Emerging circular bioeconomy business models – Consumer products from agricultural waste: Cases from Kenya and India

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About Nature-Positive-Solutions

Nature-Positive-Solutions is a One CGIAR initiative that aims to re-imagine, co-create, and implement nature-positive solutions-based agrifood systems that equitably support local food and livelihoods, while simultaneously ensuring that agriculture is a net positive contributor to nature. For more details about the initiative https://on.cgiar.org/3rHjbRO

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Summary

Agricultural waste represents untapped resources that can be used to produce large value-added products with many potential industrial applications. The use of agricultural wastes as raw materials for various industrial applications can help to reduce production cost and contribute to environmental conservation. The business cases described in this report highlight innovative approaches to convert the growing amount of agricultural waste into eco-efficient and bio-based products which are essential components of Nature-based-solutions.

Bio-corn products EPZ Limited, located in Kenya uses corn cobs as raw materials to produce a specialty chemical known as furfural, a product with a very wide application as a solvent in different end-use industries such as agriculture (pesticide), pharmaceuticals, construction and automotive. The second business case, the **Janseva Foundation** produces incense sticks from flower wastes collected from temples in India. Unlike agricultural residue, food waste and other organic waste, these flowers are not really seen as waste due to the religious value attached to them. Converting this waste to incense sticks which are used by worshipers makes the business culturally and religiously acceptable by the end users.

Business case: Kenya

Bio-Corn Products EPZ Limited

Business case at a glance

Location:	Eldoret Town, Uasin Gishu County
Waste input type:	Corn cobs
Value offer:	Furfural
Organization type:	Private
Status of organization:	• In 1979 original factory commissioned • In 2011, ISONS Group purchased the factory • In 2018, plant rehabilitated and upgraded • Currently fully operational
Scale of businesses:	Large scale
Major partners:	1. ISONS Group 2. International Centre of Insect Physiology and Ecology (ICIPE) 3. International Institute of Tropical Agriculture (IITA) 4. One Acre Fund 5. Agricultural Development Corporation (ADC) – Kitale 6. Farmer association - Marigat 7. Irrigation scheme - Weiwei 8. Prison – Eldoret GK; Ngeria

Executive summary

Bio-Corn Products Limited, situated in Eldoret Town, Uasin Gishu County, is a manufacturing company that uses corn cobs as raw materials to produce its main product, a specialty chemical known as furfural. Bi-products, Acetic Acid and Formic Acid are also produced as part of the process. Bio-Corn Products Limited business model – turning corn cobs into green chemicals – is based on the following four main processes:

- Firstly, the acquisition of corn cobs from farmers and farming institutions
- Secondly, crushing of corn cobs into smaller particles whilst pre-treating them
- Thirdly, hydrolysis of milled/crushed cobs in a pressurized reactor using steam and

- Finally, extraction of raw product for further distillation into finally furfural and other by-products

Furfural is a chemical product used in refining lubricating oils and as a constituent element of pharmaceuticals, cosmetics, resins and plastics. It is also used as a crucial ingredient in the cracking process of crude oil in addition to being an eco-friendly additive to rocket fuel. Agricultural applications include usage as an organic pesticide and weed killer. Much of the furfural produced by Bio-Corn Products Limited is exported to the USA and Europe, while by-products such as acetic and formic acids are designed for use in the local market.

Bio-Corn Products promote income diversification and enhance livelihood of maize farmers in the maize-growing regions of Kenya by allowing them to commercialize on the cob, which would otherwise be a waste or used as inefficient fuel alongside firewood. The entity obtains corn cobs from multiple sources: small- medium-and large-scale farmers, farmers associations (e.g., Marigat farmers association), irrigation schemes (e.g., Weiwei irrigation scheme), social enterprises (e.g., One Arce Fund farmers) and state corporations (e.g., Eldoret GK Prison, Ngeria Prison, Agricultural Development Cooperation – ADC). Most of the corn cobs are obtained from the counties of: Trans Nzoia, Uasin Gishu, Bungoma, Nandi, and West Pokot. At the time of writing, Bio-Corn Products Limited had established several cobs collection centres across the region, with two of its main depots being in Kitale and Moi Bridge. The smaller collection centers are strategically placed to allow convenience in aggregation from small holder farmers.

Key success drivers for Bio-Corn Products Limited are:

- Strategic positioning of the plant in maize rich region of Kenya.
- Partnership with farmers (contractual agreements) and other farming institutions for a guaranteed supply of corn cobs.
- Use of residue from the hydrolysis process, supplemented by firewood – eucalyptus – to save cost of power.
- Highly automated and specialized continuous production process.
- High demand for its green chemical products

Bio-Corn Products Limited intervention has contributed to providing farmers with an opportunity to get income from corn cobs that would otherwise end up as waste; creating employment opportunities; and contributing to the environmental conservation – historically, during corn harvest season, cobs would be disposed of indiscriminately in water sources or left to rot, contributing to environmental degradation and hazards.

Key performance indicators						
Land use	20 acres					
Capital investment:	USD 30 million					
Labor requirements:	120 full-time workers and 70 part-time workers					
O&M cost:	• Utilities: o Electricity: USD 32,520 (Kshs 4 million) per month o Water: USD 24,390 (Kshs 3 million) per month					
Output:	3,000 tons of Furfural per year. At full capacity, the entity estimates to produce 5,000 tons of Furfural per year.					
Potential social and/or environmental impact:	Income diversification (sale of corn cobs -that would otherwise end up as waste or firewood); job creation; environmental conservation					
Viability indicators	Payback period:	5 years	Gross margin:	50%	Net profit (after tax)	20%

Context and background

Maize is one of the most important cereal crops in Kenya, constituting an estimated 65% of the total food calories in Kenyan households. Maize is also a significant contributor to employment and income for farmers, many of whom are smallholders. Recent estimates by FAOSTAT – 2020 – indicate that maize in Kenya is cultivated on 2.19 million hectares of land by farmers with an annual production of 3.79 million tons. In Kenya, maize is mostly cultivated in the Central and North Rift region – the same location where Bio-Corn Products Limited is established. Specifically, Bio-Corn Products Limited is in Eldoret Town, in Uasin Gishu County. Uasin Gishu County (North Rift of Kenya) borders the counties of Trans Nzoia to the north, Elgeyo Marakwet and Baringo to the east, Kericho and Nandi to the south and Kakamega to the southwest. Bio-Corn Products Limited, which is a subsidiary of Nairobi-based parent company, ISONS Group, was established in 2017 and commissioned in 2018 after the ISONS Group purchased the Kenya Furfural Company plant from its receiver managers Ernst & Young. Under its former trading name, Kenya Furfural Company was initially established in 1977. A major motivation for the establishment of the plant was to tap into the availability of corn cobs as raw material to produce furfural for industrial use and in the process allow farmers to commercialize on the cob which traditionally is viewed as a waste.

Market environment

Furfural, is a green alternative chemical to more harmful petrochemicals and finds a very wide application as a solvent in different end-use industries, for instance, agriculture (pesticides, fertilizers), pharmaceuticals, construction (paintings), automotive (jet fuel additive) etc. Given furfural's wide application, a business such as Bio-Corn Products Limited is guaranteed quite a substantial product demand in the international market. Furthermore, there are not as many businesses that produce furfural. For instance, in the whole of Africa, furfural is produced by only two plants – Bio-Corn Products Limited in Kenya and Illovo Sugar's Sezela plant in South Africa. Despite this positive outlook, it is worth noting that the furfural market is highly susceptible to price volatility, which is influenced by several factors, particularly the US-China trade relations (China is one of the dominant markets for furfural given its high number of manufacturing companies).

In addition to the export market, Bio-Corn Product Limited can also benefit from Kenya's local market. The production process' by-products – acetic and formic acid – have great revenue potential as the product can be sold to local manufacturers who are otherwise currently importing. It is the only producer of acetic and formic acid in East-Africa.

Business Model

Bio-Corn Product Limited's main business is to turn agricultural waste – corn cob – into furfural for sale at the international markets (Figure 1). The entity has an agreement with a sales agent who markets the furfural. When a commercial agreement is established, the furfural is transported from Bio-Corn Product's plant in Eldoret via ISO-containers to the Mombasa port for further export. The by-products -acetic and formic acids- also offer a value proposition to Bio-Corn Products Limited for onsite use and to manufacturing companies locally. The residue from the production process, once dried, is further used as its main fuel source in its boiler. Since 2019, Bio-Corn Products Limited has experienced stability in the production of furfural mainly because of the following reasons: strategic partnerships with farmers and farming institutions which have contributed to consistent supply of input – corn cobs. Secondly, financial support from key partners including the parent company ISONS Group.

<table>
<tr>
<td rowspan="2">Key Partners
• ISONS Group
• One Acre Fund
• Agricultural Development Corporation (ADC) – Kitale
• Weiwei Irrigation scheme</td>
<td>Key Activities
• Procuring maize cobs from farmers
• Production of Furfural & acids
• Selling of products</td>
<td rowspan="2">Value Propositions
• Furfural – a renewable and organic chemical for export market
• Formic and acetic acids as by-products for the local market</td>
<td>Customer Relationships
• Direct & indirect</td>
<td rowspan="2">Customer Segments
• Export market – large scale industries (pharmaceuticals, cosmetics, resins, and plastics)
• Local market – large and medium scale industrial use</td>
</tr>
<tr>
<td>Key Resources
• Corn cobs
• Agreement with input suppliers
• Technical and operational competencies
• Plant well-situated in corn-producing region
• Collection centres</td>
<td>Channels
• Rapport with further downstream processors.</td>
</tr>
<tr>
<td colspan="3">Cost Structure
• Investment cost – land, building, plant
• Operational cost – labour, utilities (electricity & water), maintenance costs
• Reduced operational cost from use of residue as fuel.</td>
<td colspan="2">Revenue Streams
• Sale of Furfural
• Expected sale of production by-products (Acetic and formic acids)</td>
</tr>
<tr>
<td colspan="3">Social & environmental costs
• Possibility of work-related hazards and risks. Plant is classified as a major hazardous facility.
• Carbon emissions into the environment.
• Residue spillages.
• Environmental risk from plant discharges and waste.
• High cost of water treatment.</td>
<td colspan="2">Social & environmental benefits
• Contribute to the economy of maize producing community
• Generate employment opportunity
• Contribute to improved management of waste
• Producing green chemicals which are substitutes to more harmful chemicals</td>
</tr>
</table>

Figure 1 Bio-Corn business model canvas

Value chain and position

Bio-corn Products Limited sources its corn cobs from: (i) small-scale farmers (individual and contracted farmers); (ii) medium-scale farmers, associations, and irrigation schemes (Marigat farmers association, WeiWei irrigation scheme); and (iii) large-scale farmers and institutions such as agricultural development corporation – ADC. All the procured corn cobs are stored at the Bio-Corn Products Limited collection centres before being ferried to the plant at Eldoret for processing (Figure 3). As a pre-requisite, all corn cobs from the suppliers are supposed to be clean and dry. At the processing plant, all trucks carrying corn cobs from the collection centres go through a computerized weighing bridge where details such as the source of the cobs, name of the supplier, and weight are taken before the trucks are emptied. Payment to suppliers is done depending on the payment terms agreed upon by the supplier

and Bio-Corn Products. The company uses a variety of payment structures to suit the farmer's preference.

To optimize space at the plant and allow flow control, supplied corn cobs are put into a boom conveyor belt that enables corn cobs to be stored in a cone-like shape at the storage area "the yard" (Figure 2). Cobs are then crushed into finer particles and pre-treated, followed by hydrolysis in pressurized reactors using steam; and lastly extraction of raw product for distillation of furfural and other by-products. Produced Furfural is exported to the USA and Europe. The byproducts (acetic and formic acids) are expected to be sold locally.

Figure 2 Stored Corn Cobs at Bio-Corn Products Ltd, Eldoret

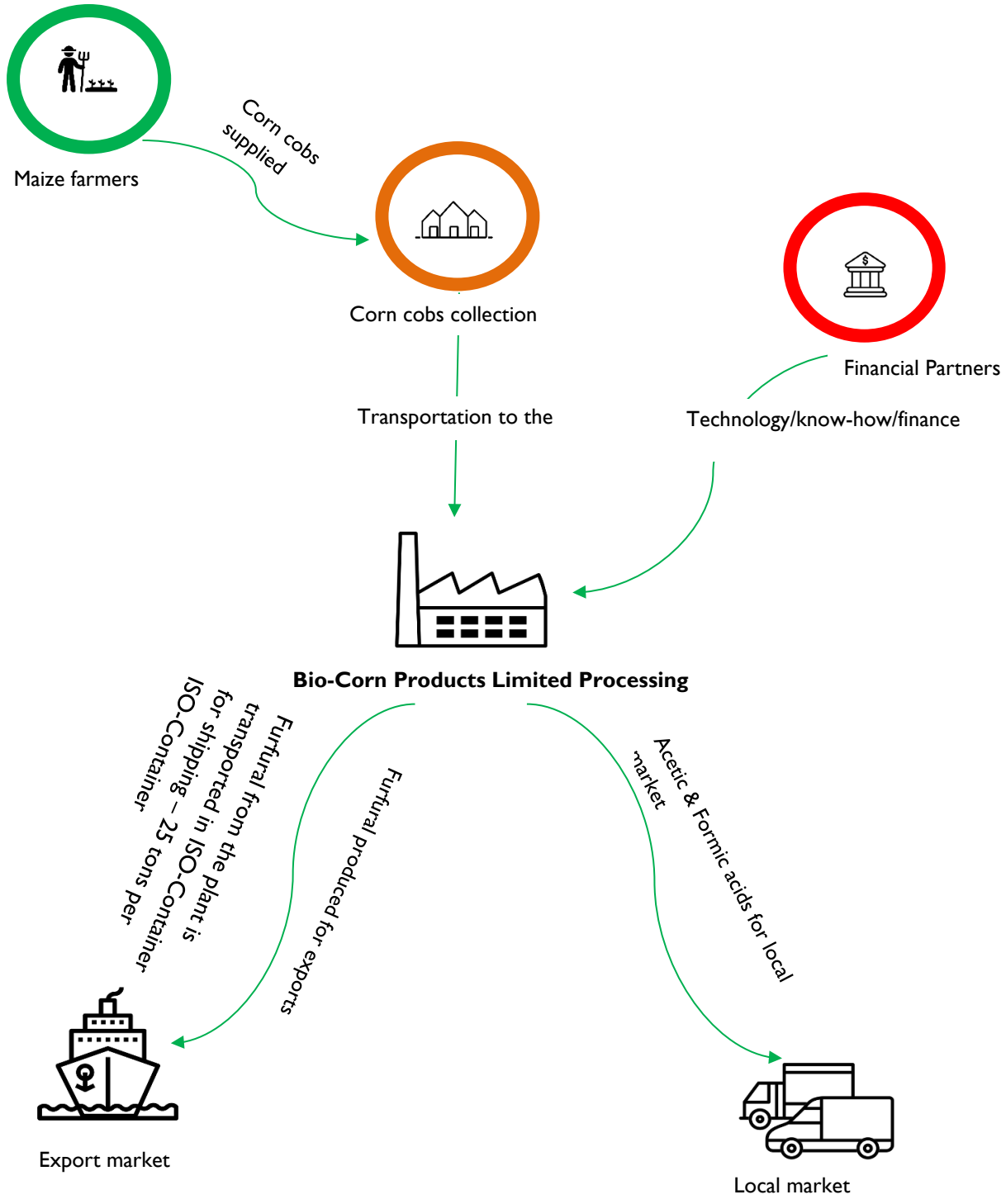

Figure 3 Bio-Corn Products Limited Value Chain

Institutional enviroment

Several laws, policies and regulations are in place to provide a legal and regulatory framework for engagement in the circular economy. In the case of Bio-Corn Products Limited, the laws, policies and regulations that govern their activities and interventions include but are not limited to; (i) Environmental Management and Coordination Act (1999) which is the principal framework that governs all activities that involve waste management; (ii) Occupational and Safety Act (2007) that provides for the safety, health and welfare of workers and all persons lawfully present at workplaces (iii) counties' cess regulations and fees charged on raw material goods when they move across counties; and (iv) Export Processing Zones Act CAP 517 that governs export-oriented investments and activities. For the case of Bio-Corn Products Limited, cess fees charged by counties on the movement of goods from one county to another is one of the notable regulations that represent a constraint to the business in the following ways:

i. The administration of cess fees has been found to be largely arbitrary, changing from time to time depending on the respective county governments. Furthermore, the collection system is poorly designed, ineffective and highly time consuming. For example, at each barrier erected by county officials on the roads, trucks have to stop for inspection and determination of the amount payable, regardless any previous inspections at an earlier barrier. This complicates entire transport and logistics system/plan contributing to lost man-hours in delays and generally driving up operational costs.
ii. Cess fees do not take into account the value of the cargo. In Bio-Corn's case for example, the waste corn cob is charged at the same rate per load as maize, a much higher value commodity, making the payments unproportioned and not viable.
iii. Nearly all counties do not accept cess permits issued by the other county (s) – in this case, the county of corn cobs' origin. The consequence of this is double taxation for inter-county transportation of products. Additionally, there are no discounts or rebates for venture contribution to income diversification at the household level or general environmental conversation through cleaning up cobs that would have been left to rot and negatively impact water sources.
iv. Whereas the law envisages that cess collected should be earmarked to promote agricultural activities in the county, most counties treat Cess fees as any other source of revenue that can be directed to arbitrary expenditure instead of a focus on improving agriculture practices, such as maize farming -which is predominant in the region.

Technology and Processes

The technology used by Bio-Corn Products Limited to produce furfural from corn cob is innovative and unique. In the whole of Africa, furfural is produced by only two plants – Bio-Corn Products Limited in Kenya, and Illovo Sugar's Sezela plant in South Africa. Since 2018, technology and process employed by Bio-Corn Products Limited have been commercially proven. At the time of assessment, Bio-Corn Products Limited produced an estimated 3,000 tons of furfural for exports annually. On full optimization, the entity estimates producing 5,000 tons of furfural annually.

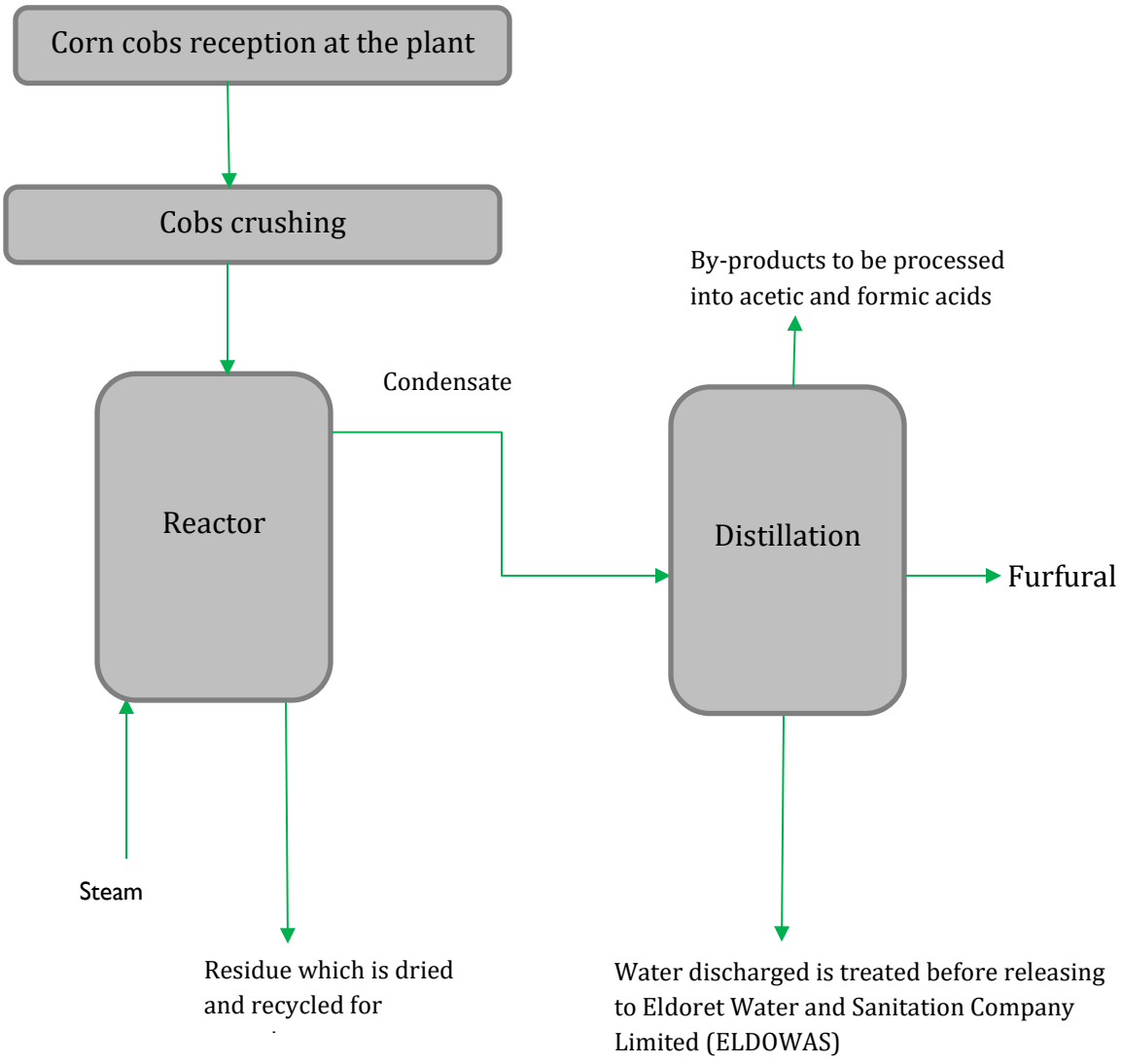

Figure 4 Process diagram for Bio-Corn Products Limited

For the processing activity, corn cobs to be processed need to be firs, cleaned, and well-dried before they are crushed/milled into recommended sizes. The crushed cobs are then stored in a compressed and pressurized container before being conveyed to the reactor for steaming where the vapours are produced for distillation further downstream. The residue from the 'cooked' corncob inside the reactor is directly conveyed to the boiler to keep it firing. The vapours are then condensed, after which the condensate is taken to the distillation columns for the final refinement of furfural and other chemicals i.e., by-products that are set to produce acetic and formic acids. It is worth noting that Bio-Corn Products Limited has developed its own laboratory where furfural produced is tested to ascertain whether minimum product specifications have been met. The technology used remains proprietary and therefore, Figure 4 which is a snapshot skips a lot more of the exact facts and figures employed in the whole process.

Owing to the high costs of electricity and diesel, Bio-Corn Products Limited uses the dried residue from the hydrolysis process as the main source of energy for steaming. In rare occasions, especially during wet seasons, residue from the hydrolysis process is supplemented by firewood, mostly from Eucalyptus trees procured from farmers.

Financial analysis

The capital cost for re-constructing and equipping Bio-Corn Products Limited was mainly sourced by the parent company ISONS Group. At present, total investment cost for setting up the processing plant is estimated at USD 30 million. Modernization of the technology and process is still ongoing. The entity has recently received a grant of USD 1.2 million from BioInnovate to facilitate the conduct of research and development (R&D) in collaboration with ICIPE and IITA to allow diversifying of their product portfolio with agricultural applications. These will in the future be sold back to farmers to improve their yields therefore creating a sustainable, circular and symbiotic relationship between farmers and the company. Key operating and maintenance costs for Bio-Corn Limited includes: utility costs (water and electricity), repairs and maintenance and payroll expenses.

Business case summary assessment -SWOT analysis

STRENGTH	WEAKNESS
• The location of the plant makes it easier to access raw materials. • Source of energy – firewood and residue readily available • Guaranteed support from sister companies such as ISONS Group • Strong partnership with institutions engaged in maize farming (ADC, One Acre Fund, irrigation schemes)	• Episodes of cash-flow challenges leading to delay in release of funds to farmers for their cobs • Employee turnover – due to demand of skilled personnel in the industry
OPPORTUNITY	**THREAT**
• Better partnership with farmers is likely to increase supply of maize cobs • Bio-Corn Products is the only furfural plant in Kenya and the second one in the whole of Africa • Ongoing plans to increase throughput and production capacity	• Power and water costs are too high • Government ban on logging and timber harvesting has led to increased cost of energy • KRA Customs formalities with export • CESS fees unpractical for low value commodity such as waste corncob

Socio-economic, health and environmental impact

Since Bio-Corn Products Limited is located in a maize-dominated region, the business is beneficial to local populations, providing farmers with an opportunity to generate an income from waste, corn cobs. Additionally, the business has created employment opportunities for skilled and unskilled labour. As at the time of writing this report, the business directly employed 120 people on a full-time arrangement, over 70 part-time employees with several thousand farmers benefitting indirectly. Moreover, the business has contributed to the growth of the economy of maize producing communities. Concerning environmental impact, Bio-Corn Products Limited has improved management of corn cobs that would otherwise contribute to environmental hazards such as clogging of drainage systems and has produced alternatives to harmful petrochemicals. At the national level, through exports of furfural to USA and European markets, the business has contributed to Kenya's export earnings and improvements in balance of payment (BOP).

Scalability and replicability potential

Key drivers for the success of this business case are:

- The business is the only furfural producing entity in Kenya and the second one in Africa.
- The business is located in a maize-rich zone with a guaranteed source of corn cobs.
- The business has potential to increase production capacity with further investment.

Currently, Bio-Corn is in the process of expanding its interventions by optimizing its technology and processes as well as mechanisms of extracting other useful products from the by-products.

Given the high initial capital and investment costs, replicability of this business case is largely dependent on the availability of funds. Involvement of national and international development agencies is critical in offsetting the initial high capital expenditure. Further, the business certainly requires a guaranteed supply of corn cobs. Specialised process skills and training of operators are also key. With capital costs sorted, this business case could be replicated in countries with large corn production and favourable policies for exporting – most of the end product (furfural) is designed for export markets for large-scale industrial use.

References

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Business case: India

Janseva Foundation – Making incense sticks from flower waste

Business case at a glance

Location:	Ahmednagar
Waste input type:	Dried flowers from flowers offered to the deity in Shirdi Shri Sai Baba Temple
Value offer:	Incense Sticks (Popularly called *'agarbatti'* in Hindi)
Organization type:	Foundation
Status of organization:	Operational since 2017
Scale of businesses:	Micro
Major partners:	No partners

Executive summary

The business has been operational since March 23, 2017. The idea came in when the director of the Janseva foundation, Mrs. Shalinitai Vikhe Patil, travelled to Israel and saw incense sticks being made from dried flowers. Impressed by the idea, she replicated the same model with the help of the Temple Trust of Shirdi Sai Baba Temple through the recycling of flowers offered in the temple.

More than 45 lakh incense sticks have been produced to date by the foundation. The foundation employs homemakers and unemployed women to encourage them to become independent entrepreneurs by organizing them in self-help groups.

Key performance indicators						
Land use	More than 1 ha					
Capital investment:	Not disclosed by the business owner					
Labor requirements:	350 women employed					
O&M cost:	*Not disclosed*					
Output:	*45 lakh incense sticks since 2017*					
Potential social and/or environmental impact:	Improved waste management at the temple, effective utilization of flower waste which usually goes unnoticed in the country.					
Viability indicators	Payback period:	*Not disclosed*	Gross margin:	*Not disclosed*	Net profit (after tax)	*Not disclosed*

Context and background

India has several temples. There are ample flowers that are offered to the deities during worship almost every hour. Unlike agricultural residue, food waste and other organic waste, these flowers are not really seen as waste due to the religious connotations attached to them. Flower recycling is needed at present in the country. The idea is considered ethical and widely accepted by the devotees as the flower waste is converted into incense sticks which are also offered to the deities. Moreover, organic products are gaining popularity with rising levels of awareness. The foundation's processing unit is located close to the temple in Ahmednagar itself to ensure easy transport and facilitation of other related services.

Market environment

The market environment for incense sticks is stable. Incense sticks are offered at different places of worship regularly and on a day-to-day basis. Moreover, it is also used in households for fragrance and other purposes. The increasing preference for organic products over inorganic products also makes this market a strong one.

Business Model

This model works as it caters to a non-perishable consumer good that is required by almost all households in the country. The value added to the raw material i.e., the flower in this case is 100%. The incense sticks are made from flowers that are regarded as complete waste after offering to the deities and pile up in dumps, rivers, and sewers. At the same time, there is

hardly any wastage in the entire manufacturing process and the output produced is also organic.

The human resources, women, in this case, have a key role to play in the entire production process as most of the job is done manually. Apart from selling directly in the temple premises through the markets, the foundation has also expanded to the online mode and the products are also now available for sale all over the country. About 10% of the income of the foundation is given to the trust.

Apart from the effective utilization of waste to reduce the environmental burden, the business model is also helping in the upliftment of women by providing them an opportunity for employment.

<table>
<tr>
<td rowspan="2">Key Partners

• Temple Trust of Shirdi Sai Baba Temple

• Inbound and outbound logistics</td>
<td>Key Activities

• Collection and transportation of input
• Sorting, drying, conversion into incense sticks
• Dipping in different powders for fragrances
• Packaging and selling</td>
<td rowspan="2">Value Propositions

• Organic incense sticks</td>
<td>Customer Relationships

• A good direct relationship with the temple

• Word of mouth
• Online platform (website)</td>
<td rowspan="2">Customer Segments

• Devotees or worshipers at the temples

• Online buyers</td>
</tr>
<tr>
<td>Key Resources

• Human resources
• Transport facilities
• Raw materials</td>
<td>Channels

• Direct sales in the markets around the temple premises

• Online sale</td>
</tr>
<tr>
<td colspan="3">Cost Structure

• Transportation cost
• Labour cost
• Share of profit with Trust (10%)</td>
<td colspan="2">Revenue Streams

• Sales of incense sticks (one box of incense sticks (30 g) is originally priced at Rs. 150, after a discount, offered at Rs. 70)</td>
</tr>
<tr>
<td colspan="3">Social & environmental costs</td>
<td colspan="2">Social & environmental benefits

• Job creation for women
• Women empowerment
• Improved waste management at the temples
• Reduced burden on the environment through the processing of waste</td>
</tr>
</table>

Figure 1 Janseva foundation incense business model canvas

Value chain and position

The flowers are first collected and transported to the foundation wherein they are segregated on the basis of their colour and dried in the sun for three days. Once they have dried, they are processed in the form of a powder. The powder is convered into a thick paste which is converted into incense sticks and are left to dry. Once they have dried, they are packed into small packings of 30 gms.

The key actors here include the temple trust, the management of the foundation, the labour, those involved in inbound and outbound logistics, retailers and the ultimate consumers.

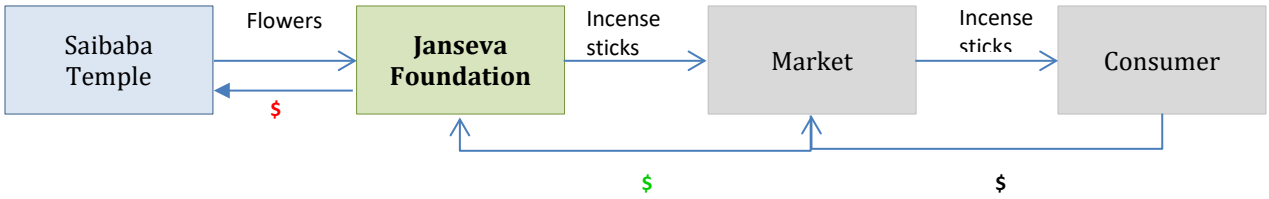

Figure 2 Janseva foundation incense value chain

Institutional enviroment

The NGOs can be registered in India under any of the following laws: Trust under Indian Trusts Act, 1882/ Society under Societies Registration Act, 1860/ Section 8 Company under Companies Act, 2013. Hence, the business is well registered under the Constitution of India.

Technology and processes

The model primarily follows a manual process which is not very elaborate and complex. Therefore, it is only the skills of the labour that play an essential role in the production process. The raw materials used in the process are also locally available and are sourced from a nearby temple. While this makes the business model robust, the business model can be very easily replicated and hence face challenges from its competitors.

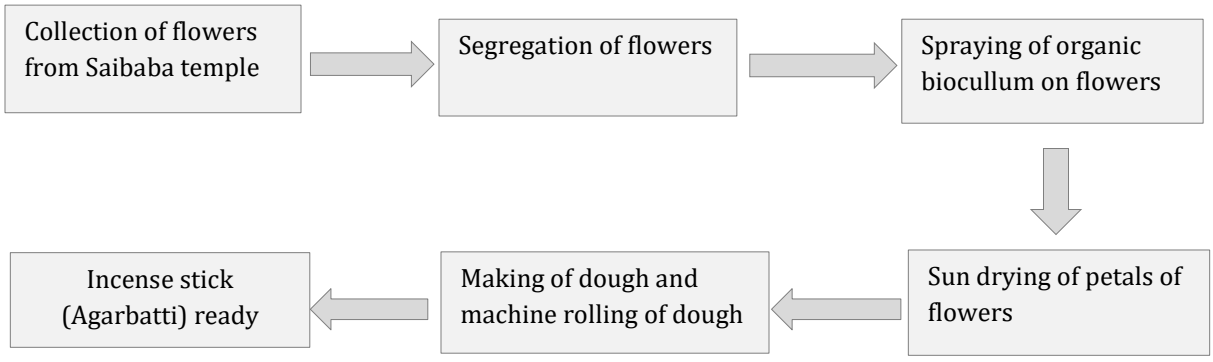

Figure 4 Process diagram for Janseva foundation incense production

Business case summary assessment -SWOT analysis

STRENGTH	WEAKNESS
• Organic incense sticks produced • Good reputation with the temple trust • Reputable brand • Proximity of the processing centre from the temple • Sufficient availability of raw materials	• Manual processing leading to low efficiency • Sales and growth heavily dependent on the relationship with temple trust • Lack of marketing and advertising strategy • Poor transport conditions • No grading of the product
OPPORTUNITY	**THREAT**
• Expansion of business market to other temple markets and nationwide • Introduction of new products using the same raw materials	• Easy replicability can lead to fierce competition

Socio-economic, health and environmental impact

The conditions of those working in the foundation have improved both socially and economically. The environmental impact has also been significant as the waste is now processed into something meaningful which would otherwise land into dumping grounds, rivers, and sewers, which leads to further degradation of the environment.

Scalability and replicability considerations

The model is scalable as there are numerous temples and rivers in India from where these flowers can be collected. The demand for incense sticks remains high in the market and the business can cater to larger temple markets, households, and markets.

Since the model only uses the skills of the labour and the involvement of technology is almost negligible, the model can easily be replicated across the country as the raw material needed to produce the incense sticks is locally available everywhere.

Reference

https://jansevafoundation.co/

Case descriptions are based on primary and secondary data provided by case operators, insiders, or other stakeholders, and reflect our best knowledge at the time of the assessment Dec 2022. As business operations are dynamic, data can be subject to change