



Opportunities for value addition to selected Western Cape organic waste streams

Wastewater from agro-processing

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Wastewater from agri-processing

1. Goal statement

This document sets out the business opportunity for value addition from organic wastewater. This document forms the foundation for discussion with the intended final outcome of **business-matching, shared expertise and ideally (foreign) investment** in value add opportunities in South Africa.

2. Scope

The analysis is limited to the Western Cape of South Africa, but where there may be other regions with equal or greater potential, so links to source of information and potential business partners is also provided. Value addition of organic wastewater occurs at both municipal and industrial level, however, this document will only focus on the industrial level. Opportunities for value addition to municipal wastewater are typically difficult to access due to the complexity of the regulations pertaining to municipal responsibilities, procurement of services and public-private partnerships.

3. Current status of utilisation of resource

Resource recovery from wastewater is becoming increasingly understood and adopted in South Africa, especially by water-intensive industrial companies. Advanced treatment technologies are developing rapidly internationally, while increased competition and demand are providing more solutions at a cost that strengthens the business case. One of the main organic wastewater producers in the South Africa is the agro-processing sector (which includes food and beverages). Approximately 3 200 ML of milk is produced annually in South Africa (IFCN, 2015), whilst beer production is estimated to be 704 ML per annum (Brewers Association, 2013). Effluent discharge from the soft drink industry is estimated to be 120 ML per annum (WRC, 2015).

One of the main uses for agro-processing wastewater is for agricultural use. For example, 90% of winery effluent was disposed of through land application i.e. irrigation in 2006 (Mulidzi, 2006). Additional resource extraction from winery wastewater is primarily at research stage and a wide range of resources are under consideration including: gypsum, potassium, glycerol and germ oil as well as use of dried content as animal feed (Melamane, et al., 2007, p. 28).

Based on GreenCape's stakeholder interactions with industrial companies and technology providers, very few companies have implemented a value add solution and most manufacturers simply treat their effluent to municipal discharge or irrigation standards. Technology suppliers estimate that **only 1% of companies with organic wastewaters have implemented a value add solution** in the Western Cape.

The most common value add utilisation of organic wastewater is for the generation of biogas, but it has also been used to recover other useful organic products such as whey, white starch and composting material (see sections on existing solutions and possible business partners for details). In the case of biogas, most of the biogas produced is used onsite to generate energy that can be used in other parts of the process such as heating boilers.

The main drivers are:

- Treatment of organic effluent to compliance standards
- Cost savings
- Corporate social responsibility

The main barriers include:

- A lack of awareness about the importance and business benefits of value addition and resource recovery
- Capital requirements
- Technical capacity

A particular barrier unique to the Western Cape is that **most industrial companies produce effluent less than 0.5 ML/D** and some of the technology providers have indicated that to be able to have a good business case, industrial companies should be producing more than 1ML/D with the minimum required chemical oxygen demand concentration depending on the technology to be implemented.

4. What is required to unlock this opportunity for utilisation/transformation

The following are considered key to unlocking the opportunity for wastewater utilisation:

- Assistance in securing funding for capital investment
- Education on opportunities for value addition to organic wastewater
- Connecting the industrial wastewater producers to the available technology providers
- Markets for the recovered resources.
- Aggregation to obtain economies of scale or viable small scale solutions

For the last, it would be also useful to facilitate some form of industrial symbiosis, where companies could collect their organic wastewater and bring this together before implementing a resource utilisation technology. However, there may be technical and organisational barriers (e.g. concern about liability/regulatory risks) to implementing such solutions. Technology that allows for the **economic recovery of resources from small volumes of wastewater** would thus be of particular interest in the Western Cape and broader South African context.

5. Existing solutions

Waste providers
<p><u>Company name:</u> Simba PepsiCo</p> <p><u>Core business:</u> Simba is part of the PepsiCo International company and is involved with the manufacturing of a popular South African brand of potato crisps. The company invested in a water treatment plant to treat their effluent to regulatory standards and are simultaneously recovering white starch that comes from their wastewater and selling it to a pharmaceutical company.</p> <p><u>Website:</u> http://www.simba.co.za/</p>
<p><u>Company name:</u> Parmalat Dairy Processing Company</p> <p><u>Core business:</u> Parmalat is one of the major players in the South African dairy industry and has been active in the South African dairy industry since 1998. Whilst treating effluent to compliance standards, the company has managed to recover whey and is selling it to the nutritional supplements market.</p> <p><u>Website:</u> http://www.parmalat.co.za/</p>
<p><u>Company name:</u> Peninsula Beverages – Coca-cola</p> <p><u>Core business:</u> A beverage company situated in Cape Town that supplies beverages under the Coca-Cola franchise. As part of the company's processing guidelines, any filled bottles that do not meet the specifications need to be thrown away. The company is therefore sending their Coca – Cola bottles to a large scale local facility for biogas generation.</p> <p><u>Website:</u> http://www.peninsulabeverage.co.za/</p>
<p><u>Company name:</u> Distell</p> <p><u>Core business:</u> A multinational brewing and beverage company, based in South Africa with a facility based in Stellenbosch in the Western Cape. Their effluent does not meet the municipal compliance standards therefore it has to be treated before discharge. Through the treatment process, biogas is recovered. This is utilised on site. Since the effluent is mostly comprised of water, not a lot of digestate is left over and any digestate left is used to reseed the process.</p> <p><u>Website:</u> https://www.distell.co.za/home/</p>
<p><u>Company name:</u> Rupert & Rothschild</p> <p><u>Core business:</u> One of many wine producing companies. This company recovers a composting product for reuse as vineyard soil conditioner from their wine processing effluent.</p> <p><u>Website:</u> https://www.rupert-rothschildvignerons.com/ ; http://www.proxawater.com/2017/06/01/rupert-rothschild/</p>

6. Possible South African business partners

Waste providers
<p>Company name: Langeberg and Ashton</p> <p>Core business: Langeberg & Ashton Foods is a division of Tiger Consumer Brands and is South Africa's largest fruit canning facility. Due to their involvement with fruit processing, they have effluents that have very high COD levels and are at times have to pay fines to the local municipality.</p> <p>Website: http://landaf.co.za/</p>
<p>Company name: SugarBird</p> <p>Core business: SugarBird, located in Malmesbury, is a division of Pioneer Foods that processes and distributes crystallised or glazed fruit. They have high COD levels in their effluent and are one of the main effluent producers in their local municipality.</p> <p>Website: http://www.pioneerfoods.co.za/</p>
<p>Company name: Fair Cape Dairies</p> <p>Core business: Fair Cape Dairies is a major producer of dairy products in the Western Cape and throughout South Africa. They consume approximately 0.25ML of water per day and their effluent has a COD concentration above the regulatory standards.</p> <p>Website: http://www.faircape.com/</p>
<p>Company name: Rhodes Food Group</p> <p>Core business: Rhodes Food Group produce fresh, frozen and long life convenience meal solutions for customers and consumers throughout South Africa. They produce effluent that has COD concentrations above the regulatory standards.</p> <p>Website: http://www.rhodesfoodgroup.com/</p>
<p>Company name: Robertson Winery</p> <p>Core business: Robertson Winery is a wine processing company located in Robertson town in the Western Cape. They are the biggest water consumers and effluent producers in the town.</p> <p>Website: https://www.robertsonwinery.co.za/</p>
Solution / technology providers ¹
<p>Company name: Proxa Water</p> <p>Core business: Proxa is a specialised water solution provider of sustainable water services within the municipal, industrial and commercial sectors. Their industrial unit focuses on advanced wastewater treatment and resource recovery in the food and beverage, petrochemical, oil and gas, mining, and energy generation sectors .</p> <p>Website: http://www.proxawater.com/</p>
<p>Company name: Veolia Water Technologies South Africa</p> <p>Core business: Veolia Water Technologies provide customised water and wastewater treatment solutions for municipalities and industries. They implement water solution across different industrial sectors some of which include the food and beverage, mining, oil and gas sectors.</p> <p>Website:http://www.veoliawatertechnologies.co.za/</p>
<p>Company name: Memcon</p> <p>Core business: Provide wastewater treatment solutions for industrial companies and design and manufacture specialised membrane filters. They implement solutions for different industrial sectors and have worked with companies e.g. Parmalat in implementing a water treatment and value add solutions.</p> <p>Website:http://www.memcon.co.za/home.html</p>
<p>Company name: WEC Projects</p> <p>Core business: WEC Projects provide solutions for biogas to energy from wastewater projects. They target food processing, breweries and industries which produce a high soluble COD waste stream.</p>

¹ These are companies that have implemented successful solutions for companies with organics in their wastewater but their business is not limited to organic wastewaters.

Website: <http://www.wecprojects.com/what-we-do/water-treatment/>

Company name: Trigen

Core business: Trigen provides biological waste-to-value systems for application in industrial processes. They primarily work with anaerobic biological technology and specialise in poultry wastewaters.

Website: <http://www.trigen.co.za/home.php>

Product buyers/offtaker

Company name: Pharmaceutical company (Name available on request)

Core business: Manufacture prescription and over the counter medication as well as nutritional supplements. Some of the raw materials for nutritional supplements can be expensive and difficult to source; these are therefore purchased from the agri-processing industries (such as potato value add opportunity described above) that would have recovered the organic resource from their wastewater.

Company name: New Horizons Energy, Athlone Biogas Plant

Core business: Receives organic waste from different sources to produce biogas and are currently looking for more organic waste. However, generally in need of solid or concentrated rather than dilute liquid organic streams.

Note: GreenCape is able to furnish potential partners with contact details for those companies listed below, as well as wider ecosystem contacts not listed in this table.

6.1. Other stakeholders to note

Since one of the key drivers to the resource utilisation is treatment of the effluent to compliance standards, another key stakeholder that could assist in unlocking this opportunity would be municipal managers and regulators. City of Cape Town is now exploring direct water reuse and industrial effluent can be a major hindrance to that, so **regulation of industrial effluents will become stricter**. The City of Cape Town also has an **initiative to encourage industry to improve their water management practices** by using a newly developed rating tool that allows businesses to gauge their progress on water efficiency versus other businesses. The Stellenbosch Municipality is also working on a different formula for calculating the **effluent discharge tariff** which will penalize industry water users more for non-compliant effluent standards which might result in a **30-40% tariff increase**.

Agriculture industry associations are key stakeholders in many agriculture & agri-processing sectors. With a few of the most prominent being:

- Vinpro representing the wine industry
- The Citrus Growers Association (CGA) representing the citrus industry
- Hortgro representing most of the remaining fruit sectors; primarily the pome and stone fruit sectors.
- Several livestock industry associations (listed in livestock analysis report).

7. SWOT analysis

Below is a SWOT analysis for this opportunity from the point of view of the likelihood of the opportunity being realised through **foreign business matchmaking, foreign investment or sharing of overseas expertise**.

Internal	<p>Strengths</p> <ul style="list-style-type: none"> • Utilisation of organic wastewater is still a growing area in South Africa and there is still room for more players in the field. • Knowledge sharing: Local universities, particularly University of Cape Town and University of Stellenbosch have research groups active in this area (e.g. wastewater bio-refineries). • Energy can be utilised on site instead of having to look for a market. 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Some industrial waste producers have inadequate organic concentration in their wastewater to recover anything substantial. • Small volumes of wastewater make it difficult to develop a good business case with logistics costs being high for transporting liquids.
	External	<p>Opportunities</p> <ul style="list-style-type: none"> • Driver: Stricter regulation on the discharge of organic wastewater to local waste water treatment works. • Driver: Drought has focussed attention of industrial users on water security. Water efficiency and reuse are gaining increasing attention. Creates an opportunity for simultaneous consideration of value-add opportunities. • Knowledge sharing: Education and awareness on the possibility of resource recovery from organic wastewater.

8. Opportunities outside of the Western Cape

Other opportunities for value add of organics in wastewater are in the Gauteng province which has the largest agro-processing and food and beverage sector in South Africa and KwaZulu-Natal province which also has a significant presence of agro-processing and food and beverage sectors (Quantec, 2017). There are opportunities in other regions as well, an example is Woodlands Dairy, a dairy processing company located in the Eastern Cape which has an effluent of 1ML/day and invested R60 million into a water recycling plant that produces Biogas as a by-product.

9. References

Brewers Association, 2013. Energy Usage, GHG Reduction, Efficiency and Load Management Manual. [Online] Available at: https://www.brewersassociation.org/attachments/0001/1530/Sustainability_Energy_Manual.pdf [Accessed 3 July 2017]

International Farm Comparison Network Dairy Data, 2015. [Online] Available at: <http://ifcndairy.org/ifcn-products-services/dairy-report/> [Accessed 3 July 2017]

Quantec, 2007 EasyData by Quantec. [Online] Available at: <http://quanis1.easydata.co.za/> [Accessed 7 July 2017].

WRC, 2015. NATSURV 3: *Water and Wastewater Management in the Soft Drink Industry*. [Online] Available at: [http://www.wrc.org.za/Pages/DisplayItem.aspx?ItemID=11633&FromURL=%2FPages%2FDefault.aspx%3Fdt%3D%26ms%3D%26d%3DNATSURV+3%3A+Water+and+Wastewater+Management+in+the+Soft+Drink+Industry+\(Edition+2\)%26start%3D1](http://www.wrc.org.za/Pages/DisplayItem.aspx?ItemID=11633&FromURL=%2FPages%2FDefault.aspx%3Fdt%3D%26ms%3D%26d%3DNATSURV+3%3A+Water+and+Wastewater+Management+in+the+Soft+Drink+Industry+(Edition+2)%26start%3D1) [Accessed 3 July 2017]