etc.</p>	<p>1 Manager = R000000.00</p> <p>8 Drivers = R00000.00</p> <p>8 assistants = R00000.00</p>
<p>8. STAFF REQUIREMENTS FOR MRF</p>		<p>Establish salary needs according to function e.g. manager, assistants (admin, housekeepers), sorters etc.</p>	<p>1 manager = R00000.00</p> <p>1 Admin officer = R0000.00</p> <p>2 Housekeepers = R0000.00</p> <p>10 Sorters = R00000.00</p>
<p>9. BAGS REQUIRED</p>		<p>Cost for a 40 Micron clear bag varies between R1.20 – R1.80 quality dependent</p> <p>Average weight in kg of a full clear bag could help indicate the potential tonnage per collection trip</p>	<p>e.g. R1.40 X 26297 service points = R36 815.8</p>
<p>10. COST OF CONTINUED MARKETING AND AWARENESS</p>		<p>Costs budgeted for marketing and awareness in the Saldanha Municipality is currently at R120 000.00 per year</p>	<p>R120 000.00</p>

<p>11. MONITORING OF PARTICIPATION RATE</p>		<p>To justify cost the participation rate must be high and maintained</p> <p>The participation rate is vital for the success of any separation at source programme</p> <p>Monitoring participation is essential</p>	<p>No cost</p>
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12.2.3. Municipal Implementation, Service Provider or Both?

A final consideration is whether the municipality will implement the system on its own or appoint a service provider to implement the system. This has been discussed throughout this guide. Within municipalities there has been consensus that most would appoint a service provider to sort the waste, run the MRF and/or collect the waste.

It is important to consider an extended contract as certain systems require a great deal of capital investment from contractors. Alternatively, municipalities can consider building the necessary infrastructure and leasing it to service providers.

When working with contractors it is important that the contract be written in a way that clarifies how the separation of waste will take place, as well as all other relevant details. Contracts would include awareness campaigns and specific targets that need to be met, as well as for example, penalties or incentives.

12.3. STEP 3: GET TRACTION

To get traction, it is important to obtain support from the local community and councillors. The community needs to agree to the proposed system, as they are key to making the system work. Councillor buy-in is also very important as they not only vote to determine budget allocations, but also can support the project through their interactions with their ward members.

12.3.1. Public Buy-In on the System

As mentioned previously it is important that residents are satisfied with the system and are willing to do their part to make it work. No system will be effective if there is no public buy-in. Public meetings or meetings with community associations, clubs, woman's groups etc. can be simple ways to achieve broad exposure with minimal effort. It is not only important that the public are made aware of the proposed system but also that their barriers and drivers to participation are heard and acted on. Be aware that public meetings require careful facilitation and sensitive mediation; otherwise they can degenerate into complaints sessions about municipal services in general.

12.3.2. Political Will and Budget

It is important that the costs of any system be estimated and compared to the current cost of disposal. Although S@S systems are more expensive than standard waste disposal the following longer term savings also need to be taken into account:

- how much airspace is left at the current landfill site
- how much airspace will the S@S system save over time through waste diversion
- how much will it cost to construct a new cell with a liner, if space is available
- is there land available close to municipality for a new site
- how much will it cost to licence a new site
- how long will it take to licence a new site, taking into consideration that most waste management licences are currently appealed and challenged in court

All these factors should be considered as future costs are probably much higher than the current costs. The various costs of setting up new landfill sites means that existing landfill airspace is very valuable, and it should be conserved as much as possible. This is a powerful reason to get a S@S system running as soon as possible.

12.4 STEP 4: IMPLEMENT

It is now time for you to implement your chosen system. Often the call for a S@S system will come from councillors whose constituency residents are advocating for it. If this is not the case, it may be advisable that a S@S system first be piloted in a suburb to fine-tune the implementation of a rollout.

12.4.1. Continued awareness

It is essential to start and maintain awareness and communications campaigns at a high level within your municipality. This can take many forms:

- delivering recycling starter kits to residents with bags, leaflets and fridge magnets
- publicising the launch in local media
- providing full information on the municipality's website about why and how to participate
- sending out newsletters with rates accounts
- working with school recycling programmes and waste related puppet shows
- putting out ongoing articles in local media with amounts of recyclables collected in easily understood terms (e.g. x amount of rugby fields, x amount of trees saved)
- liaising with homeowners' associations, neighbourhood watches and estate and rental agencies
- holding events with outdoor recycling
- displaying banners and pole posters promoting responsible waste management and S@S

Continuous feedback on progress will keep residents interested and active in the supporting the S@S system, and will encourage S@S to become a regular household routine.

12.4.2. Review the System

Once the system has been implemented, it is important to review and assess it to make sure it is working as intended, and that lessons are learnt. As circumstances change, or new technology or systems develop, these can be brought into the system to address, update and improve its efficiency.

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ANNEXURE A: MUNICIPAL QUESTIONNAIRE



Department of Environmental Affairs and Development Planning
Directorate: Waste Management

Municipal Separation of Waste @ Source Questionnaire:

• Note to all interviewers: Please document all communication!

The Waste Manager

1) Is there separation @ source taking place in the Municipality? (Yes/No) if no, explain why not.

2) What separation @ Source systems or programmes is currently in place within the municipality?

NAME OF SYSTEM e.g. split bag system, drop-offs, waste exchange systems etc.	HOW IT WORKS i.e. explains how the system is implemented

3) In what socio economic areas are these systems implemented and why? E.g. Informal, lower income, higher income, commercial and industrial.

4) Does the separation @ source system currently cover the entire municipality? (Yes/No)
If no, why only parts?

* (please indicate the % of households serviced by separation @ source system)

5) Does your current separation @ source systems and programmes form part of a partnership or is it managed by a contractor? (Yes/No)
If yes, how does the partnership/contract work? If no, why?

6) Which Department/Staff are involved in the separation of waste @ Source projects?

How many staff is needed?

Are you using EPIP, EWPW, CDW?

7) What are the role of waste pickers, if any? Explain the relationship between waste pickers and the Municipality.

Are they a hindrance?

Are you considering including waste pickers, and in which way?

8) Split bag systems: What are the participation rates of households?



9) Split bag systems: Is it currently a pilot or has it been fully rolled out?

10) What are the cost to the municipality to run their separation of waste @ source projects (per household, if available)?

11) What are the cost to the municipality for implementing other separation @ source systems e.g. buy back centre, drop-off etc. (per household, if available)?

12) What are the cost of disposal to municipality without the use of a split bag system? (How is this calculated)



13) Would regionalisation have an impact on the consideration of a separation at source system within the Municipality? (Explain)

14) What are the challenges?

15) Status Quo of pilot projects within the municipality. Have they become permanent? If not, why did you stop? E.g. too expensive, participation rate inadequate. (Please include a history of the project)



ANNEXURE B: STEPS IN CONDUCTING A WASTE AWARENESS STRATEGY

The following steps will help guide you to a successful campaign:

- Step one:** Establish Overall Purpose, Objectives and Outcome
- Step two:** Collect Initial Information
- Step three:** Identify the Audience
- Step four:** Decide on Your Key Message
- Step five:** Select the Action/Activities
- Step six:** Select the Communication Tools
- Step seven:** Develop a Plan
- Step eight:** Evaluate and Celebrate



Establish Overall Purpose, Objectives, & Outcomes

When planning to promote a campaign, it's helpful to begin by clarifying the overall purpose for the campaign. What is the issue or the reason for the campaign? Why do you want to raise public awareness?

If this is a general plan for the year, the purposes will usually be quite broad. A more targeted campaign might focus on particular individuals and/or promote a particular activity or event and/or send a particular message.

Step One:

Ask yourself

EXAMPLE:

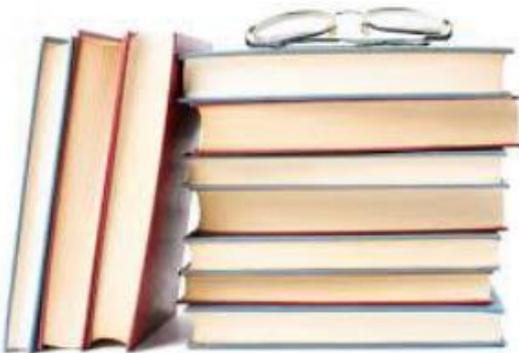
(It may be helpful to find answers to some or all of these questions at this time.)

What do we want people to do or demonstrate as a result of our campaign?

- Understand why recycling is important?
- Get excited about recycling or waste minimisation and pass this on to others
- Start recycling, separating at source or reporting illegal dumping
- Are the numbers of household separating waste declining lately? _____
- Other:

It can also be helpful to identify smaller campaign objectives at this time. This helps you break down the larger task into more manageable chunks.

And finally, imagine what the end result(s) will be. What would change because of the campaign? Write two to five statements that would describe those changes.



Step Three: Identify the Audience

Is this a general campaign or are there particular people you want to reach? Public awareness campaigns are generally, most successful if they are designed with a specific audience in mind. Sometimes these people will be identified by their membership in a particular demographic group and sometimes by special interests.

When starting an awareness campaign, it is important to be clear about the target audience(s) so that the activities and communication tools can be tailored to particular group(s). For example, many websites include special sections with headings like: For Parents, For Educators, or For Children. These sections of the website then use appropriate approaches and language that would appeal to that group.

Ask yourself

(It may be helpful to find answers to some or all of these questions at this time.)

- Who do you want to reach with this campaign?

Simple demographics:

- Businesses
- Residential such as high, medium and low income
- Informal Settlements
- Farms
- Commercial
- Industries
- Factories
- Other: _____

People with special interests:

Examples might be: Other departments within Government, Industries within the Waste Sector, Recyclers, NGOs, Community Committees, Universities or clubs etc.



Step Four:

Decide on Your Key Message

For an effective public awareness campaigns identify one or two key messages that they want to communicate to the audience(s) they've selected. Once a group decides on the overall purpose of the campaign and identifies the audience(s) they wish to reach, the group can design a campaign around a key message (which often acts as a memorable slogan).

There are a variety of sources for key messages. These will, of course, differ depending on the audience.

Ask yourself

(It may be helpful to find answers to some or all of these questions at this time.)

- Do you want to inform, influence, or persuade your audience?
- What tone do you want to take? (Eg. Serious, breezy, humourous, etc.)
- What do you want people to remember?
- What emotions do you want people to feel?
- You plan to send a twitter message (or a telegram) of seven words or less describing what you want to say to your audience. What would you say?

Step Five:

Select the Communication Tools

There are a variety of communication tools that can help get your messages across. Depending on the audience you are hoping to reach, one or more of these tools may be most suitable.

The following lists identify:

General communications tools, Selected social media tools, and Communication tools available in your municipality

Ask yourself

(It may be helpful to find answers to some or all of these questions at this time.)

- Which tools are most likely to appeal to your target audience?
- Which tools offer the best result for a reasonable amount of money?
- Which tools can you afford - in both time and money?
- Do you have the expertise so that the product looks reasonably professional? (If not, can you afford to hire someone else?)

Step Six: Select the Actions / Activities

Review your overall purpose and objectives, the audience(s) you want to reach, and the key message(s) you want to get across. What actions or activities would make sense? Take time first to brainstorm lots of ideas. Consider promotions campaigns you have encountered or heard about. What components did you think were effective or interesting? You may find it helpful to review the lists of communication tools in Appendix A when you are looking for ideas.

Once you have a list of ideas, consider which:

- Fit best with the audience(s) you've chosen
- Support the message you've chosen
- Can be completed within the budget you've set
- Excite and motivate your staff and volunteers
- Can be implemented effectively given the expertise of your staff, volunteers, and partners.

Step Seven:

Now it's time to decide who will do what and when. Break the project down into small easily doable tasks and list everything that will be required. It's often helpful to be as specific as you can and to check that the people who are named are willing and able to do their part within the time frame.

Don't forget to include plans for how you will evaluate your promotional efforts.

Step Eight: Implement, Evaluate and Celebrate

Now is the time to evaluate and celebrate your efforts! You will already have plans in place for the evaluation. If possible, collect the information you need as soon as possible while the campaign is still fresh.

Now is the time to evaluate and celebrate your efforts! You will already have plans in place for the evaluation. If

Develop a Plan

Ask yourself

(It may be helpful to find answers to some or all of these questions at this time.)

- What actions would help communicate our message best?
- What would appeal to the people we want to reach?
- What would excite and motivate our staff and volunteers?
- What would be the best use of our money and people?

Ask yourself

possible, collect the information you need as soon as possible while the campaign is still fresh

(It may be helpful to find answers to some or all of these questions at this time.)

- How did you do?
- Did we meet our objectives?
- What could we do next time to make it even better?
- Who do we need to thank?

ANNEXURE C: SUMMARY OF S@S SYSTEMS IN THE WESTERN CAPE

Municipality	Different S@S systems options	Costs
City of Cape Town		A household in Cape Town receives 4.33 lifts per month at an estimated actual cost of R66.52 per month
Theewaterskloof:	<p>Split bag system:</p> <ul style="list-style-type: none"> • Only rolled out to 4% of households • Municipality supplies bags • 32% participating rate in Villiersdorp pilot • Employ contractor to hand out and collects bags • Contractor employs local waste pickers to collect bags • Only implemented in higher/middle income areas • Collection happens on refuse collection day • Recyclables are taken to transfer station • The recycler employs sorters at the transfer station for sorting and baling of recyclables • Municipality does all communication/awareness with the residence 	<p>R10.09/household/month</p> <p>The municipality is constructing transfer stations with MRF at Caledon and RSE at respective cost of R18 126 571 and R14 667 393</p> <p>This works out to R1 900.39 for the entire 3 years that the project would be implemented</p> <p>Per year it would work out to R633.46 and per month R52.79. Current cost of disposal to municipality without the use of a split bag system: R335.77/ton (transportation and disposal cost)</p>
Breede River Valley:	<p>Split bag system/swop shop:</p> <ul style="list-style-type: none"> • It is a permanent programme • Implemented in Worcester and Rawsonville • 10 out of 12 areas have a split bag system 	<p>R80 000 for bags, public relations and awareness</p> <p>Cost for the S@S programme is not available (The aim is to create jobs and assist</p>

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • Approximately 10% of formal households • Implemented in higher income areas (cleaner and more recyclables/willingness to recycle) • A swop shop is used in the informal area of Avian Park • Municipality distributes clear bags with own transport and staff • System uses one truck and 6 workers per areas (permanent driver/6 EPWP workers) • Municipality exchanges one free bag for each filled bag placed for collection • Collection takes place on collection day three times a week • EPWP workers go door to door to collect bags • Bags are placed at a collection point along a designated route • Municipal truck and team collect the bags from collection point • Recyclables are taken to three partners (organisations) that use recyclables to generate income. • Municipality does its own public relations work • Municipality provides training to staff • Participation rate between 60 and 70% • Waste pickers formed own recycling company and recyclables are also 	<p>recycling businesses to become sustainable)</p>

Municipality	Different S@S systems options	Costs
	delivered to them for selling to companies in Cape Town.	
Knysna:	<p>Split Bag system/swop shops:</p> <ul style="list-style-type: none"> • Three bag system • Does not cover entire municipality • Within the Greater Knysna area, 30 – 40% participation. • A black bag for general waste, clear bag for recycling and blue bag for garden waste • Contractor appointed for the collection and transport of recyclables from businesses • The municipality collects and transports recyclables to the Recycling Facility • Implemented in formal households, businesses, industrial area, some farms, bosbou dorpias • Five active swop shops (Rheenandal, Seven Passes, Freshstart (Smutsville), Fraaisig School – Hornlee, and Love Life Centre) • Department and staff involvement: <ul style="list-style-type: none"> ○ Environmental Management Department ○ Eden District Municipality – Municipal Health and Waste Section ○ SanParks ○ Working for the Coast ○ Rotary Clubs (Schools) ○ BioWise 	<p>Falls within the municipality's operational budget</p> <p>Currently no extra cost</p> <p>The premises of the recycling facility are rented from the Municipality by the Service Provider</p> <p>A Tender was advertised for a 1-year contract with the option of renewal for further 2 years</p> <p>R 600,000.00</p>

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> ○ WESSA ○ Youth Desk (Knysna Municipality) ○ CWP's and CDW's 	
Beaufort West	<p>Split bag system:</p> <ul style="list-style-type: none"> • Blue bag • Does not cover the entire municipality • It is a pilot project • Implemented in higher income areas e.g. Hospital Hill & Lande and parts of the town • 1 568 Households • The programme is an informal partnership between the municipality and the recycling company • +- 6 staff members in the programme • Bags are collected by the municipality • Bags are taken to the Beaufort West Recycling Depot (Private) • High participation rate (no figures available) • Nearby farms and businesses participate 	The municipality does not pay the recycler but pays for the bags and rents the premises from Transnet
Witzenberg	<p>Split bag system:</p> <ul style="list-style-type: none"> • Black (refuse) and green (garden waste) bags • Bags are collected on different days according to the collection schedule. • It is implemented in all areas of Witzenberg (Ceres, PA Hamlet, Bella Vista, Wolseley and Tulbagh) which are divided into lower income and higher income 	No costing available
Saldanha	Split bag system:	

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • A two bag recycling system • Provided a starter kit (clear bags, leaflet, fridge magnet) • Each bag collected is exchanged for new bag • 2 new bags will be provided bi-annually to all households as a promotion drive • Aimed at formal housing areas (high income, and lower income) and commercial premises. • 26 297 collection points • Does not cover the entire municipality • Implemented in phases • Currently in its second phase of the project • All towns in Saldanha Bay Municipality excluding (for third phase) Saldanha and St. Helena Bay, due to a delay in the tender process for the extension of the MRF facility to accommodate the third phase of the project. • Programme created 46 employment opportunities • 65% of all formal areas within SBM receive the service • Clear bags are collected on collection day • Average weight of a clear bag of recyclables is 3.6 Kg • The project is managed by a contractor • 32% participation rate average across all towns 	<p>R120 000 Marketing and Awareness costs</p> <p>Cost of bags: a 40Micron clear bag vary between R1.20 and R1.80 quality dependent</p> <p>3 x 4 Ton Cage Trucks 3 x 1 x 1 Ton Bakkie + 1.8 Ton cage Trailer combination</p> <p>1 x Back-up vehicle</p>

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • During holiday season participation rates in some areas rises to 80% • Fully rolled out (permanent) • Contracted a marketing and awareness specialist • The municipality's residential recycling project won the Silver award at the recent Eco-Logic National Environmental Awards 	
Hessequa	<p>Split bag system/Drop-offs:</p> <ul style="list-style-type: none"> • Green and domestic waste are placed in different coloured bags and collected by municipality • The recycling system is managed by a private contractor • The contractor collects recyclable waste from houses and businesses premises • Rural areas make use of drop-offs • Participation rate high: 40% • The contractor has some environmental education at school and at community halls for residents. 	Recycling budget – R880 000 per annum
Drakenstein	<p>Split bag system/ Drop-offs/ Swop shops:</p> <ul style="list-style-type: none"> • Municipality is currently managing the S@S and operating the programme • Still managed as a pilot (current infrastructure and processes need to be improved) • Municipality provides clear bags to residents 	2015/2016 cost was R33,39 per household per month if taking only participating households in consideration

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • Not implemented in the entire municipality (Due to cost implications and the MRF not able to accommodate the entire municipality) • Implemented in higher and middle-income areas (Better yield of recyclables and willingness to participate in the programme) • Average participation rate in the current areas 15 – 20%, with the highest participation of 49% in a specific collection area. This is influenced by time of year, presence of waste pickers, etc. • All new residential developments are required to participate in the programme • Collected in a separate truck (Currently collection of recyclables is synchronised with normal refuse collection and in the same beats – the municipality experienced this as more consumer friendly) • Recyclables are transported to the MRF for sorting and baling • Drop-off's are used in rural areas • The municipality has a paper recycling project at municipal buildings • Swop shops in low income areas. An initiative between municipality and NGO (recyclable waste exchanged for non-perishable goods, educational toys, clothes, sporting equipment etc. Municipality is the 	

Municipality	Different S@S systems options	Costs
	<p>facilitator and assists with transport in some cases)</p> <ul style="list-style-type: none"> • Current staff needs: <ul style="list-style-type: none"> ○ 1 x Waste minimisation officer (permanent) ○ 25 x general workers for sorting in MRF ○ 8 X EPWP beneficiaries ○ 8 x general workers for collection of recyclables 	
Overstrand	<p>Split-bag system/Drop-offs/Buy-back centre/Composting:</p> <ul style="list-style-type: none"> • A two bag system run by two contractors for separation at source in different regions. • Fully rolled out since 2002 • Pamphlets dropped off at holiday houses on 15th Dec • Implemented in high, middle class and commercial and industrial areas • Participation across the municipality – 73% • 50% of houses in holiday towns are holiday houses which are empty for large parts of the year • Lower income areas don't have split bag system. Swop shops and buy-back centre is available. A partnership as the municipality provide transport • The municipality collects bags and takes them to the MRF • Contractor manages the processing of the recyclables at MRF 	<p>The cost to the municipality to run their S@S projects:</p> <p>R2.65 per household per month</p> <p>Cost to the municipality for implementing other S@S systems e.g. buy-back centre, drop-off etc.:</p> <p>R8.58 per household per month</p> <p>R132.00 per ton; R7 million per year (Approx.)</p>

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • Due to the seasonality of waste management in the municipality, the municipality uses students to assist during the high season • Green waste is managed by contractor • Collection staff put out black and clear bags • Households place clear bags on street corners for collection • The MRF is managed in a partnership with contractor • The municipality gives support to the Swop Shops • The municipality provides drop-offs in all areas throughout the municipality • < 1 tonne of green waste can be dropped off free of charge • A contractor and a sub-contractor manages green waste throughout the municipality by chipping all green waste and transporting it to a composting facility • 600 tons of green waste are chipped p.m. • Most people in the high income areas make use of garden services • The buy-back Centre is very successful. Privately run and services both high and low income and informal areas due its location • It accepts a variety of recyclables from lead batteries, pipes, sink plats old cars, furniture etc. 	

Municipality	Different S@S systems options	Costs
	<ul style="list-style-type: none"> • Serves as a second hand shop. (Masikane, Swelihle, Stanford, Pearly Beach) • Swop shop and buy-back centres has been established in low income areas • The buy-back centre is run by the contractor Mon – Sat for their gain • Swop shops privately run mainly for children and women. Recyclables swapped for clothing, food, stationery, toys • Department of Community Services does collections and running of transfer stations • Department of Infrastructure and Planning manages all contracts, landfills and MRFs and oversees all administrations • The programme uses six vehicles/trucks. • The municipality does its own awareness 	

Note: Municipalities should encourage NGO's e.g. Rotary club and private individuals and entities to partner with swop shops. The main reason is municipalities cannot approach companies for supplies needed for swop shops. Municipality provides transport of recyclables from swop shops to recyclers and assists with awareness.