Assessment Report Entebbe International Airport Freezone, Soroti Industrial and Business Park and Kasese Industrial and Business Park in Uganda.

Image 1: Soroti Fruit Factory in Soroti June 22

Image 2: Entebbe International Airport Freezone Construction June 22

Image 3: Kasese Workshop July 22

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Disclaimer

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Acronyms

CAPEX	Capital Expenditure	**KPIs**	Key Performance Indicators
CSR	Corporate Social Responsibility	**MeTIC**	Ministry of Trade, Industry and Cooperatives
DM	Domestic Market	**MFPED**	Ministry of Finance Planning and Economic Development
DRM/DRR	Disaster Risk Management/Disaster Risk Reduction	**MoU**	Memorandum of Understanding
eCBA	Extended Cost Benefit Analysis	**UCPC**	Uganda Cleaner Production Center
EIP	Eco-Industrial Park	**UFZA**	Uganda Freezones Authority
EOI	Expression of Interest	**UIA**	Uganda Investment Authority
EU	European Union	**OPEX**	Operating Expenditure
FZ	Freezone	**PPP**	Public-Private Partnerships
GGAP	Green Growth Assessment Process	**RECP**	Resource Efficiency & Cleaner Production
GGF	Green Growth Framework	**SEA**	Strategic Environmental Assessment
GGGI	Global Green Growth Institute	**SEZ**	Special Economic Zone
GHG	Green House Gas	**UCPC**	Uganda Cleaner Production Center
GoU	Government of Uganda	**UNEP**	United Nations Industrial Development Organization
GRI	Global Reporting Initiative	**UNIDO**	United Nations Environment Programme
IP	Industrial Park	**VAT**	Value Added Tax
IT	Information Technology		

Global Green Growth Institute

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0. Summary of the main recommendations

To facilitate reading and argumentation and due to the number of technical recommendations, they have been highlighted in yellow in the report. Only the main recommendations are summarized below. Besides, it was decided to present the findings for all sites in one report for ease of cross-referencing and to better highlight inter-parks synergies and common recommendations.

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1. Mission Objectives

The mission aimed to complement the strategic support to Uganda Investment Authority (UIA) and Uganda Freezones Authority (UFZA) in the development of the priority industrial parks and freezones with field analysis and to give inputs for the preparation of upcoming project proposals on those sites. UFZA is a corporate body under the supervision of the Ministry of Finance, Planning and Economic Development (MoFPED). It was established in accordance with the Free Zones Act, 2014 and started operations the same year. UIA is a semi-autonomous Government Agency operating in partnership with the private sector to drive national economic growth and development. The Authority was established in 1991 by an Act of Parliament (Investment Code Act 1991), amended in February 2019.

The parks selected were Entebbe International Airport Freezone, Soroti Industrial and Business Park and Kasese Industrial and Business Park. It was decided to present the findings for all sites in one report for ease of cross-referencing and to better highlight inter-parks synergies and common recommendations. Detailed description figuring under one site are not repeated in the other even if they apply, only the reference to the relevant section will be made. The Terms of Reference for the mission are provided in Annex A.

The specific objectives were:

a) **To support UFZA and UIA in refining the value proposition for the 3 Industrial Parks/Freezones.**

b) **To initiate the implementation of green (industrial ecology) principles, in particular circular economy and symbiotic infrastructures.** That implied initiating a material and energy flow analysis projection on various sectors scenarios based on information provided by the participants. The symbiotic infrastructures explored also harnessed the potential for Public-Private Partnership (PPP) in an urban integration.

c) **To perform a sectoral prioritization taking into account economic, environmental and social impacts and whenever feasible, to narrow down to specific value chains.**

d) **To identify opportunities for innovation for a greener impact.**

More specifically per location, some topics of interest covered by the mission were as follows:

Entebbe visit: To accompany the Freezones Authority in complementing the initial feasibility assessment and sectors selection and initial business plan. To bring together the Freezones authority and other ministries in order to develop a park concept that can address both export and domestic markets through strategic collaborations in Entebbe city and in country and improve business continuity. To narrow down the expectations placed on the One Stop Centers and facilitate the definition of criteria for business enrollment in a freezone.

Soroti visit: To address some of the issues identified in GGGI previous mission particularly in optimizing the use of local produce by park's companies. To identify possible alternative value chains for local produce, by-products and waste (circular economy loops) and the linkages between IPs and Freezones in other locations for products with export potential.

Kasese visit: To address the heightened risks posed by the industrial park to the environment due to its vicinity to a natural conservation area (Queen Elizabeth National Park). To investigate the potential for agro-tourism industrial park activities that could help lift the tourism sector in the area. To investigate

the opportunities for eco-system services payments and possibly to pre-identify carbon sinks that could benefit from conservation activities while generating revenue through carbon finance.

2. Mission Organization

2.1. Mission Itinerary

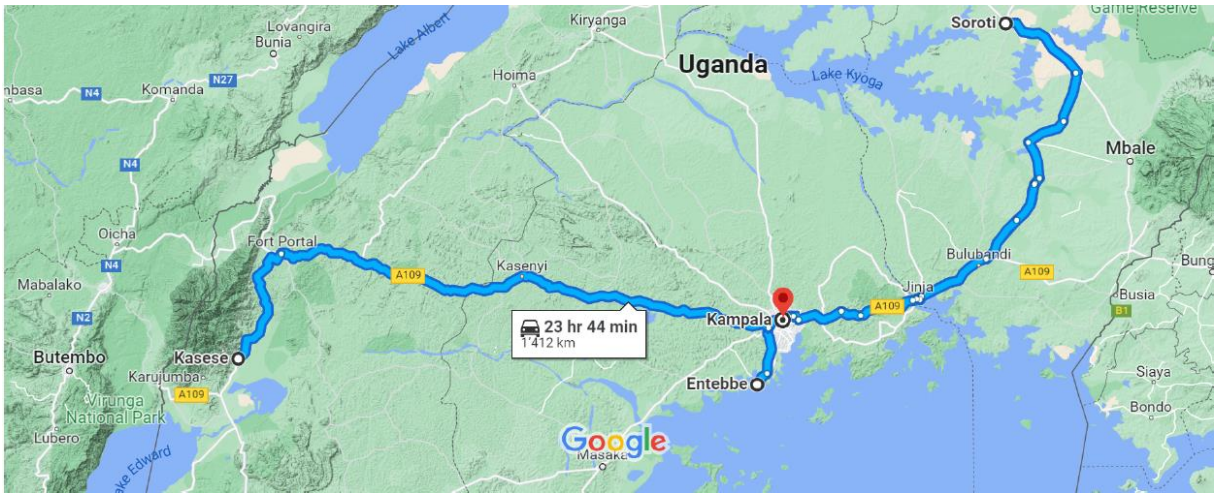

Figure 1: Mission Itinerary

The agenda of the field visits is provided in Annex B, a 3 weeks duration of 7 days was allocated to visit all the three sites. The sites visited were:

- Entebbe International Airport Freezone
- Soroti Industrial and Business Park
- Kasese Industrial and Business Park

All visits included workshops sessions on the first two days with government officials, private sector and civil society representatives. The workshops included a training on key concepts followed by focus discussions. Visits to the Industrial Parks (IPs) or Freezone (FZ) sites and to the companies operating within and in the vicinity of the site were also performed.

2.2. Assessment team composition

The team was composed of the following experts:

Table 1: Team Composition

Name	Role	Organization	Contact	Entebbe	Soroti	Kasese
Nadia Zuodar	Team Leader	GGGI	Nadia_zuodar@yahoo.com	Yes	Yes	Yes
Regina Mwenyango	Industrial Development Officer	GGGI	regina.mwenyango@gggi.org	Yes	Yes	Yes
Ronald McGill	Project Lead	GGGI	ronald.mcgill@gggi.org	Yes	Yes	Yes
Dagmar Zwebe	Country Representative	GGGI	dagmar.zwebe@gggi.org	No	No	Yes
Philip Muwanika	Financial Expert	GGGI	philip.muwanika@gggi.org	No	No	Yes

Joshua Elaru	Sanitation Expert	GGGI	elaruj@outlook.com	Yes	No	No
Edson Twinomujuni	RECP expert	UCPC	etwinomujuni@ucpc.co.ug	Yes	Yes	Yes
Anthony Kwehangana	Value Chains Expert	Ministry of Agriculture	anthony.kwehangana@gmail.com	Yes	Yes	Yes
David Were	Water Expert	Department of Environmental Management Makerere University, Kampala Uganda	dwere51@gmail.com	1 day	No	No
Hillary Arima	Environmental Expert	Ministry of Energy	arimahillary53@gmail.com	Yes	No	No
Carol Aguti	Environmental Expert	Ministry of Energy	caguti1977@gmail.com	No	Yes	Yes
Kyohangirwe Allen	Value Chain Expert	Ministry of Agriculture	kyohangirweallen41@gmail.com	Yes	No	No

It was of particularly great added-value that Uganda Cleaner Production Center (UCPC) joined the mission as it was a good opportunity to demonstrate the added value of collaborating to include Resource Efficiency and Cleaner Production (RECP) support for all industrial projects at any stage of development.

2.3. Stakeholders

The list of working groups participants and other stakeholders visited is found in Annex c. Ownership was ensured by the participation of representatives from UIA and UFZA which support mobilizing the stakeholders and providing information was key. The participation and representativity were on average very good, however a few sectors did not send a representative such as the fish sector in Entebbe and Soroti. In Kasese, it was the first GGGI visit to the site and the UIA representative had recently started her function. Though a wide range of participants were gathered, particularly from the SMEs and Farmers Cooperatives, the team was made aware of larger scale private sector stakeholders operating in the area. Follow-up missions will need to expand participation in order to complete the stakeholders mapping and understand their interdependence in the value chain. This is particularly needed for Kasese where larger businesses or businesses operating from outside Kasese with an interest in the IP or the Freezone should be identified.

Image 4: Kasese workshop

3. Methodology and Training

The full training material has been shared with the participants and can be requested from GGGI. Below is an extract of the key methological tools and concepts presented that enabled the working group sessions.

3.1. Industrial Parks and Freezone Policy Guidelines and Industrial Ecology Concepts

GGGI with EU funding has been supporting the Government of Uganda (GoU) to develop guidelines for green Industrial Parks and Freezones. There are 12 policy elements represented in Fig.2. All parks and freezones were greenfield (newly established). Discussions and site visits highlighted the fact that the 3 IPs and FZ were at a developmental phase that combined three stages from the green IP implementation stages presented in Fig. 3, namely a mix of set-up and construction and most importantly needed to finalize or complete elements from their Business Case Development.

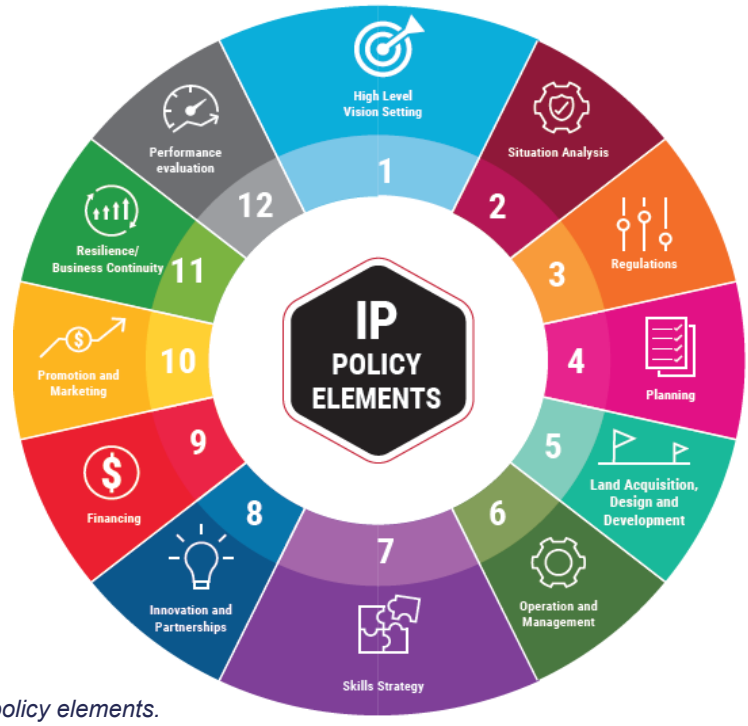

Figure 2: Industrial Parks and Freezones policy elements.

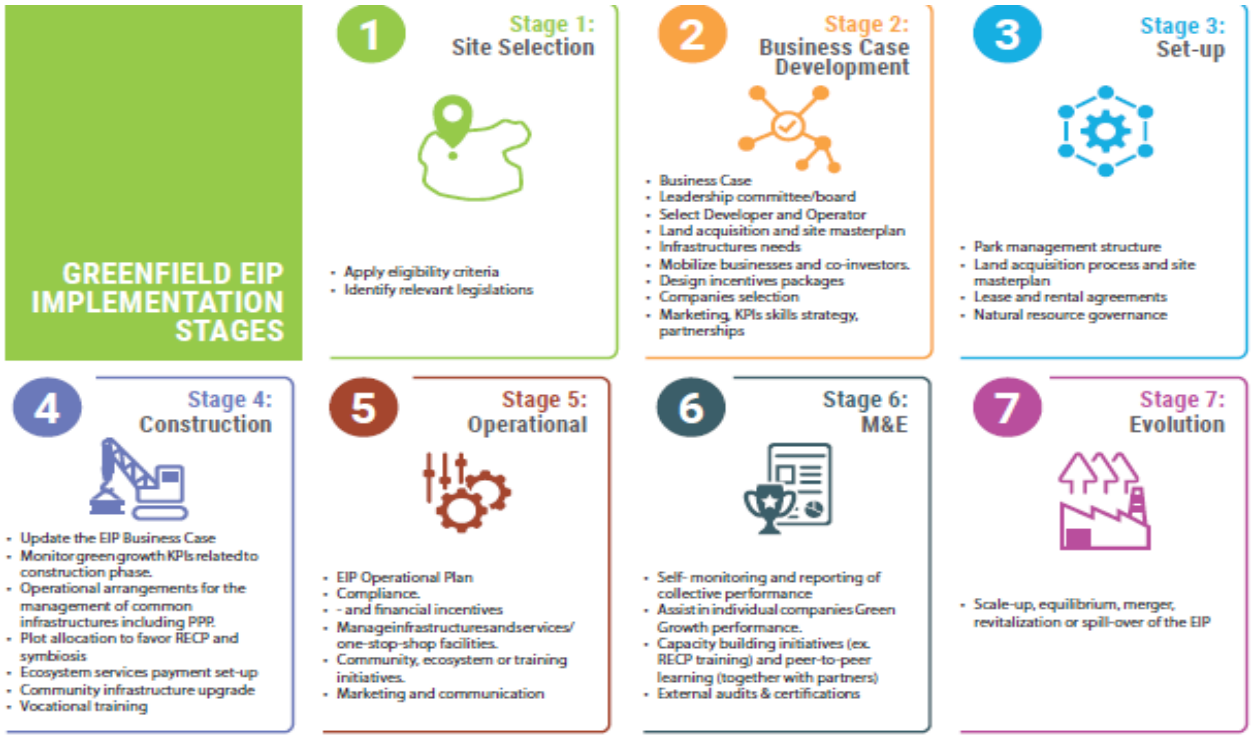

Figure 3: Greenfield Industrial parks and Freezones implementation stages.

Eco-Industrial concepts where presented based on UNIDO Eco-Industrial Parks Handbook[1] and GGGI Green Growth tools[2]. Figure 4 shows UNIDO Eco-Industrial Parks definition and the application of Resource Efficiency and Cleaner Production individually at company level, collectively at Park's level (circular economy and symbiosis through common infrastructures) to translate into sustainable cities through urban symbiosis. An important factor highlighted is that an IP or FZ can benefit the whole community in its surrounding including businesses that may not be situated in the park, as they can take advantage of its services, value chains or infrastructures.

[1] https://www.unido.org/sites/default/files/files/2018-05/UNIDO%20Eco-Industrial%20Park%20Handbook_English.pdf

[2] Particularly extended Cost Benefit Analysis (eCBA) https://gggi.org/site/assets/uploads/2019/01/FINAL-2018-eCBA-Handbook_EN.pdf

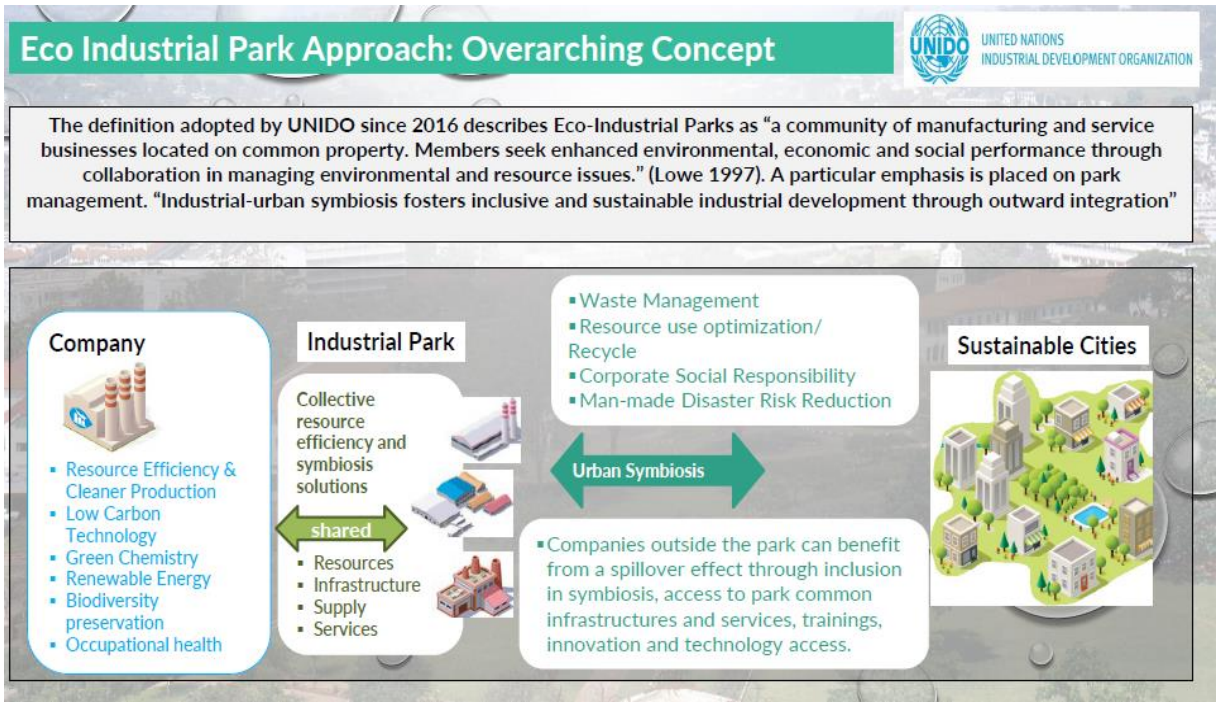

Figure 4: UNIDO Eco-Industrial Parks definition

Thoughts about green growth scenarios as presented in Figure 5 and applicable for each site were discussed in conjunction with IP/FZ site selection and definition. The end goal is to optimize performance on the economic, environmental and social levels as well as enhance Business Continuity/Resilience. This can lead to a productive sectors prioritization and common infrastructure identification that can harness the best of the IP/FZ potential (see Fig. 6).

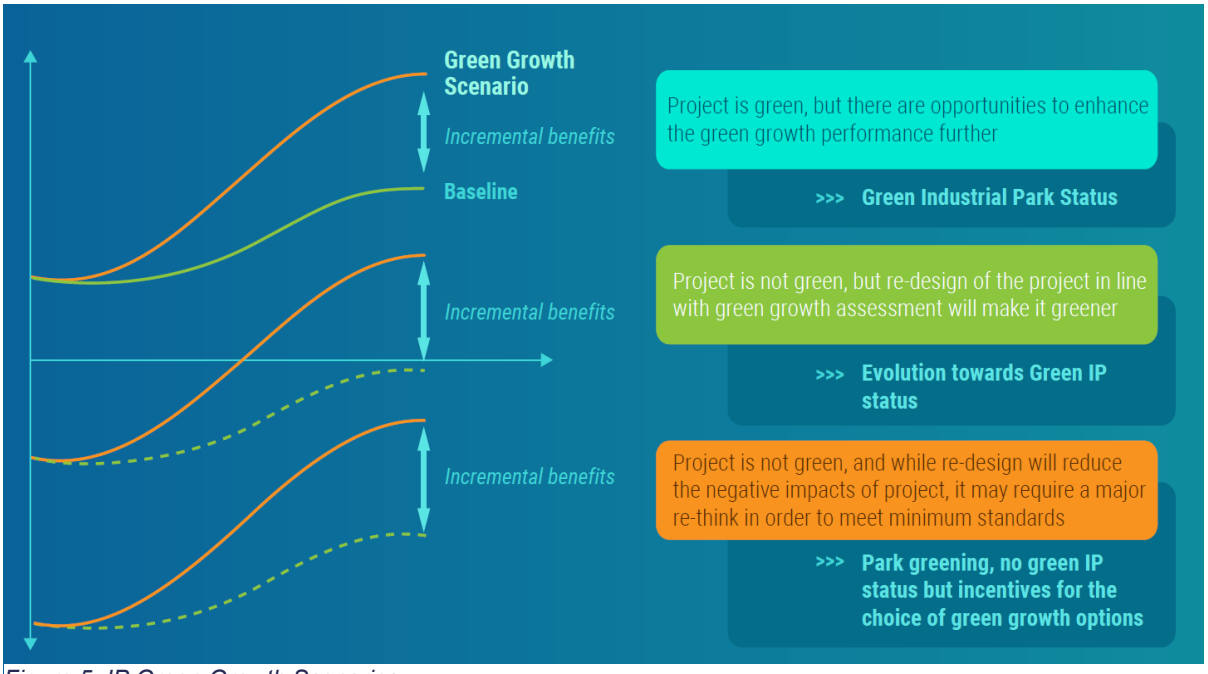

Figure 5: IP Green Growth Scenarios

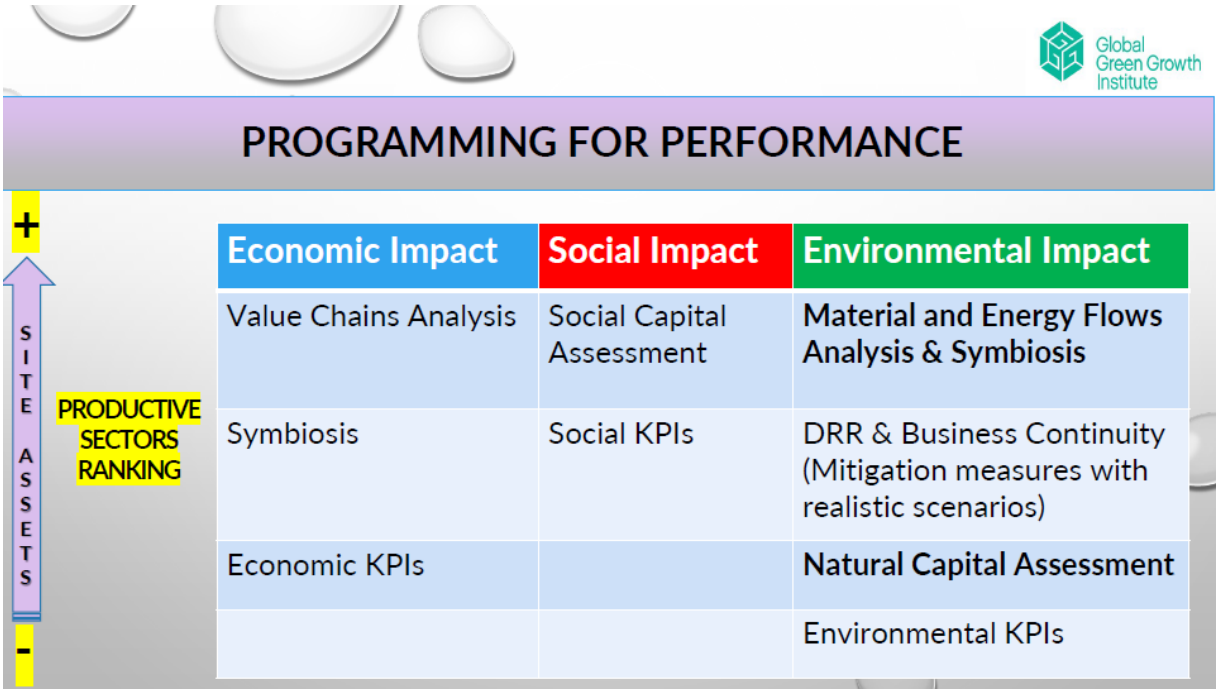

Figure 6: Programming for Performance

To achieve this prioritization, a Material and Energy Flows Analysis at IP/FZ level is necessary by compiling all the contributions from existing or planned companies. The team tried to gather preliminary data with the participants present to provide a rough picture of those flows, their impact on the environment and the opportunities for circular loops using the basic flowchart presented in Figure 7. They were able to provide collective and individual companies RECP advice (see also RECP summarized measured in Figure 8) even in this short period and limited data. However, the quality of the information highly depended on the level of knowledge of the participants, the particular companies' business models and value chains represented or were extrapolated from one value chain to another. Dedicated RECP missions with Value Chain Analysis are needed to provide more accurate data.

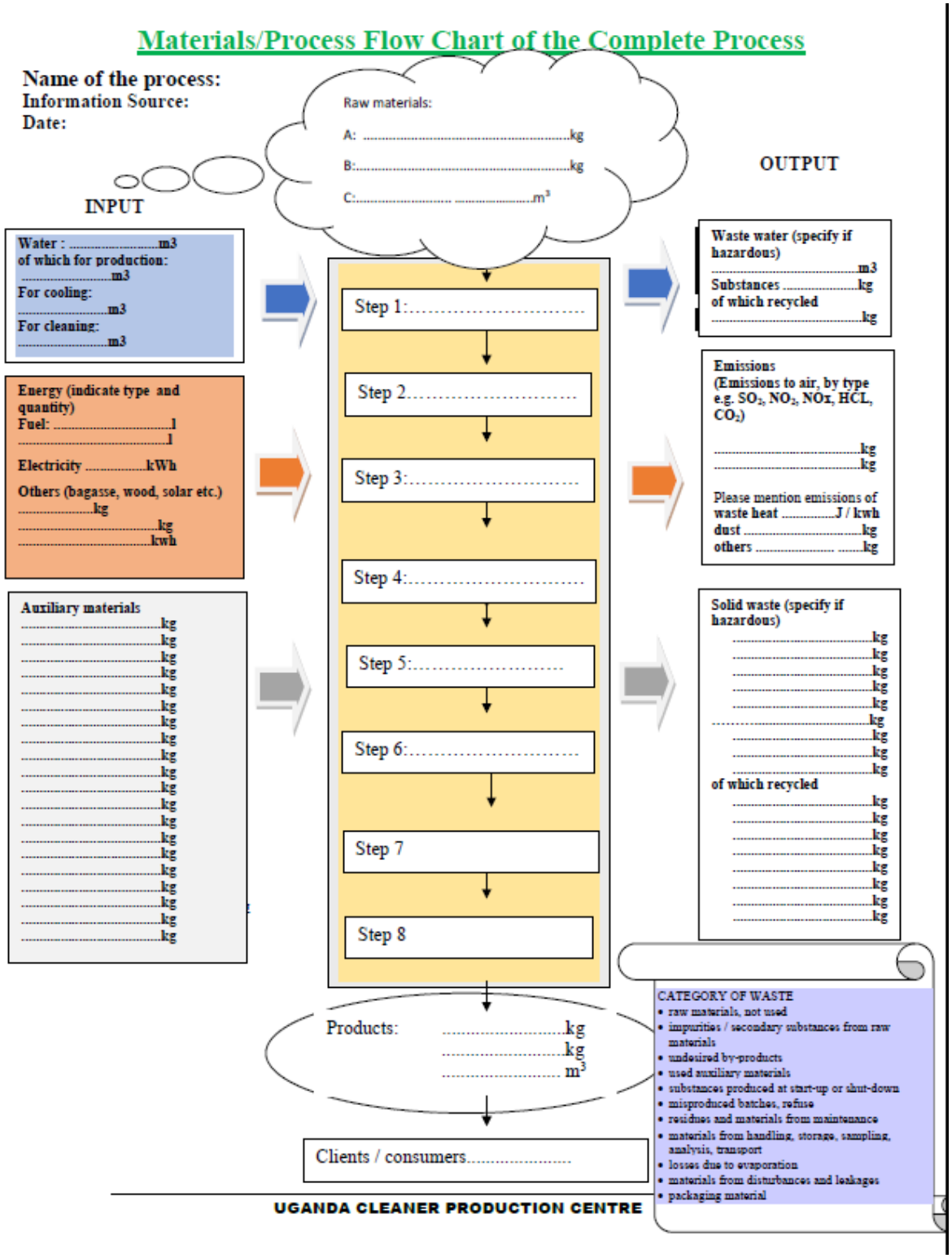

Figure 7: Programming for Performance

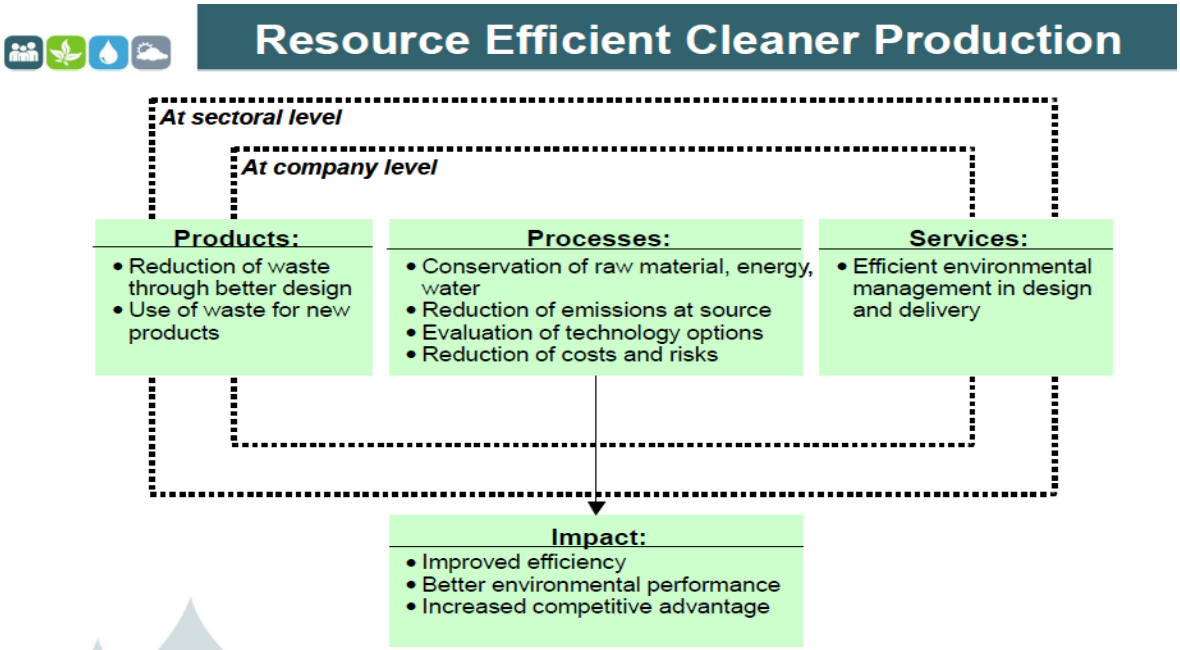

Figure 8: RECP general measures

3.2. Business Continuity/Resilience

Individual companies and IP/FZ alike are subjected to a range of risks summarized in Table 2.

Table 2: Categories of business risks

Type of Risks		
1. PLANNING RISKS • Planning compliance • Surrounding population density • Traffic and congestion • Adjacent projects • Utilities capacity • Enterprise layout • Land acquisition (see Chapter 5.1) • Demand risks • Economic justification	**2. STRATEGIC & OPERATIONAL RISKS** • Construction risks • Supplier and partner non-performance risks • Policy instability • Promoter capacity • Operations • Governance • Technology • Regulatory framework	**3. FINANCIAL RISKS** • Stock exchange /capital market fluctuations • Exchange and interest rate fluctuation • Liquidity / cash flow • Fraud • Financial viability
4. MARKET, COMMERCIAL & INTELLECTUAL PROPERTY RISKS • Competitors/ Market share/ • Reputational • Business interruption • Counterfeits • Copyright pirates • Trade secret thieves	**5. HUMAN RESOURCE, OCCUPATIONAL & SOCIAL RISKS** • Accidents/health • Operational safety • Knowledge management • Emergency support • Management • Community conflicts • Discrimination, Gender, asn	**6. ENVIRONMENTAL & HAZARDS** • Natural disasters (ex: storm, flood, fire…) • Industrial disasters (hazardous materials handling, wase and wastewater disposal, …) • Climate Change • Interruption of ecosystems services or depletion of natural stocks. • Pests control • Genetic contamination

Type of Risks		
7. **FIXED ASSET RISKS** • Security • Energy supply • Property/Infrastructure damage • Machinery breakdown	8. **GLOBAL RISKS: EPIDEMICS, POLITICAL, ECONOMICS** • Covid-19 • Global financial crisis • Conflicts	9. **IT/DATA PROTECTION RISKS** • Hardware and software failure • Malicious attacks and viruses • Loss & theft of personal data

Risks reduction should underpin every activity from site selection to sectors prioritization and more. They are also key factors to take into account when designing domestic or international markets measures. For all site, the team explained why more flexibility on export and domestic products generation has many advantages such as a) it enables to close the circular economy loops and use by-products b) export products tend to have a high level of discards that may not meet export quality criteria particularly in the agro-food sector, second class products need valorization and distribution often in the domestic market, c) as a business continuity measure, many companies and countries have shifted from an export only to a more diversified economy particularly in the light of Covid-19 logistics constraints, d) it enables the company to grow and develop its expertise on a range of products and the local population also to benefit from improved greener products. Thus, linkages or collaborations between IPs and FZ in different locations have been systematically explored implying closer collaboration between UIA and UFZA. Table 3 summarizes the arguments for desegregating exports and domestic markets measures.

Table 3: Exports vs Domestic Market desegregation

Circular Economy	Business Diversification	Business Continuity
Valorization of by-products to close circular economy loops for DM	Non export quality products valorization	DRR & global threats resilience
Waste Valorization (scavenger economy for DM	Business growth and strategy	Value-chain resilience
Post-harvest loss reduction	Improved DM products offer and consumer's choice	Compliance monitoring and anti-corruption (virtuous cycle) measures for both export and DM products.
	Increased import replacement	Reduced dependency
	Non export quality products valorization	DRR & global threats resilience

3.3. Value Proposition

A key result from the mission was to develop the dialogue between the private and public sectors, determining on one side the services expectations from IP/FZ tenants and aspirant companies and what the authorities can offer through their IP/FZ infrastructures and services. Namely, IPs/FZs to be attractive would need to help companies alleviate some of their pains and increase their gains as schematized in the Value Proposition Canvas (Figure 9).

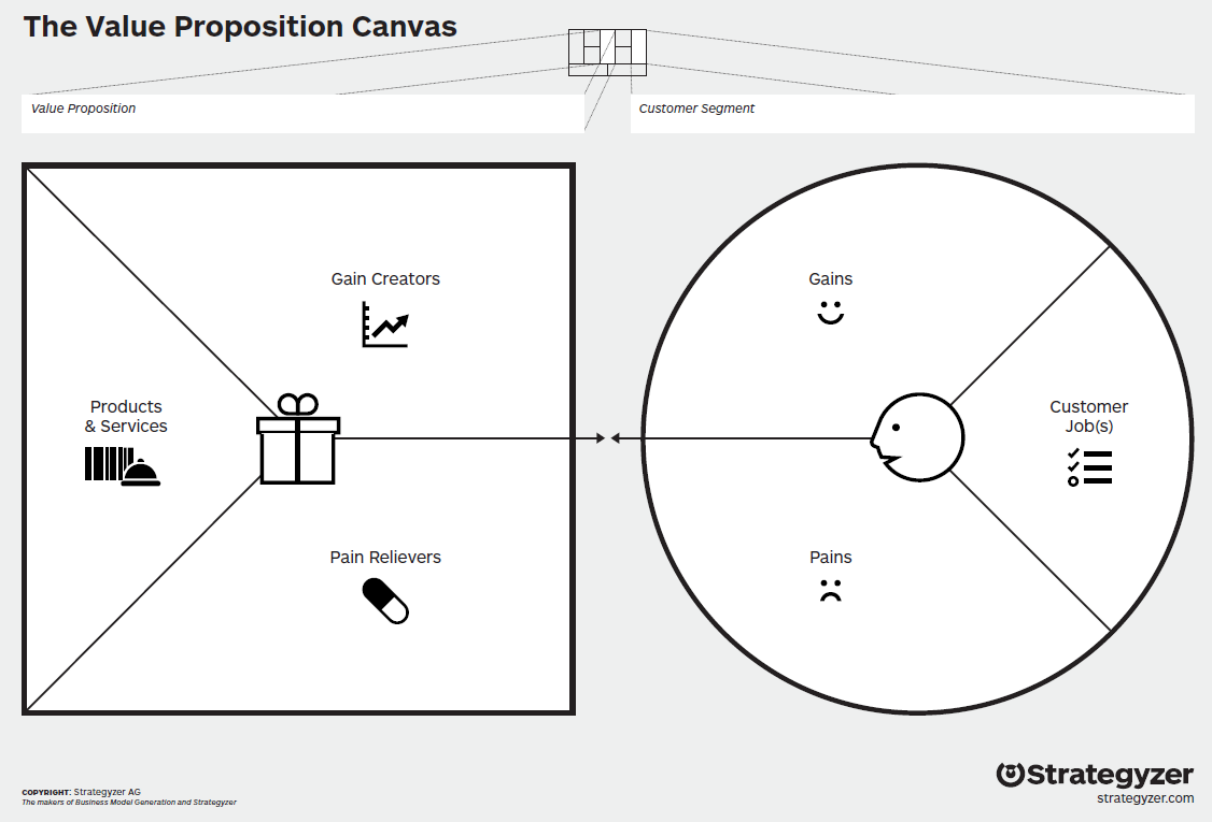

Figure 9: Value proposition Canvas

Moreover, the IP/FZ policy guidelines provide a comprehensive list of criteria to develop a Business Case Proposal for an IP/FZ which should guide as well the selection of tenants' companies. Those criteria are summarized in the site selection diagram Figure 10. As part of the criteria should be the contribution of the company to develop the value chain (backwards linkages) and use of local materials, local employment, green technology and innovation, contribution to byproducts reuse, food security contribution and poverty reduction, etc. In particular for FZs, no company granted plots should be solely motivated by the financial incentives.

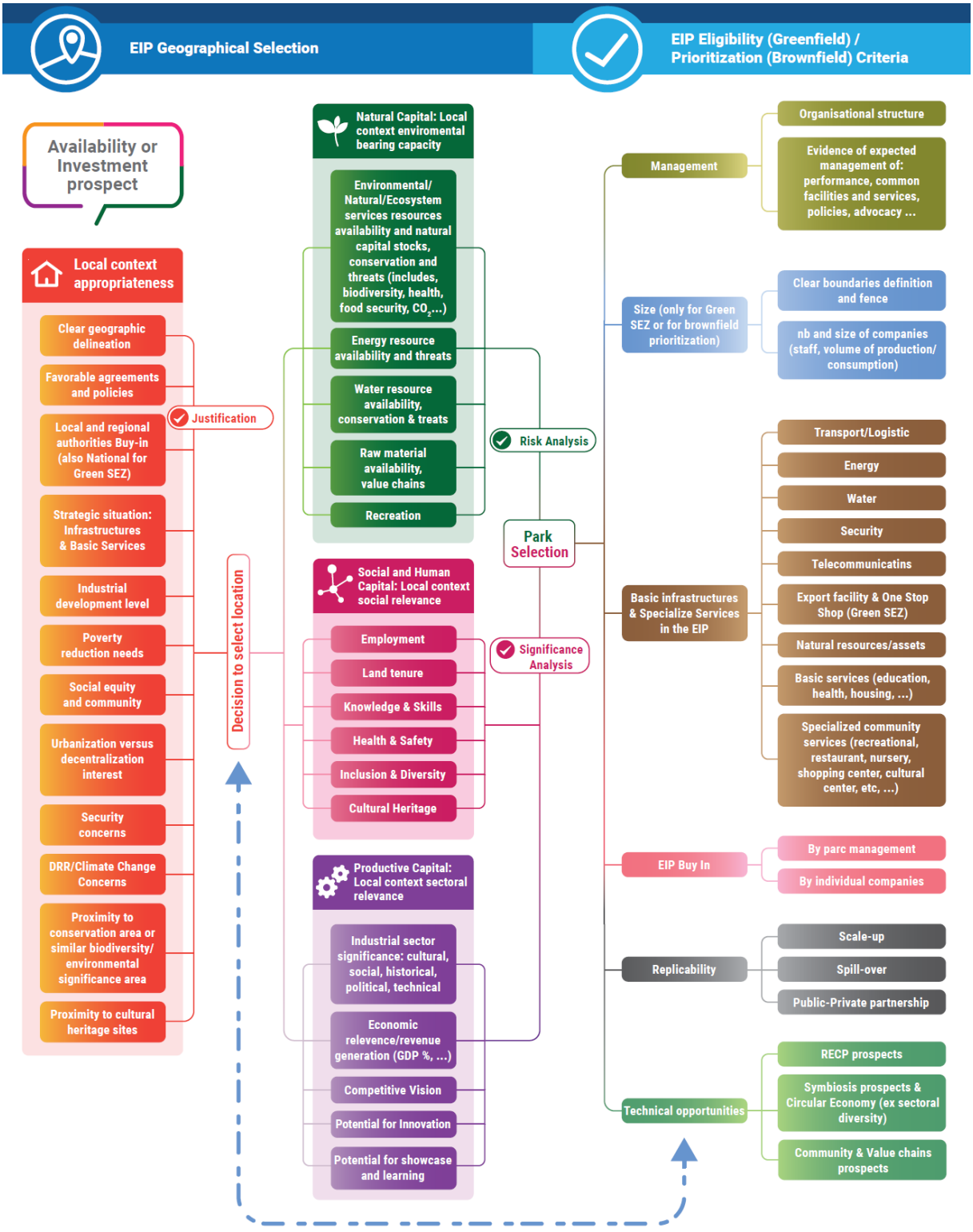

Figure 10: Site selection criteria

To strengthen the IP/FZ value proposition, one needs to develop its business model understanding its key activities, necessary resources, partners, customers segments, etc., as summarized in figure 11. Therefore, an important part of the working groups time was dedicated to explore those key questions.

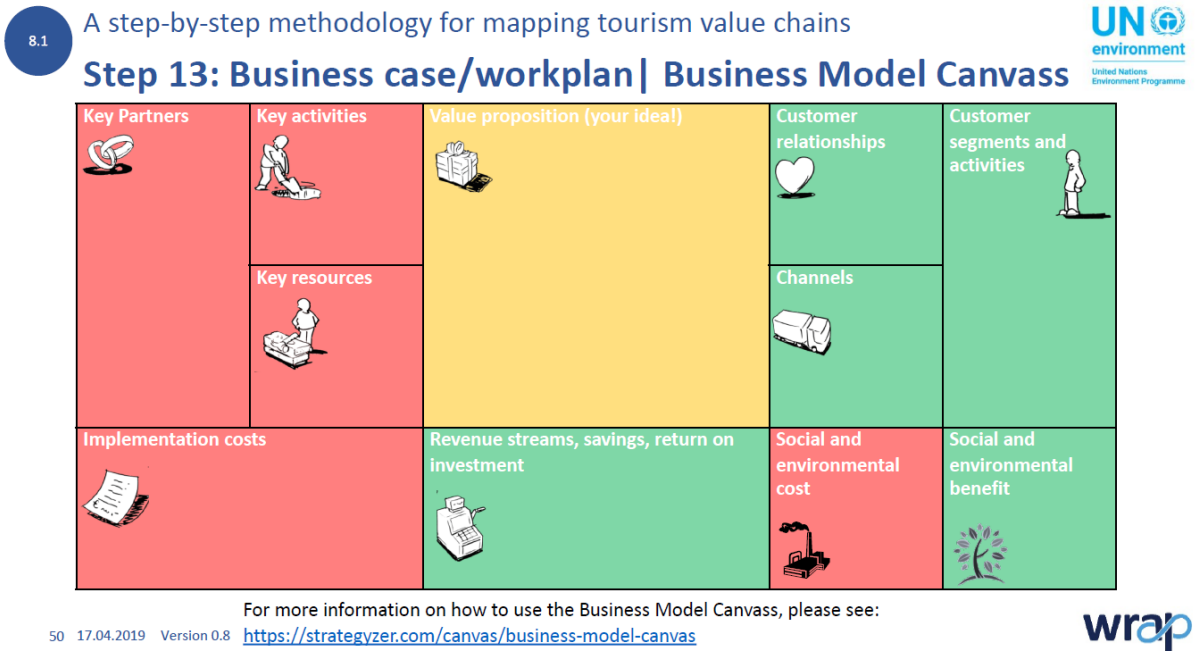

Figure 11: Business Model Canvas

The reflection on the IP/FZ offer of services cannot take place without addressing management needs and financial sustainability. Typically, an IP/FZ management structure would look like in Figure 12 and ensure proper support in services management, environmental compliance, marketing and more. In a FZ, this is complemented by a One Stop Center (also called One Stop Shop in the literature) which aims to provide inter-agency support to ease business particularly for exports. It is highly recommended for IP/FZ management to be financially self-sustainable after a few years of government budget support, particularly as the most suitable model for Uganda public IP/FZ would most likely be the subcontracting of a private management contractor. Figure 13 shows typical FZ/IP revenues streams. However, most of the land has been granted for free to investors rather than on a lease model, thus the business plans for each IP/FZ will need revision to address the cost recovery of the common infrastructures proposed in this report. Therefore, follow-up missions will need to tackle the infrastructures design in details but also the cost-recovery and management components (see Management Chapter 7).

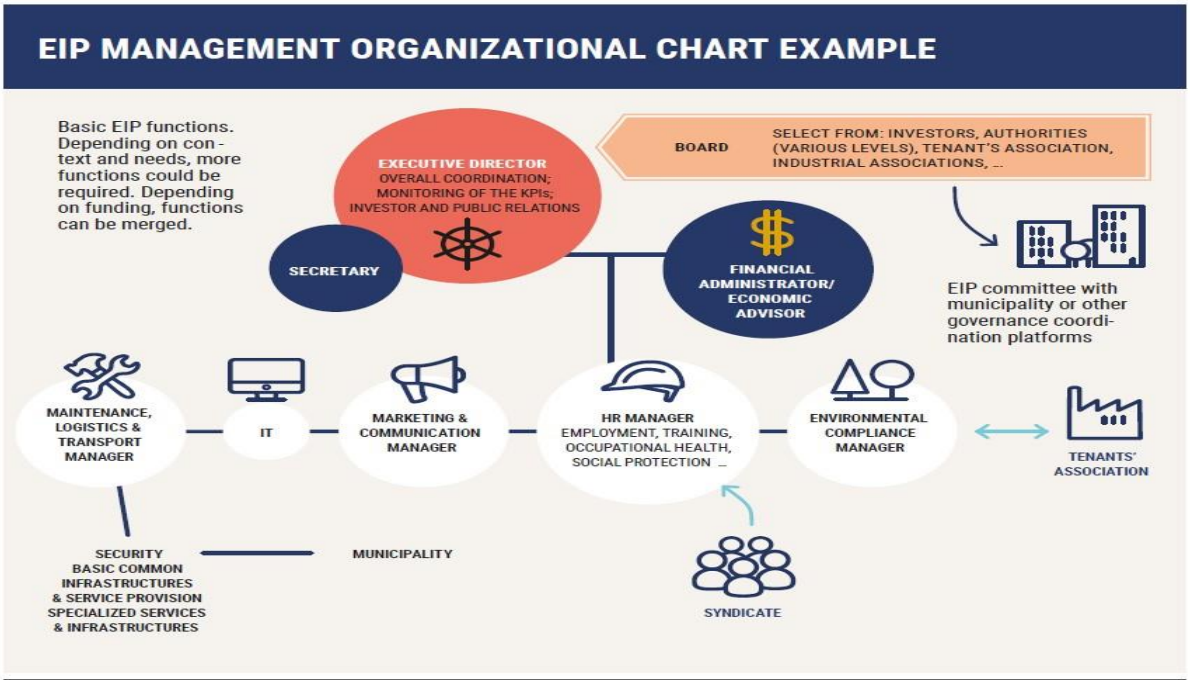

Figure 12: IP/FZ management organizational chart example

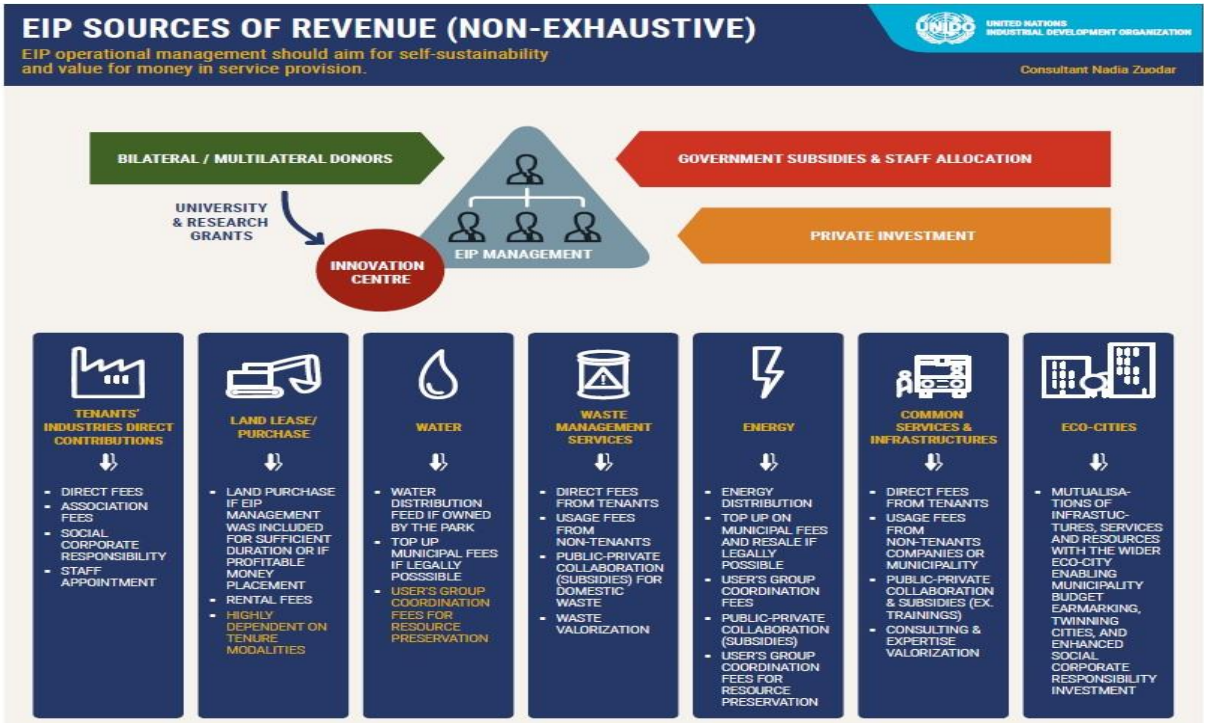

Figure 13: IP/FZ sources of revenue

4. Entebbe International Airport Freezone

4.1. General Situation and Current Status

Image 5: Entebbe International Airport Freezone Units Construction June 22

Entebbe International Airport Freezone (Image 5) is a 5 acres public zone acquired by UFZA from Uganda Civil Aviation Authority (UCAA). It is adjacent to the Cargo terminal as shown in Fig. 14. Construction works started in 2021 and were mandated to the National Enterprise Corporation (NEC), the commercial arm of the Uganda People's Defense Force (UPDF). UFZA ensures that the areas to be considered as Freezones are gazetted and developed. Within the current regulations, it is possible to register a company as part of a FZ with gazette land outside the FZ. UIA main role in regards to the FZ is:

a) Establish, Develop and Manage Free Zones;
b) Promote and Market Free Zones;
c) License and Regulate Free Zone Activities; and
d) Supervise, Maintain and Control Free Zones.

Figure 14: Entebbe International Airport Freezone site in red. Source: TECO-UFZA project study team 2019

Entebbe FZ was Initially estimated to cost UGX47billion, comprising Production units blocks 1 and 2 (each with 3 compartments), an Anchor unit block, parking areas, access control, roadworks and a four level Trade House as shown in Image 6. It is anticipated that a maximum of 14 industries/businesses will be able to setup operations

A Contract Management Team chaired by the Manager Technical Services comprising an Architect, Quantity Surveyor, and Civil Engineer from Ministry of Works and Transport, and the Municipal Engineer for Entebbe, was set up to oversee the project on behalf of UFZA. However, the future set up and arrangements for the management of the FZ are not yet

established. It is not clear as well how the compliance from gazette land outside of the FZ would be performed (see Management Chapter 7). The Trade House encompassing a One Stop Center and additional office spaces is being planned. A One Stop Center aims to facilitate export-led business. It has the duties to approve and issue permits, licenses and registration to the Zone Investors, including the approval of incentives, pursuant to the full authority delegated by the line ministries and institutions. Dedicated staff from each relevant line ministries or agencies should be assigned to a One Stop Center to offer a seamlessly-integrated administrative services package to investors and tenants' companies. In particular UFZA, Uganda Revenue Authority (URA), Ministry of Agriculture Animal Industry and Fisheries (MAAIF), Uganda Standards Bureau (USB) and other Government MDAs who facilitate exports should be represented. At the moment, the service offer from the One Stop Center is also to be further specified and given its public status, Entebbe Freezone is considered as a practical learning case for all future FZ development.

Image 6: Artistic Impression of Entebbe FZ. Source UFZA presentation from UFZA Technical Services to GGGI on 21st of June 2022.

As of June 22, the FZ had completed partial construction as of:

- Earthworks and Embankment walls;
- Roadworks to formation level;
- Production unit block 1 to scope;
- Production Unit II block at roofing stage; and
- Southern embankment wall strengthening works at mobilization and site clearance stage.

The value of the measured works was UGX 14,284,255,678, representing 76% of disbursed funds.
UFZA is therefore experiencing a funding gap of approximately UGX28.24 billion to complete the original scope of the project. However, this does not take into account the need for symbiotic infrastructures to support industries in the FZ and additional services to enhance the FZ value proposition towards specific industrial sectors.

UFZA upcoming stated priorities are the following:

- Consideration of Greening Concepts;
- Develop a Management and utilization Policy of Public Free Zones;

- Consideration of a Multi-Year Contract execution and budget.

The mission enabled UFZA to realize that Greening as a concept is not a mere Green Building isolated measures but, in this context, has more to do with the implementation of an industrial ecology approach, in particular the identification of symbiotic infrastructure and a thorough material flow analysis that can clarify the site environmental bearing capacities and thus the choice of sectors and processes within each sectoral value chain.

Image 7: Entebbe FZ Road access construction with Lake Victoria in the background

4.2. Description of potential investors and business partners

At the time of writing, UFZA has received several expressions of interests but has not yet proceeded with a selection. The workshop enabled to clarify the expectations and motivation of some of the candidates as well as investigate the possible interest of companies who did not. The FZ is expected to create over 200 direct jobs[3] thus the most important feature are the back-up linkages (value chains) companies can create which generate a more significant number of indirect jobs and contribute to poverty alleviation particularly in the rural areas. Table 4 shows a non-exhaustive list of potential investors and business partners. Line ministries falling under the Trade House One Stop Center) have not been repeated.

Table 4: Entebbe FZ potential investors and business partners.

Name	**Activity**	**Location, status of Expression of Interest (EOI) or lease**	**Interest** (refer to the value chain section 3.3)
DAIRY DEVELOPMENT AUTHORITY (DDA)[4]	***Dairy*** Dairy Development Authority (DDA) is a semi-autonomous agency under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Its role is to develop and regulate the dairy industry in Uganda. Its goal is to enhance dairy value addition and quality for increased market competitiveness.	Local authority. No EOI has been received so far from the dairy sector.	The DDA provided information on behalf of the dairy sector to compensate the absence of dairy companies in the workshop despite the extended invitations.
VITAANOVA HEALTH CARE[5]	***Pharmaceuticals*** Vitaanova Healthcare Uganda Ltd is a part of a global marketing and Distribution company. The Group has presence in more than nine African countries. Vitaanova Healthcare Uganda Ltd operates as the distributor and provides a platform for import to global companies to get their products	The company has submitted an EOI.	It seemed that the main attractiveness to enter the FZ is the tax-free regime. Besides it does not offer much value chain linkages within Uganda, though it was mentioned the plans for establishing

[3] https://freezones.go.ug/first-public-free-zone-in-uganda-commissioned-at-entebbe-international-airport/

[4] https://dda.go.ug/about.php

[5] https://vitaanovahealthcare.com/about-us/

	registered and start the distribution process across Uganda. It also supports global companies to get their products manufactured under private labels and contract manufacturing from their parent manufacturing companies / from their facilities. The company offers various products ranging from generic medicine, nutraceuticals, surgical products and Over-The-Counter (OTC) drugs.		a fabric in Jinga. Value Chain linkages is a key UFZA selection criterion to support employment and poverty reduction and so far, there was no evidence of any local sourcing from the company.
PEARL HEALTH SCIENCES	***Pharmaceuticals*** This company is setting up a pharmaceutical manufacturing facility at UIA- Jinja Industrial & Business Park (JIBP) for producing generic medicines (tablets, capsules & oral liquids) and trading of such products[6].	Based in Kakira Town. Not currently in Entebbe.	No further update.
KK Fresh Produce Exporters Limited (KK foods)[7]	***Agro-food*** KK Fresh Produce Exporters Limited is a company providing solutions to Ugandan farmers through the support of agricultural systems, quality seeds and agro-chemicals while focusing on general farming, fustigation, and irrigation. KK foods focuses on exploiting the abundant potential of small scale shareholding agriculture with the aim to perform export promotion through value chain development to export fresh fruits and vegetables to Europe and the rest of the world. The company has a yield of 200 tons of produce for export per month.	EOI submitted	Has a great interest to shift part of its activities in the FZ. It aims to expand to EU exports and for this reason requires more specialized testing services than other companies.
UGANDA MEAT PRODUCERS' COOPERATIVE UNION (UMPCU)[8]	***Meat*** To date, the Union is owned by 34 grassroots primary cooperative societies located in the "cattle corridor" and one in northern Uganda. It brings together approximately 2617 beef farmers. Its mission is to establish and maintain best practices and standards with the involvement of members and other stakeholders to produce value for money meat, and meat products. Its goal is to be the leading producer of high-quality meat and meat products for local and international markets.	EOI submitted	Has a great interest to shift part of its activities in the FZ for reputability and export markets expansion. Would also see positively the possibility to do by-products valorization with partner processors and have allegedly written an EIO reflecting this option.

[6] https://dhatugroup.com/mukesh-kumar/
[7] https://www.kkfoods.co/pages/about-kkfoods/
[8] https://www.ugandameat.ug/

Horti-fresh[9]	***Fresh Fruits and Vegetables*** HortiFresh is an all-inclusive business membership organization for the fresh fruits and vegetables sector. It is an Umbrella Association which offers a new beginning for exporters, growers, input suppliers and other service providers in the sector that is intended to improve economic development and sustainability for the horticulture sector. Its goal is to foster an inclusive network of stakeholders to promote improved production, compliance, market access, and positive social impact in the horticulture export industry.	EOI submitted	Has a great interest to shift part of its activities in the FZ. As an umbrella association, it has the potential to generate important rural value chains linkages. It can also make full use of a cold chain and export service at the FZ by bulking shipping from various providers.
BULLION REFINERY	***Gold*** The company produces semi-manufactured gold (including gold plated with platinum). It imports 100% raw materials for gold processing and then processes them into 99.9% pure gold bars which are exported mainly to United Arab Emirates.	The company is based in Kampala and is not situated in or near the FZ.	After discussion there is no interest for the company to be situated in the FZ or uses its services, primarily for security reasons.
Pearl Dairy[10]	***Dairy*** The Pearl dairy Farmers Community (PDFC) is an initiative by the (PDFL) Pearl Dairy Farms Limited (a leading Dairy manufacturing company based in Mbarara, Uganda) and IFC (International Finance Corporation). Since PDFLs' inception in 2013, the company has been procuring its raw material, milk, from farmers and cooperatives around the manufacturing facility in Mbarara. Before its operations, the wastage of milk in the region was over 50% of the produce and due to its proximity to the farming community, the company has been instrumental in reducing the wastage of milk.	Based in Mbarara at the moment.	This stakeholder has been recommended for consideration[11] in the FZ by DDA after the absence of dairy representatives in the workshop. No contact has been made so far. It is to note though that the company has recently experienced difficulties in exporting milk to Kenya, leading to a lay off of employees in 2020[12].
Amos Dairy[13]	***Dairy*** Amos Dairies Uganda Limited, also Amos Dairies, is a dairy processing company in Uganda. It is a subsidiary of Amos Dairies Limited, an Indian company with headquarters in New Delhi, India. Amos Dairies	The head office and factory of Amos Dairies Uganda Limited are located in	This stakeholder has been recommended for consideration[14] in the FZ by DDA after the absence of dairy representatives in the

[9] https://www.hortifreshffv.org/
[10] https://pearldairyfc.com/about-us/ and https://en.wikipedia.org/wiki/Pearl_Dairy_Farms_Limited
[11] It is actually an selection from DDA stakeholders list https://dda.go.ug/stakeholders.php
[12] https://ugandaradionetwork.net/story/mbarara-based-pearl-dairy-farm-lays-off-1500-workers
[13] https://en.wikipedia.org/wiki/Amos_Dairies_Uganda_Limited
[14] It is actually an selection from DDA stakeholders list https://dda.go.ug/stakeholders.php

	Uganda Limited purchases raw milk from 7,000 to 10,000 smallholder farmers in the community, through cooperative societies and middlemen. The milk is processed into Anhydrous milk fat, Butter, Ghee, Casein and Whey. The factory products are exported, to earn the country valuable foreign exchange.[5] In February 2020, Amos Diaries began to purchase raw milk from Kabula Farmers' Cooperative Society, in Lyantonde District, the district to the immediate east of Kiruhura District, where the factory is located.	Akageti, in Kiruhura District.	workshop. No contact has been made so far.
Lakeside Dairy Ltd[15]	***Dairy*** Lakeside Dairy Ltd. was incorporated on 15th July 2014, with the acquisition of Hillside Dairy & Agriculture Ltd., to carry forward the business of Dairy and Agriculture. It is a wholly owned subsidiary of Dodla Holdings Pvt. Ltd., Singapore. Hillside Dairy Limited already had a commendable presence in Western and Central Uganda. Lakeside Dairy Ltd has also obtained Investments License to establish a new manufacturing plant for processing milk and dairy products. The group is in expansion mode in Eastern Africa and particularly in Uganda as it diversifies its business portfolio to seize the available opportunity in the growing African market. With a present handling of 300,000 liters of (milk & milk products) per day, Lakeside Dairy is rapidly augmenting its processing capability and portfolio. Lakeside Dairy Ltd offers a wide range of Milk Products Comprising of Fresh Milk, Butter, Ghee, Paneer, Curd, Flavored Milk, Doodh Peda, Ice Cream and Skimmed Milk Powder.	The company is based in Mbarara	This stakeholder has been recommended for consideration[16] in the FZ by DDA after the absence of dairy representatives in the workshop. No contact has been made so far.
Vital Tomosis[17]	***Dairy*** Vital Tomosi Dairy Limited is a dairy processing company in Uganda.[2] The company is a joint venture between Vital Capital Fund, an Israel-based private equity fund, and "Tomosi Dairy Farms, a Ugandan producer of dairy products". Sold under the MilkMan brand, the resulting output supplies the local and regional markets with high-quality, affordable milk (UHT and fresh) and yogurt, all sourced from local smallholder farmers.	The main office and factory of the company are located in the town of Rushere, Kiruhura District.	This stakeholder has been recommended for consideration[18] in the FZ by DDA after the absence of dairy representatives in the workshop. No contact has been made so far.

[15] https://www.lakesidedairy.net/
[16] It is actually an selection from DDA stakeholders list https://dda.go.ug/stakeholders.php
[17] https://en.wikipedia.org/wiki/Vital_Tomosi_Dairy_Limited and https://vital-capital.com/vital-tomosis-dairy-vtd/
[18] It is actually an selection from DDA stakeholders list https://dda.go.ug/stakeholders.php

Jesa Dairy[19]	***Dairy*** JESA Farm Dairy is a family-owned dairy farm and processor in Uganda. The JESA brand comprises wide range of fresh, dairy products: namely fresh Pasteurized milk, UHT Milk, Yoghurt, Butter, Fresh Cream and Cream Cheese. airy farming is done on 600Ha of land on which a herd of 650 Friesian animals are raised under modern animal husbandry. All of the milk from the farm goes to the dairy which is also located on the farm. The dairy plant currently processes over 200,000 liters of milk a day.	The company is based in Busunju.	This stakeholder has been recommended for consideration[20] in the FZ by DDA after the absence of dairy representatives in the workshop. No contact has been made so far.
Lato Dairy	***Dairy*** It is a Ugandan dairy company specializing in the production of a wide range of milk products such a flavored milk, milk powder, yogurt, butter and ghee. As a brand in East Africa, Lato caters to both local and overseas markets. It aims to provide a platform for processing produce from the local dairy farmers in Mbarara.	It is based in Biharwe in Mbara district.	This stakeholder has been recommended for consideration[21] in the FZ by DDA after the absence of dairy representatives in the workshop. No contact has been made so far.
The Uganda Flowers & Exporters Association (UFEA)[22]	***Horticulture (Flowers)*** The Uganda Flowers Exporters Association (UFEA), a non-profit organization was established in 1993 as an umbrella organization of 14 companies bringing together growers and exporters of flowers in Uganda. UFEA provides business development services to its members and it is through the Association that efforts to influence government policies that affect the industry are lobbied and advocated for.	It is based in Entebbe.	Though a key potential partner, no representative participated to the workshop therefore further contacts are needed either with the association or with some of its members.
Wagagai Ltd[23]	***Horticulture (Flowers and Cuttings)*** Wagagai Ltd is one of the world's largest flower propagation companies of cuttings and one of the 14 UFEA members. The company mainly produce begonias, chrysanthemums and poinsettias, but also many pot plant cuttings. Based in the south of Uganda, it supplies several prominent European breeders and growers. It considers itself as not just	Entebbe International Airport, 14 Kitaasa Rd, Entebbe, Uganda	Interest from the horticulture sector to enter or use the FZ facilities in particular if cold chain and export services are provided need to be investigated as no participants from this sector attended.

[19] https://en.wikipedia.org/wiki/Jesa_Farm_Dairy_Limited, https://www.jesa.co.ug/?fbclid=IwAR0x98hdKEoOPVh1xogwSgJDqoibtvrg6yXjqXfFwVGdmva5YFk9lyRdPdw and https://www.facebook.com/JesaFarmDairy/

[20] It is actually a selection from DDA stakeholders list https://dda.go.ug/stakeholders.php

[21] It is actually a selection from DDA stakeholders list https://dda.go.ug/stakeholders.php

[22] https://ufea.co.ug/ and http://www.ugandaeconomy.com/trade-associations/ufea

[23] https://www.wagagai.com/

	a propagation company as it also develops social and environmental programs comprising of a fair trade pilot, employees health center, LED lightning for energy saving, etc.		
Pearl Flowers Ltd[24]	***Horticulture (Roses buds and stems)*** Pearl Flowers Ltd is a company that allegedly runs 80% of the economy in Ntungamo district, Western Uganda. Pearl Flowers Ltd consumes 20 hectares of volcanic soil used to grow roses. The company competes with Kenyan grown flowers and focuses on the quality and the sustainability of the production. It is one of the 14 UFEA members	The office location is in Bugolobi, Kampala. The farm location is in Rushenyi, Omugyenyi,Ntungamo	Same as above.
Rosebud Ltd[25]	***Horticulture (Roses)*** Rosebud Ltd claims to be the country's largest exporter of roses, commanding around 40% of Uganda's raised export market and is a UFEA member. The green houses on the farm cover a total of 50 hectares producing and exporting over 12 million stems per month. These stems, due to the favorable weather conditions experienced throughout the year, result in their all being of the same high standard. Rosebud Ltd solely specializes in the production of quality cut roses for export onto the world market. The company implements environmental sustainability measure as for example the greenhouses are irrigated by a modern, automated water-pumping unit, which feeds the fully computerized hydroponics systems.	It is based in Entebbe.	Same as above.
JP Cuttings[26]	***Horticulture (Cuttings)*** A company owned by Dutch stakeholders producing unrooted cuttings. It highlights its strict sanitary management using UV and Chlorine for water treatment. Its most important crops are Chrysanthemum, Fuchsia and Pelargonium amongst others.	Busiro	The company claims to be able to ship within 20 min with KLM and owns its own refrigerated trucks. It is unlikely the FZ would be attractive for more than the free-taxes but it would nevertheless be useful to gather information from such a stakeholder to better meet the expectations of the sector.

[24] https://www.pearlflowersug.com/
[25] http://www.rosebudlimited.com/
[26] http://www.jpcuttings.com/index.html

Oasis Nursery Ltd[27]	***Horticulture (Stems)*** The rose farm has 8.5 hectares under production and exports 12 million rose stems annually to European markets. The Oasis Nursery is MPS-A, MPS- SQ and MPS-GAP certified. MPS is an international accredited environment standard based on registration. It does not only concerned with the environment, but also plays a major role in the safety, health and conditions of employment. The Rose farm employs 260 employees, of whom 70% are women and 30% men. All casual workforce is locally sourced from the community hence increasing their livelihood. The Farm claims that at its inception, it invested in the electrification of the Kyungu village and neighboring areas by extending electricity from Mukono Town (a electricity line of 7 km). This spurred other economic activities like a stone quarry, medical center, cooking oil industry, in addition to domestic consumption.	Kyungu Village, Central Division, Mukono Municipality Mukono, Uganda	Interest from the horticulture sector to enter or use the FZ facilities in particular if cold chain and export services are provided need to be investigated as no participants from this sector attended.
Uganda Fish Processors & Exporters Association (UFPEA)[28]	***Fish*** Uganda Fish Processors & Exporters Association (UFPEA) was founded in 1993 as a non-profit organisation that brings together all industrial fish processors in Uganda. Later it formally registered in 1999 as a Company Limited by Guarantee and not having a share capital. The core business of UFPEA members is processing, value addition and export of fish and fishery products to different destinations that include the European Union which accounts for over 75% of total exports in terms of volume followed by the Middle East, Singapore China, Japan, USA, COMESA and the regional market. UFPEA provides business development services to its members and through the association, efforts are made to advocate for policies that favor the fish sub sector. Currently membership consists of 11 fish processing firms whose Locations include 2 in Jinja, 1 in Rakai, 4 in Kampala, and 4 in Entebbe. The “Quality Assurance Managers Association” (QAMA) is an affiliated association of UFPEA comprising of the Quality Assurance Managers within the industry who pool their expertise to ensure a harmonized approach towards fish quality and safety issues.	It is based in Entebbe.	

[27] https://www.oasisnursery.biz/
[28] https://ufpea.co.ug/about/

	11 processing plants that are currently in operation employ about 32,000 workers of which more than 90% are Uganda citizens. They export over averagely above 29,000 metric tonnes annually of fish products to international markets and export revenue USD 116 million per year on average.		
Fresh Perch Ltd[29]	***Fish*** Fresh Perch Limited is a privately owned commercial Fish exporting company. It claims being a leading exporter of Nile Perch from Uganda, marketing its products in the European, Far East and Middle East markets. Freshness of the product is a fine attribute of the commitment from the entire niche of the cold chain. It's achieved as a result of vertically integrated control processes which start from fishermen to the processor. Fresh Perch Ltd provides the basic infrastructure and training to enhance the knowledge for effective utilization of all the resources involved in the chain. Its ice production capacity of 60 tons ensures supply of adequate ice to the fishermen & icing of the fish in insulated trucks from all the collection centers spread across the Ugandan shorelines of Lake Victoria. The raw material is inspected and the selected fish is washed at the centers, packed in insulated boxes with ice and transported in a fleet of insulated, refrigerated vans to the processing plant. Processing facility with daily capacity to produce 30 tons of finished product and storage capacity of more than 350 tons ensures maintained cold chain and hence production of a fresh product.	It is based in Entebbe.	Given its own cold chain capacity, it is unlikely the FZ would be attractive for more than the free-taxes but it would nevertheless be useful to gather information from such a stakeholder to better meet the expectations of the sector.
Entebbe fish farm consultants and suppliers[30]	***Fish*** No company description is provided on the facebook site but pictures show a fish farming in Lake Victoria.	It is based in Entebbe.	It could be an interesting stakeholder to see what the FZ could offer to small scale fisheries.

[29] http://freshperch.co.ug/index.php
[30] https://www.facebook.com/Entebbe-fish-farm-consultants-and-suppliers-102130052274450/?ref=page_internal

4.3. Key productive sectors and value chains observations

The result of the discussions, site assessments and analysis of the economic, environmental and social aspects led to the selection of the key sectors showed in Table 5, the elimination of potential ones (sectors crossed out) and the identification of services and incentives that would translate in the FZ value proposition[31].

Table 5: Entebbe FZ key potential sectors

FZ key sectors, potential services and incentives for Entebbe FZ		
SECTORS	**SERVICES**	**INCENTIVES**
▪ **Horticulture** ▪ **Agri/Food** ▪ **Meat** ▪ **Fish** ▪ **Dairy** ▪ ~~**Pharmaceuticals**~~ ▪ ~~**Gold**~~	▪ Infrastructures (waste, water) ▪ Storage ▪ Packaging ▪ Cleaning ▪ Washing ▪ Sanitary treatments (irradiation? fumigation) ▪ Cold Chain including cold storage as a service for tenants and outside companies.	▪ One stop service ▪ Import and export tax free

The main limitation in regards to the sectors and companies' processes that could be fitted in the park is its very small size of 5 acres resulting notably in the following:

- Insufficient space for on-site infrastructures (waste water treatment plants, solid waste treatment…) as well as for individual companies' infrastructures.
- Water surface run off poses too great risks for Victoria Lake (see section 4.5.1)
- Water supply is limited

Therefore, the companies potentially interested to settle in the FZ were presented with **3 options**:

A. Processing at site

B. Close to finish processing

C. Consider 105 acres of land at Buwaya (30km away) for establishing a processing plant and required infrastructures.

Option C is an opportunity for the future to take advantage of a piece of land already acquired by UFZA but on which there is a land claim under trial. Access at the moment requires boat transportation which is much inconvenient but there are plans for a connecting bridge in the near future. The valorization of this land would require finance which is also problematic given the current gap of funding. Therefore, option C has been presented as hypothetical for the future with the priority being for the companies to assess their interest and activities feasibility

[31] Group discussions drawings are in Annex F

under options A and B, and only if those are confirmed to consider the added opportunity offered by option C[32]. In case option C would materialize, it would be recommended to offer a premium to companies who would choose to move from the FZ to the new site.

Table 6 presents the result of the options selection:

Table 6: Selection of options for sectoral processes allocation in the FZ

Selection of options for processes allocation in the FZ by sectors			
SECTORS	**Option A: Processing on site**	**Option B: Close to finish processing**	**Option C: Use of Buwaya land for processing**
Horticulture (Flowers)	Potentially yes but Value Chain analysis needed.	Potentially yes but Value Chain analysis needed.	Value Chain analysis needed to take full advantage of the export opportunities and assess this option.
Agri/Food	Yes, but dependent on water usage and waste generation. Explore linkages with Soroti IP for byproducts valorization.	Yes	Option C more suitable if special treatments needed (ex. EU exports) or for byproducts valorization.
Meat	Yes, but dependent on water usage and waste generation. Explore linkages with Soroti IP for byproducts valorization.	Yes	Option C can offer opportunities for byproducts valorization.
Fish	No participation to the workshop but the presence of the trade house makes options A unlikely (strong smells).	No participation to the workshop but the presence of the trade house makes option B (strong smells) unlikely. Possible interest for rented cold storage only.	Possible interest for option C to be confirmed by a value chain analysis.
Dairy	No participation to the workshop but the 3 options are possible depending on volume of water/waste. To be confirmed by a value chain analysis and after discussion with the dairy stakeholders	No participation to the workshop but the 3 options are possible depending on volume of water/waste. To be confirmed by a value chain analysis and after discussion with the dairy stakeholders listed in Table 4. Explore linkages	No participation to the workshop but the 3 options are possible depending on volume of water/waste. To be confirmed by a value chain analysis and after discussion with the dairy stakeholders listed in Table 4. Explore linkages with Soroti Innovation Center.

[32] An attempt to secure 15 more acres in the immediate vicinity of the FZ has not been successful as the owner refuse to sell.

	listed in Table 4. Explore linkages with Soroti Innovation Center.	with Soroti Innovation Center.	
~~**Pharmaceuticals**~~	Unlikely. The criterium for local value chain development is unmet unless for herbal companies that may valorize local production. Otherwise, attractiveness may only rest in the tax-free incentives which if the sole motivator, may undermine the purpose of a public FZ.	Unlikely. The criterium for local value chain development is unmet unless for herbal companies that may valorize local production. Otherwise, attractiveness may only rest in the tax-free incentives which if the sole motivator, may undermine the purpose of a public FZ.	Unlikely. The criteria for local value chain development is unmet unless for herbal companies that may valorize local production. Otherwise, attractiveness may only rest in the tax-free incentives which if the sole motivator, may undermine the purpose of a public FZ.
~~**Gold**~~	Not an option. Criteria for security, pollution, local value chain development are unmet even if using gazetted land outside the FZ.	Not an option. Criteria for security, pollution, local value chain development are unmet even if using gazetted land outside the FZ.	Not an option. Criteria for security, pollution, local value chain development are unmet even if using gazetted land outside the FZ.

Discussions on material flow analysis and value chains provided the insights into the sectors that resulted in the conclusion in Table 6. It was not possible to investigate potential additional sectors such as tourism or cosmetics during this mission and the size of the park versus the EOI received show that there will be already more candidates than space available. Therefore, analysis on complementary sectors should take place in case the Buwaya site is confirmed.

The following provides more details on both sectors and stakeholders.

4.3.1. Horticulture (Cut flowers and Seedlings)

Horticulture is potentially one of the anchor sectors for the FZ. According to UFEA, the flower industry is the 7th largest export earner in Uganda and Uganda's third-largest non-traditional export after gold and fish, earning the country approximately $30 million in foreign exchange in 2018. Unfortunately, no participant from this sector came to the workshop. Therefore, the analysis was made based on the knowledge of UFZA and participants from other sectors as well as on secondary data. Moreover, it is not sure that horticulture activities may be hosted in the limited space provided by the FZ though most of the processes may be delocalized in gazetted land. As for UFEA, some of its members seem to have already developed their export

logistics and cold chain which may question the added value for them to join the FZ if not just for the tax-free.

As per an outdated sector profile publication by UIA[33], the sector produces over 40 varieties mainly – Roses (70%), Chrysanthemum cuttings[34] (25%) and potted plants (5%). The main flower growing areas in Uganda are in the central region around the Lake Victoria basin – in districts such as Mpigi, Mukono and Wakiso. Other flower growing areas are in South Western Uganda - Ntungamo District and Kapchorwa District in Eastern Uganda. The Netherlands through the Dutch auction is the leading buyer of cut flowers and foliage. African countries such as Kenya, Uganda, and Zambia contribute sizeable export volumes. In 2009, Uganda was producing 60 per cent of the chrysanthemum cuttings exported to the Netherlands (UFEA). Ugandan flowers are further redistributed within the Netherlands to importers in other European countries such as Norway, Sweden, United Kingdom and Germany. Other important markets are the United Arab Emirates and the USA. In the same publication, the Uganda Investment Board provides also a few outlets selection for Uganda flower exporters[35] such as Flora Holland[36], Aalsmeer Flower Auction[37], Landgard[38], The UK Flower Industry[39].

A 2019 study by Asoko Insights provides interesting insights into the sector too. Uganda's flowers are grown almost exclusively for the export market, with 98% of production exported to the Netherlands. Of this, 90% of the flowers are sold through the auctions and 10% are sold through direct sales, mainly to florists. Workshop participants also expressed their knowledge of Netherlands as the main export market, with possible secondary routes to the UK and Nordic Countries. It points out to a possible gap in establishing direct export routes to traditional markets such as the EU, UAE and USA but also to growing markets such as China[40] and Japan[41]. The latter article reports that Japan imported 809 tons of roses from Kenya and 344 tons from Ethiopia, respectively, in 2019, with Kenya being the largest trade partner for Japan in rose imports thanks to its Cold Chain development. The leading floriculture exporters in East Africa, Kenya and Ethiopia devote substantially more space to the sector than Uganda and have more operators[42]. Entebbe FZ can likely play a pivotal role by offering cold chain services and possible additional land in Buwaya to bring Uganda to a level playing field with Kenya.

The study points out to various challenges hampering the sector such as the importation of seeds and rose plants (mainly from Kenya) and compliance with the phyto-sanitary export requirements to export to the EU. Uganda already offers special tax regimes to the sector making the FZ less likely to attract firms solely based on the tax-free status, which is a positive point.

Figure 15[43] shows Uganda Floriculture Supply Chain Map as per Asoko Insights: « The floriculture value chain in Uganda is centered around growers. « There are no local breeders and just one freight forwarding company that provides cold chain logistics for 80% of the sector. Two companies have fully integrated operations and manage their own transportation from farm to airport. Asoko has identified 22 firms involved in the flower industry as recognized by

[33] https://www.ugandainvest.go.ug/uia/images/Download_Center/SECTOR_PROFILE/Floriculture_Sector_Profile.pdf
[34] "Propagation by stem cutting is obtained when a healthy vegetative (non-flowering) shoot of a mother plant is cut off, and it is encouraged to form roots. This can be done by putting the shoot in a rooting medium. Once the roots are established, the cutting can be treated as a separate plant and can grow in the desired place » (https://www.ugaoo.com/knowledge-center/propagating-plants-by-stem-cuttings/).
[35] The websites have been updated here are most of the links in the UIA publication are obsolete.
[36] https://www.royalfloraholland.com/en
[37] https://www.european-traveler.com/netherlands/visit-aalsmeer-flower-auction-near-amsterdam-schiphol/
[38] https://www.landgard.de/
[39] http://www.flowersandplantsassociation.org.uk/industry/imported-origins.htm
[40] https://www.youtube.com/watch?v=9oPxrL_45Ns
[41] https://www.nipponexpress.com/press/report/10-Sep-20.html
[42] Uganda has approximately 386 hectares of land under production with plots averaging 21 hectares compared to some 1,700 hectares of 15–20-hectare plots in Ethiopia and 2,500 hectares operated as 25-40 hectare farms in Kenya. (https://www.asokoinsight.com/content/market-insights/uganda-floriculture-industry)
[43] https://www.asokoinsight.com/content/market-insights/uganda-floriculture-industry

the Uganda Flower Exporters Association. The majority (80%) are involved in the growing and exporting stages of the value chain, two of these are also transporters while the rest outsource their transport to another company. One company is a broker and wholesaler while one categorizes itself as a grower and broker. »

Given the limited number of actors, it could be useful to support new businesses wishing to start in the sector. That option could be encouraged through gazetted land and access to the cold chain and logistics services other firms have built on their own, but only if the management of those enables the same performance in particular the fast airfreight shipping. Such a program should be an endeavor of UFZA, UIA and Ministry of Agriculture jointly through a coherent program supporting the whole value chain. The FZ can play its role, particularly if the Buwaya site is open but can't be the primary instigator of such an ambitious program.

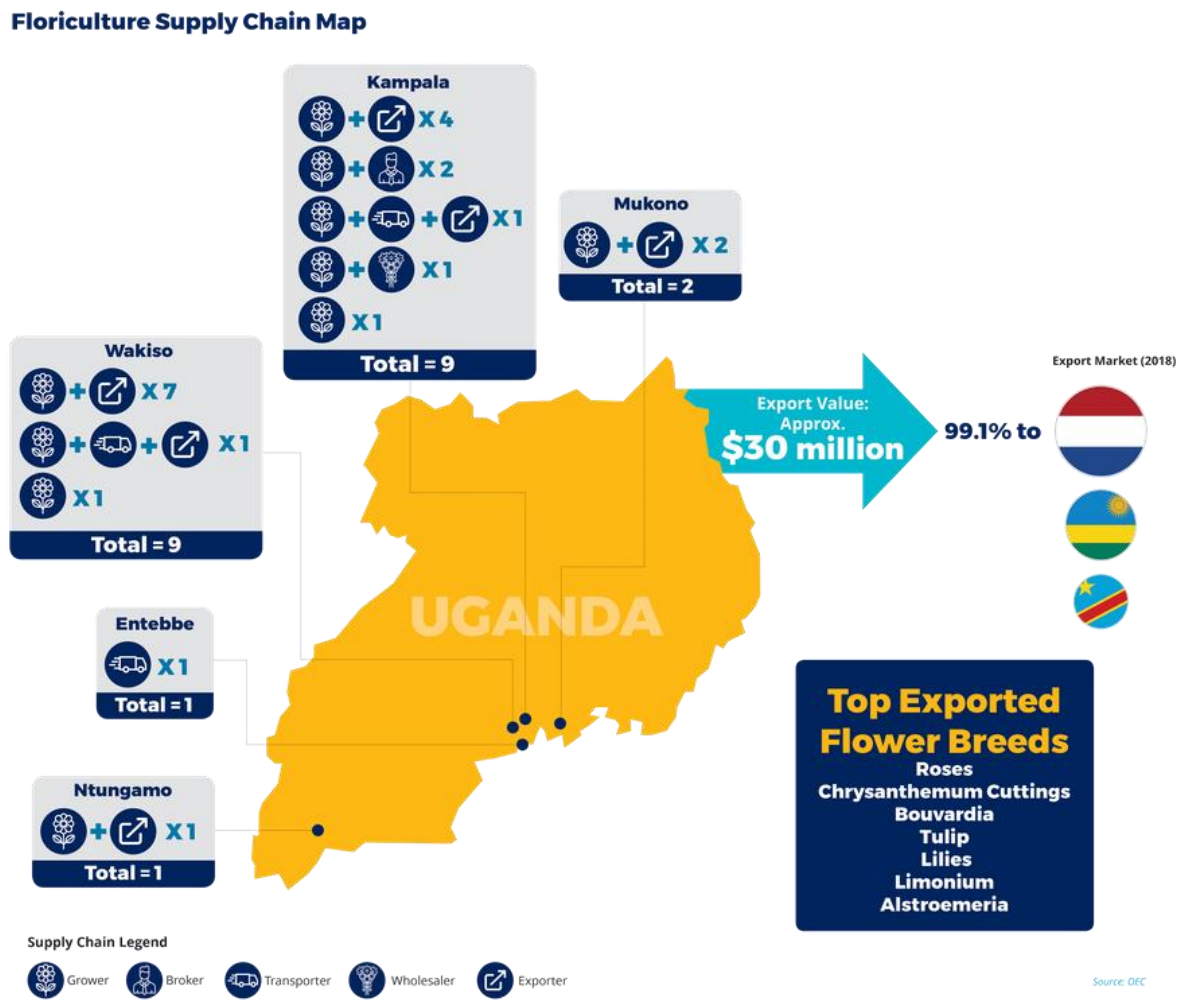

Figure 15: Uganda Floriculture Supply Chain Map as per Asoko Insights

Key players/potential investors:

UFEA members, other potentially smaller growers to be identified by UFZA, UIA and Ministry of Agriculture jointly.

Value Chain, Material and Process Flow Analysis

As no participants from the sector attended to the workshop, the information below is based on the example of Kenya. Figure 16[44] shows Kenya cut-flower value chain. Table 7 presents the processing steps for roses for export.

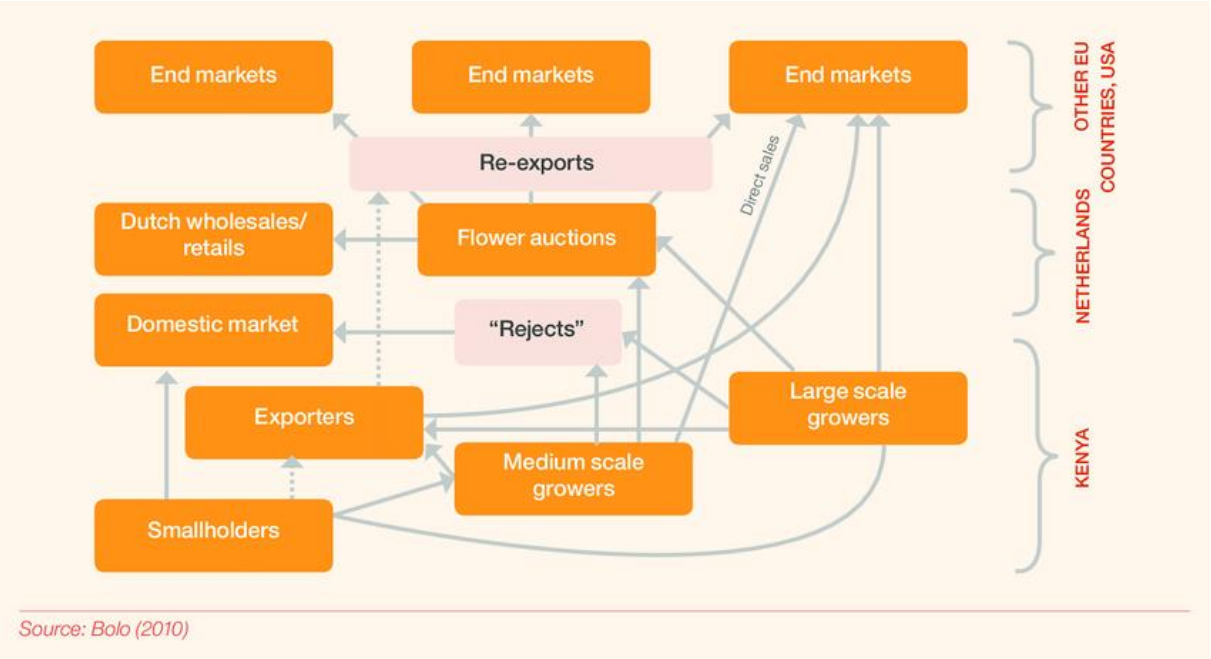

Figure 16: Kenya cut-flower value chain

Table 7: processing steps for roses for export.

Processing steps involved in roses for export to be potentially hosted at the FZ[45]		
Step	**Process name**	**Description**
1	*Harvesting*	Cut flowers are selected and taken in process plant
2	*Precooling*	Cut flowers are stored in precooling room for temperature about 5 degrees Celsius.
3	*Deleafing*	Excess leaves on rose flower stem are cut as per the stem length requirement.
4	*Grading*	Cut rose flowers are selected as per the required quality.
5	*Sorting*	Roses are sorted according to the stem length, bud size and height of the cut flower.
6	*Bunching*	Cut flowers are bunched according to the requirement of the customer.
7	*Stem cutting*	Bunch of cut rose flower is measured on scale for it's stem length and required size is cut.
8	*Post cooling*	Cut flower bunches are kept in cold room at about 2-3 degree Celsius before the packing.
9	*Packing*	Variety of various cut rose flowers are taken and packed in the corrugated box as per customer required size.
10	*Dispatch*	Packed flowers are loaded in the refrigerated van at about 3-4 degree Celsius and transported to the airport.

[44] https://www.researchgate.net/figure/Kenya-cut-flower-value-chain_fig1_263803123
[45] https://www.sanviinternationalflora.com/process-of-roses-for-export.html

Cold chain logistics is vital for the sector. Figure 17[46] shows the cold chain system of cut flower exports in Kenya. That gives an idea of the performance such a system should align to if provided by the FZ.

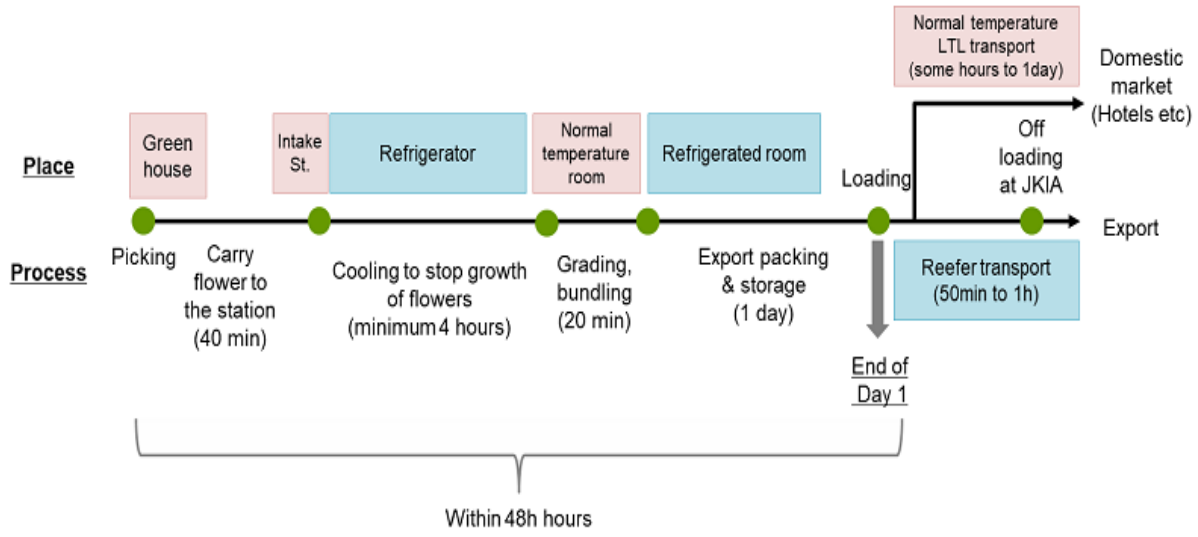

Figure 17:Cold chain system of cut flower exports in Kenya

Finally, a range of requirements for the EU market can be found on the Centre for the Promotion of Imports from developing countries (CBI) website[47]. A material flow analysis will need to be undertaken if interest from stakeholders from this sector is confirmed to assess whether the site can support this activity.

4.3.2. Agri-Food (Horticulture for Fruits and Vegetables)

Agri-Food engaging in the production of fruits and vegetables is one of the sectors with high potential to utilize unique selling point of the freezone. The main advantages of the FZ being access to cold chain and sanitary services, reputational, export knowledge.

Key players/potential investors

Two potential investors have expressed interest in participating and utilizing the facilities in the freezone, namely: KK Fresh Produce Exporters Limited (KK Foods) and HortiFresh. A short description of the companies is provided in Table 4. A key difference between the two companies is that HortiFresh is an Umbrella Association serving exporters, growers, input suppliers.

Products

An estimated amount of produce expected (derived from current export amounts) is 92 tons of produce per week out of which a 20% loss is expected. This will largely comprise of chilies, hot pepper, garden eggs, sweet potato, avocado, matoke, eggplants, sugarcane, potatoes, pineapples, etc. to be exported to mostly the EU (France, UK, Belgium, Germany) mostly in the form of whole fresh fruits and vegetables.

[46] https://www.nipponexpress.com/press/report/10-Sep-20.html
[47] https://www.cbi.eu/market-information/cut-flowers-foliage/roses/netherlands#what-requirements-should-cut-flowers-comply-with-to-be-allowed-on-the-dutch-market

Value Chain, Material and Process Flow Analysis

Agro-food production of Fruits and Vegetables (also called Horticulture of Fruits and Vegetables) value chains share in common a number of links represented in Figure 18[48]:

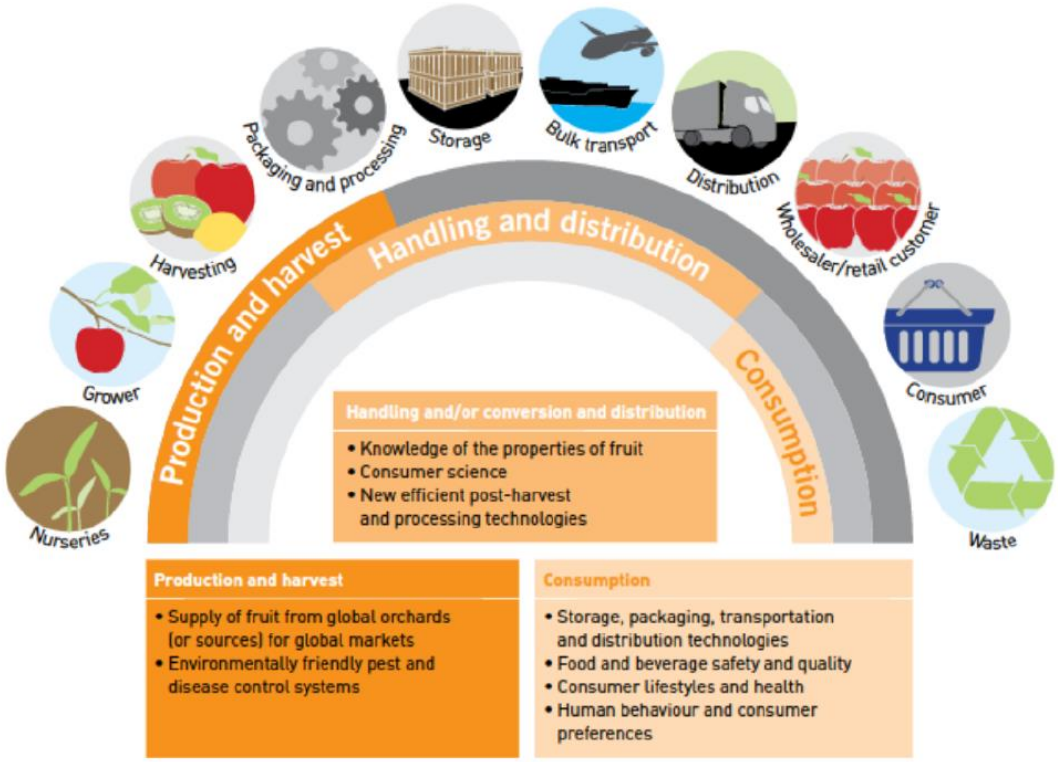

Figure 18: Generic agro-food for Fruits and Vegetables value chain

In Uganda, the avocado, mango and green beans value chains can be represented by Figure 19[49]. It is coherent with the information provided by the participants for a range of other produces though time in the workshop was insufficient to develop on each value chain. Both KK Foods and HortiFresh aim to evolve to being both local processors and international exporters.

[48] https://ecosystemsunited.com/2017/03/09/question-what-is-horticulture/
[49] Source: Dijkxhoorn et. al. (2019) and https://www.researchgate.net/figure/Avocado-mango-and-green-beans-value-chain-in-Uganda_fig4_349319137

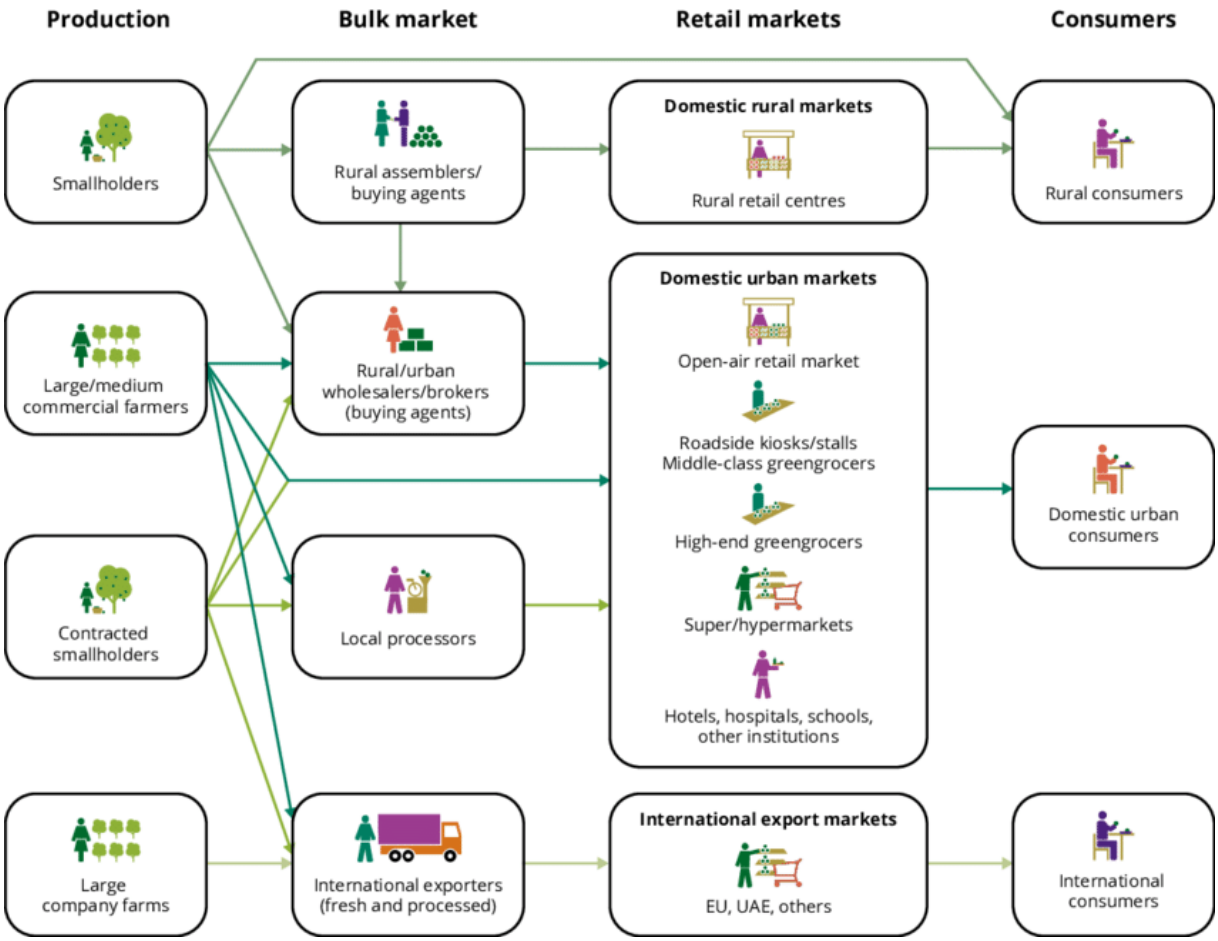

Figure 19:avocado, mango and green beans value chains in Uganda.

Raw materials

The bulk of the agricultural produce to be delivered to the freezone facility will be sourced directly from farms. It is estimated that approximately only 60% is collected with 40% being considered unsuitable for export. This unsuitable produce is either left to the farmers to consume or sell locally or in some instances left to spoil. All the acceptable produce will be transported to the facility. Post-harvest loss reduction is a necessity both economically and for food security, particularly in a selective export environment whereby quality criteria are more stringent (for example on calibers). In a circular economy approach, it is therefore necessary to valorize discards produce through domestic market sales (see also Table 3) or transformation as well as byproducts. At this stage none of the company has been able to do so.

Process flow table

On arrival at the facility, the produce will undergo the following processes (table 8) to deliver the final product which is a raw produce (no transformation).

Table 8: Agro-food processes for export

Processing steps involved in agro-food export to be potentially hosted at the FZ		
Step	**Process name**	**Description**

1	*Sorting and cleaning*	The produce is sorted into specific fruits and undergo cleaning with medium to high pressure water flow. This involves cutting and shaving as part of the process.
2	*Grading*	Involves the inspection, assessment and sorting of the various produce regarding quality, freshness, legal conformity and market value.
3	*Weighing and Packaging*	This involves the weighing and packing of the various produce.
4	*Type stacking*	Putting the packaged produce in their sorted type stacks.
5	*Inspection*	Inspecting the produce to ensure it meets the required export standards such as aesthetics, caliber and pesticides presence.
6	*Storage*	Placement of the packaged product in the cold room to await export.
7	*Export*	Transfer of the packaged product from the facility to the airport for airfreight transportation.

Inputs estimated by the participants

- About 700 liters of water per day to utilized for cleaning the produce.
- Energy requirements necessary to maintain temperatures in the cold room in the range of 0-10 Celsius.
- 14,500 packaging boxes
- 17,520 meters of packaging string.

However, experience on similar value chains by UCPC show that participants underestimate of about X % actual consumption (to be complete by Edson). As a result, based on volumes and water supply capacity, some of those process steps may not be hosted at the FZ, which is why Table 6 presented various options for processing location.

Outputs estimated by the participants

- About 650 liters of water containing mostly dirt and organic materials from the cleaning process. Limited pesticide expected as the pesticide quantity is limited at farms.
- About 15 tons of organic waste expected from discarded produce and cuttings and shavings.

Here also, it appears that waste is underestimated both in volume and composition. Besides, it could be of interest to compare consumption from organic produce and non-organic as it may influence on the waste characterization, particularly the presence of pesticides (both before and post-harvest). Besides as per their current processes, none of the companies has implemented RECP measures including in recycling water. There are however good prospects for reuse of wastewater from the process as it mostly contains dirt and organics. Filtration process will probably make it suitable for use in farms and toilets.

Possible by-products and discards valorizations

Future investment in the valorization of unsuitable produce for exports using drying or freezing process (freeze drying, dehydration, puree, etc.) should be considered. As the majority of the discards happen at the farm level, first transformation needs to happen on site with a differentiation on transformed product for the domestic market and for export. A detailed description of valorization techniques is provided under Soroti IP Section 5.3.1. Concerning exports for the international market, the FZ should particularly focus on products that take advantage of the cold chain. It is the case for example for frozen fruits and fruits purees which are gaining more international demand for the making of smoothies of for off-season fruits. Some of the key the advantages of the frozen fruits being that contrarily to fresh exports, those can be harvested ripe, can be stored longer and can use discarded produce.

A range of recent of market analysis from importer countries such as the US and EU show increasing demand and can be found for example here:

https://www.grandviewresearch.com/industry-analysis/us-fruit-puree-market

https://www.verifiedmarketresearch.com/product/frozen-puree-market/

https://www.cbi.eu/market-information/processed-fruit-vegetables-edible-nuts/tropical-frozen-fruit/market-potential

https://www.marketresearchfuture.com/reports/fruit-puree-market-5281

https://www.transparencymarketresearch.com/frozen-fruits-market.html

A good example of frozen fruits company based in Colombia is SOS, which provide a short explanation on how to process fruits purees here:

https://eng.alimentossas.com/blog/the-production-process-of-fruit-purees-for-industry

Notably, even SMEs working with indigenous people in the Amazon have been able to establish their own frozen fruits purees:

https://www.100amazonia.com/vision

A more long-term example of companies that could develop thanks to the FZ cold chain and export logistics availability is:

https://www.polproduct.nl/main-products/aseptic-frozen-fruit-puree/

A business that transformed from being just a logistics cold store into a full-scale puree producing service company.

Partnerships with supermarkets under their own label is one of many commercial options. Woolworths in South Africa is a good example as are a multitude of new frozen fruits companies popping up thanks to South Africa internal market demand:

https://frozenbrands.co.za/about

https://www.euroberry.co.za/

It is recommended for UIA to mandate a frozen fruits and fruit puree analysis that would look into the positioning of key produces such as mango, pineapple or papaya and cost of production compared to global competition particularly from Asia and South America into the EU and US markets and regional opportunities (especially DRC and South Sudan). The market study needs to include a domestic market study. It also needs to be complemented by a demand promotion strategy as production side measures won't be able to be successful without important campaigns over healthy diet and buying local as exemplified by South Africa:

https://www.gov.za/speeches/proudly-sa-launches-new-buy-local-consumer-education-campaign-2-jul-2020-0000

http://www.thedtic.gov.za/wp-content/uploads/ProudlySA_BUY_Made_In_SOUTH_AFRICA_Campaign.pdf

Such a market study has been performed for Madagascar as shown below:

https://eservices.coleacp.org/en/e-bibliotheque/market-profile-on-frozen-fruit-puree-from-madagascar-for-the-european-market[50]

Its conclusions can be useful to position Uganda as shown in Table 9:

[50] For the publication: https://eservices.coleacp.org/en/system/files/file_fields/2021/10/07/marketprofil-forzenfruitmadagascar-eng.pdf

Table 9:Conclusion from Madagascar Market Analysis and Implications for Uganda

Conclusion from Madagascar Market Analysis	Implications for Uganda
While the Asian market has the greatest potential for development in the coming years, the demand for Malagasy frozen purée seems limited. The region (especially China) produces most of the fruit it processes into purée itself. The exotic fruits are the same as those produced in Madagascar.	Further analysis on frozen produce to be exported by Uganda responding to market gaps or by the valorization of particular features (variety and quality of the fruits chosen) that would encourage a differentiation from the competition. Additionally, unlike Madagascar, Uganda can benefit from a larger internal market for which the demand for healthy diet should be encouraged, as well as in regional markets.
European demand for exotic fruit purée is increasing and presents interesting export opportunities for Malagasy producers. However, access to the EU market is subject to compliance with various EU regulations.	The FZ should centralize information on regulations over agro-food exports into the EU market. The sanitary equipment and measures should help align with EU requirements.
The growth of organic fruit purées is one of the main trends in the fruit purée market in the coming years. In order to export organic frozen fruit purées to the EU, Malagasy producers and exporters have to comply with the EU rules specific to organic food and its exportation.	Organic foods is a good avenue for Uganda exports as it supports sustainable agricultural practice (and particularly climate resilient agriculture), can address some of the resource constraints at the processing site (arguably, further investigation is needed to check if processing fruits and vegetables from organic agriculture would require more water usage for example than regular ones), and most importantly provides a better margin for fruits export into the EU and US markets.
However, while the processing of fresh fruit into (frozen) purée allows production losses to be limited, it requires a high level of logistics and appropriate infrastructure. These investments are substantial, while the size of the market for frozen fruit purée in Madagascar remains limited.	The FZ by providing common infrastructures can alleviate some of the infrastructure costs for cold chain, logistics and transformation. In collaboration with other IP such as possibly Buwaya potential site or Soroti, transformation poles in the form of innovation centers can be developed with Entebbe FZ serving as the exit door for international markets.
Madagascar's purée cannot compete in terms of quantity, logistics and competitiveness with certain large producer countries, such as India. Therefore, in order to differentiate itself on the international market and to gain market share, Malagasy producers must promote the quality of its production by increasing its volumes that are certified as organic and by promoting a strong geographical origin (Terroir, PGI, etc.). The EU market is vast and diversified in terms of potential customers. Hence the importance and the opportunity for the Malagasy on the one hand, to look for potential buyers throughout Europe within the final customers (industries and B2B not intermediate traders).	Uganda may also consider to develop a strong geographical origin (Terroir), that could serve not only for frozen fruits but also for Coffee, Cocoa and other agro-food production, similarly to the branding of the Rwenzori water. An analysis of the green and fair certifications that companies joining the FZ could be facilitated access to can also be performed.
Other opportunities to be explored: the regional market, due to the logistical advantage; and the Middle East market, which is growing even though it is highly competitive. In this sense, COLEACP has	Uganda may also explore opportunities in the Middle East market by possibly joining resources with other sectors particularly dairy and meat.

planned to complete this market profile with a more detailed study of the most promising segments for Madagascar's fruit purees in terms of price and customers.	

For more fruits by-products valorization options, consult section 5.3.1.

4.3.3. Meat

The meat industry is particularly keen on accessing the Freezone for reputational reasons, to expand their export markets while continuing to supply the domestic market as business continuity and diversification measures.

Key players/potential investors:

UGANDA MEAT PRODUCERS' COOPERATIVE UNION (UMPCU)

Value Chain, Material and Process Flow Analysis

A representation of the beef value chain in the Lake Victoria Basin is provided Figure 20[51] whereby participants inputs have been added to existing value chains studies to provide a more complete picture. The main product is steak which is sold in the domestic market accounting for 50%, the regional market for 40-45% (DRC, South Sudan) where it is transported by refrigerated trucks, and the international market with airfreight that is the sector to be developed with potential clients in the Middle East mainly, which may require Halar certification. With Covid-19 logistic constraints, the domestic market portion rose to 80% of the sales making it a strong argument for a diversification of markets rather than a strict export percentage as currently required by UFZA.

[51] http://article.sapub.org/10.5923.j.fs.20150501.01.html

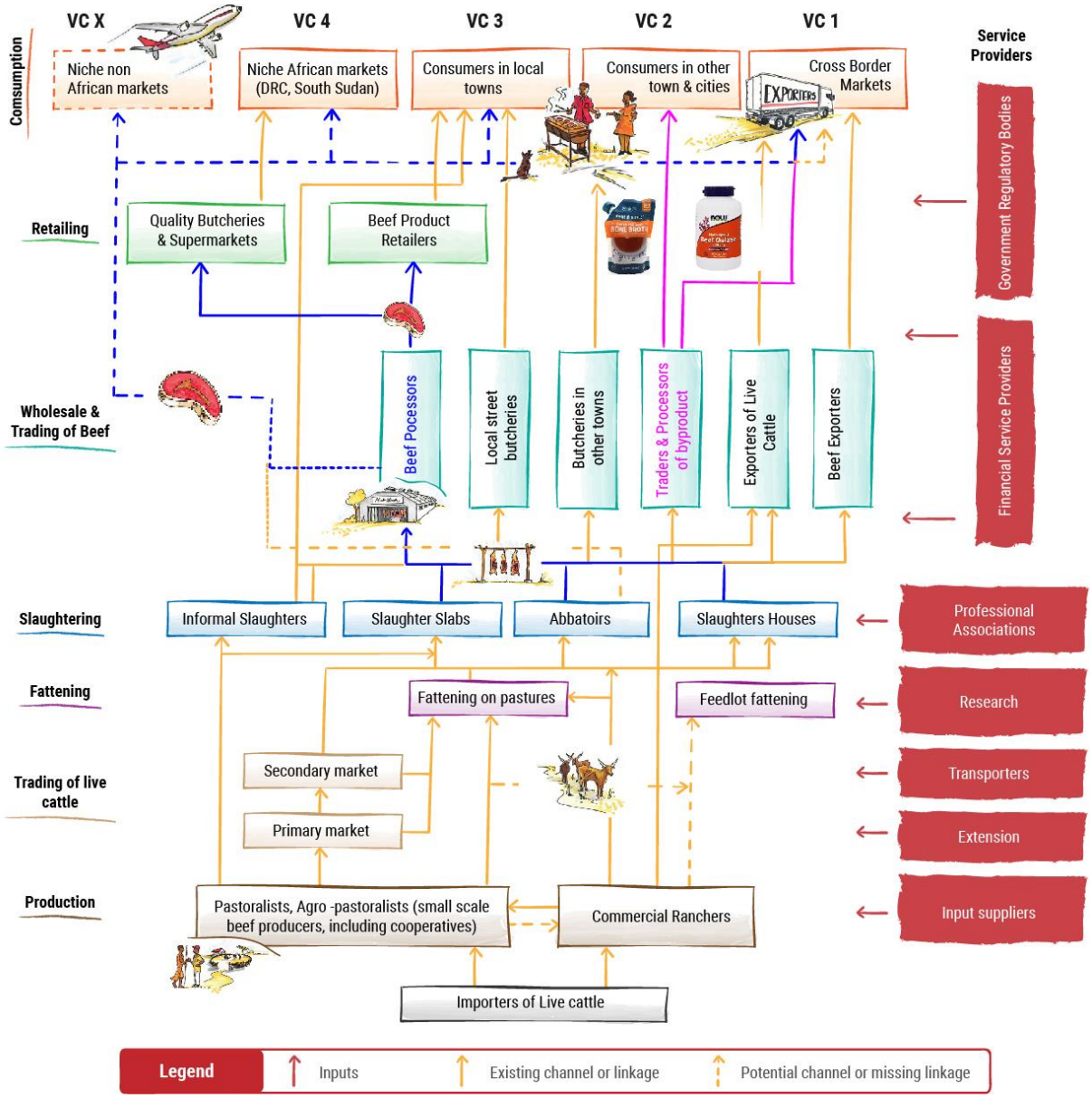

Figure 20:Beef value chain in the Lake Victoria Basin. In blue UMPCU pathway, in pink potential byproduct valorization pathway.

At the moment, UMPCU ambition given the FZ small space would be to bring the carcasses to the FZ, cut and pack into steaks on site ready for export. Thus, the main infrastructures of interest are the cold chain (fish and meat can share a facility but require different storage temperature) and export logistics, sanitary testing, security and water supply.

As requirements for the EU and Middle Eastern markets are more rigorous than regionally, part of the motivation resides in getting the knowledge transfer support to reach compliance level, facilitating access to markets as well as developing byproducts value chains.

The processes to take place in the FZ would potentially be:

- Cleaning
- Cutting
- Weighing
- Quality check
- Packaging

- Preservation
- Transportation
- Exportation

Participants estimated a need of 250l of water per day to clean blood and 15kw per day with 150l wastewater.

Figure 21 shows an example of the water usage level per processing step in the Australian Beef industry[52] as per lifecycle assessment analysis. Similar analysis would be needed for the Ugandan beef sector to provide more accuracy on water usage, however there is no doubt that the cleaning process for making the meat ready to consumption is one of the most water demanding step.

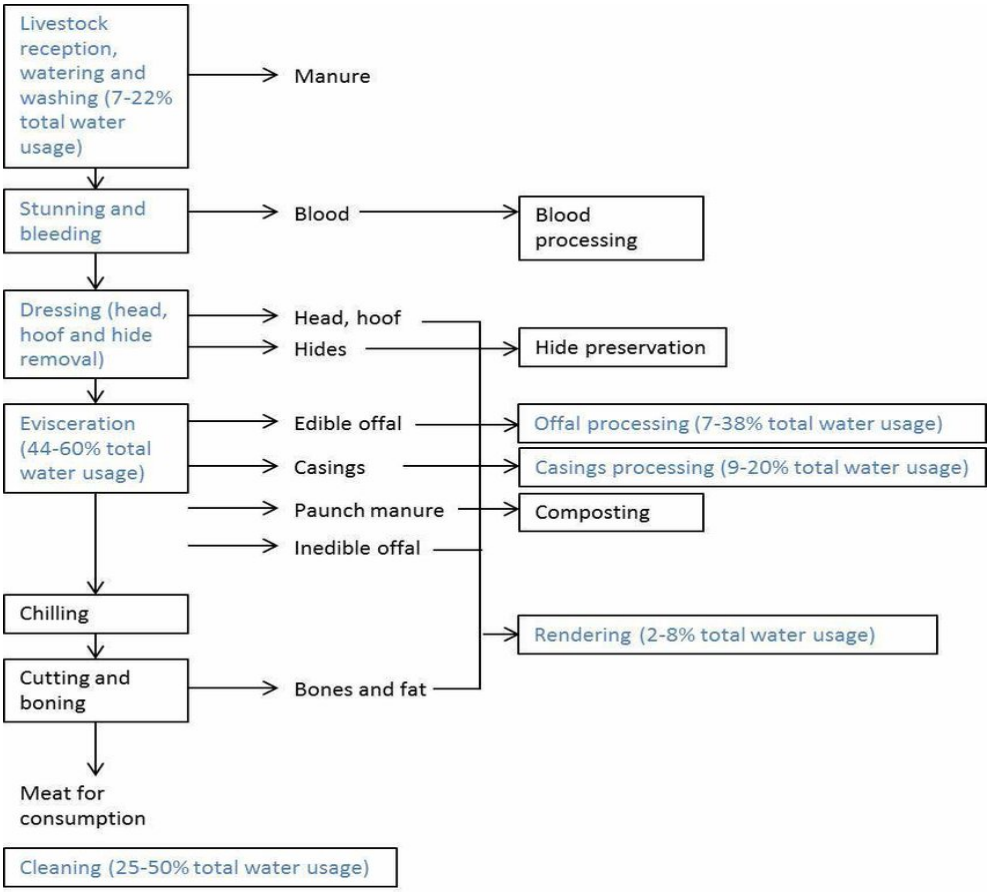

Figure 21: Process flow diagram of red meat processing operations in Australia. Operations with a substantial water consumption rate are highlighted in blue (COWI, 2000).

Another key feature needed in the FZ would be the technology transfer to extend products shelf like. At the moment, Vacuum Packaging is the preferred solution. However, Modified Atmosphere Packaging (MAP), where a mix of Oxygen, CO2 and Nitrogen are flushed into a sealed packaging is a more versatile technique. MAP can be totally adjusted to the particular

[52] https://www.researchgate.net/figure/Process-flow-diagram-of-red-meat-processing-operations-Operations-with-a-substantial_fig1_323253053

products to retain color, shape, inhibits growth of micro-organisms and protects against oxidation processes. It also keeps dry products safe from unwanted moisture development.

Possible by-products and discards valorizations

Future investment in the valorization of by-products should be considered. As the majority of the discards happen at the farm level or in at the slaughterhouses, discards would need to be collected and processed either by the company selling meat, as a business diversification, or through specialized processors. At the moment most discards are being lost. However, beef byproducts can be useful in a wide range of applications.

Figure 22[53] summarizes the type of byproducts obtained from beef as per Iowa State (USA) analysis.

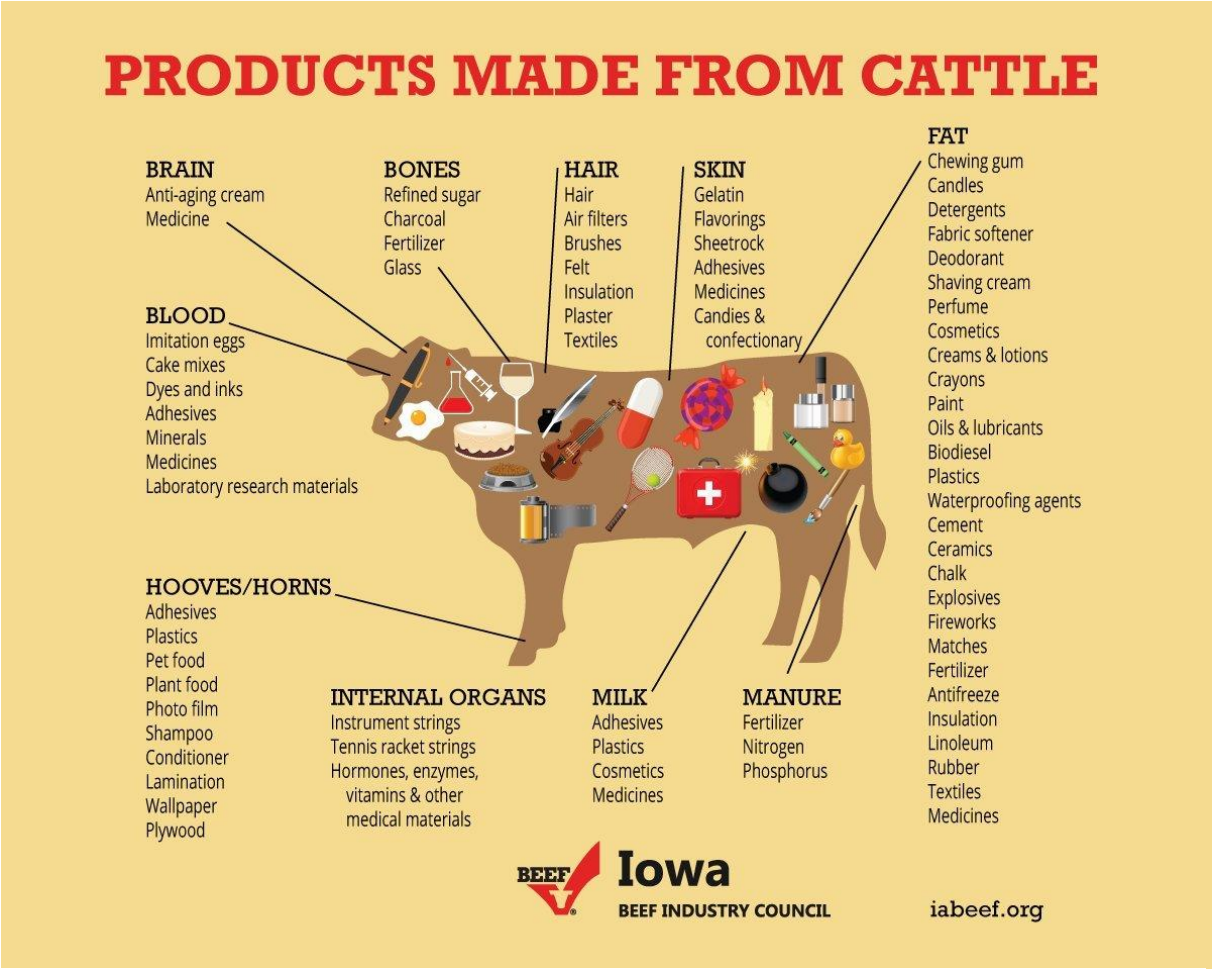

Figure 22: byproducts obtained from beef as per Iowa State (USA)

In Uganda, bones flour for fertilizer and broth, fat and skin would be the priority by products to develop. Byproducts are usually valorized in the domestic market as they may not be cost efficient for export, however a full value chain analysis is required to get more insights.

Byproduct valorization could be promoted through facilitating access to relevant processor in Buwaya IP or through collaboration with other IPs such as Soroti that may offer more space.

[53] https://ndfb.org/on-your-table/on-your-table-blog/respect-your-beef/

It is also part of greening the beef value chain. Support to the beef value chain may also look into addressing the sector impact on Climate Change. As a reference, Uganda Action Lab – "developing climate smart value chains in the dairy and livestock sectors[54] " project has proposed various climate resilient measures for Uganda as shown in Figure 23.

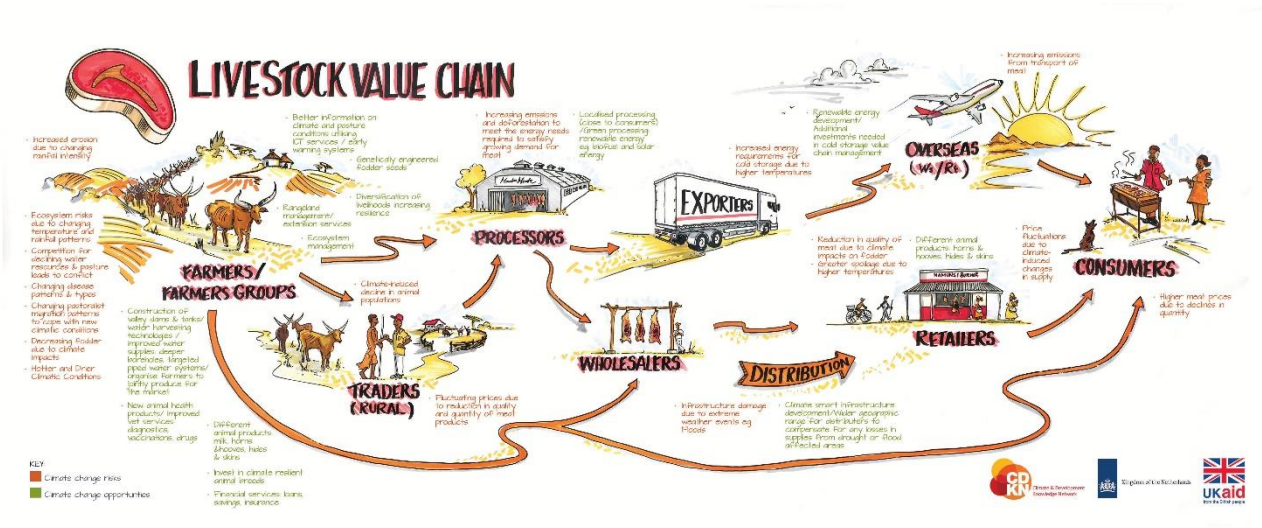

Figure 23: Uganda Livestock Value Chain with Climate Smart Measures

UFZA 2019 FZ Business Plan made a convincing argumentation also on Uganda organic meat production potential, which indeed represents a timely opportunity on the international market. It is not clear however whether this orientation would feed into the regional market that may be less selective, so important investment in marketing would be needed and the local tourist sector and potentially the high-end regional markets could possibly offer some prospects. Targeting countries such as Middle East, France which value food quality or possible some high-end Asian markets could be a way. However, many eco consumers would also look into closer loops and buy local eco meat. In the EU, it would be very difficult to hit the intercontinental market with an eco-meat in the short to mid-term both due this contradiction between the eco attribution and long-distance transport and to the time it would need to establish a reputation. It is therefore recommended for UIA to perform a market analysis so that to orient best companies market expansion and advice on certification and greening measures to meet eco-labels.

4.3.4. Fish

There was no representative of the fish industry at the workshop. However useful information was provided by participants particularly from the meat sector due to the similarities in processing. Due to the expected processing smells and water supply constraints, the sector has been eliminated as an option for the FZ in regards to the vicinity for the Trade House. But it is still a valid option for Buwaya site or for the access to common infrastructures, particularly for smaller scale fisheries who may lack their own Cold Chain and export expertise.

Key players/potential investors:

[54] https://cdkn.org/story/uganda-action-lab-developing-climate-smart-value-chains

Uganda Fish Processors & Exporters Association (UFPEA) and its members, Entebbe fish farm consultants and suppliers, Fresh Perch Ltd.

Value Chain, Material and Process Flow Analysis

As per UFPEA website, its members mainly export value added products which are chilled and frozen Nile Perch (Lates Niloticus) in various product forms, such as: Headed and gutted, Skin on and skinless fillets, Air bladders (fish maws), Fish heads, Portions, Steaks and Loins. The high value obtained for fishery products exported by the industry is the result of its ability to access and consolidate market share in major world markets, in particular the European Union. Other export markets include the Middle East, South Korea, Singapore, Israel, Japan, and Australia.

Figure 24[55] presents the Nile Perch Supply Chain in Uganda, while Figure 25[56] presents a generic fish processing chain.

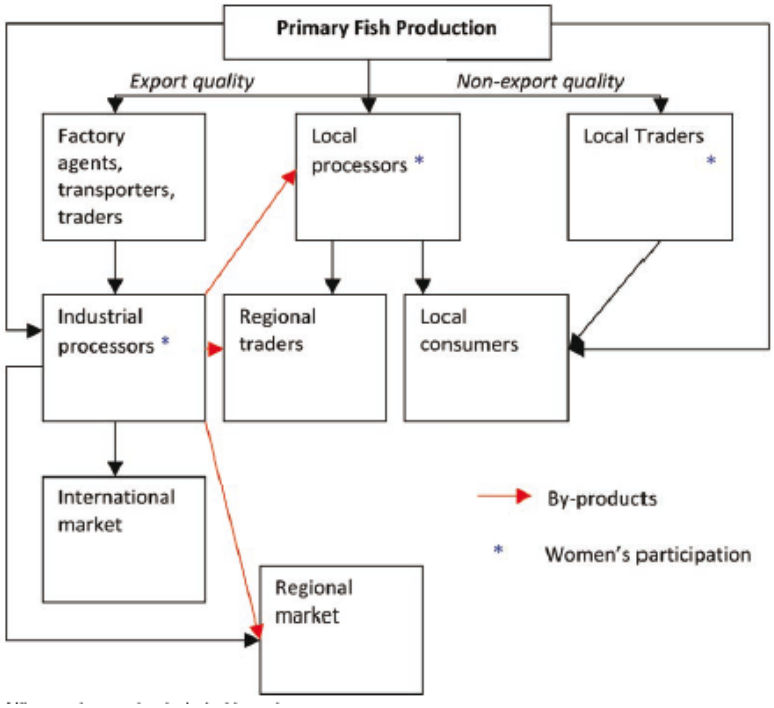

Figure 24: Nile Perch Supply Chain in Uganda

[55] http://pubs.iclarm.net/resource_centre/WF_3139.pdf
[56] https://www.sciencedirect.com/science/article/pii/B9780128023914000033

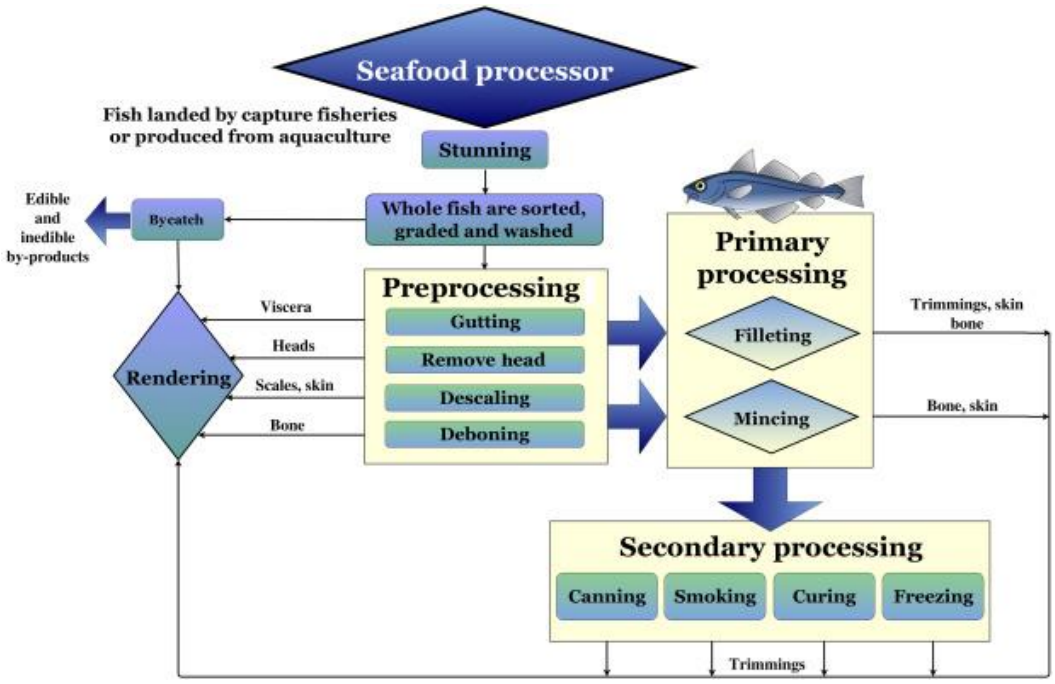

Figure 25: Generic fish processing chain

Processing steps expected to happen at FZ/IP level would be:

- Sorting and cleaning
- Cutting
- Grading
- Weighing
- Packaging
- Cooling
- Transportation

Participants estimated fish production requires 500l of water per ton as fish is precooled before reaching the FZ and 15 kWh/day. As the tonnage of fish to be processed on a daily basis is unknown, so is the total required water input, and output of wastewater. A full value chain analysis would be needed to investigate the ratio between exports and domestic market sales, by products valorization and opportunities to formalize smaller scale fishermen and reduce illegal fishing. A sector wide analysis comprising investigation on sustainable fishing practice, aquaculture, reintroduction of indigenous fish species would be needed.

Indeed, UFZA 2019 business plan identified fish as a potential sector. The report provided good facts about the depleting fish stock, which would require a natural capital assessment. By-products loss, inefficient fishing techniques and storage being some of the challenges. The sector practices an unsustainable over focalization on a few commercial products (Nile perch and tilapia) while edible fish stock is more diversified. There is scope in an innovative green growth approach and with sufficient marketing and certification support, to attempt the promotion of untapped fish and reduce the overreliance on limited species, or at least to identify conservation measures to counteract the negative impact of the Nile perch and Tilapia. A

specific biodiversity assessment is needed to assess the availability and impact of tapping into new fish value chains, but it is aligned with global efforts on fish food chain diversification. Besides a range of negative impact due to the Nile perch food chain, particularly in loss of fish biodiversity and, for aquaculture, pollution and impact of the source of feeding used could also be addressed by innovative start-ups. If the Buwaya site materializes and if the fish sector presence is confirmed, an innovation pole addressing those challenges could be an important addition giving the concerns over Lake Victoria fishing sustainability[57].

4.3.5. Dairy

According to DDA, there is potential for the FZ to benefit the dairy sector, though this would need to be confirmed with companies, as no representative from the private sector attended. Key products from the dairy sector are yoghurt, UHT & fermented milk and ghee. Current exports are mainly in Africa (Kenya, Rwanda, Zambia, Algeria and Nigeria), UAE, Syria, Japan, USA, Oman, Nepal, Bangladesh, USA. It seems that the demand from Arab States is growing.

Key players/potential investors:

DDA provided a list of potential stakeholders including Pearl Dairy, Amos Dairy and more (see Section 4.2).

Value Chain, Material and Process Flow Analysis

Uganda Action Lab – "developing climate smart value chains in the dairy and livestock sectors[58]" have aslo drawn the value chain and proposed various climate resilient measures for Uganda as shown by Figure 26.

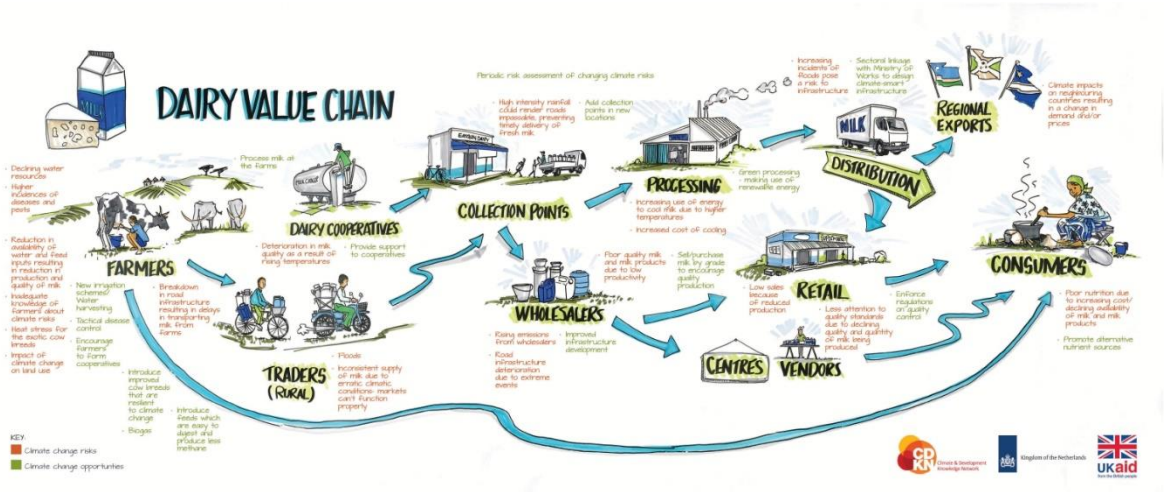

Figure 26: Uganda Dairy Value Chain with Climate Smart Measures

The following steps would be expected to happen at the FZ site:

- Quality testing
- Pasteurization
- Culture/ homogenization
- Quality check again

[57] https://enactafrica.org/enact-observer/illegal-fishing-in-lake-victoria-endangers-livelihoods-and-species
[58] https://cdkn.org/story/uganda-action-lab-developing-climate-smart-value-chains

- Measuring packaging
- Cooling
- Transportation
- Export

An estimated 100 liters of water per day, 15 kWh per day, Nitrogen air emissions and non-hazardous wastewater were mentioned by the participants. However, dairy wastewater characterization in the literature show that it is of particular concern for aquatic environment. Indeed, "the wastewaters discharged from this industry contain high concentrations of nutrients, chemical oxygen demand (COD), biological oxygen demand (BOD), total suspended solids (TSS) and organic and inorganic contents, which can cause serious environmental problems if not properly treated. The conventional biological treatment methods are suitable for dairy wastewaters due to its high biodegradability. However, long chain fatty acids formed during the hydrolysis of lipids show the inhibitory action during anaerobic treatment (…) The most important challenge is to find cost-efficient and environmentally sustainable approaches to enable water reuse and waste management."[59]

Given the lack of wastewater treatment facilities at the FZ and surface runoff, it is questionable whether the dairy sector could be a candidate, processing at Buwaya site would be an environmentally safer option provided wastewater treatment infrastructures are built. In all case, the sector requires further value chain analysis to be confirmed. The option to support other IPs such as Soroti with logistics and cold chain service for dairy exports rather than processing at the FZ is also potentially viable and should be explored further.

4.3.6. Pharmaceuticals

UFZA received EOI from a few pharmaceutical companies wishing to settle in the FZ as a door to flood the regional markets. However, those companies did not show any value chain support (backward linkages) that could contribute to Uganda's development, so the risk for their interest to be merely opportunistic based on the tax-free status is high. Based on the field mission restitution meeting held at UFZA headquarters, it is clear that UFZA leadership intends to hold its commitment for Entebbe FZ to be a good case study for the country green industrialization and how it can contribute to poverty alleviation. In this regard it will not accept companies not meeting the criteria.

On a tactical level, pharmaceutical companies can potentially bring high level of investment to play the role of anchor companies and possibly provide the funding for common infrastructures. It is not the case here because the small size of the parc would prevent any processing activity at scale, infrastructures that would require space such as sanitation plants cannot be built on the site while very few of the common infrastructures identified would be of use for pharma companies. In conclusion, there is also no tactical advantage to bring pharma companies to this site unless they can demonstrate strong backward linkages. Herbal companies have the potential to create local value chains due to their use of locally produced natural ingredients. However, given the space limitation and the better positioning of Soroti IP, there is no argument to promote such sector in Entebbe FZ.

[59] https://www.intechopen.com/chapters/61457

4.3.7. Gold

Gold has been concluded not to be a potential sector for the FZ.

Key players/potential investors: BULLION REFINERY LIMITED

A short description of the company is provided in Table 4 and following the discussions with the company, it was concluded that all the three options were not viable (feasible) because of the following reasons:

- Gold processing requires exclusivity, that is, Entebbe free zone area will have to be gazetted for only gold processing and not mixing with other business because gold business is a high security risk business that is prone to robbery and attacks and therefore requires a lot of secrecy.
- The chemicals involved in gold processing cannot be allowed to mix with other businesses in the proximity because they are highly toxic and hazardous.
- The buildings will need to be modified in order to accommodate the business

However, it was suggested that the company could help organize the Artisanal and small-scale miners in Uganda by setting up a processing plant at Buwaya and buying the gold ores from them. This would help in reducing the use of mercury that pollutes the water bodies.

4.4. Proposed Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

4.4.1. Main Common Infrastructures and RECP measures

The following are general Resource Efficient and Cleaner Production options the FZ can consider for the dairy, meat, and agro-food (fruits and vegetable) factories:

a) Minimizing waste generation and enhancing the efficiency of *filling and packaging machines* would require a high-quality power supply. The following systems and technologies should be integrated into the power system at the FZ.
   - Power/voltage stabilizer: Usually the power transmission and distribution in Uganda is characterized by power surges and voltage drops. Most machines especially filling and packaging machines are sensitive to slight changes in voltage and current which often result in significant product damage. Power stabilizer should be installed to improve power quality.
   - Capacitor bank: Most industrial loads consist of electric motors. Thus, they are inductive and have lagging power factors. In Uganda, factories incur a penalty fee for having low/poor power factors. The FZ should install a central capacitor bank to collect power factors for all factories to allowable levels.
   - Automatic change over switch: Uganda experiences frequent load shedding and power blackout. This can result in frequent starting and stopping of filling and packing machines which results in huge machine start-up waste and downtime. An automatic change-over switch can eliminate such time lags by automatically switching to an installed power backup system.
   - Power backup: Given that Uganda experiences frequent load-shedding/power blackouts. The Entebbe Freezone should explore the possibility of installing an industrial-scale standalone solar PV power backup system or a Solar PV-Diesel generator hybrid power backup system. With the increasing prices of fossil fuels, the potential for solar is huge.

b) Processing of milk, meat, and vegetable requires strict hygiene and therefore require a significant amount of chemicals and water for *Cleaning in Place (CIP).* To optimize the use of water and chemicals the housed factories can opt for Chemical Leasing (instead of buying chemicals they should pay for the services chemicals do, UNIDO being a strong promoter of the approach[60]). Eco-lab[61] has already piloted this on CIP in milk industries and it resulted in a reduction in use of caustics, acids, and water. Options for common facilities or services to operate the cleaning or to facilitate chemical leasing agreements should be investigated by the FZ.

c) The packing technologies are highly sophisticated and require specialized skills to maintain. The factories should opt for Product Service System (PSS) to pay for quantities of products packaged instead of owning packing/filling machines. In this case, the packaging or the fill machines are installed and operated by the manufacturer or supplier and the factory pays for packaging services. This would minimize product damages associated with the inefficient operation of packaging machines since manufacturers or suppliers can ensure optimum performance of the machines. This Performance Economy approach applies for the private and public sector and is promoted by UNEP[62]. It is recommended to investigate if the FZ could install and manage packing equipment that could serve several companies both within and outside the FZ. Possible packing technologies that could be fostered particularly for the meat and fish sector could be both Vacuum Packaging and Modified Atmosphere Packaging (MAP) (see Chapter 3.3.3)

d) Install a centralized air compressor system to provide compressed air to pneumatic packaging machines. The centralized air compressor system consists of a central compressed air system installation, where large air compressors and dryers located in one area provide compressed air for the entire facility. A centralized system has better energy productivity and will provide lower overall costs than a decentralized system. Besides, centralized systems are easier to track and monitor.

e) Central Cooling Systems: those are frequently preferred for supermarkets, hypermarkets, and large cold storage rooms. With the use of digital temperature control units, a central cooling system provides customized conditions for different cold rooms to store different products. Central Cooling Systems provides large-scale energy-saving and monetary gains. It is recommended for the FZ to offer cold chain services particularly to manage a central cold storage made of different rooms catering for the various type of produces, cold chain handling up to shipping and possibly own a few refrigerator trucks for transport. The cold chain service and sanitary conditions by sector need to be further investigated to better specify the offer. This service should be open to both tenants and companies outside the park and therefore dimensioned accordingly. It should work on a full cost-recovery base. It has several advantages such as:

- Ensuring the financial sustainability of the facilities by increasing the pool of customers.
- Having a multiplier effect on business development and jobs by enabling a range of companies to cold store and export through the FZ.

[60] https://www.unido.org/our-focus-safeguarding-environment-resource-efficient-and-low-carbon-industrial-production/chemical-leasing and https://www.unido.org/sites/default/files/2013-10/Chemical_Leasing_0.pdf
[61] https://www.ecolab.com/about
[62] https://www.greengrowthknowledge.org/research/using-product-service-systems-enhance-sustainable-public-procurement

- Support inter-industrial parks and FZ collaboration by offering a direct export route to other parks such as Soroti and Kasese.
- Make full advantage of the FZ assets and the vicinity to Entebbe airport.

From the discussions with the companies, the preferred management choice for many of them (particularly meat) would be to rent for a fee and manage themselves so that to be able to self-ensure the proper sanitary conditions and stock management. But various models can me investigated especially for the portion of storage addressing external companies.

f) Sanitary equipment: In the fruit and vegetables sector, pest control in the form of *fumigation* or *irradiation* have been highlighted as in high demand. However, irradiation is highly controversial especially if the FZ aims at obtaining a green status or label. Irradiation poses a number of issues that are incompatible with sustainable agriculture and nutrition. In particular, it may facilitate the development of harmful pathogens by eliminating non-harmful microbiological agents, it does not destroy toxins or viruses and though it may appear to extend shelf-life, it actually does not prevent vitamins content deterioration making produce less nutritive. Besides the equipment itself poses environmental and handling risks. Irradiated foods require specific labelling for many export countries and is forbidden for organic produce[63]. Fumigation is also polluting, using most often methyl bromide which damages the Earth's protective ozone layer. Therefore, it is recommended to install a CO2 fumigation chamber (called Control Atmosphere Treatment) as it is compatible with organic produce and adequate for relatively smaller facilities[64].

g) Testing lab: Access to a testing lab is a primary requirement for all tenants. It could be hosted in the Trade House or pre-identified in the vicinity of the FZ. The list of testing services needed should be compiled in order to identify potential testing candidates or confirm the needs for a lab onsite. An MoU with SGS[65] is being considered.

h) Export logistics services: In addition to the cold storage room and cold chain services as well as the facilitation from the One Stop Center, it is recommended to provide export logistics to both tenants and external companies that would like to use the facilities for storage and export. Needless to say, non-tenants should not be granted free-tax exports but will benefit from being able to externalize their export logistics. Selected tenants from the future Buwaya site could be gazetted as part of the FZ for fiscal purposes.

i) Introduce the RECP program to companies allocated land in the FZ, invite selected companies outside the FZ, and conduct annual RECP training.

j) In addition, a complete material and energy flow analysis needs to be undertaken to detail further resource consumption (particularly water) and possible circularity loops.

63 http://www.adequations.org/spip.php?article565 and https://www.centerforfoodsafety.org/issues/1039/food-irradiation/about-food-irradiation

64 https://www.linde-gas.com/en/products_and_supply/fumigants/carbon_dioxide_in_agriculture/fumigation/index.html and https://www.qualityassurancemag.com/article/fumigating-for-the-organic-food-market/

65 https://www.sgs.ug/

The units have been designed to offer a percentage of plug and play, on which each company will be able to upgrade to their own specific functional requirement. However, for tenants as well as common infrastructures, the following will be needed:

a) Isolation
b) Aeration and humidity management. It is to note that the orientation of the building has been chosen to make the smartest usage of the size and shape of the land but does not optimize air flows. Thus, concrete walls may be enhanced by Nature Inclusive Design additions such as vertical gardens.

c) The top floor of each unit is a platform from which managers can watch the entire operations, however there is no physical separation which may be needed to isolate the top floor from dust, fumes and other volatile emanations.

Image 8: Internal Construction Entebbe FZ June 22

4.4.2. Export facilitation

Export facilitation services is a common request by all companies which should be offered jointly by the future FZ management and UFZA in collaboration with UIA and through the One Stop Center. However, the full offer of services of this Center needs to be clarified in regards to the various demands expressed by the companies as well as budgetary requirements. Those encompass:

- Information on export markets by sector for Ugandan products at various levels of export knowledge (from companies wishing to upgrade from domestic to export markets, from regional to international markets or to diversify they markets).
- Marketing facilitation through website, fairs and B2B platforms. One of the greatest motivators for companies to enter the FZ is the reputational gain on export markets on the quality and safety of the products sold. Therefore green, sustainable, fair or similar labeling and certification would need to be explored to make green FZ and IP stand out.
- Support in learning about and meeting the requirements of various export markets (particularly EU and USA) especially in regards to sanitary, labelling, distribution, etc.
- Flexibility in adjusting domestic versus export (regional and international) production to improve business continuity in case of global crisis (see also chapter 3.2).

It is to note that UFZA is considering to have a MOU with UIA, through its Export Promotion Board, for such services. It is recommended to enlarge the discussions with the private sector in order to design a comprehensive MOU as well as consider hiring private services when UIA may have capacity challenges.

A similar MOU is expected to be put in place with the Bureau of Standards. Collaboration with the Ministry of Agriculture for the issuance of sanitary certification is also foreseen.

4.4.3. Innovation

Entebbe FZ as a public FZ is a flagship project, by itself a source of learning to test and improve the One Stop Center services and to develop viable FZ Management models. Its main source of innovation will be the facilitation for domestic firms to gain export markets and as such a range of services listed under Chapter 3.4.2 are required. But services need to be complemented by capacity building, therefore it is recommended to provide Business Management trainings particularly for value proposition, branding, quality, environmental and social performance and domestic vs export positioning. The FZ cold chain services and export logistics management could also be an important source of learning and innovation in management systems. Besides, if complemented by Buwaya site, a whole new range of innovation and common infrastructures could be designed including the valorization of by-products from the meat and fruits & vegetable sectors.

Another full array of innovation relates to organic products. At the moment none of the potential tenant was particularly focused on organic production. However, given the size limitation of the FZ and on the environmental bearing capacity of the site, it could be relevant to explore if organic companies may use processes more adapted to the site. Other companies may be offered tenure in Buwaya instead, while using the storage and export services from the FZ.

4.5. Environmental and Social Contexts

4.5.1. Water & Sanitation

The freezone facilities on completion it is expected to house industries which activities will use significant amounts of water and produce high volumes of wastewater in addition to sanitation facility waste.

From the value chain discussions undertaken (see Section 4.3), the estimated water consumption and waste water production per company and per sector are provided in Table 10. Given the current lack of water recycling in the companies practice, a ratio of 90% of waste water over water consumption is applied. Additionally, estimating each individual produces 6 liters of wastewater[66] each day, the 200 people at the facility will produce 1200 liters of sewage each day. As mentioned in Section 4.3, Table 10 figures are nevertheless strongly underestimated and should be considered as a minimum indication.

Table 10:Potential water consumption and wastewater production at the FZ

Potential water consumption and wastewater production at the FZ		
SECTORS	**Water supply needs per company per day**	**Wastewater per company per day**
Horticulture	Unknown but potentially comparable to the Agri-Food.	Unknown but potentially comparable to the Agri-Food.
Agri/Food	700l	650l
Meat	250l	150l
Fish	no direct data, see chapter 3.3	no direct data, see chapter 3.3
Dairy	No participation to the workshop but was estimated at 100l.	No estimates

[66] https://www.sydney.edu.au/news-opinion/news/2021/01/12/where-does-untreated-wastewater-go-in-developing-countries-.html#:~:text=In%20developing%20countries%2C%20each%20person,contaminated%20wastewater%20created%20each%20day.

Site workers waste	4000l[67]	1200l

It was not possible to obtain full information on water flows because it requires more clarity on the volume and scale of operation of the proposed businesses once they would move to the site and the total flow requires to consolidate data from all company planned in the site. This detailed material and energy flow analysis needs to be undertaken.

Given the diversity of businesses to be included at the park, the wastewater generated is likely to having varying constituents, and therefore require varying treatment processes (e.g., hazardous vs non-hazardous). However, the potential wastewater production will be largely from the food industry with its main characteristic being a high organic load. These wastewater streams commonly contain nitrogenous organics, organic carbon, suspended solids, dissolved solids, and inorganics. Thus, the organic load of food processing wastewater can be up to 10 times higher than municipal wastewater. If discharged untreated into the environment, the nutrient-rich soup can lead to eutrophication of Lake Victoria, a condition in which excess nutrients supercharge harmful algal blooms.

The wastewater from this facility regarding Biological Oxygen demand (BOD) and Chemical Oxygen demand (COD) commonly are thousands of milligrams per liter, even tens of thousands, however the recommended national standard for discharge onto land, surface water or sewers is 50 mg/l and 70mg/l for BOD and COD respectively[68].

Considering all the above, there is a critical need to have a wastewater treatment/pre-treatment facility at the freezone site. However, from the meeting discussions and the site visit no appropriate sanitation plan has been established with the state of affairs having the drainage system emptying directly into the environment. Furthermore, it was established that there was no space left for wastewater treatment, as the whole 5-acre plot was constructed, and the remaining space is vehicle parking and turning, and construction of an office block. Neither was there any indication of consideration for wastewater treatment offsite, through transportation of the generated wastewater onsite to existing wastewater treatment sites elsewhere.

Nevertheless, the establishment of a wastewater treatment facility is necessary the meet both the environmental and green standards set for the freezone facility. Due to the expected high organic load of the wastewater produced these are suggested treatment options.

a) Wastewater stabilization ponds: This utilizes large ponds where wastewater is treated by natural occurring processes and the influence of solar light, wind, microorganisms and algae. It is the most cost-effective approach but requires a large piece of land and so may not be feasible with the freezones area constraints. However, it could be considered for the future Buwaya site.
b) Aerobic wastewater treatment: It is a biological technique that breaks down organic impurities and other pollutants such as nitrogen and phosphorus using oxygen. A mechanical device such as an air blower or compressor mixes the oxygen. This has a low land demand but can be costly due the mechanical component.
c) Anaerobic digestor: this utilizes temperature-controlled tanks to create a favorable environment for microorganisms that digest wastewater (organic waste) in the absence oxygen. This is the greenest option as it produces biogas that can be used as energy and limits the release of greenhouse gases into the atmosphere. Its disadvantage is that is has a high capex and opex.

[67] Based on national target of 20l individual consumption per day, though part of this consumption may happen at home and not onsite https://blog.ferrovial.com/en/2016/09/20-litres-of-water-on-their-heads-the-daily-routine-of-the-women-of-uganda/
[68] The National Environment (Standards For Discharge Of Effluent Into Water Or Land) Regulations, 2020.

For options b and c, the size and type of the wastewater treatment plants will depend on volumes to be treated. Therefore, space is a strong limiting factor for the type of processes that can take place in Entebbe FZ.

Stormwater management is also a key aspect of water/wastewater management. The site visit showed that the FZ did not make considerations for environmentally sustainable management of stormwater. In the current state, the stormwater is discharge directly into the lake. There's no wetland buffer zone at the lake to filter incoming stormwater. Therefore, all the runoff constituents including leaked oil and grease from vehicles, rubber from vehicle tires, silt, organic waste droppings, among others will directly enter the lake. This limitation should be a strong argument to decide on which sectors and processes to admit within the site. Also, the possibility to design a buffer by negotiating with the direct neighbors on possible common green infrastructures need to be explored.

Image 9: Drainage wall (14m) with evacuation in Lake Victoria

Solid waste

Joshua to complete

4.5.2. Social context

It was not possible to address the social context during this mission that was limited to only 2 days on site. Neither was it possible to do focus groups or visits to the local community. As mentioned earlier the number of direct jobs created will be rather limited, so will be the impact of those workers in the location. The main advantage of the FZ is the value chains opportunities it will offer for a number of providers in the countryside. Therefore, common infrastructures have been envisioned to be open for services for a larger community rather than the tenants, from which it can multiply its positive social impact, particularly if the FZ develops a favorable charter to which users should adhere.

4.6. Entebbe FZ Key Take Aways

This summary provides a quick snapshot of the Entebbe FZ chapter main take-aways. For detailed recommendations, refer to the text highlighted in yellow under each section.

- Key concerns: Insufficient space.3 options for companies:
  - A. Processing at site
  - B. Close to finish processing
  - C. Consider the 105 acres of land at Buwaya (30km away) for establishing a processing plant and required infrastructures.
- Key sectors: Horticulture, Agri/Food (Vegetables and Fruits), Meat (byproducts valorization in Buwaya or collaboration with Soroti IP), Fish (Buwaya), Dairy (Buwaya or collaboration with Soroti IP).
- Key RECP, services and common infrastructures measures: RECP training, filling and packaging machines: power/voltage stabilizer, capacitor bank, automatic change over switch, power backup, chemical leasing, packaging services contractual model, Central Cooling Systems, centralized air compressor system, Sanitary equipment (Co2 fumigation chamber/Control Atmosphere Treatment), Export logistics services, material and energy flow analysis.
- Innovation center: Flagship project: test and improve One Stop Shop and FZ Management models, Business Management trainings (value proposition, branding, quality, environmental and social performance and domestic vs export positioning, etc.), export logistics and storage services competences as a central point for various IP/FZ, organic products.
- Key environmental and social concerns: wastewater management (wastewater stabilization ponds, aerobic wastewater treatment, anaerobic digestor), Storm Water Management, surface runoffs.

5. Soroti Industrial and Business Park (219 acres)

5.1. General Situation and Current Status

Image 10:View of Soroti Industrial and Business Park.

Soroti Industrial and Business Park covers 219 acres and is located in Temere, Arapai Sub County, 5 Kilometers North of Soroti Town, in the Eastern part of Uganda. It is near Soroti University, Teso College Aloet, Bustima University, Arapai Agricultural college and the highway to Moroto and about 3.5 km from Soroti air strip. As per mutual agreement between UFZA and UIA, 20 acres have been allocated to develop a Freezone within the IP compound.

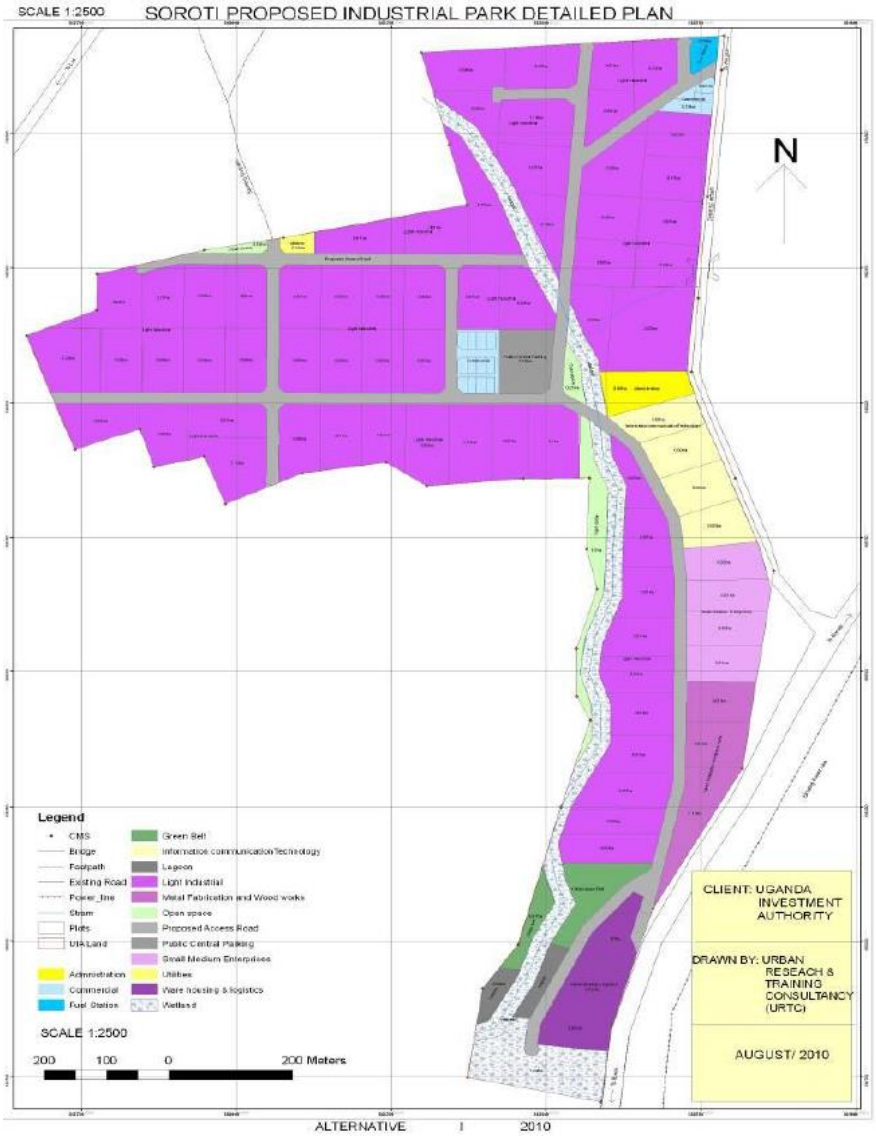

Figure 27: Soroti Industrial and Business Park 2010 masterplan. Source: URTC

5.2. SerDescription of potential investors and business partners

At the time of writing, UIA has allocated most of the IP land with just 6 acres left for SMEs and no count on infrastructures, as shown in Table 11. Investors with an asterix (*) have not been met nor confirmed and refer merely to UIA excel sheet “SCHEDULE OF LEASES FOR SOROTI INDUSTRIAL AND BUSINESS PARK JULY 2021”

Table 11: Soroti IP potential investors and business partners.

Name	**Activity**	**Location, status of Expression of Interest (EOI) or lease**	**Interest** (refer to the value chain section for details)
UGANDA DEVELOPMENT CORPORATION & Teso Tropical Fruits Cooperative Union Limited (TEFCU) [69] **and Soroti Fruits Limited (TEJU JUICE)**[70]	***Agro-processing (Fruits)*** Soroti Fruits Limited was incorporated in 2011 and is a government of Uganda investment promotion initiative aimed at supporting value addition in fruit processing for the promotion of industrial growth, income diversification and increasing house hold incomes in the country and is a subsidiary of Uganda Development Corporation which was established by an ACT of Parliament. Its shareholders are Government of Uganda through Uganda Development Corporation (UDC) which owns 80% of shares and Teso Tropical Fruits Cooperative Union (TEFCU) which owns 20%. Soroti Fruits Limited adds value to local oranges and mangoes, predominantly purchased from the Eastern and Northern regions of Uganda, producing fruit concentrates and natural ready to drink juice, branded “TEJU”. Soroti Fruits Limited mainly works with Teso Tropical Fruit Farmers’ Cooperative Union (TEFCU) which supplies the factory’s majority fruit requirements. Teso Tropical Fruit Cooperative Union (TEFCU) is an apex body of the Primary Fruit Cooperative Societies which form the main target group organized to develop and embrace cooperative principles and democracy for proper function of lower societies.	12,4 acres. Operational	It is an anchor factory for the IP upon which high expectations are raised to absorb local citrus fruits production.

[69] https://www.facebook.com/tefcu/

[70] https://www.udc.go.ug/soroti-fruit-factory/ and https://www.softe.co.ug/about-soroti-fruits-limited-teju-juice-teju-fruit-concentrate/

	TEFCU as an umbrella organization for fruit farmers in Teso sub region is mandated to promote quality and quantity fruit production, value addition and marketing. Soroti Fruit Factory was established by UDC in partnership with the Government of South Korea (through Korea International Agency [KOICA]) and Teso Tropical Fruits Cooperative Union Limited (TEFCU). It should be noted that Teso sub-region is the leading producer of citrus in Uganda. The factory was commissioned in April 2019 to provide market for oranges and mangoes and solve the challenge of post-harvest losses. It transforms fruits into into fruit puree/concentrate and natural ready to drink juice branded "Teju juice". Commercial operations commenced in October 2019. UDC has expanded the capacity of the mango processing line at the factory from 2MT/hour to 6MT/hour. This is expected to reduce the gap in the uptake of mangoes in the region and beyond (predominantly purchased from farmers in Eastern and Northern Uganda).		
SANQUA ENGINEERING LIMITED[71]	***Production of concrete products*** Sanqua Engineering is a limited liability company initially established as a Sanitation and Water (San-Qua) Engineering firm. It was incorporated in Uganda in 2004 with Ugandan directors. Its core areas of operation include Manufacturing, renewable energy and construction. In manufacturing it is into manufacture of concrete products, furniture and briquettes while in renewable energy we are into biogas. In construction it is into buildings, and low-cost water and sanitation innovative technologies. Its concrete products include; Concrete Culvert pipes, concrete Blocks of all sizes, Concrete fencing Poles, Road Kerbs, compound paving bricks, precast window cills and verandah columns, biodigesters and many more. Its activities in the construction sector include housing construction, Construction of Low-Cost water and Sanitation innovative technologies with focus on Peri-Urban Slums and Rural Poor, and the construction of biodigesters for energy for both cooking and lighting, but also bio digesters as household waste treatment facility. Currently, the company operates with a team of twenty-three (23) staff. Three (3) managers, eighteen (18) technicians and two (2) support staff. However, it hires scores of casuals as and when need arises.	4 acres. In construction stage.	The main motivation of the company is to have access to basic services including power. It is also interested in collaboration around energy production through byproducts reuse and wastewater reuse.

[71] https://sanquaengineering.com/

ASALALAMAAL LTD[72]*	***Agro-Food: Manufacture of vegetable and animal oils and fats*** The company is working in the field of investment, construction and management of projects in several countries: Tanzania, Zanzibar, Uganda and South Sudan. Its Food Industries Complex in Uganda is situated in Soroti area for the production of natural edible oils and related industries such as soap production from oil purification processes, production of fodder from the remnants of seed pressing, production of sweetness and flour from sesame, packaging of honey and its products from apiaries based on oilseed farms such as sunflower.	5 acres. In construction stage.	No further information.
SOROTI DISTRICT LOCAL GOVERNMENT	***Skilling Youth*** A ministerial project aiming to develop skills for carpentry, electricity, plumbing and artisanry.	10 acres. Construction stage. (not in the park?)	It was not possible to meet any responsible to see if any synergies in the training orientation towards skills required by the IP companies could be found.
PELA COMMODITIES LTD[73]	***Agro-Food (Factory in the grain value chain)*** Pela Commodities, whose complete name is Pela Commodities Limited (PCL), is a Ugandan company that buys, processes, packages and markets agricultural grain products nationally and to neighboring countries in the area of the African Great Lakes. It processes a range of cereals and oilseeds (80 types) including; sorghum, maize, simsim, millet, rice, among others. The sorghum grain is targeted for the brewing value chain, especially, Nile Breweries limited that processes beer. It has been successful with production test runs in the IP and is planning for full production and commercialization. Pela's grain value addition is highly commercialized and targets both domestic and export markets.	10 acres. Operational The company's processing factory is located in Soroti IP.	It is an anchor factory for the IP upon which high expectations are raised to absorb local grain production.
TESO FOODS LTD[74]	***Agro-Food (Fruit processing plant)*** Teso Foods Ltd is a wholly Ugandan owned limited company established in 2006. Teso Foods Limited has initiated a sustainable agro project towards providing a stable market for the national fresh foods' farmers in Eastern Uganda. Teso Foods	4,79 acres. The site was underconstruction.	No further information.

[72] http://asalalamaal.com/%d8%a3%d8%b9%d9%85%d8%a7%d9%84%d9%86%d8%a7/

[73] https://www.facebook.com/pelacommoditiesltd/ and https://en.wikipedia.org/wiki/Pela_Commodities

[74] https://tesofoods.com/

	Limited is engaged in the processing of fresh organic foods and beverages focusing on the local and regional market and involves the establishment of a network of over 10,000 out growers. In the districts of Soroti, Kumi, Bukedea, Amuria, Kaberamaido & Katakwi.		
KELIZ HOTEL LIMITED*	***Hotel***	2 acres. Pre-Start Stage	No further information.
KELIZ MEDICAL EQUIPMENT LTD*	***Hospital*** Manufacturing of Medical cotton products.	1 acre. Pre-Start Stage	No further information.
MEGA HOLDINGS[75]	***Agro-Food (Grain)*** The company process and export quality and natural seeds and grains. The produce is thoroughly selected and cleaned to world export quality. It especially deal in natural Sesame, assorted beans, Maize, Groundnuts, Soy beans, Millet, Sorghum, Cow peas and Rice. It is one of the leading exporters of sesame, maize, beans, cow peas, soy beans, sorghum, millet and cassava flour mainly for use in pharmaceutical industries in Uganda.	5 acres. Pre-Start Stage.	Main interest is in the infrastructures particularly power, lower rental costs.
SOROTI TEACHERS COOP SAVINGS & CREDIT SOCIETY LTD	***Printing*** A printing service currently addressing mainly the students' segment.	1 acre. Pre-Start Stage	The main interest is to provide printing services for the FZ along with the university students.
WODMA INVESTMENT LTD	***Building and Construction Plant***	3 acres. Pre-Start Stage.	No further information.
STAR TAHINA LTD[76]*	***Food processing plant*** In 2017, Star Tahina Limited brought the craft of Halva making to East Africa and opened the door to the first Tahina and Halva production factory in Uganda.	5 acres. Pre-Start Stage.Headquarters Kigunga, Alongo Jinja Road Mukono District	No further information.
KOMOLO FOODS AND BEVERAGES LTD*	***Grain and Fruit Processing***	20 acres. Pre-Start Stage	No further information.
SERERE AGRO ENTERPRISE LIMITED	***Agro Processing and Bulk Grain Handling***	4 acres. Newly Allocated	The interest in the IP is for its market expansion in Soroti

[75] https://megaholdingsug.com/

[76] https://www.facebook.com/Star-Tahina-Limited-475974332857854/

	The company has not been active so far in the region but deals with posho, rice and beans marketing local consumer in Soroti. They also clean and export maize to Kenya.		and access to basic services such as water.
DEVELOPMENT MEASURES INTERNATIONAL LTD[77]*	***Skilling The Youth*** Development Measures International (DMI) is a Registered Private Limited Company engaged in Organizing and Commercializing Agriculture Production for Improved Rural Livelihoods. Its mission is Transforming Smallholder Farmers from Subsistence Production to Commercial Production and to Enable them engage in Agriculture as a Rewarding Economic Enterprise for Wealth Creation & Poverty Amelioration.	5 acres. Newly Allocated	No further information.
OPERATION WEALTH CREATION/NAADS[78]*	***Cassava processing factories*** The National Agricultural Advisory Services/Operation Wealth Creation (NAADS/OWC) is a government programme aimed at enhancing effectiveness in delivery of agricultural extension services in Uganda. This is done through provision and distribution of agricultural inputs such as seeds, planting and breeding materials, fertilizers, agrochemicals, agricultural equipment and tractors.	5 acres. Newly Allocated	No further information.
JENA HERBALS Uganda LTD[79]	***Manufacturing facility for Covidex and other health products*** The company presents itself as "the world leader in research, development & manufacture of quality natural health products to serve humanity"[80], offering services in Consultancy, Training, Research, Manufacture of herbal medicines, Sales and distribution. Though the "world leader" status is improbable, the company was actually founded by Prof. Ogwang Patrick. He also doubles as a Senior Lecturer and current Head of Department of Pharmacy at Mbarara University of Science and Technology. Dr Ogwang has been actively involved in research on herbal medicines. The company produces Covidex, Jena Artemune and other herbals. While its fabric is underconstruction, Jena herbals current sales experience is mainly through personal networks. It still needs to take the leap to market once its first volume batch will be ready to sell.	5 acres. Under construction	The company motivation to be in the IP is primarily space and services, then collaborations, innovation center/equipment and reputation.

77 https://www.devmeasures.com/about-us

78 https://www.finance.go.ug/sites/default/files/Publications/BMAU%20Briefing%20Paper%2027-17%20-%20Distribution%20of%20Inputs%20by%20NAADS-Operation%20Wealth%20Creation%20-%20What%20are%20some%20of%20the%20benefits%20to%20farmers.pdf

79 https://jenaproducts.wixsite.com/jenaproducts

80 https://www.facebook.com/jenaherbalsug/about/?ref=page_internal

WASH AND WILLS COUNTRY HOME LTD[81]*	***Hotel***	5 acres. Newly Allocated. Wash & Wills Hotel is located along Mbale – Kampala Road	No further information.
AMINIT COMPOSTING SITE	***Waste*** Soroti Municipal Council has acquired 9 acres land located approximately 5 kilometers from the CBD at Aminit Village within Soroti Municipal Council where waste composting and landfilling is undertaken. To the north of this site is Aminit Primary School and to the west is Soroti Flying School land while to the east and south are agricultural fields.	In Aminit village but currently receives the IP wawa	See under 4.3
UGANDA FREE ZONES AUTHORITY	***Free Zone Area*** As per agreement with UIA, UFZA benefits from an allocation within the IP to operate a FZ. There is hope for an airport facility to see light in the future justifying also the enclave.	20 acres. Pre-Start Stage	It was not possible at this stage to investigate the potential business for the freezone enclave. As a safer route, Entebbe FZ is rather proposed for cold chain and export services. Soroti FZ will have to develop a value proposition in itself to position its services compared to Entebbe.
SOCADIDO	***https://socadido.org/ ?***		
SMEs	Allocation to cater for SMEs in the future	6,1 acres. Unattributed.	
NATURE & LIVELIHOODS and	***Agro-food Indigenous plants***	No EOI yet as no capital but would be	The NGO lacks the capital required to

[81] https://washandwillshotel.com/about-us/

NL BIOPRODUCTS LTD[82]	Nature and Livelihoods is a non-profit NGO working for nature conservation inside and outside protected areas throughout the country. In eastern Uganda, it has so far researched on chemical attributes, and experimented on production of high value market products such as jams and wines from a variety of indigenous (wild) fruit types collected from the farmlands of the Teso sub-region. Its research team was comprised of scientists from the Natural Chemotherapeutics Research Institute of the Ministry of Health, Makerere University School of Food Sciences, and Mbarara University of Science and Technology. Since Nature and Livelihoods is a non-profit, it cannot engage in commercialization. It has thus considered forming a company and underwent some training under the SEED program. The company it is considering forming is featured here https://seed.uno/enterprise-profiles/nl-bioproducts-ltd. NL Bioproducts is processing indigenous, wild fruits and berries into value-added market products such as jams, marmalades, and wines. In doing so, the enterprise incentivizes rural communities to sustain traditionally valuable indigenous plants in their farmlands and it helps create additional sources of income for these communities. Consumers also benefit from what the enterprise's research shows to be the unique nutritional values of these wild, organically-grown fruits compared to other farmed products on the market. The enterprise hopes to scale up production and quality assurance of the value-added fruit and berry products from government laboratories to its own facilities.	a good candidate for an Innovation Center supported by a start-up program.	start-up and particularly the costs of renting an office, a production facility, buy production equipment, storage, etc. They consider the demands that government tax and regulatory authorities place on a company upon registration too high. This gives it a strong motivation to join an IP or an FZ enclave.
NICHO VENTURES FARM LTD[83]	***Fish, Poultry*** Nicho Ventures is a Company Limited with the objectives ▪ To contribute towards farmer trainings on various agri-business enterprises. ▪ To improve/ contribute to agricultural production, productivity & market linkages for farmers & farmer groups. ▪ To provide farmers with low-cost water drilling services to facilitate their farmer activities. ▪ To promote partnership with other agricultural development partners in carrying out research, Innovation, consultancy and advisory services. ▪ To increase farmer output by providing high quality & affordable livestock feeds.	Nicho Ventures Farms is located on Plot 61, Madera School Road Otuchopi next to Pentecostal Assembly of God (PAG) church it houses a demonstration & training farm on one acre piece of land.	The company wants to set up a factory for floating fish feeds and use the available space at the farm to expand its fish production as well as design fish value addition solutions (dry fish for export).

[82] https://seed.uno/enterprise-profiles/nl-bioproducts-ltd

[83] https://www.facebook.com/Nicho-Ventures-Farms-111677220743496/ and https://www.linkedin.com/company/nicho-ventures-limited

	Nicho Ventures has various arms it works with to achieve its goals such as Poultry Farm, Brooding of Quails, Ducks and Guinea Fowls, Fish and fish feed production, etc.	No EOI yet as cannot reach the level of investment required by the IP/FZ but would be a good candidate for an Innovation Center and SME allocation based on lease.	A key motivation is to benefit from the land access and symbiotic equipment.
Eneku Enterprises/Teso Organic Honey	***Agro-Food (Honey)*** Eneku Enterprises/Teso Organic Honey is being supported by Soroti Catholic Diocese. It is the only honey processor in the region, buying from small bee keepers/farmers.	Outside the IP	Interest to collaborate with firms in the IP and possibly in cold chain services.
DAIRY DEVELOPMENT AUTHORITY (DDA)[84]	***Dairy*** Dairy Development Authority (DDA) is a semi-autonomous agency under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Its role is to develop and regulate the dairy industry in Uganda. Its goal is to enhance dairy value addition and quality for increased market competitiveness. It is running a successful demonstration site with yogurt and ice-cream in town.	Local authority. No EOI has been received so far from the dairy sector. Demonstration site in Soroti.	At the moment there is no exit strategy for companies performing under the demonstration site. Shifting to an innovation center in the IP could be a good avenue for successful start-ups.
Uganda Meat Packers	***Meat*** The Uganda Meat Packers started in the 60's as a meat (and canning) factory. It was set up in this location because it was the highest in livestock in Uganda (with Karamoja accounting for 20% of all sheep and goats in the country). Through various political turmoil, it moved from a state owned to a private facility but lost its infrastructures and came to a halt. At the moment the owner is seeking ways to revitalize it given that is has huge potential in the region.	Neighboring the IP	Collaborations possible with the IP in the areas of biogas, byproducts valorization and laboratory testing, and with Entebbe FZ for cold chain and exports logistics.

[84] https://dda.go.ug/about.php

5.3. Key productive sectors and value chains observations

The result of the discussions, site assessments and analysis of the economic, environmental and social aspects led to the selection of the key sectors showed in Table 12, the elimination of potential ones (sectors crossed out) and the identification of services and incentives that would translate in the IP value proposition[85]. The mining sector was crossed out as it does not take place in the IP. The leather sector too as there was no request from stakeholders and the processes would be too polluting compared to the level of wastewater management available in the IP.

Table 12: Soroti IP key existing and potential sectors

SECTORS	SERVICES	INCENTIVES
▪ **Agri/Food (citrus, mangoes, cotton, grain, vegetables, Honey…)** ▪ **Fish** ▪ **Meat** ▪ **Dairy** ▪ **Construction (Concrete/Brick)** ▪ **Pharma (Herbal) and Indigenous Plants Products** ▪ ~~**Leather**~~ ▪ ~~**Mining (Sand, stones)**~~	▪ Infrastructures: power, waste management and water. ▪ Storage ▪ Packaging ▪ Cleaning ▪ Washing ▪ Sanitary treatments (irradiation? fumigation) ▪ Cold Chain (deep freeze) ▪ Oil cold press, CO2, Distillation, drying, toxis scrub… ▪ Dairy making machines	▪ One Stop Service ▪ Import and export tax free within freezone enclave) ▪ Free land ▪ Innovation center ▪ Youth skills center (not related so far but to explore further)

The mission did not replace a thorough value chain feasibility analysis that was not properly conducted for the site. As an example, the value-chain analysis had to limit itself to a few agro-food produce (mango, citrus, honey, grains) though similar analysis would be needed for other value chains such as cassava for example. Some general value-chain observations and recommendations are highlighted in Table 13 are valid for both Soroti and Kasese IPs.

Table 13: General Value Chain Observations for Soroti IP

Observations based on discussions with Soroti City leaders	Recommended Action
GGGI support in **Green Industrialization** focuses at the level of FZ and IP**.** However, such a support needs to be complemented by strategies for greening the targeted value chains, and building their resilience for sustainable value chain development. Focusing on Green Industrialization without greening the value chains can create mismatch.	Strategize for greening the value chains and integration into the masterplan. Identify potential complementary

[85] Group discussions drawings are in Annex F

	donors and link-up with existing national programs.
The central government, did not sufficiently involve the actors, and Soroti City/Local government leaders on design and inception phases of the project, and thus, the actors targeted for the Industrial parks, Soroti Local government, and central government are operating in isolation.	Set up an administrative framework that integrates all stakeholders
The information on the key actors, exiting linkages, relationships and material flows along different marketing channels for each segment of the targeted value chain for industrial parks is insufficiently documented.	This information is a critical gap and should be generated early on.
The district production officers, and commercial officers seem to have no framework in place for multi-scale assessment, monitoring and integration of Industrial Parks into the Soroti City work plans, including the current Parish Development Model.	Need for a framework that integrates the industrial parks into the district workplans
The project seems to have ignored integration of the value chain approach in the master plan, that would strengthen inter-linkages among the various actors and address associated financing, technology and capacity gaps to deliver holistic support for needed services. To this effect, the mission identified key common productive infrastructures but at a stage where land allocation and financial promises were so advanced that there may be a lack of available space for them and expectations of too much free services from the tenants rendering the IP financial sustainability questionable.	Need for holistic integration of the value chain development approach into the project and for the identification of productive infrastructures early on.
The value chains analysis report that would have prioritized value chains, mapped actors, analyzed market flow volumes and trends, analyzed business models, identified opportunities, constraints, defined the processed flows and proposed concrete viable options for support or enhancement based on solid analysis is lacking	Conduct a value chains analysis Need for documentation of the opportunities and potential of the value chains before commercialization.

5.3.1. Agri-Food (Fruits: Mango and Citrus)

The fruits sector is an anchor sector for the IP and there are great expectations on the IP being able to process the majority of the agro-production. However, based on the discussions with farmers and processors, farmers have limited access to preferred improved industrial varieties for citrus and mango and are not sufficiently market oriented. Companies are sourcing in the region but not necessarily in Soroti district and there seem to be absence of ongoing interventions and efforts being made by the National Agricultural Research Organization (NARO) to address the processing variety constraints and many gaps still exist. There are very little linkages and coordination between value chain actors, and stakeholders, including the Research, and Local Government officials. Also, because the production is rainfed, several threats face the citrus and mango value chains including climate vulnerability that is often associated with prolonged drought, unavailability of resilient clean and quality seedlings and

at an increasing rate scarcity of water. Thus, due to seasonality effects/low yields, the producers/cooperatives fail to fulfil their orders for adequate quantities of commercial quality produce while experimenting high post-harvest loss at the same time. In conclusion, preferred industrial citrus/mango seedling availability and adequacy is crucial. Efforts to engage R&D institutional support to farmers is an issue to consider especially with NARO. The intervention should incorporate private firms and individual farmers as seed multipliers towards accessing adequate seedlings for citrus and mango. The problem is not new, Figure shows a value chain analysis[86] for the citrus in Eastern Uganda in 2018 that matches the situation found in Soroti. However, given the time required for the trees to grow and despite the challenges, the valorization of the current production is still vital.

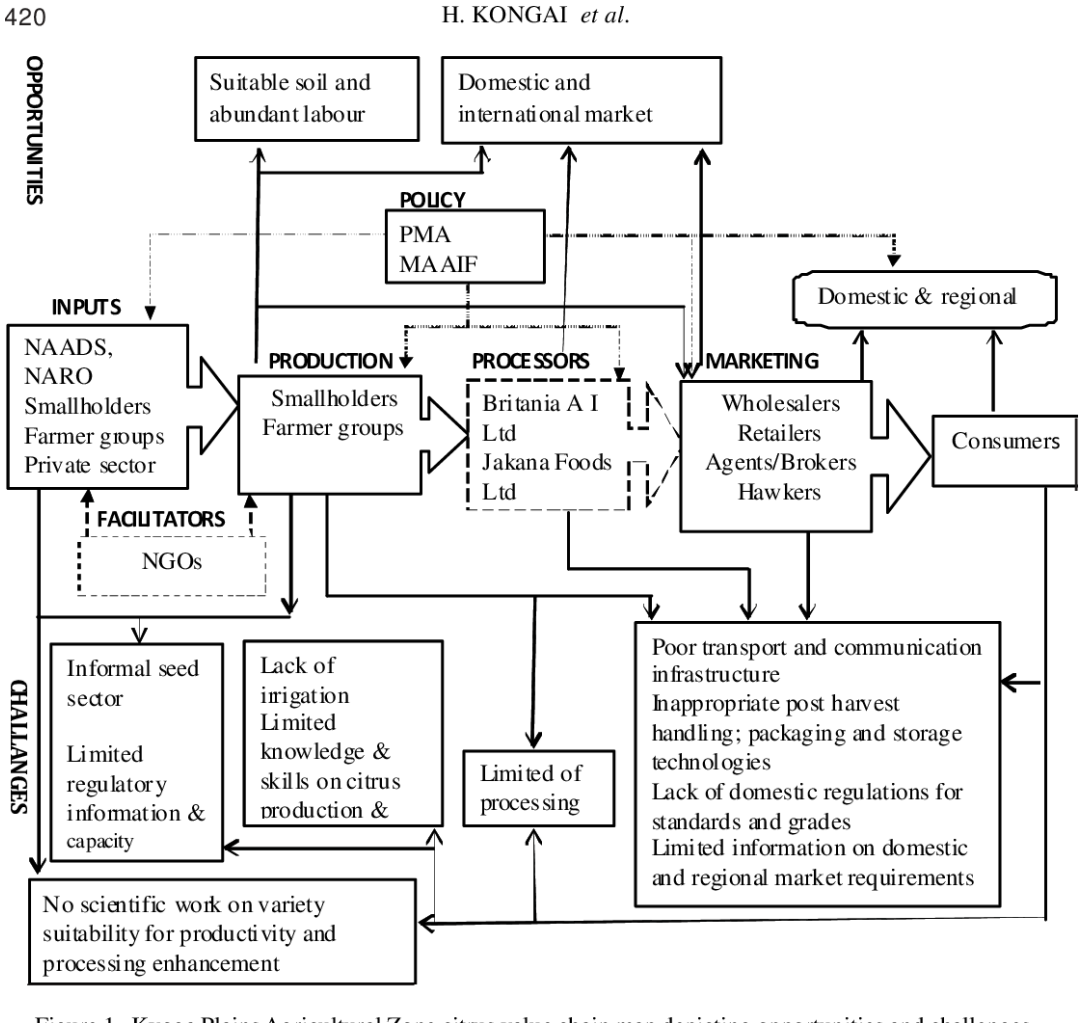

Figure 28: Citrus Value Chain Analysis from Eastern Uganda

Key players/potential investors:

Teso Tropical Fruits Cooperative Union Limited (TEFCU) and Soroti Fruits Limited (TEJU JUICE), TESO FOODS LTD

Value Chain, Material and Process Flow Analysis

[86] https://www.semanticscholar.org/paper/Analysis-of-citrus-value-chain-in-eastern-Uganda-Kongai-Mangisoni/d47f0037278ff569f577bd7980c81ceef10e6a54

Soroti Fruits Limited is an anchor company for this sector and given its government shareholding, it is expected to be exemplary in its role to absorb local production, turn it into market opportunities and show good social and environmental practice. It produces orange concentrates that are then used as an ingredient for production of Ready to Drink, Fruit Drink, that is then sold to customers(B2C). It sells concentrates to large companies such as Harris International/Riham, and Britania (B2B). The company buys produce from farmer cooperatives/organizations but did not implement formal supply contracts. The farmers themselves seem to have little access to markets and no linkages with transporters.

Image 11: Front view from Soroti Fruits Limited.

The two most important challenges that were highlighted are a) the absorption capacity of the company is insufficient in regards to farmers production volumes in the regions it supplies from. A contrario, Soroti farmers quality production (of commercial produce) is insufficient for the company's needs. b) there is a high post-harvest loss on the farmer side, and a high level of waste on the company's side due to no by-product's valorization.

Fruit Juices considerations

Table 14 shows different fruit juices categories based on their processes and percentage of actual fruit juice.

Table 14: fruit juices categories

Fresh raw orange juice (unpasteurized)	Not From Concentrate Orange Juice (NFC)	Nectar	Frozen Concentrate Orange Juice	Fruit Drink/ Fruit Juice	Non-Carbonated Soft Drink	Carbonated Soft Drink
This version of the juice consists of oranges that are squeezed and then bottled without having any additives or flavor packs inserted. **The term "fresh squeezed"** means that the juice has not been processed in any form, such as concentration, pasteurization or HPP. In the US, the terms "freshly squeezed" is protected by the FDA and a warning is mandatory specifying *"This product has not been pasteurized and therefore may contain harmful bacteria that can cause serious illness in children, the elderly, and persons with weakened immune systems."* To maximize the shelf life of freshly squeezed orange	**Orange juice that is pasteurized and then sold to consumers without having been concentrated (NFC).** Not from concentrate organic juice manufacturers apply mechanical pressure and processing to create not from concentrate juices produced straightforwardly from fresh vegetables and fruits. They need to make sure that the materials are ripe from careful selection and hygiene. After that, the fruit is pressed with a pneumatic press; then, it is extracted and finally packaged. This procedure is operated in an aseptic environment to extend shelf life and provide excellent storage. Most juice not from concentrate procedure may decrease the natural and authentic flavor from the liquid and remove important micronutrients (vitamins, antioxidant) due to the pasteurization process aimed to kill bacteria and germs. Thus, the importance to have an excellent pasteurization procedure, which decreases the product exposure to heat. Excessive heat can result in cooking flavors, which give distasteful changes in the delicately scented components. (NB: Leaving a glass of	Fruit nectar is defined as a drink made from fruit juice or pulp, water and sugar. Some fruits naturally contain so much fruit acidity or fruit pulp that they cannot be sold as 100% fruit juice; they can only be made palatable using water and sugar, which is called **fruit nectar**. There is a required minimum fruit content for fruit nectars, which is between 25 and 50%, depending on the type of	Commercial squeezed orange juice is pasteurized and filtered before being evaporated under vacuum and heat. After removal of most of the water, this concentrate, about 65% sugar by weight, is then stored at about -12 °C. Essences, Vitamin C, and oils extracted during the vacuum concentration process may be added back to restore flavor and nutrition. When water is added to freshly	Common on Ugandan market is **Ready-to-drink (RTD).** Fruit drink is intended for direct human consumption which contains fruit juice, or fruit pulp. It may be made from a single or a mixture of two or more fruits. It is usually reconstituted or diluted with water appropriately. It may be sweetened with nutritive and/ or non-nutritive (intense) sweeteners and other permitted food additives. Usually contains 10% (minimum) of fruit juice **(For example TEJU fruit juice**	Non-carbonated soft drinks are water-based flavored drinks, (e.g. passion flavored, orange flavored etc.) Also includes tea drinks, and herbal-based (flavored) drinks, without carbon dioxide**. (For example Cheers)**	Carbonated soft drinks are water-based flavored drinks sweetened with nutritive and/or non-nutritive (intense sweeteners) with added carbon dioxide and other permitted food additives. (**For example Fanta, Coca Cola sodas etc.)**

juice, refrigeration in sterile glass or plastic containers is used and juice that has been continuously refrigerated in optimal conditions can keep from 5 to 23 days (but usually up to 3 days). New technology: **High-pressure processing (HPP)** is a process where manufacturer use high pressure instead of high temperature to kill off dangerous bacteria that produce more nutrient-dense juice compared with pasteurized juice.	juice on a table a few hours decreases also tremendously the vitamins content). In addition, a production procedure where the juice is set in aseptic storage where the oxygen is removed can extend shelf life for up to 1 year. Because of stripping the oxygen, some producers add extracts or a flavor pack during the last step to give more taste. Even when it says, "100% orange juice," and the label only has one ingredient (orange juice), the juice is likely to contain added flavorings which manufacturers don't have to include on the label. (Because the synthetic flavor chemicals were "derived" from oranges). Besides, business use bulk storage in tank yards, boxed and barreled frameworks, and sterile frozen storage.	fruit. Fruit nectar does not contain any colorings or preservatives.	thawed concentrated orange juice, it is said to be **reconstituted. A 100% juice made from concentrate** is free from added sugars, in some cases preservatives are permitted. (**For example 100% Minute Maid in USA**)	**or Splash or Oner)** A fruit juice drink has a low fruit content. The definition of fruit juice drinks states that **the fruit content must be at least 6 to at least 30 % fruit content**. The level depends on the **type of fruit:** for **citrus fruits** it is at least 6 %, while for grapes the fruit content is at least 30 %.		

Some examples of fruit juice products found in Kampala supermarkets; besides Teju brand, competition is overwhelmingly made in Kenya:

Image 12:Teju Orange Fruit Drink and Mango Fruit Drink with 15% fruit juice from concentrate and 15% fruit puree respectively, both with added sugar and preservatives. Made in Uganda. The products are also available in bottles.

Image 13: Fruit-Dale Orange Fruit Juice, a reconstituted 100% orange juice with orange juice concentrate and water. Mango Fruit Nectar with 30% mango concentrate, added sugar, no preservatives. Made in Kenya.

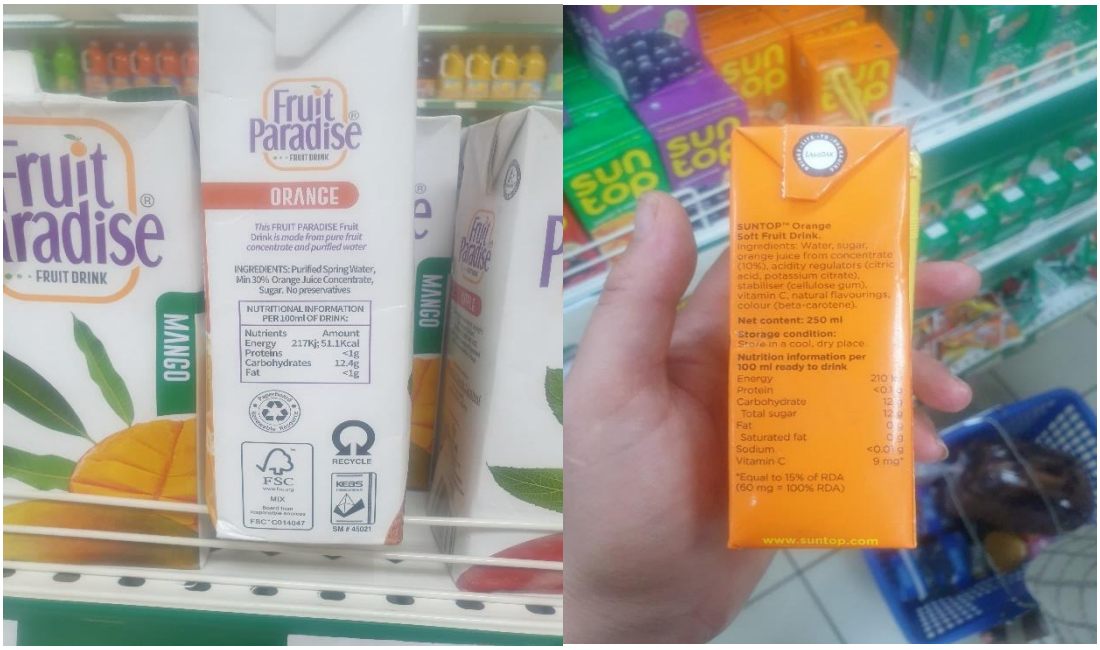

Image 14:Fruit Paradise Orange Fruit Drink with 30% orange juice from concentrate, added sugar, no preservatives and Suntop Orange Fruit Drink with 10% orange juice from concentrate, added sugar, no preservatives. Both made in Kenya.

Image 15: Pick and Peel 100% Orange Juice from Concentrate, no sugar, no preservatives and 100% mango juice from puree, no sugar, no preservatives.

From Table 14 and Images 11 to 14, one can see that the healthiest option in terms of maximizing vitamins content and reducing sugar and artificial flavors is the fresh raw orange juice, though as it is unpasteurized, conservation requires special handling and equipment. In developing countries, the Not for Concentrate juice (NFC), which is pasteurized, is a safer and easier option to manage. At the moment Soroti Fruits Limited doesn't commercialize such a juice. The Concentrate Orange Juice is an industrial product favored for ease of transport and transformation and takes the largest share of the company business. As a finished product Teju drinks contain less orange juice/mango purees percentage than its Kenyan competitors (with the exception of Suntop). Notably, Pick and Peel juices show that there is a market for 100% juice from concentrate with the healthy benefit of not having added sugar and preservation processes not requiring added preservatives to a level requiring labelling.

From a formulation view point, it appears that there is room for Soroti Fruits Limited to develop products that would hold a higher percentage of fruits juice and healthier benefits for the Ugandan population. This would result in an increase of the company absorption of raw orange and mangoes, benefiting the farmers. Of course, the volume of increase may not be as relevant given the market penetration of Teju juice compared to its competitors and the higher percentage of sales from its B2B products which are the orange concentrate and mango puree. From a commercial viewpoint, one would need to investigate whether the company took a strategic stance by not making competition to potential buyers of its concentrate products. In our opinion, this is unlikely for two reasons, first as we do not know the origin of the orange concentrate used by Kenyan brands but it is most likely Kenyan. Secondly because the level of awareness of the Ugandan population in regards to fruits juice composition is very low, making Teju Fruit Drink as it is formulated now as much a competitor to other brands than it would be with a 100% fruit juice formulation (from a product perspective). It seems that the positioning of the brand is rather on price to target an relatively unaware mass Ugandan market.

From a price perspective, it appears that Teju Fruits Drinks are sold from the factory to a similar price as Rwenzori Water. With transport to the wholesaler covered by the company which explains the less than 30% margin for the wholesaler, a rather low figure in the distribution hierarchy.

Without entering in more details, from a supply side perspective, the above demonstrates that there is need for competitive market structuring and aggressive marketing and distribution strategies for Teju brand, and to rethink a possible diversification of juice products with particular emphasis on healthier options able to absorb a higher share of local fruits production. From a demand side perspective, efforts from manufacturers need to be supported by a strong government campaign over healthier food choices and choosing local produce (see also section 4.3.2). It is recommended for UIA and Soroti Fruits Limited to discuss on a collaborative approach to generate the necessary market information and ways to mobilize the stakeholders that could support such a campaign.

Image 16: Processing at Soroti Fruits Limited.

From an IP value proposition perspectives in regards to common infrastructure, Figure 29[87] shows the basic pathway of the orange concentrate and NFC products; and Figure 30[88] provides a simplified idea of the cold chain requirement per type of product. It implies that if the IP offers cold chain and storage as a common infrastructure, it will need to assess the type of products and volume to decide on the type of facilities and equipment to procure (for example aseptic or not). Similarly, for Entebbe FZ value proposition, UFZA would need to decide whether to offer cold chain and logistics support only to fresh fruits or transformed products and which type. It is recommended to equip for transformed products such as frozen fruits, fruits puree and concentrates in order to boost the sector. Larger companies are able to build their logistics chain on their own, but many SMEs may find it challenging and benefit from a comprehensive service instead.

[87] https://orangebook.tetrapak.com/chapter/supply-chain-and-global-consumption-orange-juice
[88] https://orangebook.tetrapak.com/chapter/transport-and-handling-bulk-product

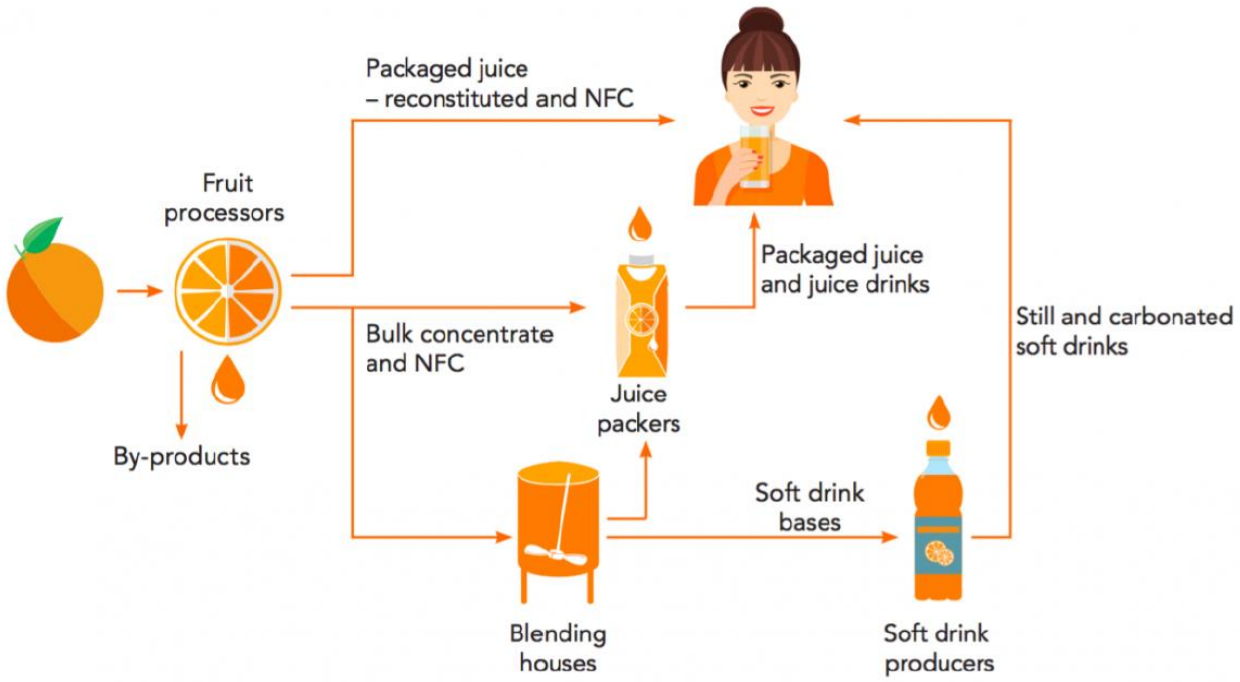

Figure 29: basic pathway of the orange concentrates and NFC products.

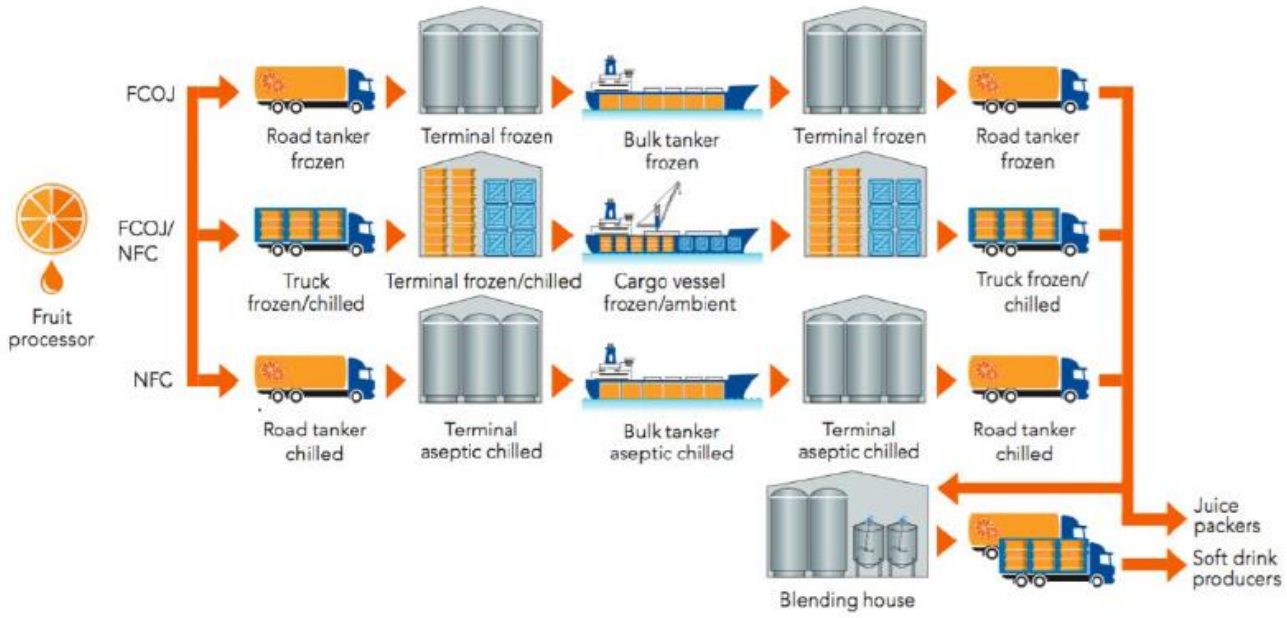

Figure 30:cold chain requirement per type of orange juice product

Byproducts valorization

As mentioned earlier, there is a need to reduce post-harvest loss on the farmers side, and waste on the company's side while generating additional income. This can be done by reusing by-products from fruits processing as well as using discarded fresh fruits. One way is to use the biomass as energy source, see options proposed in section 5.4. However this is a last resort option if no commercially viable other valorization pathway is found, which is what this sections is exploring. The largest portion of waste for the citrus (orange) processing is constituted as per Figure 31[89] and for mangoes as per Figure 32[90]. Consult also section 4.3.2 for valorization of frozen fruits and fruits purees.

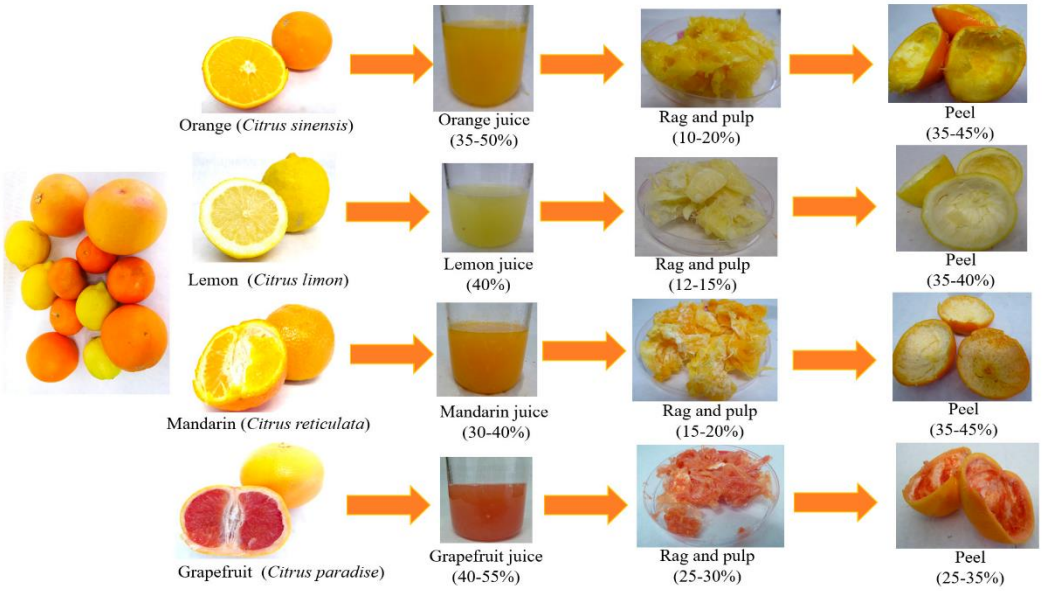

Figure 31: The principal citrus species and their composition in terms of juice and co-products composed by peel and rags and pulp residues.

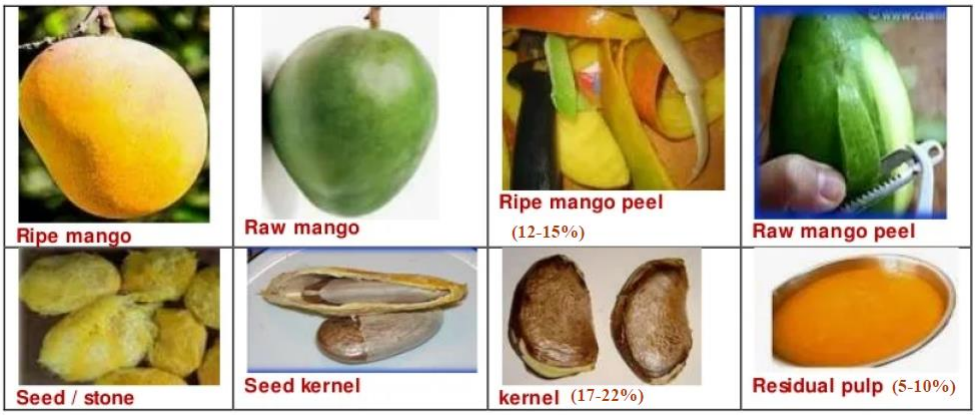

Figure 32: Mango waste and processing residues.

[89] https://www.mdpi.com/2223-7747/10/6/1069/htm

[90] https://www.slideshare.net/jaisingh277/mango-fruit-processing-wastes-and-residues-utilization-for-food-and-food-supplements note that the figure also presents green mangoes which is not used for puree but rather for salted products such as mangoes pickles, particularly in Asia.

Orange by-products categories and examples are shown in Figure 33[91] and Figure 34.

Figure 33: Orange by-products categories.

Figure 34: Orange by-products examples.

[91] http://sustainablejuice.com/environment/

Extract from Springer publication[92]: "The major by-product of citrus processing **is cattle feed and molasses** made from the peel. The peel is first pressed, and the press cake is dried and pelletized. The press liquid is concentrated to make molasses, which may be added back to the dried peel or sold separately as a feedstock to make beverage alcohol by fermentation**. Cold-pressed peel oil** is recovered by extracting the oil from the peel by contacting with water, resulting in an emulsion. The oil is separated by centrifuging and is sold, mostly to **flavor** companies, **who fractionate it into various components**, most of which find their way back to the juice companies. During the evaporation process to concentrate the molasses from the press liquor, oil that remained in the peel is recovered. This oil is composed **of terpenes, largely d-limonene**, which is recovered by distillation and sold as a solvent or as a feedstock for chemical synthesis of terpene resins.

Pulp from the finishers may be washed with water to recover extra solids. The wash water is concentrated to make **water-extracted soluble orange solids (WESOS)**. This material cannot be added to pure juice but is used in other products, such as soft drinks.

Innovation: Each citrus fruit has characteristic flavonoids which contribute to its distinct flavor in some cases.

There is recent research to find biological activities for the minor constituents of citrus fruit, but commercial application may be limited because of the expense of extraction and purification of minor components from large amounts of peel residue, requiring treatment or disposal of large waste streams. The pharmaceutical approach of organic chemical synthesis would probably be more efficient for any component with true biological activity."

For information, such a biorefinery perspective is shown in Figure 35[93] though given the cost of production and equipment, it is not recommended for Uganda except potentially for Pectin.

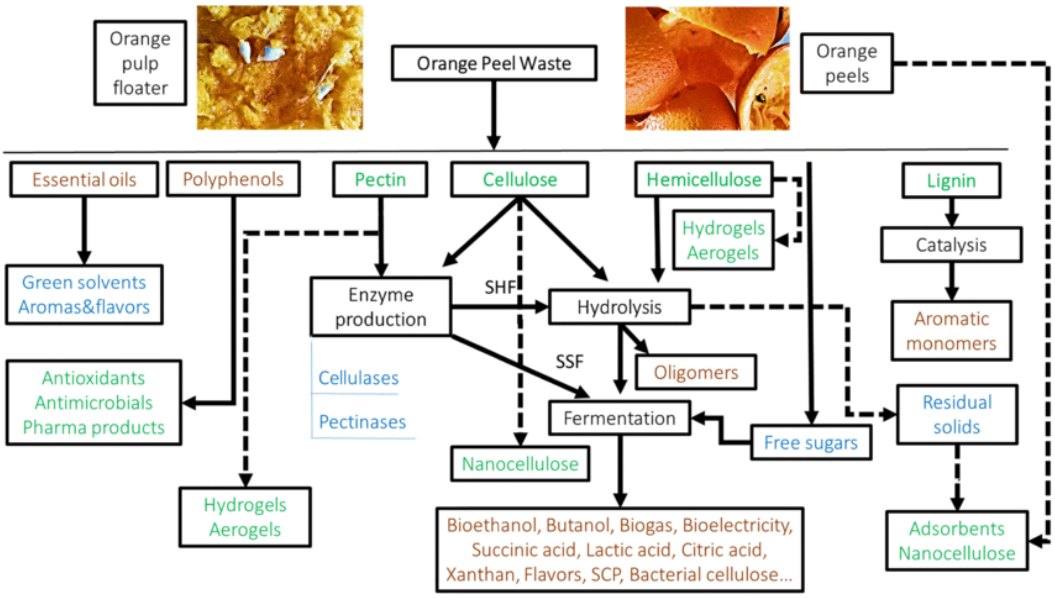

Figure 35:Perspectives on biorefinery integration based on orange waste (OPW), peels and pulp

[92] https://books.google.ch/books?id=882Sbn94f9AC&printsec=frontcover&hl=fr#v=onepage&q&f=false
[93] https://www.researchgate.net/figure/Perspectives-on-biorefinery-integration-based-on-orange-waste-OPW-peels-and-pulp_fig2_333681283

For mangoes, some valorization options are shown in Figure 35[94].

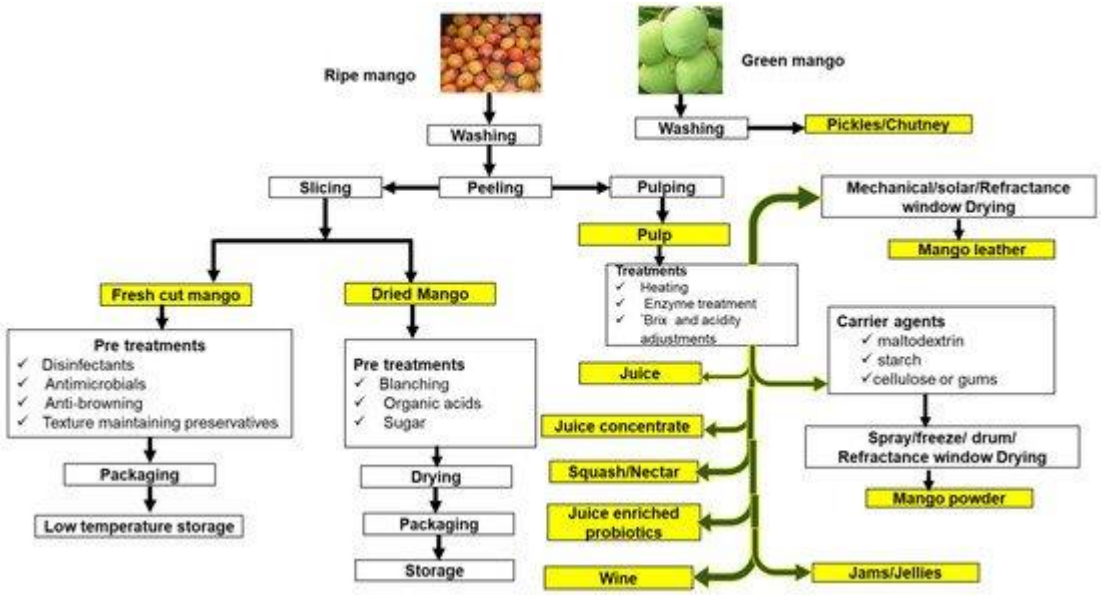

Figure 36:Processing of different products derived from mango.

In Uganda, all the following valorization products can be explored and are feasible with various levels of technology as also shown in Image 17 and Image 18:

Molasse and Pellet: Both can serve as animal feed under a certain mixture percentage. It would be recommended for Soroti Fruits Limited to explore possible collaborations with Uganda Meat Packers and NICHO VENTURES FARM LTD.

Dried Fruits: Can be sun dried or hoven dried. Gentle drying of the fruit at low temperature ensures better quality and treatment with Sulphur (for color conservation) not necessary. This is a low technology option recommended if no funds are available to put in place more lucrative technology such a the freeze-dried or vacuum dried techniques.

Candied Fruits: Whole fruit, smaller pieces of fruit, or pieces of peel, placed in heated sugar syrup, which absorbs the moisture from within the fruit and eventually preserves it.

Fruits Chips: Dried fruits with oil to give a crisp texture. Often with added salt or sugar.

Puffed Fruits: Unlike conventional drying, the fruits are heated in a vacuum. This innovative puffing technology of vacuum drying ensures that the water contained in the fruit evaporates in a very short time at low temperature. This gives a crunchy texture without adding oil or sugar.

Freeze-dried Fruits or Lyophilized Fruits: sublimation is used to remove the moisture from the ripe fruit during freeze-drying. This preservation process ensures that the nutritional values and flavor of the fresh fruit are preserved - without any additives! It retains most of its sugars. Lyophilization is a process in which water is removed from a product after it is frozen with liquid Nitrogen and placed under a vacuum, allowing the ice to change directly from solid to vapor without passing through a liquid phase. This process leaves the fruit a crispy shell of the fresh

[94] https://www.mdpi.com/2077-0472/11/11/1105/htm

version. Can last 25 years if stored under ideal conditions. Given the high margins, it is recommended to invest this technology as a priority both for the IP innovation center and Soroti Fruits Limited as a company.

Fruits Powder: Powders from dried or freeze-dried fruits used for flavoring and coloring. Citrus Peel powder can also be used in cosmetics. Given the high margins of freeze-dried fruits powder, it is recommended to invest this technology as a priority both for the IP innovation center and Soroti Fruits Limited as a company.

Individually Quick Frozen (IQF) Fruits: Consists of freezing individual pieces of food separately from the other pieces at extremely low temperatures. It allows fruits not be clumped and frozen together. Fast enough freezing causes much smaller ice crystals to develop within the product. Ice Crystals that develop with slower methods of freezing are bigger and these crystals damage the cells and tissues of the product. The process of ice crystallization takes place between -1 to -4º C. IQF Freezers freeze content extremely fast, bypassing this crucial zone as quickly as possible. IQF can be achieved by cold air bed or by immersion in liquid nitrogen. The latter is ideal for products that are difficult to individually quick-freeze, such vegetables, fruits, marinated or cooked products, since they have tendency to clump or stick to the belt during the freezing process. Ex. https://www.pmg.engineering/iqf-technology/ and https://www.youtube.com/watch?v=piOftFE7aB8. Given the growing global demand, it is recommended to invest in this technology as a priority for the IP innovation center in collaboration with Entebbe FZ. An option could be to explore peer learning with Soroti Fruits Limited by hosting this section of the center under its roof.

Frozen Fruits Purees: A variation of the IQF technique. Contrarily to the aseptic fruits puree process where fruits are pureed, pasteurized and canned or packaged losing part of their quality due to heat treatment, in frozen purees the fruits are harvested at maturity and sometimes even transformed and frozen on site to ensure that no flavor is lost. Given the growing demand for smoothies and off-season fruits options, it is recommended to strengthen the offer for this product in the B2C market rather as an ingredient for fruit juices only and for the IP innovation center to explore peer learning with Soroti Fruits Limited.

Cold Press Oil: Orange peel oil is relatively easy to extract due to its high percentage, making it extractable under mechanical press oil. It is useful as a flavoring agent and for the cosmetics industry and can be recovered as a preliminary step before transforming into another by-product such as pellets. Orange essential oil is highly flammable and its percentage in animal feed needs to balance toxicity with its benefits (particularly as a natural antibacterial and anti-fungal agent)[95]. It is not recommended as an export product due to the overwhelming supply from countries such as South Africa, India or Morocco.

Cold Press Butter: **"**Rise in the use of mango seed butter/oil in the personal care industry and in the treatment of different skin problems is estimated to create exceptional business prospects in the global mango butter market in the forecast period of 2021 to 2031."[96] Mango kernel butter can be extracted through various method but the cold press extraction is the best option to maintain the oil chemical characteristics in particular its unsaponifiable content that

95 https://www.researchgate.net/publication/263440081_Supplementation_of_Essential_Oil_Extracted_from_Citrus_Peel_to_Animal_Feeds_Decreases_Microbial_Activity_and_Aflatoxin_Contamination_without_Disrupting_In_vitro_Ruminal_Fermentation and https://www.scielo.br/j/rbz/a/nfgfWPDGWkChskvZ3RL64Qq/?lang=en&format=pdf

96 https://www.transparencymarketresearch.com/mango-butter-market.html

hold most of its therapeutic benefits. It also enables to market the product at organic (if the value chain is), which corresponds to the demand from a global organic cosmetics niche sector as well as increasingly in the food sector. This product offers a much higher margin than mango kernel uses as mere biomass and many competitors such as in Asia or neighboring countries are still sending for processing in Europe particularly Italy[97], France and the USA. The equipment can be used for a range of other seeds oils making it suitable for an innovation center.

Essential Oil: Essential oils can be extracted through the use of a solvent, most often hydro distilled, using alcohol or through Supercritical carbon dioxide extraction. It is recommended for the innovation center to be equipped with CO2 extraction equipment as it can serve both the herbal and food sector and would enable to produce food grade fruits extracts for flavoring. A more detailed justification is given in section 5.4.

Pectin: Most of the pectin used in the food industry in Uganda is imported. Production in Uganda could thus level the trade deficit. However, its higher potential is in the production of dietary fibers that is used as a food supplement for medical purpose as it is beneficial to the microbiota[98]. It is recommended for Soroti Fruits Limited and Jena Herbals to explore a possible collaboration on pectin capsules. Studies have been undertaken in Uganda for the production of pectin from bananas[99].

Fruits Jams: The production of fruit jams is straightforward though it is not likely to use much by products, rather possibly discards. However, on a commercial viewpoint, the dried and frozen fruits options are more likely to bring higher commercial margins.

Fruits vinegars: Specialty fruit vinegars[100] are made from wine or white distilled, and can be produced by adding fruit or fruit juice to create a sweet-and-sour taste. It is a gourmet trend but the domestic market is probably not ready and as an export product, it is unlikely to be cost-efficient as a global market product.

Fruits wines: This is not particularly recommended for orange and mangoes but is an interesting option for indigenous fruits, see NL BIOPRODUCTS LTD business proposal under section 5.2.

Mango Leather: There is a growing customer demand globally for vegan leather. Some firms are thus developing very high-profile products with various fruits skins including mango and pineapple. Some examples are Fruitleather[101] and Pinatex[102]. his is not an immediate option for Uganda but a trend worth following for a possible positioning in the future.

[97] See https://www.desertcart.co.ke/products/48004045-mango-butter-100-pure-and-natural-1-kg for a Kenyan brand processing in Italy.
[98] https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8433104/
[99] https://www.researchgate.net/publication/344763247_Characterization_of_Pectin_from_Pulp_and_Peel_of_Ugandan_Cooking_Bananas_at_Different_Stages_of_Ripening/fulltext/5f8e8bc5458515b7cf8dd056/Characterization-of-Pectin-from-Pulp-and-Peel-of-Ugandan-Cooking-Bananas-at-Different-Stages-of-Ripening.pdf
[100] https://www.specialityfoodmagazine.com/news/trend-watch-speciality-vinegars

[101] https://fruitleather.nl/ and https://www.youtube.com/watch?v=rcieZYwyEiA see also https://www.abcfruits.net/mango-by-products-in-to-valuable-products/
[102] https://www.ananas-anam.com/

Image 17: Fruits valorization as sold by https://www.koro-shop.co.uk

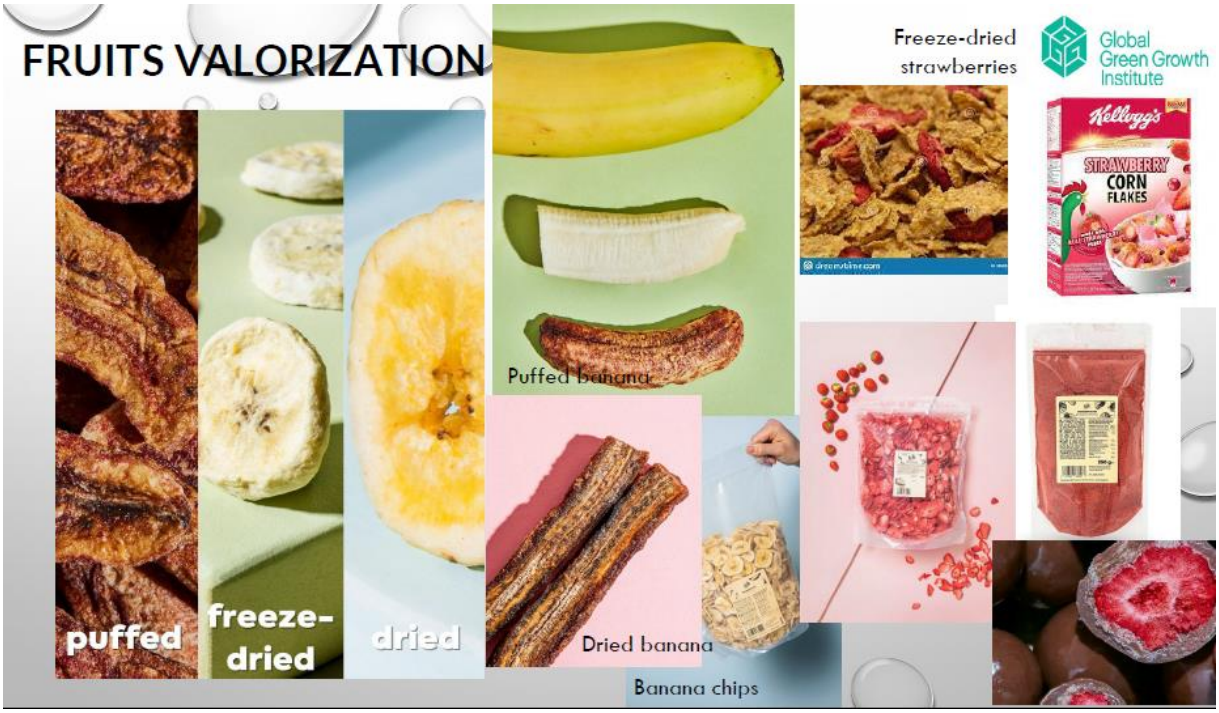

Image 18:Fruits valorization as sold by https://www.koro-shop.co.uk

Obviously, a thorough market and costs analysis is necessary before investing in any of the presented options.

In order to facilitate access to the equipment, it is recommended to build an innovation center in the IP (see section 5.4) that would enable SMEs and larger companies to test the processes and produce their first batches, till they find the resource to equip on their own. Soroti Fruits Limited has expressed interest in exploring valorization pathways in particular in the form of dried fruits and fruits purees as well as to host such an innovation center. Other candidates like Jena Herbals (see section 5.3.8) also have the potential expertise to process plants products.

5.3.2. Agri-Food (Grain)

The grain value chains and particularly cereals and oilseeds including; sorghum, maize, simsim, millet, rice, among others are tremendously important for the region productivity and food security. Soroti, the neighboring districts and Teso region in general present a potential for adequate quantities of cereals as a raw material for production efficiency and effectiveness. Farmers seem to still to lack well established structures to conduct business and also be able to command premium prices for their produce. Grain marketing and the market structure would be much better if there were an organized trade system through Farmer Organization's or the Village Agent Model. This would change the face of cereal production and increase the household income in Teso Sub Region. Besides, there are few or no processors in the chain reported, implying that, if the challenges facing the value chain are addressed, it could open more opportunities for investment.

Key players/potential investors:

PELA COMMODITIES LTD, MEGA HOLDINGS, SERERE AGRO ENTERPRISE LIMITED

Value Chain, Material and Process Flow Analysis

Pela Commodities LTD particularly is an anchor company for the IP, which process flow includes reception of grains, sorting, drying, packaging, storage and dispatch. Grain deliveries are mainly from by smallholder producers most of whom use conventional farming methods Most trade between farmers and Pela commodities happens in seasonal periods/markets, trading centers or even directly on the farm. As was reported during discussions, limited access to knowledge and skills on post-harvest handling, food safety and quality by farmers. This often led to production of poor-quality produce with high moisture content of about 28% that fetched low prices. The farmers do not always comply with Good Agronomic Practices, thus compromising the safety and quality of the cereals supplied. For example, farmers were blamed for 'mixing' sand, dust, nails, metals, etc. with the grains. The payment mechanism commonly practiced between farmers and Pela is by cash after cleaning and drying processes.

The processor plans to give quality and certified grain seed to farmers as a means to support enhanced production and productivity. It has also installed the first Aflatoxin removal machine (TOXI-SCRUB) in Uganda, that will enable the company to meet diverse quality regulations.

With Pela Commodities as a main actor relative to farmers, the farm gate price of the grains seems to have been often based on very limited negotiation. Such uneven bargaining power can lead to farmers failing to respond to market incentives, and can stifle farmers' drives to invest in increased productivity. This makes the formation of producer groups, cooperatives and multistakeholder platforms to strengthen bargaining power within the chain essential as well as to promote a diversity of processors. It was not possible to visit SERERE AGRO ENTERPRISE LIMITED as they were not yet operational in Soroti. However, under the social impact KPIs that would need to be set by the IP, there is room for various CSR and risk management measures to benefit the farmers that could be promoted with local processors.

One model could be the set-up of climate risk insurance schemes (agro insurance)[103], or other CSR practices whereby processors agree on a pre-purchase based on agreed levels of production and provide extension services[104]. Pela expressed intentions to evolve in this area are plans are for putting a committee 37000 farmer under a MOU whereby the company will provide with seedlings in the form of loans. As all seeds will be certified, it is to note that they will GMO, reducing farmers independence over its seeds and creating negative incentives in the organic sector. The company affirms accepting to process all types of seeds but does not actively support this sector.

As regards the IP, circular loops in the reuse of husks for energy have been identified (see section 5.4). Pela particularly would be interested in diversifying its offer, for example in the area of oilseeds or fruits including byproducts valorization (dried fruits) to make up for its off seasons. It would be supportive of an innovation center or to act as service contractor.

Image 20: Pela commodities processing machines

Image 19: Pela Commodities grain drying pannel

[103] See Zimbabwe example https://www.developmentdiaries.com/2022/02/zimbabwe-ifc-ipec-move-to-boost-agriculture/
[104] For a reference publication: https://documents1.worldbank.org/curated/en/851711521095180329/pdf/124304-WP-PUBLIC-AgriBookMar.pdf

5.3.3. Agri-Food (Honey)

Generally speaking, the honey value chain is still underdeveloped in the region, the number of raw honey sellers/producers and buyers are still few, and this undermines the behavior of actors along the value chains. The current status of honey processing and marketing in the region is still poor. With exception of only Eneku Enterprises/Teso Organic Honey that is being supported by Soroti Catholic Diocese, Urban traders, and other key intermediate traders were not reported or are very few. Therefore, the current market environment may not able be to effectively encourage farmers and other chain actors to boost their productivity, and production.

Key players/potential investors:

Eneku Enterprises/Teso Organic Honey

Value Chain, Material and Process Flow Analysis

Bee keepers/farmers sell their un processed honey directly to Eneku Enterprises/Teso Organic Honey. They transact in small quantities at a time and this limits the overall level of honey production in every period. Comb honey was the only main product bought by processor and supplied by farmers, Due to the fragility of comb honey, it is difficult to transport and can only be traded in local markets.

Generally, the honey products market is segmented into two: price sensitive and quality sensitive. The price sensitive market is a price-driven market that is dominated by informal farmers/producers. These normally sell honey to Eneku Enterprises/Teso Organic Honey of inferior quality and one kilogram is sold at Ugx 7,000. The quality sensitive market caters for the middle and high-class consumers who usually buy honey from Eneku Enterprises/Teso Organic Honey at Ugx 25,000 per Kg.

Eneku Enterprises/Teso Organic Honey processes honey through extraction and sieving to remove all particles of beeswax and other material making it the purest form of honey. This grade of honey fetches high prices in the market and can compete favorably with imported honey if properly stabilized and certified. It has the only processors of honey in Kasese, buys combed honey and sell liquid honey after processing. The gross margins at processing level of UGX 18,000 per Kg are surprisingly high.

Unfortunately, the site visit showed that the company requires technical upskilling, upgrade of its sanitary measures, temperature and humidity control, aeration, equipment handling and more. As a result, the honey showed signs of deterioration (percentage of fermentation[105]).

Linkages between producers and Eneku Enterprises/Teso Organic Honey are established through delivery of the raw honey. Generally, no honey was reported to be supplied by contracted suppliers. It was all purchased in an ad-hoc manner from producers or the open market. The company claims that quality testing on the honey received is performed but the state of the facilities, storage and testing material may hint to the contrary. The company allegedly is allowed to store honey for 2 years. However, the fact that all honey is stored in a single storage tank make the risk of contamination and high volume loss higher, parallelly to the risk of keeping low standard batches to avoir the loss. The company certainly does a good job in providing IGA to honey producers but may be too compromising on the honey quality received.

It is therefore recommended for Eneku Enterprises/Teso Organic Honey to perform RECP assessment, upgrade its technical skills, sanitary measures and processes as well as its

[105] As per the company information, honey moisture content should range 17-20% with sugar 80-85%.

technical support to harvester to reach better quality levels. At minimum the following is needed:

- Protective and sanitary cloth
- Hygiene along the process line
- Cold room (possibility to rent cold room space at the IP to explore)
- Cleaning of the premises and equipment.

Labels should also be edited to warn people against the consumption of honey products before 1 year old due to the risk of Botulism. Certification of Origin and organic certification should be fostered to best market the product.

Provided there is an upgrade, the company does not require space in the IP but could benefit from collaborations with the IP for various honey applications that could be certified of Origin:

- With the dairy sector as a top-up for ice cream
- With the pharma/Herbal sector (ex: Jena Herbals) for syrups and other therapeutic hives products.
- With the Agro-Food sector (fruits) for possible by-products valorization with honey.

The wax could also be processed and sold to the beehives. Checking for pesticides would be mandatory as otherwise it reduce in low fertility amongst bees.

- As an exportable product it could benefit from the FZ facility.

Image 21:Eneku Enterprises/Teso Organic Honey building.

5.3.4. Meat

According to stakeholders, the production capabilities in livestock in the region are being underutilized. This calls for prompt efforts towards bolstering the processing and value addition levels within the area for production of value-added livestock products.

Key players/potential investors:

Uganda Meat Packers

Value Chain, Material and Process Flow Analysis

For a detailed description of the cattle value chain in Uganda, see section 4.3.3

Based on the Uganda Meat Packers redevelopment plan (though no business plan was shared), it could handle 400 heads of cattle per day (150 000 cattle per annum) and can inject up to 46 mio USD in the local economy (cattle being worth 300-400 USD per animal). A lot of external demand is for live cattle on which there is no value addition. Therefore, the company is interested in transformation such as fresh cuts and meat canning (need machinery) and byproducts valorization (bones, offal, skins). However, the potential estimates are mainly based on the space available in the property, almost all equipment is needed together with a rehabilitation of the infrastructures. They also need to perform an EIA to see whether the site can sustain the number of cattle, particularly due to the high land degradation and water consumption needs. According to the owner, they are in the process of looking for investors and have mandated a team of consultants to prepare the business plan.

It is highly recommended for the company to share its business plan with UIA for possible collaborations. Possible collaboration with the IP are manifold even though the core activities of cattle processing won't take place in the IP by lack of space and sustainability of the resource (water demand) amongst other. However, the following could be explored:

- To develop byproducts transformation services within the IP or as a gazette activity outside the IP. See also section 4.3.3 such services could be of interest also for companies operating under Entebbe FZ.
- Access to the export and cold storage facilities in Entebbe FZ, potentially also packing. The company aims to have its own cold storage facility in Soroti. Collaboration with Entebbe would be particularly appreciated given the uncertainty of the development of air transport in Soroti.
- Biogas production (see section 5.4)
- Access to an accredited laboratory to confirm standards (microbiology), see section 5.4.

Image 22: Uganda Meat Packers meeting

5.3.5. Dairy

In the Teso Sub region, the dairy value chain is still underdeveloped with very few dairy farmers and milk buyers which ultimately undermines the entire dairy value chain limiting other actors from joining the dairy business. This is attributed to the dominant indigenous local breed which is a low milk yielding breed. However, the same breed is being used for meat. Nevertheless, the Dairy Development Authority (DDA) affirms it is progressing well in TESO region on policy formulation and regulatory services and is supporting research efforts to improving dairy/beef breed stock and development of new technologies and training. This could potentially contribute to develop the dairy value chain. However, the lack of and poor-quality pastures was reported due to seasonality effects and may undermine as well milk production. Integrating proper management systems into the community production systems is necessary to support this value chain.

At the moment, the little milk produced by farmers is consumed at home, local markets and any surplus is delivered to milk cooling facility that is operational with support from Diary Developed Authority.

Key players/potential investors:

DDA, start-ups

Value Chain, Material and Process Flow Analysis

Organized and well structures for milk collection centers were reported by DDA officials in neighboring Districts who then deliver the surplus to the cooling unit. Small scale/cottage

processing of milk into yoghurt, ice-cream was observed at the DDA incubation center and products were being sold to clients on site, neighbors and nearby trading centers. Milk handling and processing was fairly good. Good hygienic practices and good manufacturing practices were noted except for the use of artificial flavors imported. All equipment, and cans were food grade, thus low chances of compromising the quality of milk.

Synergies could be explored with the IP. Firstly, the Dairy Development Authority (DDA) seem to be promoting the incubation model, though neither graduation of incubates was reported nor timeliness defined. If the IP integrates an Innovation Center with dairy equipment (for example pasteurizers, packaging for yogurt, ice cream making machine, no capacity for UHT or milk powder due to high costs of equipment for the time being) and cold chain services, DDA successful start-up may upgrade to the IP. DDA could be offered a lot to run a section of the Innovation center to demonstrate dairy techniques and provide trainings. At the moment such demonstration site only exists in Kampala.

Collaborations with companies processing fruits could lead to the design of co-products valorizing fruits by-products such as flavors, dried fruits and powders, fruits purees and candied fruits. This would offer a range of toppings creating a more marketable business model for the yogurt and ice-cream parlor. It is to note that similar parlors exist in Kampala. A good example of frozen product presentation with a range of toppings is https://www.llaollaoweb.com/en/frozen-yogurt/.

Another avenue to take into account the relatively low milk production and the non-viability to compete with mass products, would be to develop an offer of highly branded soft and semi-hard cheese products with certificate of Origin and preferably organic. In Eastern Africa both Kenya[106] and Ethiopia are cheese exporter while Ugandan companies such as Pearl Dairy Farms Limited (Lato milk) also exports milk in the region. There is an opportunity to further support the development of quality cheese products both for the Ugandan domestic market and abroad (including buyers such as Indonesia and Estonia as demonstrated by Ethiopian cheese market analysis[107]). There are a number of business ideas and start-up on market production in Uganda that could benefit from a holistic value chain support in which both Soroti as a demonstration site and Entebbe (for cold chain and possible complementary site in Buwaya) can play a role[108] by addressing the technology barrier.

[106] See a start-up example here: https://www.howwemadeitinafrica.com/kenyan-cheese-company-sees-growing-demand-in-east-africa/138591/
[107] https://oec.world/en/profile/bilateral-product/cheese/reporter/eth
[108] For some examples: https://www.monitor.co.ug/uganda/magazines/full-woman/asio-is-building-a-cheese-empire-1846470 and https://ugandanconventionuk.org/cheese-making-business-in-uganda/

Image 23: DDA dairy incubator.

5.3.6. Fish

Based on discussion, the fish value chain is not developed but the mission found great potential in aquaculture and fish feeding production.

Key players/potential investors:

NICHO VENTURES FARM LTD

Value Chain, Material and Process Flow Analysis

A general aquaculture value chain for Uganda is show in Figure 30[109].

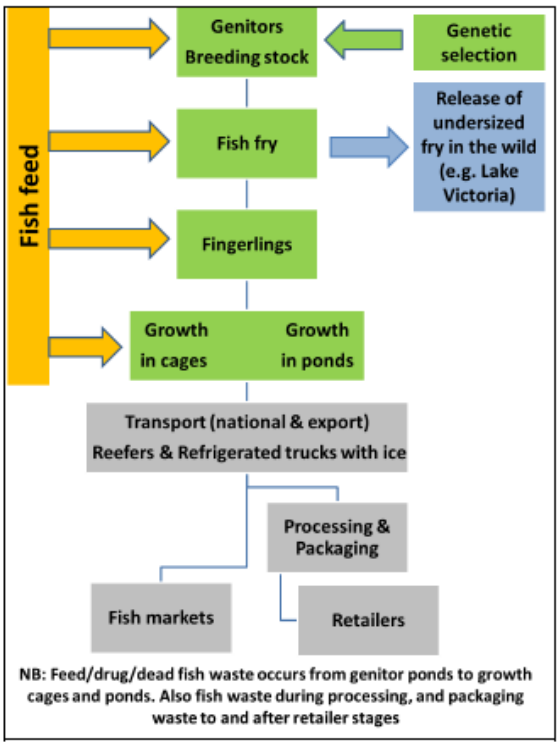

Figure 37: Aquaculture Value Chain in Uganda, 2016 SEA Report.

Nichoventures Ltd is engaged in hatchery management and production of tilapia and African catfish fingerlings. The company lacks adequate production space for hatchery management, thus its interest to join the IP despite not having the investment funds required. It is important that fingerling productivity and production are boosted to position the company at a strategic and competitive edge in order to exploit the viable opportunities that exist. At the moment there is no other fish processing and value addition reported leaving a strong niche for Nichoventures Ltd and the company is the largest producer of fingerlings for Tilapia and African catfish.

The company has been exploring innovative floating food production for which some equipment would be needed.

It is therefore recommended to upgrading the fish value chain by enabling the company to settle in the park under the SMEs allocation under a financial plan to be discussed. It could also be the anchor for an innovation pole on fish/animal feeding. The company is also exploring

[109] https://europa.eu/capacity4dev/file/86253/download?token=OXp6X7aq

on other animal feeding for poultry. Experiments with black soy flies shouldn't be reproduced due to the possible risks posed to the fruits production in the area. Warms, grasshoppers and cockroaches could be further explored. It is to note that Uganda already has positive experience and research on the valorization of cockroaches' production for animal feeding[110].

In addition, a possible synergetic restoration measures from the impact of the brick making activity taking place in the park would be the use of the abandoned bricks pits for fish breeding. A biodiversity assessment would be needed to inform on the impact of such activity.

The company is also open to other fish valorization such as solar dried fish.

Image 24: Nichoventures Ltd African catfish fingerlings.

5.3.7. Construction

This sector could not be investigated fully, information relied on the visit to the informal brick makers and Sanqua Engineering. It was not possible to analyze whether this sector should be strengthened within the IP but the lack of available space makes it unlikely as well as the negative reply from some companies.

Key players/potential investors:

SANQUA ENGINEERING LIMITED, WODMA INVESTMENT LTD

Value Chain, Material and Process Flow Analysis

Sanqua Engineering provided a detailed description on the company challenges in the IP particularly on availability of power and the type of waste produced (debris reused and aerosols). There is great potential to use agro-food waste (particularly orange waste) for biogas

[110] https://www.youtube.com/watch?v=sdOarYa991Y, https://thefishsite.com/articles/insect-meal-offers-hope-for-east-african-fish-farmers, https://www.idrc.ca/en/research-in-action/integrating-insects-poultry-and-fish-feeds-kenya-and-uganda and https://www.idrc.ca/en/research-in-action/integrating-insects-poultry-and-fish-feeds-kenya-and-uganda

heat generation as well as reuse the wastewater from fruits. Edson to complete as section 5.4 RECP did not mention the concrete sector.

On the social side, UIA should held further discussions with Sanqua and other companies in the sector should be engaged to see if there is any option to provide employment to the informal brick makers.

5.3.8. Pharma (Herbal) and indigenous plant products

The sector is at the moment represented by one company, Jena Herbal that produces Over the Counter (OTC) products and is a one man made business from a university professor, who draws his research on plants from his university collaborations.

Key players/potential investors:

JENA HERBALS Uganda LTD and NATURE & LIVELIHOODS and NL BIOPRODUCTS LTD

Value Chain, Material and Process Flow Analysis

As a value chain, the herbal sector can help create local value chains for plants products both cultivated and Indigenous. If done with a sustainability objective, then it can help restore and promote indigenous species. If not, then illegal poaching of endangered species can happen. Therefore, production must be organized by building farmer's capacity through creation of stronger and effective farmer organizations to undertake massive production of natural trees/herbs to generate adequate quantities of raw material and doing so sustainably. It is particularly problematic for plant extracts requiring timber as it result in the cutting of the tree.

Jena Herbals is currently under construction but its owner has already developed a range of products below his brand including Covidex, products for diabete, etc. that are allegedly under market testing and adoption.

The need to support and regulate the production and commercialization of herbal remedies, and importantly innovation by bringing modern scientific knowledge together with traditional medicine is great, particularly in developing countries where medical access may be limited. Without proper regulation and certification, false claims and even dangerous products can be distributed in the market.

It is recommended for UIA to enforce the use of WHO guidelines for the production of Herbal Medicines[111] in collaboration with Ministry of Health.

As an example, the Covid-19 crisis gave rise in a range of claims over Herbal Medicines as exemplified by Madagascar Covid-Organics[112] that was formulated with sweet wormwood (Artemisia annua) which contains the anti-malarial substance artemisinin and caused controversies both as a covid-19 treatment and on its potential impact on malaria drug resistance.

Claims on potential treatments from herbal medicines require double-blind large-scale testing that most companies and universities can single handedly not afford, which creates the current mismatch between large pharma groups and smaller scale producer and part of the monopoly over medicine. It is thus quite important for Uganda to develop this innovative sector and generate the support through research partnerships, common equipment and mainly on quality and claims control.

In this regards Jenna Herbals formulation are presented in a range of format that shows the know how on how to produce extracts and revolve around a small number of ingredients for

[111] https://www.afro.who.int/publications/guidelines-registration-traditional-medicines-african-region
[112] https://www.science.org/content/article/unproven-herbal-remedy-against-covid-19-could-fuel-drug-resistant-malaria-scientists

which various claims are emitted. It valorizes at least one indigenous specie, Warburgia ugadansis[113] (Ugandan greenheart) that would be of interest for conservation and for a small contribution, planting in the IP[114]. Other plants such as from the Eucalyptus genus can valorizes the species most sustainable for Uganda climate, while the lemongrass and ginger for example are common (unless valorization of a local specie). It is not surprising that herbal extract can apply to treatment of a range of ailments. However, Jena Herbals should be more cautious in its health claims by clarifying its clinical studies procedure and balancing his marketing claims over health claims[115]. As an example, when selling Covidex, the firm should ensure that potential clients still implement the protection protocols recommended by WHO[116] as a first epidemics control and consult in case of aggravated signs and do not use the herbals as their sole mean of prevention and treatment.

The herbal medicine market is constantly growing and is also the battlefield of Indian and Chinese firms amongst other. In our opinion, to reach the quality and obtain the permit for distribution in EU and US markets is a very long-term goal as it requires considerable investment for meeting the regulations, obtaining the license and establishing official distributors, at least in a transparent commercial way. There are practice of selling to individuals to the USA directly from Africa through shipping but it is not a recommendable practice. It is however on the growth in South Africa too.

As a formal commercialization, the most promising markets are domestic and regional, the latter because the regulations are more stringent than on global market, as would be the interest for a product formulated in the region.

Another aspect is the cost of medicine, sustainable production and maintained quality control. To produce in volume considerable equipment is needed. To some extent, equipment to perform oil extraction and essential oils extraction could be shared with the agro-fruit sectors and thus set up in an innovation hub (see section 5.4). Another avenue recommended to Jena Herbals is to consider transforming its business model by adding a contract manufacturing service. Such an offer could enable the company to amortize cost of equipment, act as an anchor for a range of companies from the agro-food to the cosmetic sector looking for specialized plant extracts, and balance the risks of its own brand commercial success over the successful service to a range of brands. It can also enable the company to bulk some purchases getting cheaper prices as well as bulk shipments and potentially share distribution channels. Many SMEs worldwide have resorted to this strategy once they have realized the complexity of building and maintaining a single successful brand. It is recommended for Jenna Herbals to develop a full business plan in 3 phases (domestic, regional and global) with the last for export with a detailed strategy and costing on how the company would meet the regulations. Partnerships with global universities can help reduce those costs but can't on their own go the full length till registration and commercialization.

The company would be supportive of an innovation center or to act as service contractor for making extracts if the equipment would be placed under its roof. It has the advantage compared to other interested firms in the IP that it possesses the required technical skills for plants extraction equipment though upskilling would be needed (for some examples of by-products valorization see section 5.3.1).

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[113] https://en.wikipedia.org/wiki/Warburgia_ugandensis and https://www.sciencedirect.com/science/article/pii/S2211715621001478

[114] Jena Herbals could also be mandated to do a botanical survey in the IP wetlands to identify potential plants of interest and complement the environmental and biodiversity assessment.

[115] Actually, depending on those claims and the nature of the product, the firm may not be allowed to sell under OTC but will be required to register as prescription drug, which is manifold more complex, costly and time consuming and usually not feasible for SMEs unless massive funding. See also https://www.fda.gov/drugs/types-applications/drug-application-process-nonprescription-drugs for an example of regulations in the US market. There are special conditions for magistrale preparations (preparation formulated by pharmacist) but we won't enter in details here, please contact the author of this report if you need more information.

[116] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public

Image 25: Covidex by Jena Herbals

Image 26: Warburgia ugadansis

Image 27: Construction site Jena Herbals

In addition to Jena Herbals, it is recommended to UIA to attract more SMEs in the herbal (therapeutic or agro-food) and cosmetic sector or identify possible partners in the city that could use the innovation center and strengthen its cost recovery as well as close circular economy loops with the classic agro-food sector (for example reuse of mango kernels for body butters and hair mask preparation, orange peel scrubs, production of flavors, etc. see section 5.3.1). One such companies is NATURE & LIVELIHOODS and NL BIOPRODUCTS LTD that envisions to valorize indigenous plants in a range of application from wine to jams and more (see full description under section 5.2). Again, the common crucible for all start-ups/SMEs of this kind is the lack of access to space and equipment for phytoproducts extraction and testing.

5.3.9. Printing

According to the discussion, the nearest printing service is in Kampala which makes the city short of professional printing services. In reality, it is likely that most companies will require marketing, printing and similar services whether they find them in proximity or elsewhere.

Key players/potential investors:

SOROTI TEACHERS COOP SAVINGS & CREDIT SOCIETY LTD

Value Chain, Material and Process Flow Analysis

At the moment the cooperative is offering printing service to the students. However, the jump between offering basic printing products to students and being able to design marketing material and packaging to companies is huge. Globally, many local printing companies have been closing due to more attractive services from China, other locations in Asia and even South Africa. Local printing companies need to be able to compete either on prices or quality. Competing on prices requires high volume and large investments into machinery that won't necessary be accessible to SMEs and cooperative. On quality, it requires companies that are willing to add extra-money in packaging usually because they target the luxury or high-end sector, which is lacking in Uganda.

Nevertheless, UIA and the park management should look into the marketing and packaging needs from the IP to understand the types of products and facilitate if possible bulk purchases.

It is recommended for the Cooperative of teachers to contribute to such analysis through interviews and visits to companies in and outside the IP to better understand the market and define a realistic value proposition for their services.

5.4. Proposed Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

5.4.1. Main Common Infrastructures and RECP measures

The following are general Resource Efficient and Cleaner Production options the IP can consider:

	Proposed action or project	**Description**
Urban-industrial symbiosis	a) Installation of shared steam generation boilers or common steam generation and distribution facility for Soroti Industrial Park.	In Soroti industrial park, operating industries run fossil fuel-powered boilers and driers. These boilers lack pollution control devices on their exhausts thus emitting GHG and Short-lived climate pollutants (SLCP) into the environment. According to the Electricity Regulatory Authority, Soroti has biomass potential ranging from 3000-7000 tons per hectare and generates a significant amount of agricultural residues or bio-mass including coffee, rice, and sunflower husks which have proven to be good sources of thermal energy

		for the generation of steam and drying grains in agro-processing industries in Uganda. For example, brookside Dairy (U) Ltd[117], located in Kampala, transports rice husks from eastern Uganda to power its steam boilers. Upland Rice Millers[118](U) uses a biomass-powered drier to dry its grains. Therefore, with an urban-industrial symbiosis, Soroti Industrials can have access to a reasonable amount of biomass to power a common steam generation and distribution facility. On commissioning of Soroti Meat Packers Ltd (production capacity of 115,000 cattle per year), the biomass feedstock potential will be supplemented with cow dung and blood from the abattoir (potential biogas feedstocks). Therefore, an integrated boiler with both biomass and biogas burners to generate steam to meet the thermal energy demand for the industrial park can be considered.
	b) Compositing of Organic residues from agro-processing factories like Jena Herbals and Soroti Fruit factories at Soroti Municipality Composting infrastructure	Soroti fruit factory generates about 2 metric tons of organic residues per day, such quantities of can be composted with organic matter from Soroti municipality (50 to 90 metric tons per day) and be distributed to farmers as part of a corporate social responsibility program. However, precautions should be taken to increase the PH of organic manure and establish a system to allow sorting of organic matter from municipal waste. Soroti Municipality has a good composting know-how and potentially functional composting infrastructure provided support that the industrial park can leverage.
	c) Central Cooling Systems:	Those are frequently preferred for supermarkets, hypermarkets, and large cold storage rooms. With the use of digital temperature control units, a central cooling system provides customized conditions for different cold rooms to store different products. Central Cooling Systems provides large-scale energy-saving and monetary gains. It is recommended for the IP to offer cold chain services particularly to manage a central cold storage made of different rooms catering for the various type of produces, cold chain handling up to shipping and possibly own a few refrigerator trucks for transport. The cold chain service and sanitary conditions by sector need to be further investigated to better specify the offer.

[117] https://www.brookside.co.ke/
[118] https://ratin.net/index.php?/rtvt/site/warehouse_info/1718

		This service should be open to both tenants and companies outside the park and therefore dimensioned accordingly. It should work on a full cost-recovery base. It has several advantages such as: ▪ Ensuring the financial sustainability of the facilities by increasing the pool of customers. ▪ Having a multiplier effect on business development and jobs by enabling a range of companies to cold store and export through the IP. ▪ Support inter-industrial parks and FZ collaboration by offering a direct export route via Entebbe until Soroti airport materializes. ▪ Fully support the technologies demonstrated in the Innovation Center (deep freeze).
RECP	d) Introduce the RECP program to companies allocated land in the industrial park at the initial phase and conduct annual RECP training for industries in the industrial parks. Invite selected companies outside the IP to the training.	The RECP performance indicators for one of the factories in Soroti IP were 12.7 liters of water per liter of products, 0.28 kWh/ liter, and 0.14 kg CO_2eq per liter of product. In order to improve the resource use efficiency of industries in Soroti Industrial Park, there is a need for a Resource Efficient and Cleaner Production program to support them identify the best available technologies and practices or low carbon technologies. For example, despite the abundance of biomass potential in Soroti District, some industries in Soroti industrial park opted to use fossil fuel-powered boilers and driers which generated more GHG emissions as compared to biomass-powered boilers and driers. Furthermore, some operating industries are running standard efficient motors with an efficiency rating of IE 1 and Ingress Protection (IP) rating note suitable for the dusty and water environment. By inviting companies outside the parks to the RECP training, benefits are manifolded: - It creates a virtuous circle for a sustainable city with the IP leading the way to mobilize the wider industrial community to adopt RECP. - It makes RECP trainings more cost-efficient. - It facilitates cross-learning. - It improves the impact of the environmental mitigation actions taken by the IP.

	e) Promote chemical leasing[119] model for wet processes (for example fruits and dairy processing) factories in Soroti industrial park	Fruit and herbs processing, as well as cold storage, require Cleaning in Place (CIP) which is both chemical and water-intensive. It is therefore important to adopt a chemical leasing model, especially for CIP to optimize the use of chemicals and water. This will significantly reduce the pollution load to the wastewater treatment plant. A reduction in volumetric pollution load will require a much smaller size of the wastewater treatment plant for the industrial park.
	f) Sanitary equipment:	As for Entebbe FZ, see section 4.4.1, for the fruit and vegetables sector, pest control is needed. it may be recommended to install a CO2 fumigation chamber (called Control Atmosphere Treatment) including for frozen and dry food.
	g) Industrial ecology approach	A complete material and energy flow analysis needs to be undertaken to detail further resource consumption and possible circularity loops in particular for the possible biogas production.
	h) Testing lab:	Access to a testing lab is a primary requirement for all tenants. It could be pre-identified in the vicinity of the IP or part of the Innovation Center.
	i) Export logistics services:	It is recommended to provide export logistics to both tenants and external companies that would like to use the facilities for storage and export first via Entebbe FZ route.

5.4.2. Innovation

It is proposed to set up an Innovation pole for demonstration of technologies, learning and as a start-up emulation center in 4 sectors: Dairy, Agri-Food, Pharma (Herbal) and animal eco-feeding production. Possibilities to collaborate with the Youth Skilling Center need to be investigated.

The technologies and equipment required would encompass:

a) Dairy (see also section 5.3.5): Equipment for milk, yogurt, ice cream and soft cheese processing as for example pasteurizers, packaging for yogurt, ice cream making machine in collaboration with DDA in order to expand and offer a platform for dairy companies to graduate from the current government learning center. The most straightforward management system would be to allocate land to DDA and the responsibility to get the funding for the equipment.

[119] https://www.unido.org/our-focus-safeguarding-environment-resource-efficient-and-low-carbon-industrial-production/chemical-leasing and https://www.unido.org/sites/default/files/2013-10/Chemical_Leasing_0.pdf

b) Animal eco-feeding production (fish, poultry, etc. see also section 5.3.6): It would explore agro-food by products valorization such as citrus pellet and insects (particularly cockroaches) for animal feeding with a priority on fish floating food. No particularly equipment is recommended at this stage, rather to provide land to innovative start-up in the sector and possibly gazette some of them who will install their equipment. Gazetted companies would have to adhere to an MOU stipulating their eco (green) approach to feeding production, the circularity loops development with the IP (by using by products from companies in the IP or by supplying companies with feed), its contribution to food security and sustainability in the region. An example of such start-up would be NICHO VENTURES FARM LTD.

c) Agro-food (fruits and vegetables) transformation (refer to sections 5.3.1 and 4.3.2): Here the focus would be to transform products in broadly 2 main categories as a priority, which are Frozen Foods and Dry Foods using vacuum and liquid nitrogen-based technologies. Some typical equipment would encompass vacuum driers, IQF (Individually Quick Frozen) freezers, screw chillers and centrifuges.

d) Agro-food and Pharma botanical extracts: Primary focus would be on oil/butter extraction via cold-press technique and Supercritical CO2 Extraction[120]. It is recommended to give priority to the latter over the hydro-distillation technique as it requires less power stability and enables to produce a wider range of extracts, in particular food grade flavors from fruit juice for example. Countries like Namibia and South Africa have successfully supported their SMEs by giving access to herbal extraction technologies such as in:

- https://www.nbri.org.na/inp-tab-mopane-the-opuwo-processing-facility-and-visitors-centre

In South Africa (Cape Town), earlier access to CO2 technology was made as collaboration with the universities. However, for Soroti, we recommend to rather equip the IP and propose rentals for university research.

Two management options are possible for the agro-food equipment:

i. To place the center under IP management with subcontracting (possibly to a tenant), provide access to both tenants and outside companies for price recovery. The advantage is that the IP keeps the leadership in the use, maintenance, pricing and full ownership of the equipment. The disadvantage is that it requires funds to install and maintain, subcontracting may be difficult as is direct management, dedicated land may be missing in the IP and the quality of the service may deteriorate in time due to competing priorities.

ii. As a PPP with one of the tenants who will manage and offer a service facility. A strict MOU would need to be agreed covering areas of pricing for accessibility to IP tenants and profitability, operation and maintenance as well as ownership. The advantage is that the costs can be co-funded by UIA and the tenant company and that it can benefit from

[120] For a description of the principles https://www.natex.at/co2-technology/supercritical-co2-extraction/. Some international companies providing small scale extraction systems are for example https://www.sfe-process.com/supercritical-fluid-equipment/
And https://ocolabs.com/extractors/

the tenant expertise. It enables also to find more space if placed on tenants' land, though easy access from the IP management may be compromised. The main disadvantage is the loss of ownership from the government and risks if the MOU is not enforced that the facility gets inaccessible due to high costs, non-prioritization of other companies over the manager own production or the reverse, neglect of the facility due to competing priorities in terms of products lines. Several companies have expressed interest in operating as manager: Soroti Fruits Limited, Jana Herbals and PELA COMMODITIES LTD.

For all those infrastructures, a thorough business plan needs to be drafted detailing the cost recovery based on products market analysis, management, source of funding and comparative suppliers offers. It is recommended to set up committees to oversee the choice of infrastructures and technologies and ensure buy-in from the private sector and trust in their quality management. Several missions to assess the feasibility are needed that should include Entebbe FZ in order to optimize collaborations and avoid duplication.

The innovation center cannot focus on technology only but needs to ensure that companies have the proper business management systems in place. Therefore, it is recommended to provide Business Management trainings particularly for value proposition, branding, quality, environmental and social performance and domestic vs export positioning in collaboration with UFZA.

5.5. Environmental and Social Contexts

5.5.1. Regulatory status

It was indicated that an Environmental and Social Impact Statement (ESIS) for the IP was conducted but no copy was shared. Similarly, an ESIA certificate was allegedly issued but no copy was shared to inform the Mission. ESIA certificates[121] are only valid for 5 years in line with the National Environment Act, 2019 and the EIA certificate needs to be subjected to this.

It is therefore recommended for UIA to check its compliance in updated ESIA.

As for some of the companies in operation or in construction:

- *Pela commodities*- An environment impact assessment was allegedly carried out but no document was shared with the team. The facility stores 40,000 Liters of AGO and 40,000 of PMS but there was no mention that specific environment studies were carried out for the auxiliary facilities neither was their evidence on the permits acquired to construct petroleum facility and store products. In the organizational structure of the company, no environmental officer position was indicated. There is no clear Waste Management policy for the site either.

It is recommended that the company appoints and environmental officer and upgrade its compliance with environmental legislation. As per GGGI IP/FZ policy guidelines, UIA should

[121] Note: Project specific ESIAs need to be done to guide the development of each project and Strategic Environmental assessments for the Masterplan of the IP, in line with the National Environment Act, 2019.

also develop beyond compliance KPIs for the IP including environmental KPIs to which each company will be committed.

- *Teju juice, Soroti Fruit factory*- An Environmental and Social Impact Study (ESIA) was allegedly undertaken but no EIA certificate was shared. The factory has in place tanks for the storage of fuel at site but no construction and storage license were obtained from the Ministry of Energy and mineral development.
- *Jena herbal*- the site is under construction. Similarly, an Environmental and Social Impact Study (ESIA) was allegedly undertaken but no EIA certificate was shared.

5.5.2. Water & Sanitation

Water consumption (Edson)
Wastewater (Edson).

Solid waste

No centralized *solid waste* management system and particularly reuse is planned for, with the exception of one application received in the park to turn waste to energy (still at feasibility stage). The waste is being dumped in the Soroti city municipal site at Aminit. It is however highly unlikely that the same facility can be used for the waste generated from the industrial park unless major upgrades are undertaken, which could be an opportunity for symbiotic collaboration with the IP.

The solid waste management facility run by Soroti City is approximately 10 acres but the site is full and not well maintained. Its lack of funding is notorious as per various

Image 28: Aminit site worker

news publications[122]. As per the site visit, the office was depilated, the staff welfare lacking including the lack of basic protection equipment such as boots and gloves. Staff has been reduced to 8 casual workers out of 22. They allegedly have no contract. The 10m deep, 100m wide pit is full and there is a need to dig a new one. The water harvesting facilities at the site broken down. The water to the site was cut off by National water and Sewerage Cooperation which is a serious security threat as it impedes early response in case of fire. The site is prone to fire outbreaks which range for about a month mainly attributed to waste containing fire picked from the market. The communities in the surrounding area are inconvenienced by the operations of the facility due to the pollution and safety issues. A number of children and illegal dump collectors access the site at their own risk due to the lack of capacity for vigilantes. Thus, the facility requires proper fire management control and safety at the site including occupational hazards for the workers and daily collectors. A fence to prevent accidents from unauthorized collectors including children is needed. As the municipal fire brigade is far and would allegedly ask for fuel when called, it is recommended to place a brigade in the park that can intervene in Amenity site too. Moreover, a dedicated truck for the IP waste could be funded and managed by the IP.

There is also a good know how on composting, though this effort is being hampered by the ministry management whereby any revenues proceeding from the sales is being deposited on a ministerial account with no earmarking for the waste management facility. Therefore, it is highly needed to privatize the operations of the facility to provide for sustainability and operate PPP arrangements. The facility could be self-sustaining through the sale of manure if the city makes provisions for use of funds generated from the sale of manure for the maintenance and payment of utilities at the site.

Soroti Fruit Factory dumping to another site would require supervision. Indeed, due to the overload of the municipal site, *Teju juice, Soroti Fruit factory* waste is carried offsite to a private destination hired by the factory within Arapai. There is no reason to believe that this site would be better managed, staffed or equipped than the municipal site. Besides, the waste being composed in majority of citrus peel, the essential oil it contains is flammable and can pause great fire risks to the neighboring community. This is one of the many reasons why a reuse of citrus byproducts is particularly indicated. An assessment of Teju waste site is recommended together with byproducts valorization and composting (see also section 5.4).

[122] https://ugandaradionetwork.net/story/aminit-garbage-composting-plant-hit-by-lack-of-fund?districtId=506

Image 29: Aminit overflowing waste

Image 30: Aminit sorting area

Image 31: Aminit sorting area overflow

5.5.3. Disaster Risk Reduction and Biodiversity

The park is covered with vegetation characteristic of a disturbed ecosystem. There is a stream that flows through the park. UIA made provisions for a *buffer zone* at the extreme end of the land but without considerations for ecosystem services. It may be necessary to provide for a buffer zone along the seasonal stream of 10 meters on either side of the stream for ecosystem services, flood control, drainage and recreation purposes in line with the National Environment (Wetlands, riverbanks and Lake Shore Management), Regulations, 2000.

Moreover, a safety corridor between the industrial park and the neighboring communities is recommended.

In addition, some portions of the park are a seasonal wetland that floods during the rainy season; thus, a functional draining system of the area is required. From the site visit the open-air drainage were not maintained.

Image 32: Swamp area with seasonal stream.

5.5.4. Social context

This field mission was focused on the productive and environmental aspects and didn't provide time to address social impacts, which should be the topic of follow-up missions. However, the brick making activities taking place in the swamp composing the park was investigated further. The activity is performed by various groups disseminated in the area, some of them occupying allocated land. They are mainly farmers generating an income in the off-farming season for some of them, or as the main activity for others. Focus groups discussions showed that the majority would be willing to relocate provided it would be on a land as suitable for brick making (in the vicinity) or to be employed by companies in the park. They emit however a number of reserves on the latter concerning:

- The alleged very low wages paid by the companies in the park. This point couldn't be investigated further; however, it is recommended to follow-up employment practices and notably enforce GGGI IP/FZ guidelines whereby companies are required to provide above Household Economy level income. The municipality is encouraged to perform such an analysis in the park's neighborhood so that wages can be allocated in a way to contribute to poverty reduction. As per the brick makers, they express concerns that the wages at Teso company may be allegedly in the 180-200000 UGX per month why they consider 500-600 000 UGX being worthwhile leaving the brick making business.

- The belief that the lack of education and skills would render them unsuitable for positions with companies in the park and the relatively low percentage of them that would secure a manual worker position. According to them, they were 70 workers in their groups and there are other groups in the area. This is compounded by the belief or observation that many engineers are not hired from the local community.
- The casual working conditions whereby if work is short-term and unpredictable or if long term contracts are not honored, they can't take the risk to lose their investment in brick making. This investment can be considerable as some of the brick makers are landless but others have sold their land for example to buy a motorcycle. Some are left with just a piece of land to grow food for home consumption but not commercial.

It is important to note as well that the brick making activity provided by these occupants is highly prized by the community and if abandoned, would have a negative impact on the local economy. Truck drivers come to the area to take sample of the bricks and send to them market. Moreover, they seemed not to have been informed that the land they occupy is allocated and that they may have to move. They claim it is there. Therefore, it is recommended to establish a community group comprising of representatives of the brick-makers, the municipality, UIA, the IP industries to negotiate future arrangements. An option would be to find a nearby suitable site to regroup the various groups and where support could be provided to professionalize and green the practice. As an example, they need machines for brick making for which they lack capital, improved stoves as they are using firewood, no petrol, possible reuse of waste generated from the IP, etc. Without the support the pool factor may not be strong enough given the likely tensions between groups that may arise upon regrouping as well. Remediation of the damages caused to the land by the digging could also be investigated such as the creation of fish ponds.

Image 34: Brick Makers in Soroti IP swamp.

Image 33: Brick making site in the swamp

5.6. Soroti IP Key Take Aways

This summary provides a quick snapshot of the Soroti IP chapter main take-aways. For detailed recommendations, refer to the text highlighted in yellow under each section.

- Key sectors: Agri/Food citrus, mangoes, grain, vegetables and honey (upskilling, diversification, byproducts valorization and Innovation Center), Fish (aquaculture and fish feeding), Meat (byproducts valorization), Dairy (innovation center), Construction (Concrete/Brick making), Pharma (Herbal) and Indigenous Plants Products (Innovation Center).
- Key general value chains concerns: Full value chains analysis, greening the value chains and integration into the masterplan.
- Key RECP, services and common infrastructures measures: RECP training, common steam generation and distribution facility, compositing (with collaboration and upgrade of Aminit solid waste management facility), chemical leasing model for wet processes, cold chain and storage, logistics, collaboration with Entebbe FZ, sanitary equipment, testing lab.
- Innovation center: Dairy processing demonstration, fruits processing and byproducts transformation (frozen and dry), botanical extraction, animal eco-feeding options. Business Management trainings.
- Key environmental and social concerns: Conduct EIA, flood control and drainage, waste management, allocated land occupation (brick making), buffer zone along stream needed.

6. Kasese Industrial and Business Park (216 acres)

6.1. General Situation and Current Status

Image 35: Metu Zhongtong Bus Co. Ltd company under construction as of July 2022

Kasese Industrial and Business Park land is 216 acres and is located in Muhokya Parish, Central Division, Kasese Municipality along Mbarara and Kirembe Roads. As shown in the masterplan dated 2020 (see Fig. 30), it is boarded by the Queen Elizabeth National Park in the South, Kirembe Road in the West, mountain Rwenzori in the north and the cobalt industry in the East. The industrial park is located in the proximity to DRC, and thus tenants can have easy access to output markets in DRC. Almost half of the park (90 acres) has been allocated to an automotive company named Metu Zhongtong Bus Co. Ltd (see Image 20). As per mutual agreement between UFZA and UIA, 20 acres have been allocated to develop a Freezone within the IP compound. Another 17 companies have been identified to take up spaces within the IP.

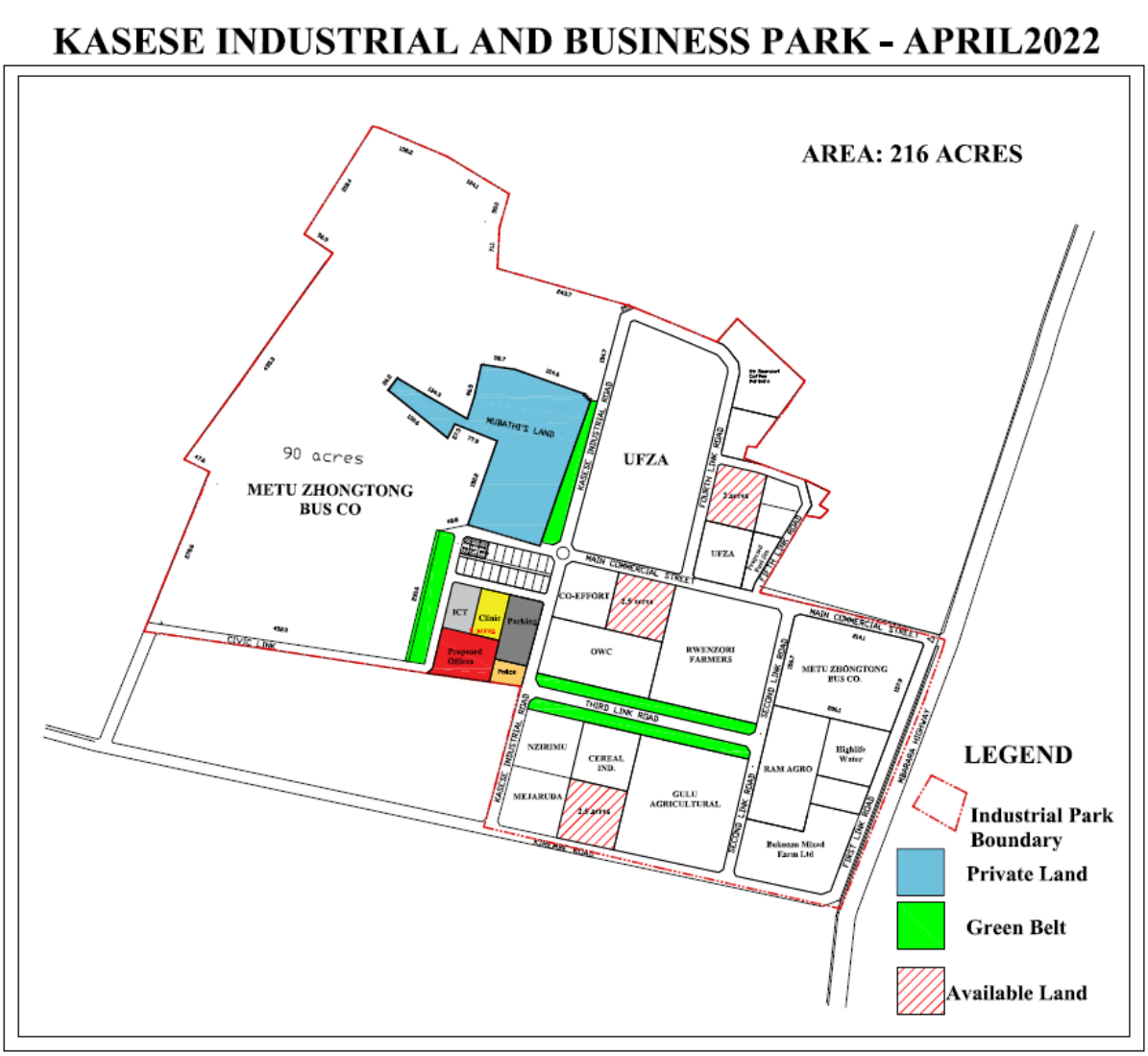

Figure 38: Kasese Industrial and Business Park proposed Masterplan 2022

6.2. Description of potential investors, business partners and environmental stakeholders

At the time of writing, UIA has allocated the major part of the park leaving little room for additional companies or infrastructures, however according to UIA allocations are not final. The stakeholder met were selected through UIA excel sheet "KASESE INDUSTRIAL AND BUSINESS PARK SCHEDULE OF LEASES-2022". Companies with an * were not met.

Table 15: Kasese IP potential investors and business partners.

Name	**Activity**	**Location, status of Expression of Interest (EOI) or lease**	**Interest** (refer to the value chain section for details)
Gulu Agricultural Developments Limited[123]	***Agro processing Cotton, Sesame, Maize, Oil miling.*** GADC was established in northern Uganda in the aftermath of the LRA-instigated war. The company revived and took control of the COO-ROM ginnery in Gulu 2009. GADC is currently active in the cotton, cotton cake and oil milling as well as sesame and maize business. Additionally, it runs the Gulu Timber Company. It promotes a zero-waste value chain and is certified from bodies such as the Control Union and ECOCERT (Fair For Life).	10 acres under construction.	
Rwenzori Farmers Marketing Cooperative Society Limited[124]	***Agro processing Cotton*** The co-operative grew out of an association of parents with children in school, supported by TJX Europe, through Save the Children. Education remains a main priority for the co-op.The co-op grows rain fed cotton once per year. As such, the yield and prices secured for one year influence the decision on how much to grow the following year. Unlike in most cotton co-ops, Rwenzori contract out the ginning but maintain ownership of the cotton. This allows the farmers to increase their	10 acres under construction.	

[123] https://gadc.co.ug/

[124] https://www.fairtrade.org.uk/farmers-and-workers/cotton/rwenzori-farmers-marketing-cooperative-society-limited/

	income by 20-25%. It was certified in 2014 and is the first Fairtrade certified cotton producer organization in East Africa. Annual production capacity: increasing year on year Number of farmers: 406 farmers; 173 women and 233 men Farmers are continuously trained in best practice. There are at least three farmers per geographical zone within the co-op who are trained in handling pesticides, use protective equipment, and several are also First Aid trained. The Fairtrade Premium is an additional sum of money which goes into a communal fund for workers and farmers to use – as they see fit – to improve their social, economic and environmental conditions. The co-op has struggled to find buyers for their Fairtrade cotton other than their existing partnership with TJX Europe. Fortunately, through meeting the contracted volumes for TJX Europe, Rwenzori co-op members were able to settle their existing trade loans, and have now begun to see a small profit. The Premium that was collected after the 2015/2016 harvest was used towards the initial building of new premises, training of farmers and education including day centers for children whose mothers work in the cotton gardens. The co-op is seeking further commercial partnerships and Fairtrade contracts so that they can be secure in the knowledge that they can sell the cotton they produce as Fairtrade, and obtain the additional Premium money. They are intending to use the Premium towards access to clean drinking water, environmental protection measures and continued education for the children.		
Mejaruda Enterprises Co. Ltd	***Pole and wood treatment plant for power and telecommunication Lines***	2 acres under construction.	It seems that the main interest is to access land and expand the market in Kasese.
Mt Rwenzori Coffee Farmers[125]	***Coffee Processing*** Mt. Rwenzori Coffee farmers' cooperative union is a farmers' organization with a membership of 20 primary cooperative societies and 2,948 individual farmer members all together – 1697 men, 1,251 women and 972 youth members. The Organization is registered to operate in the 7 districts on and around Mt. Rwenzori	3 acres under construction.	

[125] https://mrcfcu.org/

	including Kasese, Bunyangabu, Kabarole, Rubirizi, Ntoroko, Bundibugyo and Kamwenge. The purpose of forming Mt. Rwenzori coffee farmers cooperative union was to establish farmer managed production and marketing system that will help coffee farmers gain what is worth their effort in the coffee value chain. The specific objectives of the union is to increase members' bargaining power through; Collective procurement and use of production and processing facilities and inputs.		
Metu Zhongtong Bus Co. Ltd[126]	***Assorted auto mobile factories, warehouses and testing grounds.*** Metu Zhongtong Bus Industries was started by Mr. Metu Katabazi, its Chairman and proprietor. It begun operations in 2011 with the selling of spare parts of heavy vehicles and later it ventured into the assembling of 67-seater buses in June 2018.The Company has engaged in Research and Development, production and sales of coaches and buses since then and is currently setting up an automobile production plant in Kasese. The company's mission is to manufacture high quality buses adaptable to local conditions in Africa.	100 acres under construction.	It was not possible to meet with the proprietor but it seems that the main interest was the access to land and local labor.
Uganda Free Zones Authority	**Export business accelerator/Freezone** As per agreement with UIA, UFZA benefits from an allocation within the IP to operate a FZ.	20 acres. Pre-Start stage.	At that stage there was no particular plan for the FZ enclave.
Bukonzo Mixed Farm[127]	***Agro processing Fruits (mango, pineapple, citrus)*** Bukonzo Mixed Farm is an enterprise owned by Dr. Crispus Kiyonga, the defence minister and Bukonzo West County MP. With support from the National Agricultural Advisory Services (NAADS), Bukonzo Mixed Farm trains farmers and give them planting materials to start them off in fruit production. The company is now focusing on transforming all the small cotton gardens into fruit gardens in the coming years. After registering several successes in horticulture in 2009, Bukonzo Mixed Farm worked with NAADS to make fruit growing popular in the district.The one-year partnership that cost over sh185m saw the NAADS secretariat contribute sh158m, while Bukonzo Mixed Farm contributed over sh28m.	5 acres. Pre-Start stage.	

[126] https://www.metubusafrica.com/

[127] https://www.newvision.co.ug/new_vision/news/1325934/bukonzo-farmers-reap-fruits-partnership

	Under the deal, Bukonzo Mixed Farm was supposed to identify farmers to be trained in better agronomic practices. The farm would then provide extension services to farmers from Karambi, Bwera, Nyakiyumbu, Mukunyu, Kisinga, Lake Katwe, Kyalhumba, Bukoki, Bughoye, Karusandara, Maliba and Kicwamba sub-counties. Fruit factory: the company has raised enough volumes to sustain the factory and is in advanced its stages towards of acquiring the machinery to extract juice from the three crops on the farm.		
RAM Agro Ltd*	***Agro processing***	5 acres. Pre-Start stage.	
CO-EFFORT[128]*	***Warehousing*** The company specializes in Civil Engineering/construction of Roads & Bridges	1 acre. Pre-Start stage.	No further information.
Cereal Industries (U) Ltd	***Agro processing***	2 acres. Pre-Start stage.	
Highlife Water*	***Water packaging plant***	2 acres. Pre-Start stage.	No further information.
OPERATION WEALTH CREATION/NAADS[129]*	***Cassava processing factories*** The National Agricultural Advisory Services/Operation Wealth Creation (NAADS/OWC) is a Government programme aimed at enhancing effectiveness in delivery of agricultural extension services in Uganda. This is done through provision and distribution of agricultural inputs such as seeds, planting and breeding materials, fertilizers, agrochemicals, agricultural equipment and tractors.	5 acres. Pre-Start stage.	No further information.
KILEMBE MINES	***Minerals*** See Annex E.	Neighboring the IP.	The company would be open to perform a range of diversification activities in the field of environmental remediation, water treatment, etc.
KILEMBE INDUSTRIES LTD	***Energy***	Situated outside the IP.	Provides electricity to the IP but has so far received

[128] https://eastafricatenders.com/directory/co-effort-works-u-limited/

[129] https://www.finance.go.ug/sites/default/files/Publications/BMAU%20Briefing%20Paper%2027-17%20-%20Distribution%20of%20Inputs%20by%20NAADS-Operation%20Wealth%20Creation%20-%20What%20are%20some%20of%20the%20benefits%20to%20farmers.pdf

	The company distributes power to western Uganda covering 6 districts of Kasese, Rubirizi, Sheema, Mitooma, Bushenyi and Buhweju. They are also the suppliers of power at Kasese Industrial Park. 2They manage a prepaid billing platform with 10 feeders, 566 km of low voltage lines and 260 km of medium voltage. They have 20, 024 subscribers with a potential of serving 50,000. These connections have had impact on over 1.5M people. The shareholders of the company are the subscribers. There are 3900 communal shareholders. The Electricity Connection Policy (ECP) program enables more connections by making power affordable for customers which would otherwise cost 750,000 Ugx without the pole service and 2.4M Ugx with the pole service. With the EPC program, customers only pay 23,000 Ugx for inspection. ECP will run until 2027 depending on donor availability. Currently, they do not have an evacuation line from the power station. They use a distribution line with lower loads. They have a need for a separate line to have a fully operational evacuation and distribution line. They also need conductor size changes to enable them to serve more customers. All this has been communicated to the Ministry to Energy. The problem of evacuation line has been identified as a national one. NDP II concentrated on building dams but there are hopes that NDP III will improve and deliver on the need for evacuation lines. A new project, run by KFW to improve the situation started in 2018. However, scarcity of materials has slowed it down. There is a backlog of almost 700K connections because of lack of connection materials.		no estimate of provisional consumption once fully operational. See section 6.5.4.
UGANDA WILDLIFE AUTHORITY (UWA)[130]	***Environmental Protection*** Uganda Wildlife Authority, (UWA) is Uganda's Government agency responsible for the management and protection of Wildlife in and outside protected areas. The agency is supervised by the Ministry of Tourism, Wildlife and Antiquities. Uganda Wildlife Authority, (UWA) manages 10 National Parks; 12 Wildlife Reserves; 5 Community Wildlife Management Areas; and 13 Wildlife Sanctuaries. The ten National Parks include Queen Elizabeth, Lake Mburo, Murchison Falls, Kidepo Valley, Kibale, Mount Elgon, Rwenzori Mountains, Semuliki, Mgahinga Gorilla, and Bwindi Impenetrable National Parks. These parks display the best in East Africa.	Queen Elizabeth Park is situated at the border of Kasese IP, only separated by a road.	Due to the vicinity of the two parks, there is a wide scope of cooperation in risk mitigation, environmental protection but also in plants and byproducts valorization.
SOLITON TELMEC[131]	***Telecommunications***		

[130] https://ugandawildlife.org/

[131] https://www.soliton.co.ke/about.html

	Soliton Telmec Limited is a telecommunications technology company with their head office based in Nairobi, Kenya. The company supports both the basic and complex infrastructure required to enable electronic communications across the nation which include data centers, fiber optic lines; and the related routing and transmission equipment, including on-going support backed by a Service Level Agreement. With subsidiary offices in Uganda, Kampala and a branch in Mombasa, Kenya to support project implementation in the region, it provides services across the East Africa region.		
CONSERVATION AND DEVELOPMENT UGANDA LTD (CODEA)[132]	***Environmental Protection*** A local NGO incorporated in Uganda as a company limited by guarantee without share capital. The organization seeks to mobilize communities and improve their capacity to protect, restore, and improve the environment. CODEA also works to empower community groups, households, and individuals to meet their socio-economic needs sustainably; contribute to improving health conditions especially for children, youth, and women, as well as promoting justice and gender equality. CODEA operates in the republic of Uganda with major concentration in the western region. The organization so far implemented projects in the Rwenzori region districts including Kasese, Kabarole and Bundibugyo. A current project concerns increasing youth employment through vocational skills and entrepreneurship development in tourism and hospitality. In Kasese, they are exploring with solar powered energy cooking stoves.		
MUHAMA TOURS			
Youth Go Green[133]	***Environment and Youth*** A Non-Governmental Organization (NGO) with a mission to Promote sustainable green growth economy while contributing to youth empowerment. Its interest is to improve environment conservation through tree planting, climate change mitigation, adaptation. By providing critical information, supplying agricultural inputs, lobbying, advocacy & bringing local, national and global stakeholders together, it aims to ignite impact climate action. The organization has a total membership enrollment of 500,000 youth across the country where 58.9% are female. Youth Go Green's environmental aim is to respectively engage "One Million Youths" in an aggressive environmental protection campaign, and plant 10 million trees across the country in 5 years.	Not in the park	The main interest is to get contracts from UIA to perform flood mitigation through tree planting and provision of seedlings.

[132] https://www.codeauganda.org/about_us
[133] https://www.youthgogreen.org/

Nyakatonzi Growers Co-Operative Union Ltd - NGCU[134]	***Agro-food and textile*** The Nyakatonzi Growers' Cooperative Union is a 15,000-member cotton cooperative seeking to improve value addition through more efficient oil extraction, and to diversify into soybeans, sunflower and other oilseeds. The partnership with 2scale aims to build farmer's capacity, introduce technology innovations and improve cooperative management. In particular, it will co-finance new equipment that will increase capacity, oil extraction rates and revenues.		
GEDA[135]	***Environment & Gender*** Gender Environment and Development Action (GEDA-UGANDA) is a Not-for-profit Development Organisation that operates in Uganda. GEDA- Uganda was founded with a gender and environment mission geared towards understanding the measures and drivers of gender inequality in environment, economic, health, socio- cultural spheres in development and humanitarian context with strong commitment and action learning agenda to ignite community led innovations and solutions that promote gender equity, environmental and economic justice for a world where women and girls have the power to harness their full potential. As girls and women interact with the environment most often looking for firewood, cultivating the land and therefore being more attracted to environmental degradation. The NGO engages them to use other alternative energy sources like energy cooking stoves, heat retention bags, briskets among others.		
MUBUKU INTEGRATED FARMERS ASSOCIATION (MIFA)[136]	***Environmental Protection*** A limited company engaged majorly in environment sustainability and livelihood improvement interventions. It has, hitherto concentrated our activities in Kasese district, which is its home district. It has partnered with Ministry of Water and Environment which has supported MIFA LTD to implement restoration of degraded river banks and watersheds as well as livelihood interventions like fish farming and tree growing since 2015. In 2021, MIFA LTD won and signed a contract with the Ministry of Water and Environment to implement a World Bank funded project, "Non-Consultancy Services for Supporting Implementation of Priority Catchment Management Measures in Downstream Nyamwamba."	It is mainly active in Kasese.	The NGO is mostly interested in in environmental contracting services emanating from Kasese IP.

134 https://www.facebook.com/nyakatonzigrowers/ and https://www.2scale.org/en/past-partnerships/cottonseeds-nyakatonzi-growers-cooperative-union-uganda-en
135 https://gedauganda.org/
136 https://mifaltd.org/

UGANDA SMALL SCALE INDUSTRIES ASSOCIATION (USSIA)[137]	***Various industries*** USSIA is a registered membership Non-Governmental Organization with the aim of creating a forum and structures for supporting and enhancing growth in the Small-Scale Industrial sector of Uganda. USSIA is, therefore, a grass-root based organization with a branch network of 27 Zone offices spread in 25 districts mainly in the central, southern, western and eastern region. USSIA membership is voluntary and is composed of the Small-Scale Industrialists (SSI) that are operating and are legally registered. The Members enterprises are classified in industrial categories: Metal Fabrication, Handcrafts, Foods & Beverages, Wood Works, Building Materials, Textiles & Garments, Technology (ICT), Social support services, Leather Work & Leather, Ceramics, Tax and legal services, Printing & Graphics, Electrical Works and Electronics, International SME & Cottage industry fair, Chemicals, Pharmaceuticals & – Workers', PAS Herbals Members benefits/services such as: – Access to finance facilitation – Training & skills development – Appropriate technology acquisition – Networking – Business start-up support – Business advisory services Information & Communication – Market entry support – Advocacy for SMEs		
BUSONGORA KINGDOM[138]	***Tourism & Cultural Heritage*** King Ndahura II Imara Kashagama hosts a small cultural heritage museum and tourism activities demonstration (horses, ostriches, etc.).	No boundaries with Kasese IP.	Interest in promoting Kasese as a touristic destination and incubate activities in collaboration with an FZ tax-free craft shop.

[137] https://ussia.or.ug/about-us/
[138] https://www.theeastafrican.co.ke/tea/magazine/uganda-lost-kingdom-busongora-3768562 and http://www.busongora-chwezi.org/history/king-ndahura

6.3. Key productive sectors and value chains observations

The result of the discussions, site assessments and analysis of the economic, environmental and social aspects led to the selection of the key sectors showed in Table 14, the elimination of potential ones (sectors crossed out) and the identification of services and incentives that would translate in the IP value proposition[139].

Table 16: Kasese IP key existing and potential sectors

SECTORS	SERVICES	INCENTIVES
▪ **Agri/Food (citrus, mangoes, cotton, grain, vegetables, coffee, cocoa, tea, vanilla, water packaging…)** ▪ **Meat** ▪ **Fish** ▪ ~~**Mining (steel, salt)**~~ ▪ ~~**Pharma**~~ ▪ **Wood (eco? electric poles)** ▪ **Tourism** ▪ **Automotive** ▪ **Renewable energy (recycling husks into briquets** ▪ **Dairy** ▪ **Leather**	▪ Infrastructures: power (alternative energy), waste management and water. ▪ Storage (cold, cereals storage) ▪ Packaging ▪ Cleaning ▪ Washing ▪ Laboratory & coffee testing lab ▪ Sanitary treatments and trucks decontamination ▪ Cold Chain (deep freeze) ▪ Oil cold press, CO2, Distillation, drying, toxis scrub… ▪ Security (plus wildlife management) ▪ Green chemistry for pole treatment ▪ Food court	▪ One stop service ▪ Import and export tax free within the enclaved freezone) ▪ (Youth skills center)? ▪ (Innovation center)? ▪ Free land

The mission did not replace a thorough value chain feasibility analysis that was not properly conducted for the site. Some general value-chain observations and recommendations are highlighted in Table 16 and are valid for both Soroti and Kasese IPs.

Table 17: General Value Chain Observations for Kasese IP

Observations based on discussions with Kasese leaders	Recommended Action
GGGI support in **Green Industrialization** focuses at the level of FZ and IP**.** However, such a support needs to be complemented by strategies for greening the targeted value chains, and building their resilience for sustainable value chain development. Focusing on Green Industrialization without greening the value chains can create mismatch.	Strategize for greening the value chains and integration into the masterplan. Identify potential complementary donors and link-up

[139] Group discussions drawings are in Annex F

	with existing national programs.
The central government, did not sufficiently involve the actors, and Kasese City/Local government leaders on design and inception phases of the project, and thus, the actors targeted for the Industrial parks, Soroti Local government, and central government are operating in isolation.	Set up an administrative framework that integrates all stakeholders
The information on the key actors, exiting linkages, relationships and material flows along different marketing channels for each segment of the targeted value chain for industrial parks is insufficiently documented.	This information is a critical gap and should be generated early on.
The district production officers, and commercial officers seem to have no framework in place for multi-scale assessment, monitoring and integration of Industrial Parks into the Soroti City work plans, including the current Parish Development Model.	Need for a framework that integrates the industrial parks into the district workplans
The project seems to have ignored integration of the value chain approach in the master plan, that would strengthen inter-linkages among the various actors and address associated financing, technology and capacity gaps to deliver holistic support for needed services. To this effect, the mission identified key common productive infrastructures but at a stage where land allocation and financial promises were so advanced that there may be a lack of available space for them and expectations of too much free services from the tenants rendering the IP financial sustainability questionable.	Need for holistic integration of the value chain development approach into the project and for the identification of productive infrastructures early on.
The value chains analysis report that would have prioritized value chains, mapped actors, analyzed market flow volumes and trends, analyzed business models, identified opportunities, constraints, defined the processed flows and proposed concrete viable options for support or enhancement based on solid analysis is lacking	Conduct a value chains analysis Need for documentation of the opportunities and potential of the value chains before commercialization.

6.3.1. Automotive

According

Key players/potential investors:

Metu Zhongtong Bus Co. Ltd

Value Chain, Material and Process Flow Analysis

Uganda

Automotive: already allocated, full RECP analysis needed

6.3.2. Agri-Food (Fruits: Citrus, Mangoes)

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

9.	Based on discussions, generally, the orange and mango value chains are still underdeveloped in the district and therefore not viable for the industrial parks	Fruit drink/juice processing not viable in Kasese Industrial Park

Agri/Food : Need for full fledged VCA with more representativity from private stakeholders outside the IP.

citrus, mangoes: Orange and mango value chains still underdeveloped in the District thus not viable.

6.3.3. Agri-Food (Cotton)

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Cotton: Cotton processing not recommended (routine fire outbreaks and dust)

s/n	Observations based on discussions with cotton and maize actors	Recommended Action
	Nyakatonzi Growers Cooperative Union **Cotton value chain** • Union composed of 40 primary cooperatives that are engaged in cotton production • After harvest, primary cooperatives and other few individuals aggregates seed cotton from several farmers and deliver it to the union's ginnery. It is then checked for moisture content, extraneous matter, weighed and stored before being processed • Weak linkages in this cotton chain are noted between individual producers, and the union • Stronger linkages were reported between producer primary cooperatives and the union. • No formal supply contracts were reported to exist between producers and the union. • No linkages were reported between transporters and producers • Storage facilities with storage capacity of about 120 to 150MT of bales are available • Production/processing peak period is from January to March. • Operates below capacity due to seasonality effects • Ginnery has a production capacity of 120 to 150MT bales per 24 hours • The union ginnery is entirely dependent on supply from 40 primary cooperatives as producers and few individual farmers. • The ginning process is a highly specialized process whereby seed cotton is separated into cottonseed and cotton lint and generates a lot dust. The lint is cleaned, and finally pressed into bales. The cotton seed is sold to millers. • Over dependence on rain-fed production, has adversely affected the production cycle of the union. During the visit, the ginnery was not in operation due to lack of raw material. • Weak farmer linkages due to the seasonality of cotton production were observed. Farmer groups are rarely	Cotton processing not recommended for the Kasese industrial park considering the routine fire outbreaks and dust quantities generated during processing

	permanent, as farmers tend to move in and out of cotton production every season. This undermines upgrading the value chain. • During processing, lint as the primary product of seed cotton is sold and is transformed by the textile industry into yarn, textiles, garments and apparel, as well as into absorbent cotton wool. Cottonseed as a by-product is also sold to millers and later transformed into edible oil, cottonseed cake, soap stock and cotton husks. • The union, as operators of the ginnery are critical actors within the cotton value chain industry. Their position, efficiency and organization are critical for the effective operations and upgrading the value chain. • Routine fire outbreaks were reported • Poor quality control and equipment maintenance was observed.	

6.3.4. Agri-Food (Grains)

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Grain: Maize grain, cleaning, drying and processing and installation of Toxi-Scrub to remove aflotoxins recommended

8.	There are few or no processors in the district for maize, coffee and cocoa value chains. This opens more opportunities for investment and exploitation within the industrial parks.	Conduct value chain analysis to recommend investment levels and strategies

8.	There are few or no processors in the district for maize, coffee and cocoa value chains. This opens more opportunities for investment and exploitation within the industrial parks.	Conduct value chain analysis to recommend investment levels and strategies

s/n	**Observations based on discussions with cotton and maize actors**	**Recommended Action**
	Maize value chain • The maize grain ware house section is operated under the Uganda Ware House Receipt system	

	• The ware house cleans and dries grains for safer storage of up to 3 to 6 months. • Charges Ugx 7 for each Kilogram of the grain per month, though, last operated and received grain in 2020 due to inadequate finances. • Weak linkages are noted between farmers and the union • No formal supply contracts were reported to exist between producers and the ware house. • Monthly quantities and volumes could not be ascertained • Due to seasonality effects, the ware house had no grains stored at the time of the visit • The management of the union seem not be market oriented • Poor governance and management could be noted during the discussion	Maize grain, cleaning, drying and processing and installation of Toxi-Scrub to remove aflotoxins is recommended for the Industrial park

6.3.5. Agri-Food (Coffee, Cocoa)

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Coffee/cocoa: partial processing (roasting) for local consumption.

8.	There are few or no processors in the district for maize, coffee and cocoa value chains. This opens more opportunities for investment and exploitation within the industrial parks.	Conduct value chain analysis to recommend investment levels and strategies

6.3.6. Meat

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Meat: No request, unlikely given lack of space except for possible storage.

6.3.7. Dairy

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Dairy: No request, explore peer-to-peer learning with Soroti.

6.3.8. Leather

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Leather: processing too polluting, explore artcrafts valorization options through the FZ.

6.3.9. Fish

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

(Fish): Not viable, fresh lake fish is sold without processing.

1.	Based on discussion, the fish value chain is not developed, and only happens on the lake landing sites where Government has constructed a cold storage facility.	Fish processing not viable in IP

6.3.10. Mining

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Mining (steel, salt): not in the park

6.3.11. Pharma

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

(Pharma): no

6.3.12. Wood

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

Wood (eco? electric poles): current allocation for traditional wood poles likely to be too polluting, explore eco-poles options.

6.3.13. Tourism

According

Key players/potential investors:

DDA

Value Chain, Material and Process Flow Analysis

Uganda

3.	Based on discussions, the agro-tourism value chain is still underdeveloped in the region, despite its potential in the district. Ultimately, this undermines the agro-tourism value chain limiting revenue generation for the government	Need for promotion of Agro-tourism as viable value chain

Tourism: Consider art crafts free-tax shop in the FZ and scavenger activities to mitigate tourism impact. Need for promotion of Agro-tourism as viable value chain.

Innovation Center Options

Provide Business Management trainings particularly for value proposition, branding, quality, environmental and social performance and domestic vs export positioning.

Recycling husks or Lantana camara (invasive plant from QEP) into brickets.

Eco-poles using recycled plastics or foam (from automotive factory) or bamboo (linkages with flood mitigation measures).

Coffee/cocoa processing techniques (roasting and beyond). Dry coffee processing recommended due to the IP water constraints.

Renewable energy: recycling husks or Lantana camara into brickets. Consider innovation center.

Image 36

FZ options

Coffee/Cocoa packaging

Tourism support: Tax-free shop, website, communication

Facilitate coordination with Entebbe FZ

s/n	Observations based on discussions with value chain actors	Recommended Action

2.	Most of the grains maize, rice, mango fruits and cassava tubers are sold at farm gate prices and the farmers don't benefit from the effort that address processing and value addition along the chain.	
3.	There is an emerging and potential market from the neighboring districts of Fort portal and across the border in Congo which can be utilized by the maize, rice, cassava and fruit farmers	
4.	Maize, rice and cassava are sold in open markets, produce stores and shops. Maize flour is mainly outsourced from Kampala and other Districts	
5.	Maize and coffee were reported as main products sold to regional markets, especially Congo as was reported by actors.	
6.	Maize was reported as main products sold to domestic and regional markets, especially in Congo.	
7.	From the discussions trading in maize, cassava is mostly between farmers, rural bulkers, local traders, & traders from other regions. No quantities or volumes were detailed to better understand how maize, cassava, fruits, rice moves along the value chains to the final consumer were reported.	Need for value chains analysis
8.	From the discussions, maize, rice, cassava and fruits marketing in Kasese takes a number of channels; Farmers to Consumers, Farmers to Retailers, Farmers to local retailers to regional markets, Farmers to rural bulkers, and farmer to companies among other channels farmers	
9.	It was observed that there were weak linkages and relationship between all the value chain actors for maize, rice, fruits and cassava value chains.	
10.	Maize, rice, cassava, fruits processing in Kasese district is still at low levels or lacking, resulting to low competitiveness of the value chains.	
11.	As was reported, farmers experienced high losses of their quality maize right from harvesting to marketing. As a result of poor harvest and postharvest handling practices which leads low quality of the maize.	Crucial for farmers to adhere to good practices to maintain the quality of maize during harvesting and postharvest handling
12.	There is lack of knowledge on harvest and post-harvest handling practices in Kasese especially for maize grain, leading to high afflotoxin levels	
13.	Based on discussions coffee and cotton are priority value chains for cash generation in Kasese District.	
14.	Coffee was reported to undergo two primary processing stages; wet process and dry process. Common being the dry process.	
15.	Wet process for coffee primary processing was reported as complex than dry processing requiring specific equipment and large quantities of clean water. Though, coffee produced in this way was reported to be of better quality and commands higher prices.	
16.	The dry process was reported to involve drying of fresh cherries immediately after harvesting without removing the pulp and later exported after attaining moisture content of 13-14%	Dry coffee processing recommended for Kasese Industrial Park
17.	Trading in coffee and cotton mostly took place between producers (farmers and cooperatives), village local traders/aggregators/middlemen, wholesale traders, processors and exporting companies.	

18.	Trade volumes and quantities between actors for the coffee and cotton value chains were not established understand the flow.	Need for value chains analysis
19.	Tree planting focused on conservation strategies, located in Kasese municipality was reported, and was mainly done and championed by Youth Go Green with support from Eco trees, and Kasese District Local Government.	Planting of indigenous trees with the Industrial Park is recommended
20.	Briquettes production was reported as a potential means that can be integrated into the Industrial Park to manage the waste.	
21.	A potentially large regional and export market for coffee and cotton was reported.	
22.	Rwenzori farmers and Marketing society and Nyakatonzi Growers Cooperative Union were mentioned as the main channels of sale of coffee and cotton respectively. The main reason for this choice was because these producers were members of the cooperative societies	

6.4. Key Proposed Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

	Proposed action or project	**Description**
RECP	Introduce the RECP program to companies allocated land in the IP, invite selected companies outside the IP, and conduct annual RECP training.	
	Promote demand-side management of water used for industries in Kasese industrial parks.	Kasese district is a water-stressed area with one of the available water sources contaminated with copper while other major sources fall under cultural heritage areas/sites under UNESCO protection. The easily accessible water resources are stressed by the growing water demand. In the month of June to August, the district reports frequent water outages. The available water needs to be used efficiently to counterbalance rapidly growing water demand, especially with the establishment of industrial parks. This can be achieved through the demand-side management of the water use program in Kasese Industry Park. A similar initiative in Mbarara district reduced water consumption in Milk processing factories from12 to 4 liters of water per liter of milk processed. Demand-side management of water use can as well reduce the size of the wastewater plant required to manage the industrial park effluent.

	The industrial park management should give priority/preference to dry processing technologies/ factories during land allocation	Dry processes are less water-intensive compared to wet processes. For wet coffee, processing requires up to 40 liters of clean water per kg of dry parchment coffee compared to dry coffee processing which requires less than 1 liter of water kg dry coffee beans. Therefore, giving priority to dry processes or technologies can reduce water demand by more than 300% and consequently reduce the wastewater pollution load from the industry. With such consideration, the industrial park can generate relatively less wastewater that can be managed through the Kasese Municipal sewerage system.
Energy Efficiency and conservation	Install a power evacuation line to feed power to the transmission line and sufficient load breakers at the Kasese power substation to improve power transmission and distribution stability in Kasese.	Power quality/reliability affects the efficiency of process equipment and machinery and this consequently results in waste generation during processing and increases pollution load. The increase in pollution load increases the possibility/risk of exposing the ecology of the national park to toxins and pollutants. It is, therefore, important to avoid system un-stability caused by the outage of line, transformers or generators due to sub-station faults by installing power evacuation lines and load breakers at the Kasese power substation.
Environmental compliance	Metu-Zongtong should consider operating the paint shop outside Kasese Industrial Park (Kasese district)	The paint shop is one of the most water and chemical processes in car assembling plants. paint shops use caustic, flammable, and carcinogenic chemicals. These include Isocyanates like hexamethylene diisocyanate, and diisocyanates. The paint shop is the most environmentally damaging area of a car plant, accounting for 60 percent of an assembly plant's energy use and almost all VOC emissions. the danger to the environment comes from volatile organic compounds (VOCs), which when released into the atmosphere react with sunlight to create ground-level ozone. The wastewater from the paint shop usually contains high levels of suspended and total solids such as oil, grease, dyestuff, chromium, zinc, copper, cadmium, nickel and phosphate in washing products. This level of chemical pollution loading from the paint shop possess a huge risk to the ecology of the park.
	Pole treatment factory should consider/explore alternative or innovative pole production processes other	The woold pole treatment is a both chemical and water-intensive process. This process usually uses chemicals listed as chemicals of concern including chromium, and Polly-chloro-carbons. These are highly toxic and hazardous to the environment. This poses a high risk of exposure to toxic chemicals to the ecology of the national park.

	than wood pole treatment.	To produce one wood pole of 150kg requires 270 liters of water and 9.7 liters of chemicals. The water demand of such a process exerts pressure on already stressed water resources and poses risking of contamination of the existing environment and underground water resources. Therefore, the factory should explore innovative processes like green chemistry or steel or plastic pole production.

Food court with markets centralized inside the park (to reduce illegal market activities along the road).

6.5. Environmental and Social Contexts

6.5.1. Regulatory status

An Environmental and Social Impact Statement (ESIS) for the industrial and business park Master plan was undertaken in 2012. It is indicated that an ESIA certificate was issued but no copy was shared to inform the Mission. ESIA certificates are only valid for 5 years in line with the National Environment Act, 2019 and therefore UIA needs to carry out an Environmental audit and renew the certificate if available[140].

There is also a need to strengthen environmental audits from companies in the IP as well as in its vicinity. As an example, neighboring cotton companies produce a lot of dust and do not meet the requirements for both environmental protection and occupational hazards when it comes to air contamination[141].

Image 37: Broken windows from Cotton company. No environmental or SHE audit has taken place.

[140] Note: Project specific ESIAs need to be done to guide the development of each project and Strategic Environment assessments for the Masterplan of the industrial Park in line with the National Environment Act, 2019.
[141] Dust can cause respiratory disease with workers and asphyxiate foliage.

The IP can serve as a good example for good environmental practice for all companies in the vicinity of Queen Elizabeth Park, which is why RECP trainings were recommended for all of them (see section 6.4).

6.5.2. Water and Sanitation

Water supply to the park have been made by National Water and Sewerage Corporations accounting for 30% of the water needs for Kasese. There is an indication that once the park is operational there will be need for additional sources of water, which poses a great challenge:

- NSWC has experienced challenges in accessing water from Rwenzori Mountains National Park and Lake George due to their conservation status as United Nations Scientific and cultural Organization (UNESCO) sites. Lake George is also a Ramsar site protected under the Ramsar Convention, 1971- so abstraction of water will need permits.
- Tailings from Kilembe mines (see section 6.5.5) and the Kasese Cobalt are polluting the water source mainly Lake Edward according to the reports from NWSC. Locals also fear for the IP to reproduce the same mishaps (environmental pollution) as experienced from previous industrial activities. See the full summary of visit of Kilembe mines in Annex E. There is need to contain the tailings from Kilembe operations through a retention wall, revamping the activities of Kilembe mines and dewatering. This process has started with the evaluation of the bids is on-going by the Ministry of Finance Planning and Economic Development and the Ministry of Energy and Mineral Development. However, the Kilembe Mines team recommend to supply extra water from Dunguria river rather than using river Nyamwamba water. This is because there is a concern that the pollution levels will increase astronomically once operations at the mine resume. Secondly Nyamwamba river has power projects along it and national water operations would interfere with these.

Image 38: Kilembe Mines site

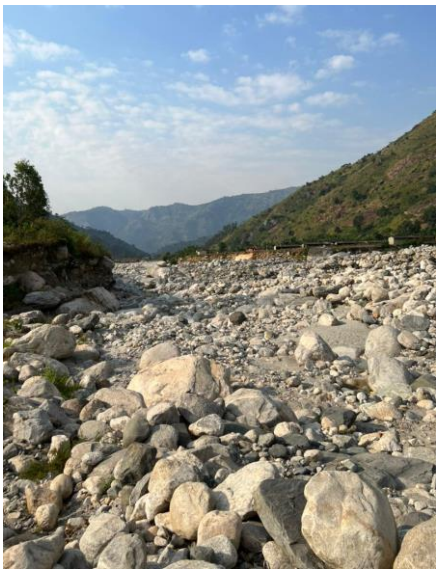

Image 39: Rocks from River Nyamwamba flooding

Waste management

There is no centralized waste management system in place except for one application to turn was to energy by making briquettes. Illegal dumping of liquid waste to the stream is not unheard of.

UIA and the municipality should explore options for symbiotic waste water management plant possibly on the damaged area left by the Cobalt Mines.

6.5.3. Disaster Risk Reduction and Biodiversity

The park is covered with vegetation characteristic of a disturbed ecosystem and invasive species (for example Lantana camara). There is a seasonal (Katadoba) stream that flows through the proposed park site with presence of wetland vegetation -papyrus (Cyperus papyrus). Birds were observed nesting on the shrubs along the stream. There is a risk of Floods from Mt. Rwenzori and boulders from the mountains during the raining season. However, there seem to be no mitigation measures for floods, river overflows and other risks that may greatly affect production with the IP once operationalized.

This was confirmed by the visit to **CODEA.** The facility is located within the industrial park though privately owned. As a result, it is excluded from the planning provisions of the park. There was clear evidence that the floods from the mountains flow through the land allocated to **METU** and passes through the private land owned by CODEA and the garden below that are eroded due to the floods.

Therefore, a comprehensive DRR mapping and management plan (park and surrounding) is recommended, in particular to show the need for proper drainage system for the area right from the mountain to avoid floods complemented by forest restoration measures. Possible linkages with the Nyamwamba Action for Conservation and Resilient Municipal Infrastructure Against Flooding (NACAREMIA-Flooding) project could be explored.

UIA made provisions for a **buffer zone** at the extreme end of the land but without considerations for ecosystem services. It may be necessary to provide for a buffer zone along the seasonal stream of 10 meters on either side of the stream for conservation, flood control, drainage and recreation purposes of the park in line with the National Environment (Wetlands, riverbanks and Lake Shore Management), Regulations, 2000.

6.5.4. Energy

The main source of energy is electric power. When it comes to Kasese Industrial Park, the Kilembe feeder is used. The industrial park has already been connected to the national grid power with 33kv line, though, there is need to install more transformers. An evacuation line is required to facilitate stabilization of power supply to the park (see sections 6.2 and 6.4). Another line of 132KVa is required for change of conductors. When power outages happen at night, operators are afraid to resolve the problem. This is because they must go into Queen Elizabeth National Park, where the equipment is located, to manually handle the fault. This area has wild animals and safety is a concern. The solution would be to automate the metering unit which is found in the game park. Kilembe Investment also wishes to get protection equipment outside the national park as the solution. Automation of the fault recovery

procedures with better equipment would be the ideal solution especially for power supply at Kasese Industrial Park. The cost of this equipment would be incorporated in the tariff to recover the money.

Currently, Kilembe Investments has never been given an estimation of the power needs for the industrial park. Park tenants have communicated that UIA promised them free power and expect a transformer to be delivered free of charge. Once the power supplier quotes the power cost, the tenants have run away. This is a position UIA has to come out and clarify on. Who pays for what?

An energy flow analysis of the each of the proposed establishments in the park to facilitate proper planning is necessary.

The valorization of waste to generate energy (ex: husks) should be strongly promoted. Besides, provision for solar power as stand-alone power plant (as a PPP outside the park for example) or incorporation of solar into the energy mix of individual companies would be recommended.

6.5.5. Queen Elizabeth National Park

The industrial park does not meet the site selection criteria as presented in GGGI IP/FZ guidelines it is too close to the nature reserve Queen Elizabeth National Park. It is only separated by the road (mbarara- kasese highway). These two parks are not compatible as there is a high potential for the IP to pollute adversely the national park. It is to note however that companies in the vicinity but outside the park are also pollution contributors, thus the recommendation to increase environmental audits in and close to the IP (see section 6.5.1). The possible negative impacts from the IP are manifold and range from direct pollution due to industrial processes including water, soil, air, noise pollutions, littering by the influx of workers, trucks and visitors, invasive species propagation, fires risks, animal poaching and road kills, epidemics spread, and more. The park is also blocking an elephant corridor. A thorough risk assessment needs to be carried out; the following is a snapshot of the range of mitigation measures to be undertaken. It is to note that the outdated ESIA did absolutely not address the full scope of risks incurred by Queen Elizabeth National Park. Needless to say, the Uganda Wildlife Authority (UWA) is not equipped to take on the IP extra load in environmental measures. It is therefore recommended to set up an environmental governance committee that will draw the plan of action, budget and to link it with ecosystem services payment from the companies. The most important contributor should be Metu Zhongtong Bus Co. Ltd given it is the company closest to the park border, account for the largest activities in the park and has a high potential of negative impact from the trucks movements to chemical pollution. Unfortunately, it was not possible to meet with the company management. Table shows a range of mandatory risk mitigation measures as well as optional CSR measures that could be undertaken.

Action type	Proposed action or project	Description
Risk Mitigation	Set up Natural Resources Governance committee	▪ Meetings/workshops of stakeholders to apportion responsibilities and feedbacks. ▪ Development of a mitigation plan and regular implementation monitoring.

	Beef up the ranger post at KCCL with more manpower, equipment, accommodation and skilled staff to keep an eye on spill overs from the industrial park.	▪ Seven more staff should be recruited. These should comprise of awareness and education rangers, enforcement patrol rangers and be gender sensitive. ▪ Staff accommodation. It should be age and gender sensitive. ▪ Means of transport like motorcycles so that the area is effectively patrolled. ▪ Equipment like walk talkies and GPS sets for data collection. ▪ Periodic trainings of staff on how to monitor and contain spill overs from the industrial park.
	Waste management actions (wastewater, gleese, used oils, metallic wastes, noise, dust etc.)	▪ A comprehensive waste management plan for the industrial park. ▪ Dust bins elected in all corners of the industrial park and along the road. ▪ A strong wall with sound proofs and dust proof along the industrial park. ▪ Sensitization meetings, communication campaigns and enforcement measures (ex: littering fines) against littering. ▪ Ban roadside markets along the industrial park. ▪ Implement RECP/industrial ecology measures and in particular reusing/recycling of wastes.
	Follow NEMA regulations with the sensitivity of proximity to queen Elizabeth national park.	▪ Fund the environmental and social impact assessment for the industrial park. ▪ Fund monitoring compliance of the ESIA. ▪ Do periodic environmental audits for the industrial park.
	Manage illegal fires in the national park	▪ Fund firefighting equipment such as a water boozer, fire beaters, helmets, overalls, gum boots. ▪ Fund creation and maintenance of fire lines. ▪ Fund creation of fire management plans. ▪ Control cigarette smoking.
	Manage poaching of wildlife	▪ Fund anti poaching programs such as extended patrols. ▪ Fund equipment like walkie talkies, camping gears, PPEs. ▪ Offer drones to swiftly patrol the area. ▪ Offer fuel for motorcycles. ▪ Training scholarships for wildlife management skills. ▪ Fund the extension and maintenance of the electric fence.
	Invasive alien (exotic) plant species spread mitigation	▪ Fund mechanical removal of invasive species. ▪ Control spread by electing washing bays for all tracks before they enter the industrial park. ▪ Get alternative routes other than passing through the national park by all tracks going in the industrial park (if not negatively impacting other national parks). ▪ Fund restoration programs like grass seeding of degraded areas.

	Pay for ecosystem services	▪ Water abstraction fees. ▪ Each industry in the park should pay annual fees on queen Elizabeth account to help in its conservation programs. ▪ Industrial products that share names with wildlife as a brand name should pay for their conservation (for example roofings use elephant as a trade mark, some drinks (beers) like Nile special use trademarks of lions etc.)
CSR	Animal rehabilitation programs	Queen Elizabeth National Park immediate border may see a loss in biodiversity due to species shying away from the noise and movements. Therefore it could be an opportunity to set up complementary rehabilitation programs and infrastructure just in this location. ▪ Translocate extinct species back to queen for example giraffe, zebras etc. ▪ Captive breeding of species like parrots, lions, chimpanzees, okapis etc. ▪ Facilitate awareness raising campaigns and visitors to the rehabilitation programs for a fee.
	Reseach	▪ Fund research for best practices to manage key species and industrial environmental impact monitoring.

Image 40: Queen Elizabeth National Park Electric fence and fire control line.

Image 41: Queen Elizabeth National Park Electric fence limit allowing animals to enter into the IP and residential areas.

Image 42:Current KCCL staff accommodation.

6.6. Kasese IP Key Take Aways

This summary provides a quick snapshot of the Kasese IP chapter main take-aways. For detailed recommendations, refer to the text highlighted in yellow under each section.

- Key sectors: Agri/Food (grain, coffee, cocoa), Automotive, Renewable energy (recycling husks into briquets).
- Key general value chains concerns:
- Key RECP, services and common infrastructures measures: RECP training, demand-side management of water used, preference to dry processing technologies, power evacuation line needed, food court.
- Key common infrastructures and services to offer:
- FZ enclave: Tax-Free tourist shop and tourism promotion.
- Key environmental and social concerns: Conduct ESIA, water scarcity, no centralized waste management system, comprehensive DRR mapping and management plan needed, strengthened environmental audits for companies in and neighboring the IP, buffer zone along the seasonal stream needed.
- Queen Elizabeth Park impact mitigation measures: Set up Natural Resources Governance committee, beef up the ranger post at KCCL, waste management actions, enforce NEMA regulations, manage illegal fires and wildlife poaching, pay for ecosystem services, invasive alien (exotic) plant species spread mitigation, animal rehabilitation programs (CSR).

7. Management

Establish criteria for companies selection based on the policy guidelines, municipality plans and various ministries. Consider leasing to selected innovative companies unable to meet the level of investment.

Provide full access to applications and information local UIA and if applicable UFZA and summarized to local authorities (MoU). Work out the communication processes and information management. 5 years local position filling as currently done is suitable to avoid loss of knowledge and high staff turnover.

Establish a national symbiosis platform (ex South Africa).

Refine financial sustainability models for IP/FZ considering the costs of additional infrastructures/services.

Establish IP/FZ boards and agree on management structure (based on the guidelines). Distinction between operation (can be contracted) and regulation.

Gazette land compliance

Establish natural resource governance groups where needed (ex: Kasese).

Address solid waste management symbiotically with IP/FZ and cities.

UIA to facilitate information and access to exports markets (ex: Mauritius, SA, Costa Rica) together with IP /FZ marketing.

Reflect on infrastructures before allocation in order not to have no space left for it! This is why it should be already in the masterplan

Develop the One Stop Center services list/commitments to practical level.

Involve UCPC in all phases of IP/FZ development.

Provide value-chain greening support beyond the IP/SZ themselves.

UFZA ensures that the areas to be considered as Freezones are gazetted and developed. Within the current regulations, it is possible to register a company as part of a FZ with gazette land outside the FZ, this poses the question on the capacity to monitor environmental and social compliance in gazette lands given the fact that compliance monitoring in the FZ itself already requires to be set in place in a reliable manner.

NCPC

The National Cleaner Production Centre of South Africa (NCPC-SA) is a key industrial sustainability programme of the Department of Trade and Industry (DTI), hosted at the Center for Scientific Industrial Research (CSIR). Its mandate is to enable South African industry to increase its competitiveness and sustainability through more resource efficient and cleaner production. NCPC-SA offers services in two focus areas, namely the Resource Efficiency and Cleaner Production (RECP) and Industrial Energy Efficiency Project in South Africa.

Some constraints of the program is that individual companies and particularly SMEs are often liquidated in a very competitive business context in South Africa. It is also worth noting that companies may need to be re-assessed periodically, for example if the first assessment exercise didn't cover all possible

aspects (waste, energy and particularly water). It was observed during the mission that the RECP training of companies did not necessarily materialized in the form of new companies spontaneously volunteering for RECP assessment. Communications and inter-collaboration between companies in South Africa being a challenge and requiring time and often facilitation programs such as repeated RECP awareness raising session. NCPC has also documented financial gains for companies from RECP implementation which can be tapped in when building a case in a specific region.

The concept of EIP is not institutionalizing at NCPC yet though and one can wonder what added value it would prove. One possible added value could be an improved sustainability of the project gains (RECP assessment included) provided by the concomitant awareness built with companies individually and with the park management that can serve as a relay to new or unwilling companies. Another importance to introduce EIP in NCPC is possibly to influence policies in regards to IDZ and more generally to adopt the EIP standards which would include the fostering of symbiosis and strengthened collaboration with WISP or increase capacity in NCPC to perform symbiosis. At the moment NCPC does not have the required capacity to manage symbiosis despite owning the instruments, and relies rather on a MoU with WISP which requires incentives for its full implementation.

The Western Cape Industrial Symbiosis programme (WISP) initiative is a Western Cape Provincial
NCPC-SA and GreenCape entered into a Memorandum of Understanding (2014-2017, consult Annex E) based on the fact that there were common area of interest and collaboration. Signed in 2014 the MoU addresses specific areas of collaboration such as: rolling out of Industrial symbiosis program in

SYNERGie Management System Tool
The SYNERGie Software is a management system that has been developed to manage synergies identified between companies from the day of identification to the day when synergies are completed. The software is solely owned by International Synergies Limited based in the UK. It is being used successfully in different parts of the world where Industrial Symbiosis programmes are running despite its quite hefty price: South Africa paid the steep amount of 200 000USD for its acquisition. Some more references are provided in the bibliography, particularly http://www.international-synergies.com/ , http://www.nispnetwork.com/ and http://green-cape.co.za/wisp/about-us/international-synergies-limited/

Develop an EIP park management expertise with the current team that could serve as a base for the development of a service to be sold to other IDZ in the country and possibly the rest of Africa. UNIDO could provide management capacity building for EIP addressing the typical

Those lead to the recommendation of support for the park that are more of strategic/managerial nature:
Increase of the price of the levies charged to fund the provision of services: to respond to some companies unwillingness to pay, it is necessary to demonstrate the cost-benefit of some of the shared infrastructures and proposed RECP engagements the park may suggest to tenants. A complete economy analysis and willingness to pay is required by a consultant (preferably national as it is an exercise of extended duration). In addition, the

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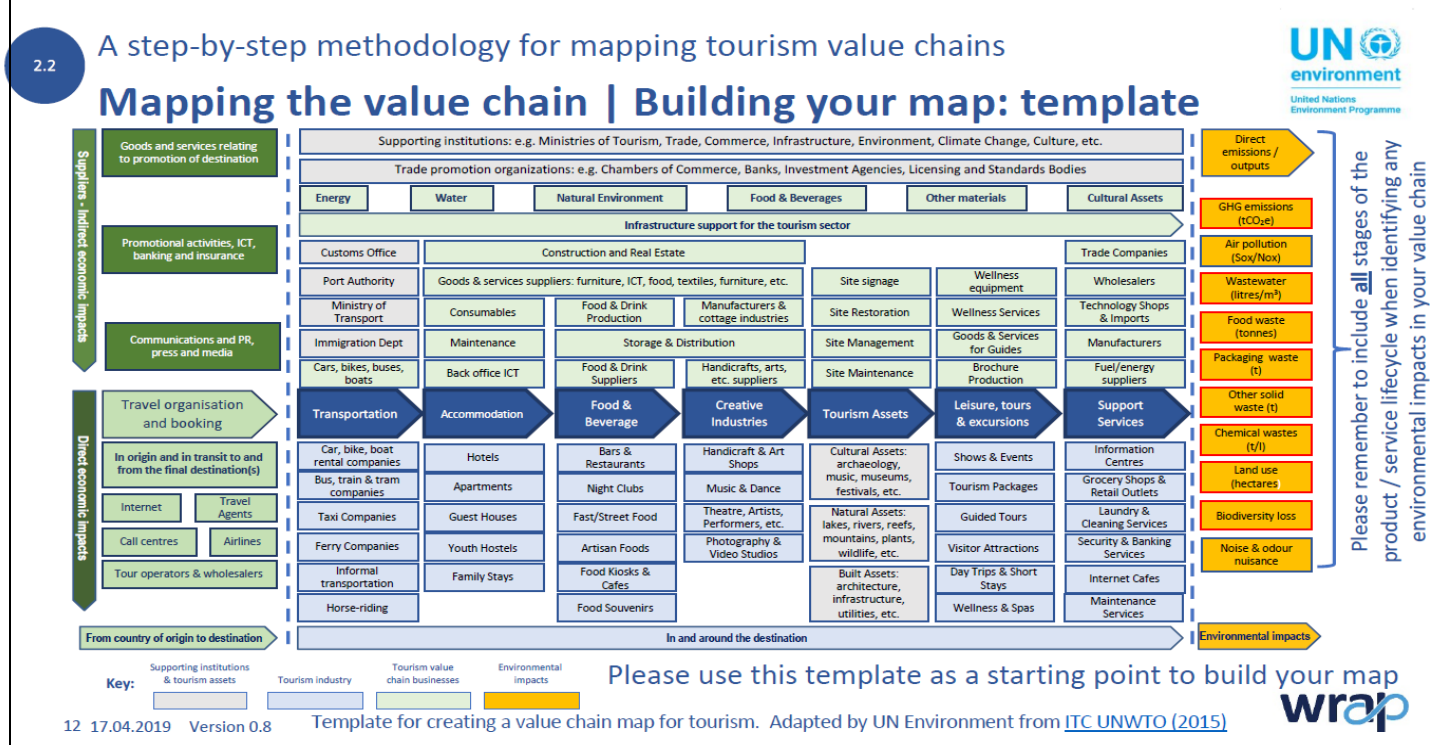
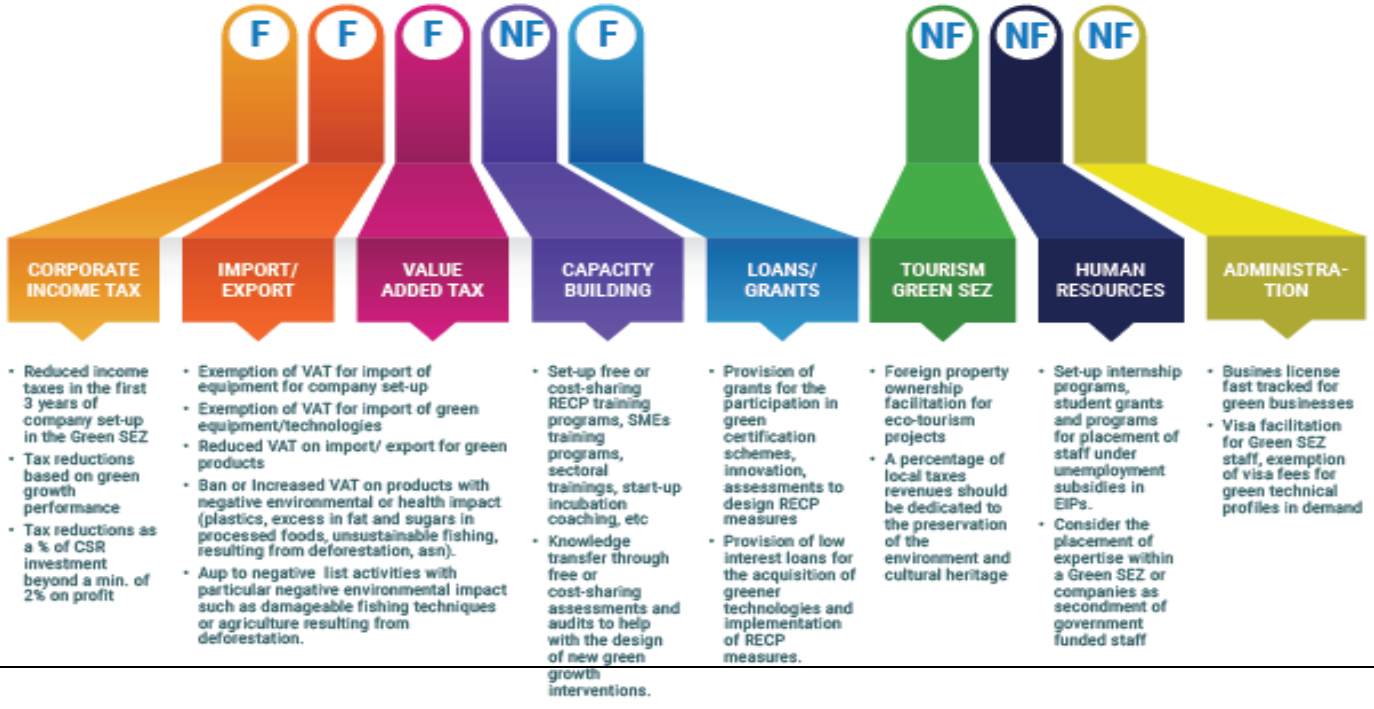
consultant would need to look into lean management features, advise the management team in this aspect and provide with the elements that can enable the marketing of the results as well as strengthened the trust between tenants and management.

Develop an engagement strategy for the identification of new tenants in the park that can optimize symbiosis by characterizing waste and resource consumptions as well as adherence to EILDZ standards..





8. ANNEXES

A. Terms of Reference of the Mission

Concept note for field mission in Uganda

Months of June-July Duration 1 month

Project Background

In line with Government of Uganda's Vision 2040, the National Development Plan and the Uganda Green Growth Development Strategy (UGGDS), GGGI has partnered with the European Union (EU) as part of the EU Inclusive Green Economy Uptake Programme (Greenup), to deliver a project entitled "Greening Uganda's Urbanization and Industrialization" (2020-2023). This mission concerns outputs 2.1, 2.3 and 2.4 as follows:

Output 2.1 (E2-1) **National Green Industrial Business Parks (IBP) and Free-Zones (FZ) Policy Guidelines are finalized**
Activity 2.1.1 Support the MTIC and NPA with the development of the National Green Industrial Business Parks (IBP) and Free-Zones (FZ) Policy Guidelines
Activity 2.1.2 Support the MTIC & NPA with Capacity Building of the relevant stakeholders to be able to apply the guidelines.

Output 2.3 (E2-3) **Green Growth is mainstreamed in the Masterplans for four (4) selected IBPs and/or FZs**
Activity 2.3.1 Select the four IBPs/FZs in close cooperation with the stakeholders
Activity 2.3.2 Background research through review of the existing Masterplans and other relevant documentation and stakeholder consultation(s)

Output 2.4 (E1-8) **Infrastructure Investment Plans for four (4) IBP and/or FZ is finalized, including Emission Reduction potentials**
2.4.1 Support the MTIC with the development of an Infrastructure Investment Plan per IBP/FZ.
2.4.2 A Shortlist of 3 projects per IBP/FZ is developed (12 in total).
2.4.3 Six Project Teasers are developed.

Output 2.1 concerns the development of policy guidelines for Green Industrial Parks and Freezones. An initial draft has been completed and presented in a half day meeting validation. It was then proposed to organize a retreat with a working group that will spear head the editing providing detailed guidance for the redaction of a shorter document to be published by GoU. This document has been submitted for final comments.

Concerning outputs 2.3 and 2.4, GoU decided to prioritize the development and servicing of five (5) key industrial parks namely; Kampala, Kasese, Jinja, Soroti and Karamoja in the short term to be deliver part of these objectives by 2025.

The Government of Uganda has carried out a pre-feasibility and feasibility studies as well as a detailed project report for the following four (4) industrial parks:

i. Kasese Industrial and Business Park (KsIBP)
ii. Jinja Industrial and Business Park (JIBP)
iii. Soroti Industrial and Business Park (SIBP)
iv. Karamoja Industrial and Business Park (KaIBP)

After a thorough review of documentation available and analysis on best opportunity potential for green development, GGGI preidentified Kasese and Soroti, as well as Entebbe Freezone for prioritization.

Mission objectives

The mission aims to finalize the work on the policy guidelines through bilateral restitutions to the client, to complement the strategic support to UIA and UFZA in the development of the priority industrial parks and freezones with field analysis and to give inputs for the preparation of upcoming project proposals on those sites.

Kampala visit: Consolidate the policy guidelines adoption through bilateral restitutions with the client.
Entebbe visit: To accompany the Freezones Authority in a complementary feasibility assessment and sectors selection following our comments on their initial business plan. Ideally, we would like to bring together the Freezones authority and other ministries in order to develop a park concept that can address both exports and domestic market. To bring UCPC and GoU experts to perform a material flow analysis projection on various sectors scenario, match the result with the economic benefits prospects and the detailed (and budgeted) environmental and social mitigation plans with an estimated likeliness of percentage of completion. Perform an rough analysis to maximize economic benefits while minimizing environmental and social impacts that will most likely provide a different ranking than GoU would have done by only comparing the economic gains. We can try to identify symbiotic infrastructures as well once the sectors selection is completed, though typically we need to have the companies preselected first. Depending on the availability and expertise of GoU participats, at minimum we will narrow down to possible value-chains and describe the TORs for the technical expertise required to finalize the feasibility and business plan as well as for GGGI and GoU to develop the project proposal that would fund it.

Soroti visit: We will try to address some of the issues identified in GGGI previous mission by having UCPC do a material flow analysis, to identify possible alternative value chain (for example for the non-used local oranges) possibly to link with another freezone (peer to peer collaboration) for products with export potential. Then together with the material flow analysis, to facilitate UCPC to perform or plan an RECP analysis with interested companies. To identify opportunities for RECP training, identify symbiotic activities (common infrastructures) and possible circular economy.

Kasese visit: Here we have identified that the risks to the environment far outweigh any possible positive economic impact if an industrial park is built, including the encroachment with the natural conservation area. Therefore, we would like to develop an alternative proposal in the form of an an agro-tourism park that will lift the tourism potential of the area. The field visit should give us insights on whether this is possible, in order to develop the TORs for a complete feasibility study team including agro-value chain experts, tourism experts, economics, environmental expert with carbon calculation skills, etc.... Ideally, we would like to pre-identify carbon sinks that could benefit from conservation activities while generating revenue through carbon finance.

Sites visited (detailed itinerary in annex)

- Week 1: Flight to Uganda and Kampala
- Week 2: **Entebbe**
- Week 3: **Soroti**
- Week 4: **Kasese**
- Week 5**:** GoU Debriefing in Kampala and flight back to Switzerland
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B. Field Visits Agenda

	GGGI June-July 21 Field mission			
	Date	**Time**	**Activity**	**Location**
WEEK 2 ENTEBBE	**June 20 (Monday)**	Morning	11h-12h30 Meeting with EU-project GGGI team	Kampala
		Afternoon	14h-17h Entebbe mission preparation	Kampala
	June 21 (Tuesday)	Morning	9h15-10h00 Plenary meeting with Entebbe municipality 10h-10h20 Distribution of tasks amongst the team 10h20-11h15Bilateral meetings with municipality by sector	(Leaving 7h30) Entebbe hotel
			11h15-12h00 Plenary meeting with Entebbe Freezone management (including airport management) 12h00-13h Bilateral meetings with Freezone management by sector	
		Afternoon	14h-16h Sites visits with municipality and Entebbe Freezone management 16h-17h30 Bilateral meetings with municipality and freezone management	Freezone site (Depart 17h)
	June 22 (Wednesday)	Morning	9h15-10h15 Plenary meeting with private sector 10h15-13h00 Bilateral meetings with private sector	(Leaving 7h30) Entebbe
			12h00-13h Mid-mission team debriefing	
		Afternoon	14h-17h00 Team 1 continued bilateral meetings with private sector 14h-17h00 Team 2 Entebbe neighboring communities' meetings and hostelry sector visits	Entebbe (Depart 17h)
	June 23 (Thursday)	Morning	9h15-13h Entebbe complimentary virtual meetings	Kampala
		Afternoon	14h-15h30 Team debriefing 15h30-17h30 Team notes compilation	Kampala
	June 24 (Friday)	Morning	8h30-13h Entebbe data analysis and preparation for Soroti	Kampala
		Afternoon	14h-16h Entebbe data analysis and preparation for Soroti	Kampala
	June 25 (Saturday)	**Free**		**Kampala**

	GGGI June-July 21 Field mission			
	Date	**Time**	**Activity**	**Location**
	June 26 (Sunday)	Morning	7h30 Travel to Soroti	Soroti
		Afternoon	Logistics in Soroti	Soroti
WEEK 3 SOROTI	**June 27 (Monday)**	Morning	8h15-9h00 Plenary meeting with Soroti Park management 9h00-10h30 Bilateral meetings with Park management by sector	Soroti
			10h30-11h30 Plenary meeting with Soroti municipality 11h30-13h Bilateral meetings with municipality by sector	
		Afternoon	14h-16h Sites visits with municipality and Park management 16h-17h00 Bilateral visits to the private sector (inside the park) 17h00-17h30 Rapid team catch-up of the day	Soroti
	June 28 (Tuesday)	Morning	9h00-13h Team 1 Bilateral visits to the private sector outside the park 8h15-13h Team 2 Soroti neighboring communities' meetings: farmers and civil society	Soroti
		Afternoon	14h00-17h Team 1 Bilateral visits to the private sector and farmers outside 14h00-17h Team 2 Soroti neighboring communities' meetings: conservation areas and hostelry 17h00-17h30 Rapid team catch-up of the day	Soroti
	June 29 (Wednesday)	Morning	8h30-9h30 Mid mission team debriefing 9h00-13h Complementary meetings	Soroti
		Afternoon	14h- 15h Local Debriefing 15h-17h complementary meetings	Soroti
	June 30 (Thursday)	Morning	8h15-10h Team debriefing 10h Travel back to Kampala	Soroti

	GGGI June-July 21 Field mission			
	Date	Time	Activity	Location
	July 3 (Sunday)	Morning	7h30 Travel to Kasese	Kampala
		Afternoon	Travel to Kasese	Kasese
WEEK 4 KASESE	July 4 (Monday)	Morning	8h15-9h00 Plenary meeting with Kasese Park management 9h00-10h30 Bilateral meetings with Park management by sector	Kasese
			10h30-11h30 Plenary meeting with Kasese municipality 11h30-13h Bilateral meetings with municipality by sector	
		Afternoon	14h-16h Sites visits with municipality and Park management 16h-17h00 Bilateral visits to the private sector (inside the park) 17h00-17h30 Rapid team catch-up of the day	Kasese
	July 5 (Tuesday)	Morning	8h15-13h Team 1 Bilateral visits to the private sector outside the park by sector 8h15-13h Team 2 Kasese neighboring communities' meetings: farmers and civil society	Kasese
		Afternoon	14h00-17h Team 1 Bilateral visits to the private sector and farmers outside by sector 14h00-17h Team 2 Kasese neighboring communities' meetings: conservation areas and hostelry 17h00-17h30 Rapid team catch-up of the day	Kasese
	July 6 (Wednesday)	Morning	8h00-9h00 Mid mission team debriefing 9h-13h Conservation areas visits and meetings	Kasese
		Afternoon	14h- 15h Local Debriefing 15h-17h complementary meetings	Kasese
	July 7 (Thursday)	Morning	7h30 Travel to Kampala	Kasese
		Afternoon	Travel to Kampala	Kampala
	July 8 (Friday)	Morning	8h30-10h Team debriefing (virtual consider to do it in flesh) 10h- 13h Team data analysis and notes compilation	Kampala

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D. Schedule of Leases

Soroti

SCHEDULE OF LEASES FOR SOROTI INDUSTRIAL AND BUSINESS PARK JULY 2021														
	Name of Developer	Business Activity	Date of Allocation	Acreage	Payment Terms	Development Status	Contact Person(s)	Email	Contact	Lease Date	Lease Extension	Lease End	Block & Plot	Additional Notes
1	UGANDA DEVELOPLMENT CORPORATION &TESO FRUIT (TEJU JUICE)	Agro-processing	22nd/Nov/ 2012	12,4	Subsidized	Operational		teju@softe.co.ug	0200-455455	22nd/Nov/2012	Lease extended to full term of 49 years on 5th/July/2016	22nd/Nov/2061	Plots 1-4 Pineapple Close	
2	SANQUA ENGINEERING LIMITED	Production of concrete products	11th/Jul/ 2016	4	Subsidized	Construction Stage	Epuwat Ignatius Okwi Enos	sanqu.ug@gmail.com	0755-215440 0772-895019	23rd/May/2017		23rd/May/2022	Plots 53,55&57-59 Temele Industrial Road	
3	ASALALAMAAL LTD	Manufacture of vegetable and animal oils and fats	1st/Oct/ 2019	5	Subsidized	Construction Stage	Hesham R . Yosef	asalalamaal999@gmail.com	0778-556202	No lease yet				
4	SOROTI DISTRICT LOCAL GOVERNMENT	Skilling Youth	5th/May/ 2020	10	Subsidized	Construction Stage	Soroti Local Gov't- CAO - Soroti District		0782-860004	No lease yet				
5	PELA COMMODITIES LTD	Factory in the grain value chain	23rd/Oct/ 2020	10	Subsidized	Construction Stage	Isaiah Mbuga Amos Wekesa	isiah.langa@perryengineering.com	0701-750015	No lease yet				
6	TESO FOODS LTD	Fruit processing plant	18th/Nov/ 2015	4,79	Subsidized	Construction Stage	Capt Mike Mukula		0313-106662 0313-106663	22nd/July/2016	4th/Aug/2021	4th/Aug/2022	Plots 1,2,5&6 Palm Tree Close	Given one year extension
7	UGANDA FREE ZONES AUTHORITY	Free Zone Area	18th/Nov/ 2015	20	Subsidized	Pre-Start Stage	Rebecca N Wamono (Dir. Business Devt & Investor Support)	rebecca.nalumu@freezones.go.ug	0417-722634 0704-028174	27th/June/2019		27th/June/2024	Plots 18,20,22,24,26,28,30,32,34,36,38 ,40,42,44 & 46 Temele Industrial Road	
8	KELIZ HOTEL LIMITED	hotel	4th/Apr/ 2016	2	Subsidized	Pre-Start Stage	Kenneth Okalang	okalang.ok@gmail.com	0-467362451992	24th/July/2018		24th/July/2023	Plot 48,46 3rd Street	
9	KELIZ MEDICAL EQUIPMENT LTD	Hospital	4th/Apr/ 2016	1	Subsidized	Pre-Start Stage	Kenneth Okalang	okalang.ok@gmail.com	0-467362451992	23rd/July/2018		23rd/July/2023	Plot 29 3rd Street	
10	MEGA HOLDINGS	Agro-processing	21st/Dec/ 2017	5	Subsidized	Pre-Start Stage	Makode Christopher		0718-555417 0703-339421	13th/Apr/2018		13th/Apr/2023	Plot 18,26 3rd Street	
11	SOROTI TEACHERS CO-OP SAVINGS & CREDIT SOCIETY LTD	Co-Operatives	23rd/Oct/ 2017	1	Subsidized	Pre-Start Stage	Oluga Augustine	stecos_2004@yahoo.com	0783-305082	23rd/Jan/2018		23rd/Jan/2023	Plot 16, 3rd Street	
12	WODMA INVESTMENT LTD	Building and Construction Plant	2nd/Aug/ 2018	3	Subsidized	Pre-Start Stage	Labong Joachim Olweny	jabongjo6@yahoo.com awilichristine@gmail.com	0776-696667 0703-552385	No lease yet				
13	STAR TAHINA LTD	Food processing plant	25th/Sept/ 2018	5	Subsidized	Pre-Start Stage	Yossi Gabay	startahina@gmail.com	0775-898948	13th/May/2019		13th/May/2024	Plots 6-14 2nd Street	
14	KOMOLO FOODS AND BEVERAGES LTD	Grain and Fruit Processing	1st/Oct/ 2019	20	Subsidized	Pre-Start Stage	Isiagi Stanlas		0705-408000 0778-901043	21st/Sept/2020		21st/Sept/2025	Plots 1-15 & 17-19 3rd Street	
15	NATIONAL MUSLIM WOMEN DEVELOPMENT COUNCIL	Developing a Regional Agricultural Mechanization Equipment Centre	20th/Jan/ 2020	1	Subsidized	Newly Allocated	Hamida Settenda Mukasa	nationalmuslimwomen@gmail.com	0701-730088 0712-730088	No lease yet				Issued notice of intention to withdraw on 5th Aug 2021
16	SERERE AGRO ENTERPRISE LIMITED	Agro Processing And Bulk Grain Handling	5th/May/ 2020	4	Subsidized	Newly Allocated	Stephen Onyait	jsonyait18@gmail.com	0774-355748	19th/Nov/2020		19th/Nov/2025	Plots 1-3 1st Street and 2-4 2nd Street	
17	WASH AND WILLS COUNTRY HOME LTD	Hotel	30th/Apr/ 2020	5	Subsidized	Newly Allocated	Ariong Joseph	sales.washandwills@gmail.com	0752-507108					
18	DEVELOPMENT MEASURES INTERNATIONAL LTD	Skilling The Youth	5th/May/ 2020	5	Subsidized	Newly Allocated	Martin J Opolot	info@devmeasures.com	0772-624667	No lease yet				
19	OPERATION WEALTH CREATION/NAADS	Cassava processing factories	23rd/Oct/ 2020	5	Subsidized	Newly Allocated			0414-671717/8 0774-249071	No lease yet				
20	JENA HERBALS (U) LTD	Manifacturing facility for Covidex and other health products	5th/Aug/ 2021	5	Subsidized	Newly Allocated	Prof. Ogwang Martin E.	jenaherbals@gmail.com	0779-617612 0756-299255					
				129,4										
20	PROPOSED SME LAND	SME Activities		6,21										

Kasese

KASESE INDUSTRIAL AND BUSINESS PARK SCHEDULE OF LEASES-2022					
No	Name of Developer	Business Activity	Acreage	status	Proprietor
1	Gulu Agricultural Developments Limited	Agro processing	10	Construction	Jeff Steinberg 0783185287
2	Rwenzori Farmers Marketing Cooperative Society Limited	Agro processing	10	Construction	Bwambale Ivan 0776-122717/0706-179621 rwenzorifmcs@gmail.com
3	Mejaruda Ent Co	Pole and wood treatment plant	2	Construction	Mulhumbira David 0771-337176/0702-693995
4	Mt Rwenzori Coffee Farmers	Coffee Processing	3	Construction	Kule Juvenal Rwantagale (GM) mtrwenzoricoffeegrowers@gmail.com 0782-651443
5	Metu Zhongtong Bus Co. Ltd	Assorted auto mobile factories, warehouses and testing grounds	100	Construction	Metu Katabazi 0751-798448
6	Uganda Free Zones Authority	Export business accelerator	20	Pre-Start stage	Patrick:0782-115544/0702-115544
7	Bukonzo Mixed Farm	Agro processing	5	Pre-Start stage	Dr. Kiyonga 0782-060348/0772-601495 bukonzo.mixedfarm@gmail.com
8	RAM Agro Ltd	Agro processing	5	Pre-Start stage	Monne Michael (Director) ramindustry@gmail.com 0772-423646
9	CO-EFFORT	Warehousing	1	Pre-Start stage	David Muhwezi: 0772-353106 coeffortworks@gmail.com
10	Cereal Industries (U) Ltd	Agro processing	2	Pre-Start stage	Nelson Biryabarema 0700-604030 godfreybwambale@yahoo.co.uk
11	Highlife Water	Water packaging plant	2	Pre-Start stage	Mohammed Saleh: 0776-001222
12	Operation Wealth Creation/NAADS	Establish cassava processing factories	5	Pre-Start stage	0414-671717/8 0774-249071

E. Kilembe Mines visit summary

Background

The mine was originally owned by a Canadian Company. Full mining operations stopped in 1977. On their departure, they sold the mine to the Uganda Government. However, the situation at the mine never improved due to instability in Uganda and the mine gradually fell into decay.

Copper was mined at Kilembe and crushed, it was transferred via pipe to Kasese town for filtering and sent to Jinja via rail for smelting. Cobalt was thought useless and piled at Kasese Cobalt Company

Mubuku 1 was the second power plant in Uganda by the same contractor as the Owen Falls Dam contractor. This power plant is still running but struggling because of the old infrastructure. It was revamped to supply Him Cement.

Copper and cobalt tailings used to be taken by pipe downstream. However, the pipe has since been broken due to different factors. These tailings are now heaped downstream. Recent floods have disrupted this site.

Mining efficiency at Kilembe was 1%. Mining is done by drilling and blasting into the rock. A sample is then tested for mineral deposits. Crushed stone from the mine was made into aggregate for construction.

A Chinese investor (Tibet company) acquired the mine in 2014 but violated the environmental laws and NEMA forced its closure. This contract was terminated within 3 years and the operations lasted only 1 year. Tibet company had agreed to put a Smelter in Kasese because power was readily available as part of the deal. This was never fulfilled. They instead wanted to export the ore to China for Smelting. This contributed to the collapse of the deal.

Nowadays

A flood cut off the mine in 2020 further exacerbating the situation. Flooding of river Nyamwamba was left huge rocks in its pathway. Routine clearing of the rocks would help keep floods in check. Now, the site needs a crusher to clear away the waste. The pile up of these huge rocks has worsened the floods.

National Water is planning to use river Nyamwamba water to boost its water supply to the already struggling water. However, at the moment the water that goes through the mine is polluted. Kilembe team proposes that National Water instead uses another river called Dunguria. This is because there is a concern that the pollution levels will increase astronomically once operations at the mine resume. Secondly Nyamwamba river has power projects along it and national water operations would interfere with these.

The existing mine operations and staff are domiciled under the ministry of finance. They have been given the liberty to sell the power from Mubuku 1. The revenue from this caters of salaries and simple maintenance operations at the mine.

Under the current government, the UPDF was given a directive to take care of the remaining structures.

Future prospects

A tender was advertised for mining copper and cobalt. Cobalt had previously been dumped as waste because it was assumed it had no market value. An integral part of the tender is that the winning company must set up a smelter in Kasese. A core part of this new tender is remediation of the water polluted by Kilembe mine.

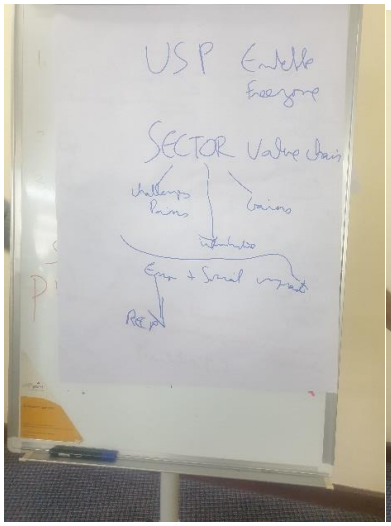
A vibrant town existed around Kilembe mine where there were over 2000 structures, first bank in Kasese, air ticket booking office, settlements with different communities from Uganda. All this has since gone into ruin. The team at Kilembe hopes development of a tourism value chain around the mountain location would be good for revitalization of the different activities around the area. The area around the mine is also good with coffee and passion fruit growing.

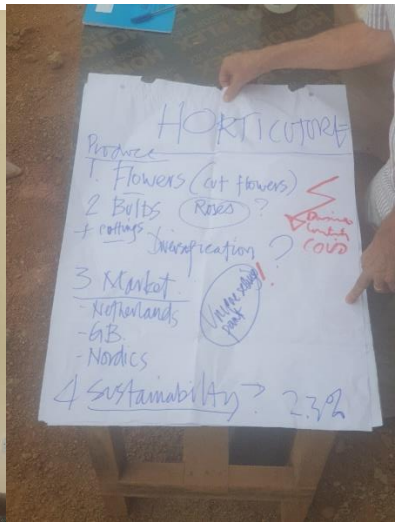
KILEMBE INVESTMENTS MEETING SUMMARY

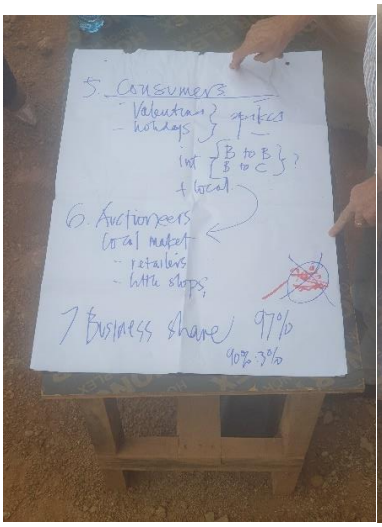
1. Company distributes power to western Uganda covering 6 districts of Kasese, Rubirizi, Sheema, Mitooma, Bushenyi and Buhweju. They are also the suppliers of power at Kasese Industrial Park.
2. They manage a prepaid billing platform with 10 feeders, 566 km of low voltage lines and 260 km of medium voltage. They have 20, 024 subscribers with a potential of serving 50,000. These connections have had impact on over 1.5M people. The shareholders of the company are the subscribers. There are 3900 communal shareholders.
3. The Electricity Connection Policy (ECP) program enables more connections by making power affordable for customers which would otherwise cost 750,000 Ugx without the pole service and 2.4M Ugx with the pole service. With the EPC program, customers only pay 23,000 Ugx for inspection. ECP will run until 2027 depending on donor availability.
4. Currently, they do not have an evacuation line from the power station. They use a distribution line with lower loads. They have a need for a separate line to have a fully operational evacuation and distribution line. They also need conductor size changes to enable them to serve more customers. All this has been communicated to the Ministry to Energy. The problem of evacuation line has been identified as a national one. NDP II concentrated on building dams but there are hopes that NDP III will improve and deliver on the need for evacuation lines.
5. A new project, run by KFW to improve the situation started in 2018. However, scarcity of materials has slowed it down. There is a backlog of almost 700K connections because of lack of connection materials.
6. When it comes to Kasese Industrial Park, the Kilembe feeder is used. However, it lacks adequate protection to stabilize the line. When power outages happen at night, operators are afraid to resolve the problem. This is because they must go into Queen Elizabeth National Park, where the equipment is located, to manually handle the fault. This area has wild animals and safety is a concern. The solution would be to automate the metering unit which is found in the game park. Kilembe Investment also wishes to get protection equipment outside the national park as the solution. Automation of the fault recovery procedures with better equipment would be the ideal solution especially for power supply at Kasese Industrial Park. The cost of this equipment would be incorporated in the tariff to recover the money.
7. Currently, Kilembe Investments has never been given an estimation of the power needs for the industrial park. Park tenants have communicated that UIA promised them free power and expect a transformer to be delivered free of charge. Once the power supplier quotes the power cost, the tenants have run away. This is a position UIA has to come out and clarify on. Who pays for what?

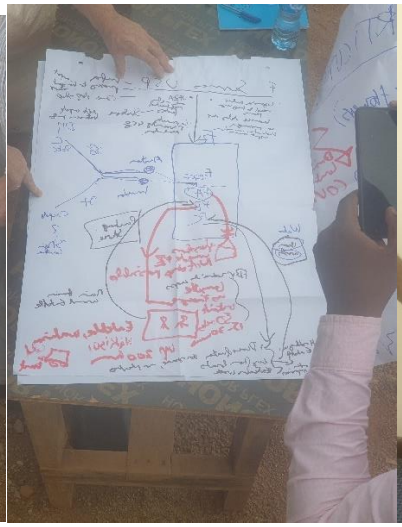
F. **Snapshots from the working groups**

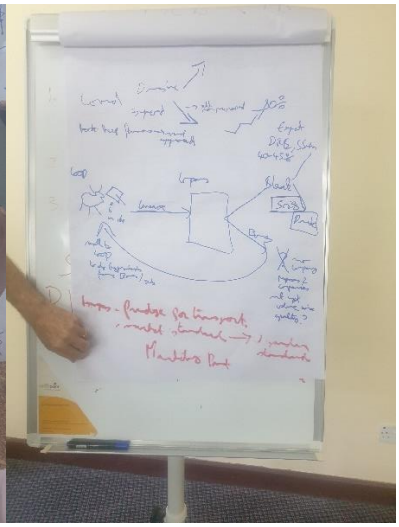
Entebbe

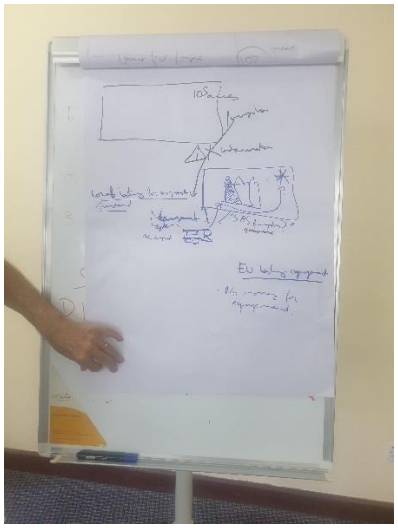






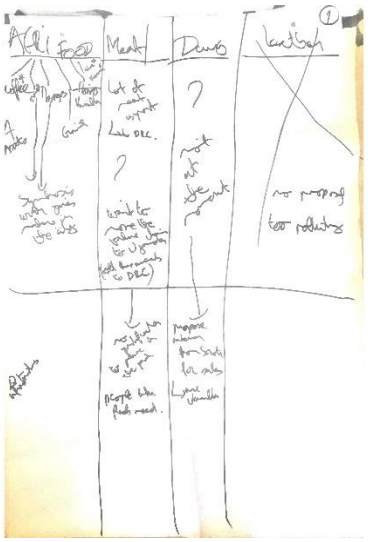


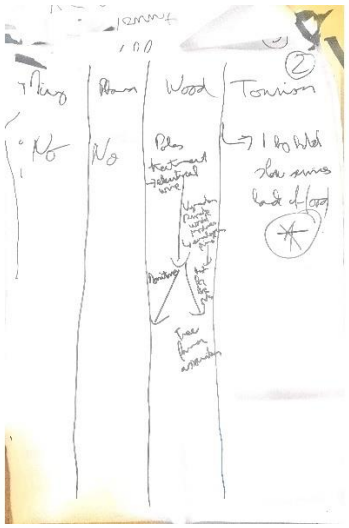


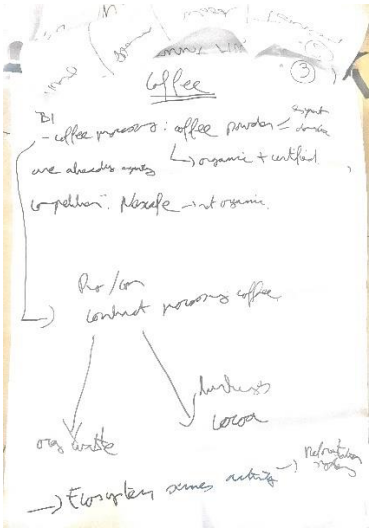


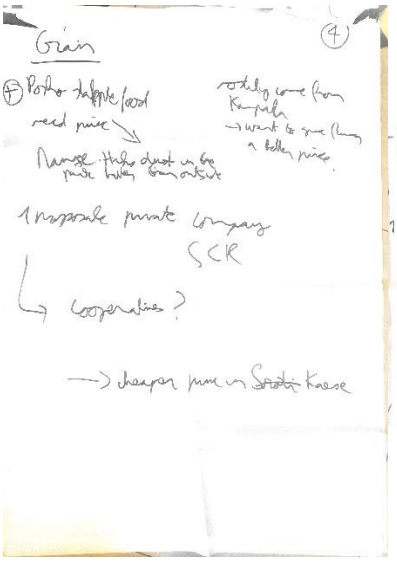
Soroti

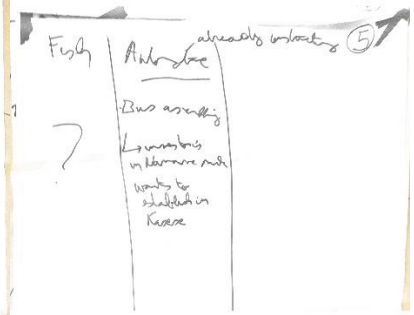
Kasese

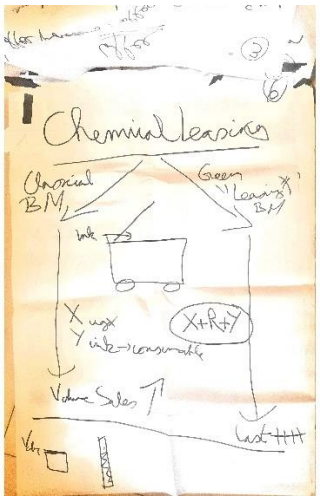






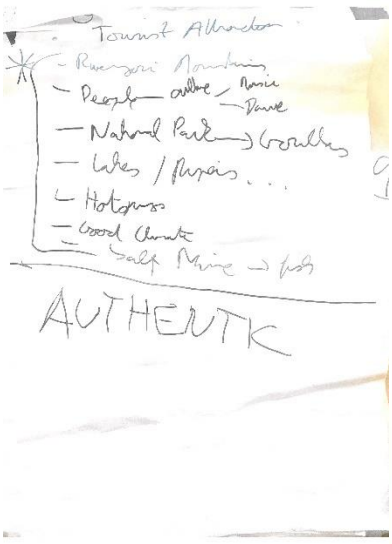


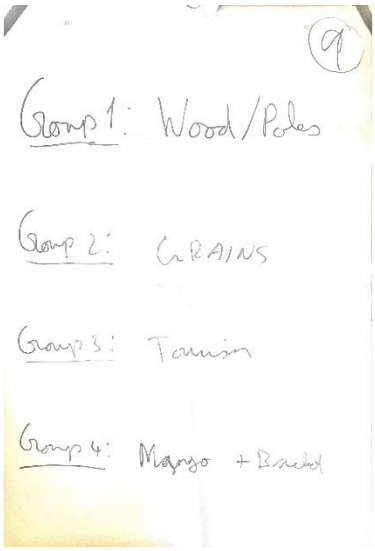





COFFEE
Coffee
POWDER
Trade off
Value is Lost


Packaging
B2B
B2C
Consumer
? Plastic Bags
No value add bags.
→ White Plastic bags
? Hotels in Kampala have coffee made
/ Tourism
Niche
Origin
→ jute bags
Vacuum Bags.
Peace to Piece
Knowledge
Transfer
→ Partnership
Universities


Tourist Attraction
Rwenzori Mountains
People
culture
Music
Dance
Natural Park
Wildlife
Lakes / Rivers
Hotsprings
Good Climate
Salt Mine → fish
AUTHENTIK


9
Group 1: Wood/Poles
Group 2: GRAINS
Group 3: Tourism
Group 4: Mango + Bracket