

SUMMARY REPORT

GREENING UGANDA'S URBANIZATION AN INDUSTRIALIZATION REPORT ENTEBBE INTERNATIONAL AIRPORT FREEZONE, SOROTI AND PAKWACH INDUSTRIAL AND BUSINESS PARKS



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Acknowledgements

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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		

Executive summary

➤ 1. Introduction



Based in Seoul, the Global Green Growth Institute (GGGI) is an intergovernmental organization founded to support and promote green growth. It targets key aspects of economic performance such as poverty reduction, job creation, social inclusion, and environmental sustainability. GGGI works with countries around the world, building their capacity and working collaboratively on green growth policies that can impact the lives of millions. The organization partners with countries, multilateral institutions, government bodies and the private sector. This is to help build economies that grow more economically and efficiently. Ultimately, they become more effective and sustainable in the use of natural resources, less carbon intensive, and more resilient to climate change.

GGGI has partnered with the European Union (EU) as part of the EU inclusive green economy uptake program (Green UP). At present, it delivers a project entitled “greening Uganda’s urbanization and industrialization” (2020-2023). The program is aligned with the government of Uganda’s vision 2040, the third National Development Plan (NDP III), and the Uganda green growth development strategy (UGGDS). The project promotes sustainable development and inclusive green growth in Uganda. It focuses on green city development, green industrialization, efficient waste management and green growth integration into planning and budgeting.

▶ 2 .Mission Objectives



To support Uganda in becoming mid-income status via industrialization, the project aimed to facilitate the development of 3 industrial locations at Entebbe, Soroti and Pakwach.

The overall goal of the mission was to design selected future infrastructures to serve both the industrial park and the wider city in a green way allowing both to thrive, as an economic system. The main objective was thus to develop green masterplans including symbiotic infrastructure plans and infrastructure project concept notes for the 3 locations. This mission also 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 free zones with field analysis and follow-up of GGGI 2022 June-July field mission that provided recommendations for the preparation of upcoming project proposals in Entebbe and Soroti.

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, of 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 Pakwach Industrial and Business Park. The Terms of Reference for the mission (Team Leader) are provided in Annex A.

The specific objectives were:

- To support UFZA and UIA in refining the value proposition for the 3 Industrial Parks/Freezones.
- To initiate the implementation of green (industrial ecology) principles, in particular circular economy and symbiotic infrastructures. That implied initiating (Pakwach) or further developing (Entebbe and Soroti) a material and energy flow analysis projection on various sector scenarios based on information provided by the participants and from previous missions. The symbiotic infrastructures explored also harnessed the potential for Public-Private Partnership (PPP) in urban integration.
- To perform a sectoral prioritization considering economic, environmental, and social impacts and whenever feasible, to narrow down to specific value chains for Pakwach and refine value chain selection and partner identification for Entebbe and Soroti.
- To identify and further specify opportunities for innovation for a greener impact.
- Based on the above, to design green masterplans for the 3 sites specifying companies' clustering and location of symbiotic infrastructures.
- Based on the above, design bankable concept notes for symbiotic infrastructures, innovation, and green transformations.

GGGI Entebbe Soroti Kasese Assessment Report_v3 by Nadia Zuodar June-July 2022 2022 and GGGI Soroti Internal watsan visit brief by M Ali Shaikh (2/16/2023)

▶ 3. Mission Organization

3.1. Mission Itinerary

The sites visited were:

- Entebbe International Airport Freezone (EIAFZ) under UFZA;
- Soroti Industrial and Business Park (SIBP) under UIA.
- Pakwach Eco-Industrial Zone (DPEIZ) under Private Sector.

The team members performed initial joint visits to the site followed by individual visits when required. The visits took place over the months of July to November with details available under each sectoral report. All visits included group sessions with government officials, private sector and civil society representatives. 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.

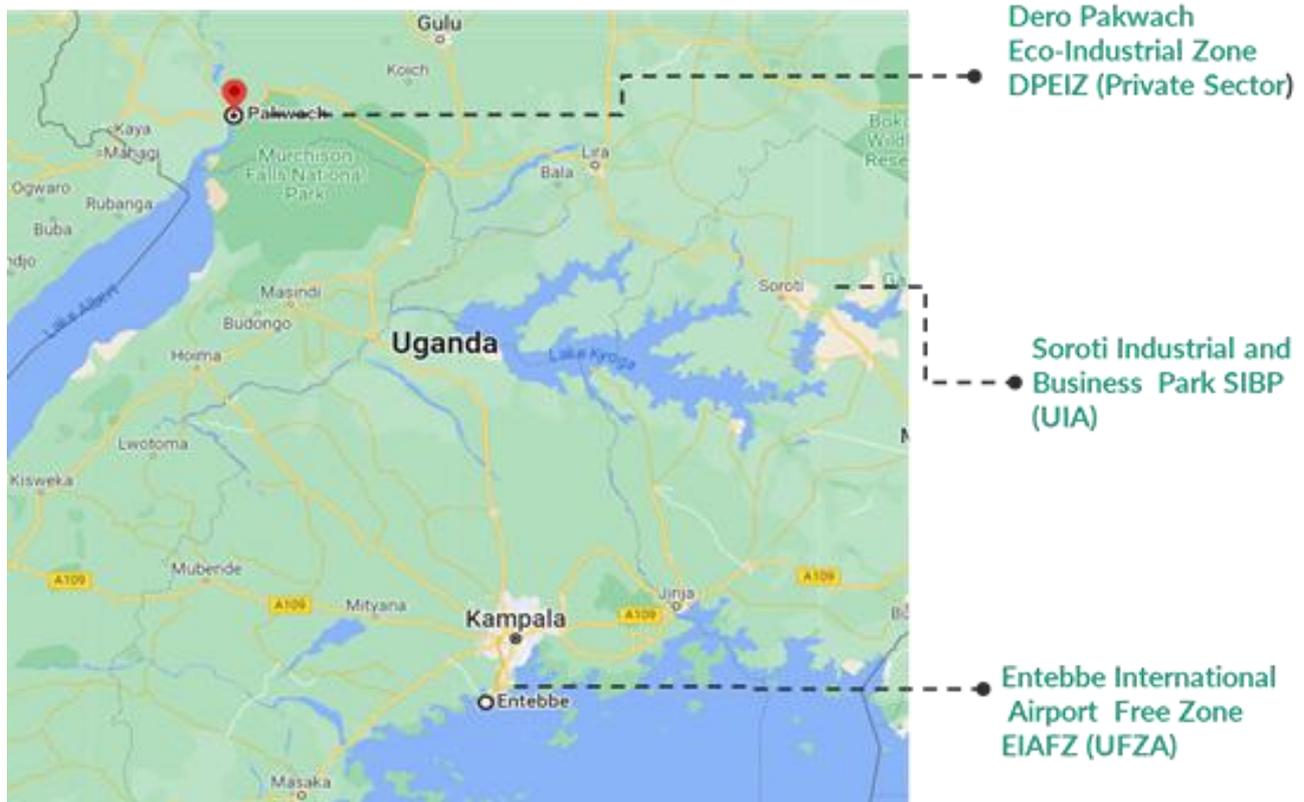


Figure 1: Mission Itinerary

To simplify the writing, Pakwach Eco-Industrial Zone is also referred as Industrial Park

2. Mission Objectives



To support Uganda in becoming mid-income status via industrialization, the project aimed to facilitate the development of 3 industrial locations at Entebbe, Soroti and Pakwach.

The overall goal of the mission was to design selected future infrastructures to serve both the industrial park and the wider city in a green way allowing both to thrive, as an economic system. The main objective was thus to develop green masterplans including symbiotic infrastructure plans and infrastructure project concept notes for the 3 locations. This mission also 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 follow-up of GGGI 2022 June-July field mission that provided recommendations for the preparation of upcoming project proposals in Entebbe and Soroti.

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- To perform a sectoral prioritization taking into account economic, environmental and social impacts and whenever feasible, to narrow down to specific value chains for Pakwach and refine value chain selection and partner identification for Entebbe and Soroti.
- To identify and further specify opportunities for innovation for a greener impact.
- Based on the above, to design green masterplans for the 3 sites specifying companies clustering and location of symbiotic infrastructures.
- Based on the above to design bankable concept notes for symbiotic infrastructures, innovation and green transformations.

GGGI Entebbe Soroti Kasese Assessment Report_v3 by Nadia Zuodar June-July 2022 2022 and GGGI Soroti Internal watsan visit brief by M Ali Shaikh (2/16/2023)

3.2. Assessment team composition

The team was composed of the following experts:

Table 1: Team Composition

Name	Role	Organization	Contact	Entebbe	Soroti	Pakwach
Nadia Zuodar	Team Leader	GGGI	Nadia_zuodar@yahoo.com	Remotely	Remotely	Remotely
Regina Mwenyango	Industrial Development Officer	GGGI	regina.mwenyango@gggi.org	Yes	Yes	Yes
Philip Muwanika	Financial/Urbanist Expert	GGGI	philip.muwanika@gggi.org	Remotely	Remotely	Remotely
Seith Mugume and team	Water and Sanitation Expert	MEIR	smugume@meir.co.ug	Yes	Yes	Yes
Edson Twinomujuni	RECP expert	UCPC	etwinomujuni@ucpc.co.ug	Yes	Yes	Yes
Norman Kwikiriza	Value Chains Expert		anthony.kwehangana@gmail.com	Yes	Yes	Yes
Silas Bahizi	Financial Expert		silas@phialliance.com, silasbahizi@gmail.com	Yes	Yes	Yes
Allan Kajjoba	GGGI Intern	GGGI	allan.kajjoba@gggi.org	backstopping	backstopping	backstopping
Abbey Ssekalema	Masterplan Graphics	3rdStreak	abbey700@gmail.com	Remotely	Remotely	Remotely

Table 1: Team Composition

3.3. Report format

The present report describes the general approach for the mission, the overall strategy that guided the process and coordinated the sectoral research and provides a summary of the findings. It is complemented by the following sectoral reports:

- Water and Sanitation
- Resources Efficiency and
- Cleaner Production Value Chains
- Tourism sector analysis (for Pakwach)

It was decided to present the summary of 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. To facilitate reading and argumentation and due to the number of technical recommendations, they have been highlighted in yellow in the report and numbered. A number of power points presentations have also been issued that can serve as summaries of this report:

“GGGI preliminary findings Entebbe FZ Soroti & Pakwach IPs oct 23 NZ rev”
“Green industrial masterplans investors presentation_regina edited”
“Uganda_Investment_select investment projects NZ Philip”

3.4. Stakeholders

on 20th of November 2023 to mobilize early interest in the preliminary concept notes (see Annex B) The list of working groups participants and other stakeholders visited is included in each sectoral report. Ownership was ensured by the participation of representatives from UIA, UFZA and Dero which support mobilizing the stakeholders and providing information was key in the initial team joint field visits. The participation and representativity were on average good, however the team had to mobilize a large part by itself, particularly with business associations, companies operating in the vicinity of the parks or in similar business lines, that may have benefited from direct mobilization/marketing by UIA/UFZA. That showed that previous mission report recommendation to expand stakeholders' participation in order to complete the stakeholders mapping and understand their interdependence in the value chain had not been sufficiently followed through, including when looking at possible government programs



Figure 2: Industrial Parks and Freezones policy elements

linkages. As an example, though the team identified potential expansion opportunities for NARO PAH safe fish smoking Kiln in Soroti and Pakwach) and DDA (dairy production in Soroti) projects with the parks, access to project data was not fully granted, thus (R1) it is recommended for UIA/UFZA to engage dialogue and possible collaborations with DDA and NARO.

The team performed a debriefing with each client in November 2023 to validate the sectors prioritization and recommendations. An investor event was also organized.

4. Methodology, Strategic Approach and Management Considerations

The mission methodology is guided by GGGI Industrial Parks and Freezone Policy Guidelines edited in 2022 by the team leader. It was completed by more targeted sectoral tools as well as by more recent strategic UNIDO strategic and planning tools downloadable online on the UNIDO Eco-Industrial Parks Knowledge Hub . While the UNIDO tools were practical to make a status of the last year mission recommendations and implementation plan, it became quickly clear that none had been followed through, which resulted in the team reintegrating, deepening or modifying those in the present mission based on the parks and freezone most recent developments. (R2) It is nevertheless recommended for UIA/UFZA to reuse the tools provided in order to list and perform the monitoring of this present report recommendations.

and DDA (dairy production in Soroti) projects with the parks, access to project data was not fully granted, thus (R1) it is recommended for UIA/UFZA to engage dialogue and possible collaborations with DDA and NARO.

The team performed a debriefing with each client in November 2023 to validate the sectors prioritization and recommendations. An investor event was also organized on 20th of November 2023 to mobilize early interest in the preliminary concept notes (see Annex B).

4. Methodology, Strategic Approach and Management Considerations

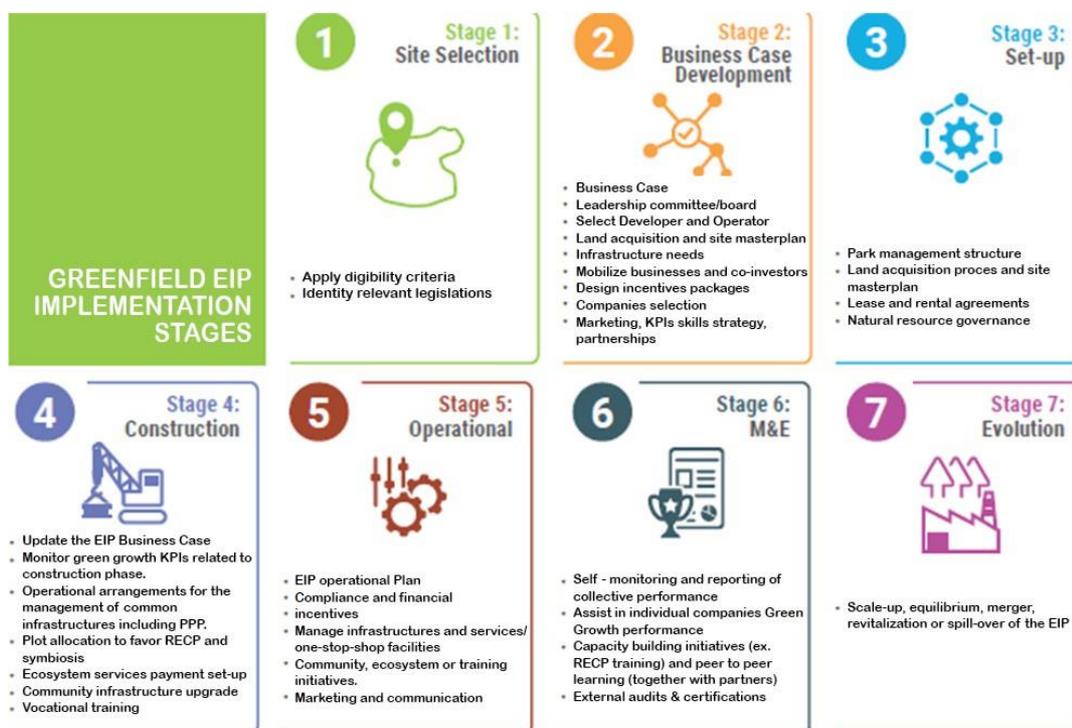


Figure 3: Greenfield Industrial parks and Freezones implementation stages

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Figure 4: UNIDO Eco-Industrial Parks definition

Figure 4: UNIDO Eco-Industrial Parks definition

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

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

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 (see Fig. 6) as well as enhance Business Continuity/Resilience (see Table 2). This can lead to a productive sectors prioritization and common infrastructure identification that can harness the best of the IP/FZ potential



Figure 5: IP Green Growth Scenarios

Figure 5: IP Green Growth Scenarios

To achieve this prioritization, a Material and Energy Flows Analysis and Symbiosis Analysis at IP/FZ level is necessary by compiling all the contributions from existing or planned companies. The RECP sectoral report describes the methodology and tools associated to this analysis. Particular attention was placed in identifying symbiosis. Such symbiosis have taken the form in all parks as addressing the key water & sanitation (watsan) aspects of a) water supply; b) waste water management; c) solid waste management; d) storm water management and energy needs. However, in all cases, the team considered that the watsan urban symbiosis solutions were primarily primary services that should have taken place at design stage independently of their green element or not. (R3) It is therefore strongly recommended for future parks/zones development to address the watsan sector as a precondition so that a greening initiative can take the form in an improvement from Business as Usual into

an improved solutions such as for example the team proposal for waste recovery.

The reasons why watsan and energy symbiosis are prominent compared to productive sector symbiosis in the form of sharing of equipment or infrastructures like storage is first because they correspond the most pressing needs benefiting to all and secondly because the latter has been found limited on all 3 sites due to the sectors/ companies practice, technical or volume specifications of the equipment, management capacity or sanitary measures. As an example, the team explored all options for common storage units before designing individual companies or associations (a form closer to symbiosis) units on the 3 sites, a PAH safe fish smoking Kiln by company (hoven volume by specifications suitable for one SME at a time) or concept ideas on sweet potatoes puree or cassava flour transformation.

stage 2 (Business Case Development), while Soroti IP and Entebbe 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.

In practical terms, the eco-industrial approach aims to reach the highest level of performance by optimizing the 3 components of economic, social and environmental impact as per the diagram in Fig.6.

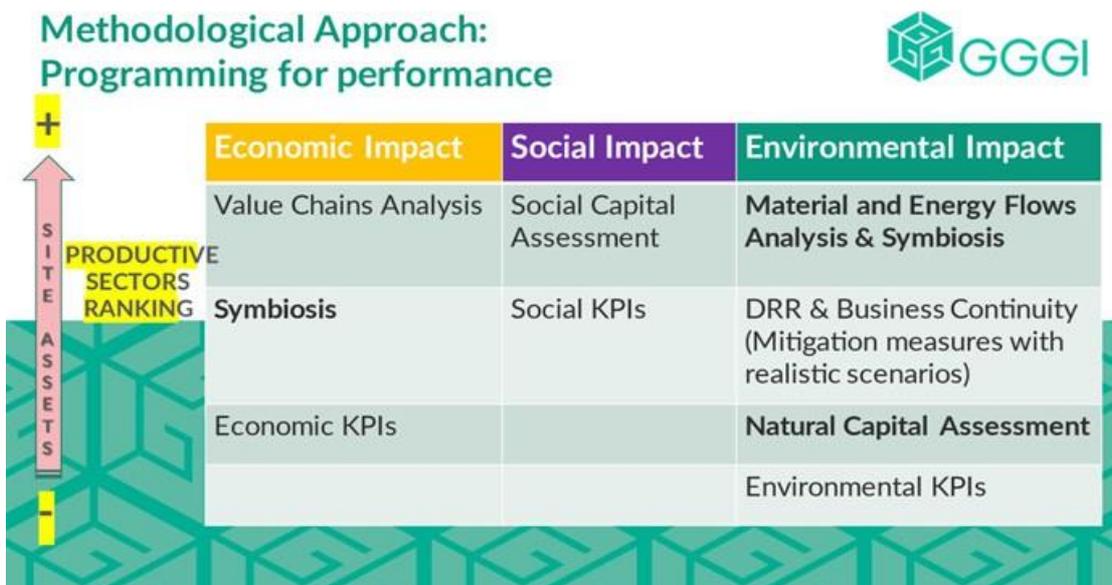


Figure 6: Programming for Performance

Figure 6: Programming for Performance

In this mission given the limited time and the most pressing needs, the emphasis was put in the Value Chains, RECP and Business Continuity/Resilience aspects. The social and environmental aspects were mainstreamed but it was not possible to perform targeted social or environmental particularly biodiversity assessments, nor was it the focus of the mission. The Business continuity/Resilience aspects looked into some of the categories of risks (Table 2) to address the most obvious but it was not possible to systematically review them.

Type of Risks		
1. PLANNING RISKS <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Construction risks • Supplier and partner non-performance risks • Policy instability • Promoter capacity • Operations • Governance • Technology • Regulatory framework 	3. FINANCIAL RISKS <ul style="list-style-type: none"> • Stock exchange /capital market fluctuations • Exchange and interest rate fluctuation • Liquidity / cash flow • Fraud • Financial viability
4. MARKET, COMMERCIAL & INTELLECTUAL PROPERTY RISKS <ul style="list-style-type: none"> • Competitors/ Market share/ • Reputational • Business interruption • Counterfeits • Copyright pirates • Trade secret thieves 	5. HUMAN RESOURCE, OCCUPATIONAL & SOCIAL RISKS <ul style="list-style-type: none"> • Accidents/health • Operational safety • Knowledge management • Emergency support • Management • Community conflicts • Discrimination, Gender, asn 	6. ENVIRONMENTAL & HAZARDS <ul style="list-style-type: none"> • Natural disasters (ex: storm, flood, fire...) • Industrial disasters (hazardous materials handling, waste and wastewater disposal, ...) • Climate Change • Interruption of ecosystems services or depletion of natural stocks. • Pests control • Genetic contamination

Table 2: Categories of business risks

Nevertheless, the parks/freezone locations and level of implementation implied that determining the environmental bearing capacity was often a precondition to prioritizing the productive sectors. Figure 7 shows a summarized logical/decision-making tree to determine potential sectors to prioritize. The initial broad sectors selection was obtained and validated as a result of 2022 mission. It took into account a range of criteria including government priorities, stakeholders' interest, rapid value chain analysis and unique selling points considerations. The 2023 mission aimed at confirming the feasibility of the preselected sectors and stakeholder interest and went down to specifying subsectors or even products that would best meet the performance criteria.

The logical tree is to be read as an iterative decision-making process, starting from the preidentified sectors, selecting one and processing the material flow analysis projections. Then addressing the waste water and solid waste problem, the most pressing environmental impacts to be expected that for the 3 parks was found to be water

pollution. The logical tree has to be adapted in context, for example for some industries and contexts, other most pressing impact could be rather taking the form of air pollution/rejects, biodiversity loss or soil degradation. In the context of the 3 parks/zones, the fact that water pollution was considered as most pressing does by no way imply that this would be the only potential negative impact on the environment. It only means that those additional impact may be addressed through mitigation measures and not through the current process of sector prioritization. It is also due because a preselection of those sectors has been made in 2022 mission resulting for example in the exclusion of some of them that may have led to another range of environmental impacts such as pharmaceuticals or gold transformation in Entebbe. In all cases the logical tree can be applied as well to address those additional environmental impacts.

As an illustration, in the example of Entebbe Airport Freezone, key constraints were the vicinity of Lake Victoria and the very small space which translated in

limited space for watsan infrastructures in the park, restrictions on processes as described in 2022 mission report, to which this mission brought the actual calculations to specify the maximum volumes per sector that could be handled.

Once the most pressing impacts are identified (ex: chemical toxicity or phosphates pollution leading to eutrophication), the logical tree looks at the maximum volume that can be handled in a sector that would lead to manageable levels of waste (both waste water and solid waste). To do so, it applies RECP principles, look potential variations by commodity or if organic production is favored, potentially financially viable waste valorization pathways (that implies both a max volume limit and a minimum volume for infrastructures functioning). Thought the solution to manage all waste at park level is favored, in some cases urban symbiosis with the municipality infrastructures is necessary for various reasons ranging from available space on site to build the infrastructures, minimum volumes requirements, efficiency opportunities to address both urban and industrial waste, costs, etc.

Once a sector is validated from the environmental bearability perspectives (with identification of the RECP, valorization and waste management measures with mitigation factors), the financial viability of the sector

at the specified volume of production needs to be confirmed. In some cases, the sector can't be validated, in others restrictions on processes or on products type can apply as for instance on the dairy sector, which wastewater is rich in nutrients such as nitrogen and phosphorus, that can contribute to the eutrophication of lakes and rivers. This is why for example the selection of potential cheese making in Entebbe Airport Freezone and exclusion of milk and yogurt that would lead to unmanageable levels of nutrient load was favored as a result of the logical tree decision process.

The logical tree in Fig. 7 has been drafted to represent the decision-making processes on waste but the same applies on limited resources such as water and energy supplies. This has also been taken into consideration as part of the material and energy flow analysis and included both in the sectors selection/mitigation measures and in the water supply and energy production concepts notes designed.

(R4) It is recommended for UIA and UFZA to develop a partnership with UCPC to pre-screen all industrial parks project applying RECP tools (in particular the material and energy flow analysis) and this logical tree. This should be complemented by a program to train companies in RECP measures implementation and park management in monitoring those.



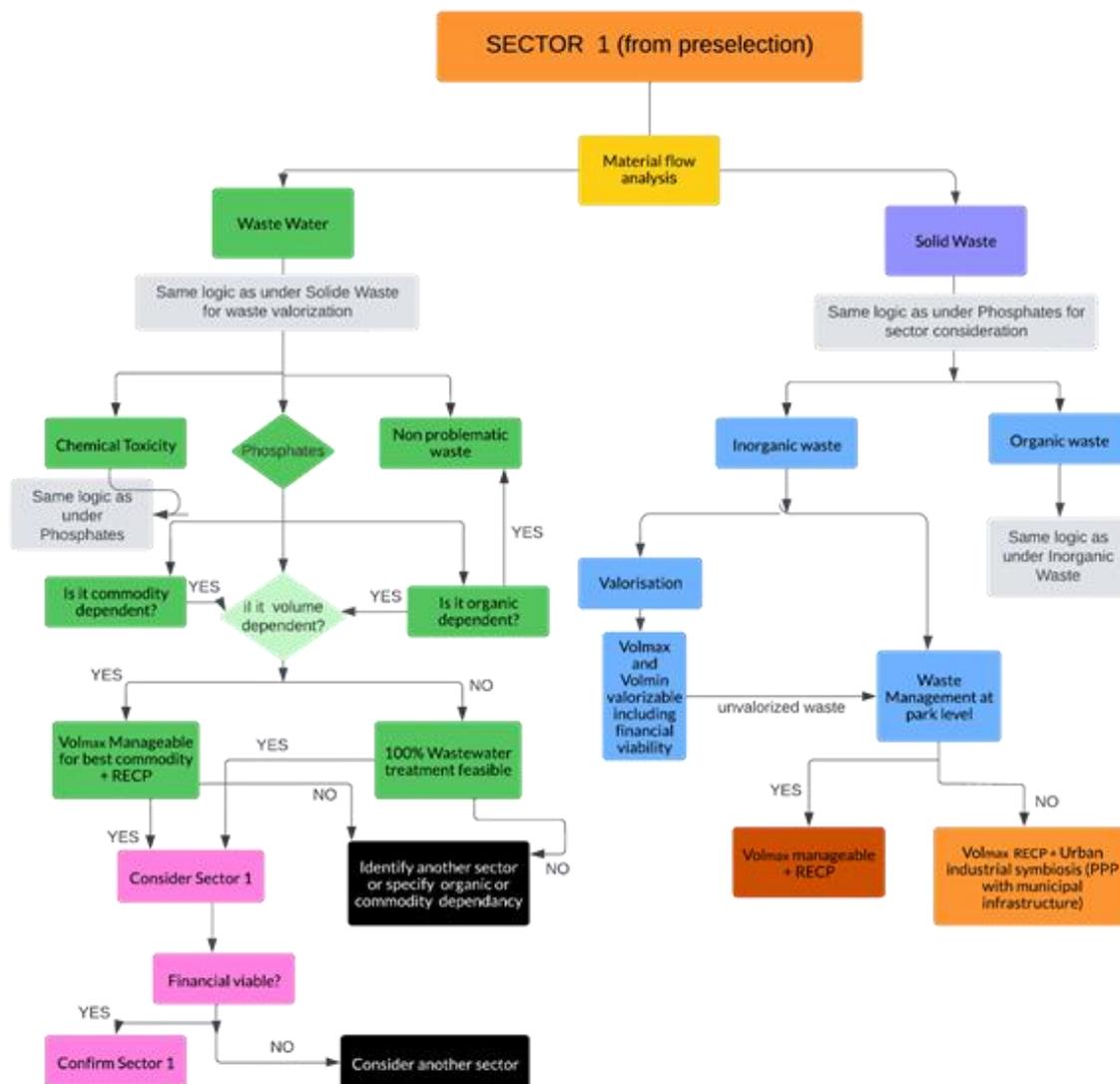


Figure 6: Logical/Decision Making Tree on sectoral prioritization and environmental bearability

In practical terms, the eco-industrial approach aims to reach the highest level of performance by optimizing the 3 components of economic, social and environmental impact as per the diagram in Fig.6.

Figure 6: Programming for Performance

In this mission given the limited time and the most pressing needs, the emphasis was put in the Value Chains, RECP and Business Continuity/Resilience aspects. The social and environmental aspects were mainstreamed but it was not possible to perform targeted social or environmental particularly biodiversity assessments, nor was it the focus of the mission. The Business continuity/Resilience aspects looked into some of the categories of risks (Table 2) to address the most obvious but it was not possible to systematically review them.

Nevertheless, the parks/freezone locations and level of implementation implied that determining the environmental bearing capacity was often a precondition to prioritizing the productive sectors. Figure 7 shows a summarized logical/decision-making tree to determine potential sectors to prioritize. The initial broad sectors selection was obtained and validated as a result of 2022 mission. It took into account a range of criteria including government priorities, stakeholders' interest, rapid value chain analysis and unique selling points considerations. The 2023 mission aimed at confirming the feasibility of the preselected sectors and stakeholder interest and went down to specifying subsectors or even products that would best meet the performance criteria.

The logical tree is to be read as an iterative decision-making process, starting from the preidentified sectors, selecting one and processing the material flow analysis projections. Then addressing the waste water and solid waste problem, the most pressing environmental impacts to be expected that for the 3 parks was found to be water pollution. The logical tree has to be adapted in context, for example for some industries and contexts, other most pressing impact could be rather taking the form of air pollution/rejects, biodiversity loss or soil degradation. In the context of the 3 parks/zones, the fact that water pollution was considered as most pressing does by no way imply that this would be the only potential negative impact on the environment. It only means that those additional impact may be addressed through mitigation measures and not through the current process of sector prioritization. It is also due because a preselection of those sectors has been made in 2022 mission resulting for example in the exclusion of some of them that may have led to another range of environmental impacts such as pharmaceuticals or gold transformation in Entebbe. In all cases the logical tree can be applied as well to address those additional environmental impacts.

As an illustration, in the example of Entebbe Airport Freezone, key constraints were the vicinity of Lake Victoria and the very small space which translated in limited space for watsan infrastructures in the park, restrictions on processes as described in 2022 mission report, to which this mission brought the actual calculations to specify the maximum volumes per sector that could be handled.

Once the most pressing impacts are identified (ex: chemical toxicity or phosphates pollution leading to eutrophication), the logical tree looks at the maximum volume that can be handled in a sector that would lead to manageable levels of waste (both waste water and solid waste). To do so, it applies RECP principles, look potential variations by commodity or if organic production is favored, potentially financially viable waste valorization pathways (that implies both a max volume limit and a minimum volume for infrastructures functioning). Though the solution to manage all waste at park level is favored, in some cases urban symbiosis with the municipality infrastructures is necessary for various reasons ranging from available space on site to build the infrastructures, minimum volumes requirements, efficiency opportunities to address both urban and industrial waste, costs, etc.

Once a sector is validated from the environmental bearability perspectives (with identification of the RECP,

4.3. Value Proposition and Management Considerations

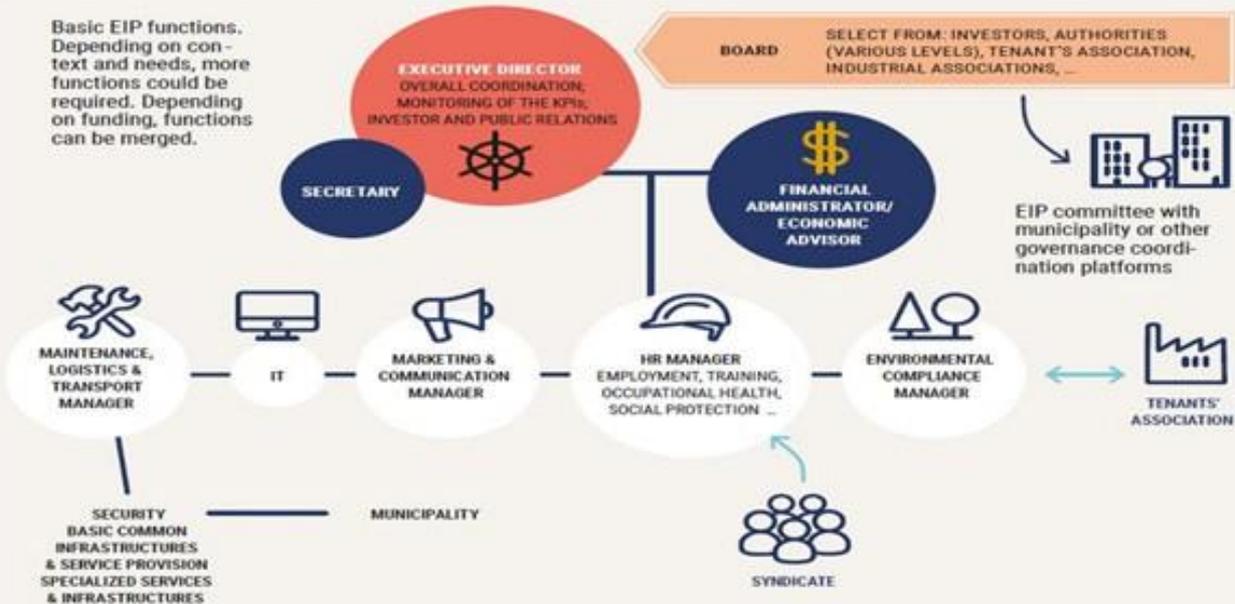
Both 2022 and 2023 missions enable UIA/UFZA and Doro to develop their Park/Freezone Value Propositions. The key elements to include in a Value Proposition and identification of Unique Selling Point has been fully described in the 2022 mission report, therefore it is not repeated here. The outcomes of this mission in terms of Value Propositions can be summarized as such:

- A conceptualization of the Unique Selling Point through a clarification on sectors/processes and sometimes even products. It is to note that for some companies, the specification on processes and risk mitigation may also lead to a loss of interest from realizing that some of their processes or volumes ambition may not be bearable in the location (ex: full processes in Entebbe, wet processes in Soroti). It is however still a positive outcome as it helps manage expectations on both sides before any investment is made.
- Watsan, Energy and RECP infrastructures that solve current pain points from both companies outside and currently operating in the IPs/FZ.
- Productive infrastructure concept notes that can play a seed role in developing the value chain, improving efficiency or bring innovation. As part of the criteria should be the contribution of the company to develop the value chain (backward 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. It is to note though that the IPs/FZ are not considered as a sole contributor of a value chain strengthening. Therefore, a business continuity analysis has been taken to encourage sectors at a level of development matching the current supply chain capacity and realistically integrating potential supply chain developments or inputs from other programs. This is a critical point to avoid potential tenants' early failure or symbiotic infrastructures insolvability due to mis dimensioned resource.

The reflection on the IP/FZ offer of services cannot take place without addressing management needs and financial sustainability. This has been described in 2022 mission report, in particular: " Typically, an IP/ FZ management structure would look like in Figure 8 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 9 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/concept notes proposed.

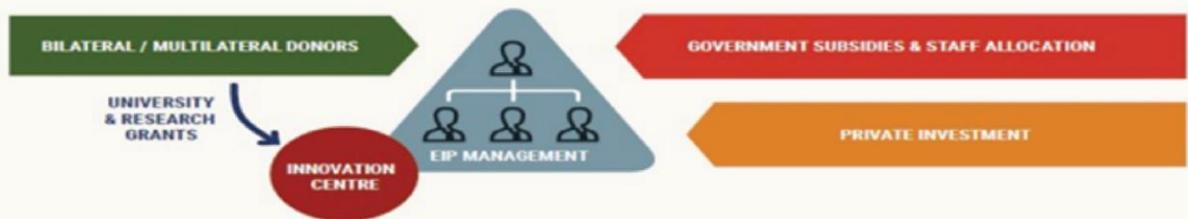
EIP MANAGEMENT ORGANIZATIONAL CHART EXAMPLE

Basic EIP functions. Depending on context and needs, more functions could be required. Depending on funding, functions can be merged.



EIP SOURCES OF REVENUE (NON-EXHAUSTIVE)

EIP operational management should aim for self-sustainability and value for money in service provision.



In regards to management, recommendations from the 2022 mission are still valid, the 2023 mission wasn't focused on management either. (R6) A dedicated follow-up management assessment mission would be needed to cover all the areas of management, its structure, define the responsibilities and come up with a management plan that prioritizes actions for each IP/FZ. It was particularly worrying to see that despite Soroti IP being partly operational and Entebbe FZ close to completion, insufficient attention has been placed in building the management structure and team, evident

in the difficulty to mobilize UIA/UFZA representatives passed the first field mission. Needless to say, that with the government ambition to build many more industrial parks, this problem has to be addressed as a priority. It is likely as well that some of the issues pinpoint by the team in particular on the watsan sector would have been highlighted earlier with the set-up of a management team including an environmental officer in each site. In the meantime, the following Table 3 from 2022 mission and showing some key management actions that would be has been updated to the latest status.

Table 3: Proposed Management Actions

Management Area	Proposed actions	Description
Governance	(R6) Establishment of IP/FZ boards and agreement on management structure (based on the guidelines).	This action is still valid and has seen no progress so far. "Stakeholders' mobilization proved to be problematic, partly due to the lack of an administrative framework that integrates all stakeholders, as well as the constitution of the IP/FZ board. This should be addressed in priority before engaging into any new infrastructures as negotiations need to follow a formal, recordable channel. That includes a coordination committee with the municipality, as well as outreach communication actions/committees on social and environmental aspects. The guidelines identify also a number of core management. A distinction between operation (can be contracted) and regulation needs to be drawn and in the transition before all the functions are covered, a clarification on the tasks to undertake in substitution by UFZA/ UIA staff. It is highly recommended to encourage the creation of a tenants' association
	(R7) Establish provisional IP/FZ KPIs at early stage based on the policy guidelines.	This action is still valid. "KPIs help to articulate the vision and identify each stakeholder and management staff contribution. It is necessary to engage this reflection early on, even if consolidated KPIs may take longer."

	(R8) Establish natural resource governance groups where needed (ex: Pakwach IP).	This action is still valid. “To address environmental impact, design prevention and mitigation plans that include the community and set up payments for ecosystem services schemes, a formal avenue is also needed. “
Capacity	(R9) Reduce Staff turnover	The 5 years local position filling as currently done by UIA is suitable to avoid loss of knowledge occurring with high staff turnover. UFZA would require to delocalize staff permanently unless early contract management is established
	(R10) Ensure Competences/ Availability	. Use consulting mandates and contract management arrangements wisely in order not to delegate tasks to staff that may not have been capacitated accordingly or do not have sufficient dedicated time to perform those. The reflection on the management model should highlight this. Clears TORs need to be designed for all management functions with their contributions to the IP/FZ KPIs.
Regulation	(R11) Provide training to UFZA/UIA staff on the policy guidelines and communication sessions with all stakeholders.	A good understanding of the policy guidelines is necessary for UIA/UFZA staff to assess potential tenants, regulatory authorities and the municipality to perform their monitoring role and for potential tenants to design bids that match the IP/FZ standards.
	(R12) Ensure that Environmental and Social Impact Study (ESIA) are undertaken but and EIA certificate obtained	Compliance to environmental regulations need to be enforced. In partially operating IPs like Soroti, it was evidenced that some companies' wastewater would not meet compliance targets.
Processes	. (R13) RECP assessments and trainings	This recommendation is still needed and should be particularly enforced in parks where the report has highlighted a need for water demand mitigation or other RECP requirements. “Involve UCPC in all phases of IP/FZ development.

		<p>Introduce the RECP program to companies allocated land in the IP, invite selected companies outside the IP, and conduct annual RECP trainings. UCPC needs support in order to make RECP a standard and self-sustaining service for all companies nationally, the FZ/IP acting as good practice demonstration.”</p>
	<p>(R14) Develop an engagement strategy for the identification of new tenants in the FZ/IP that can optimize symbiosis by characterizing waste and resource consumptions as well as adherence to green standards.</p>	<p>“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.</p> <p>Bids from interested companies should closely match the policy guidelines Business Case Development description for the IP/FZ. It is recommended to draw a check-list that would be available for both UIA/UFZA staff and potential tenants.”</p> <p>The 2023 mission confirmed the identification of potential opportunities particularly for SMEs which would directly fit into this recommendation.</p>
	<p>(R15) Develop a framework that integrates the industrial parks into the district/municipalities workplans. Integrate the infrastructures in the IP/FZ masterplan based on ongoing provisional material and energy flow analysis. Identify PPP actions.</p>	<p>“IP/FZ have a tremendous impact on multiple levels in the districts/ municipalities, creating additional burden to public services that often need upscaling. It is necessary to reflect on infrastructures before allocation in order not to have no space left for it or not to plan for public services upscale! This is why it should be already in the masterplan. Material and energy flow analysis need to be ongoing from the start and updated with each new sectoral choice or company inclusion.”</p> <p>As exemplified by this mission, due attention to watsan and energy infrastructures have been insufficient. The present report has provided concept notes that fit directly into this recommendation.</p>

	(R16) Address waste management symbiotically with IP/FZ and cities.	<p>“Waste management is a challenge in all locations visited both at FZ/IP level and municipality/district. No industrial activity can be undertaken without addressing this issue as a precondition. Given the need for space and resource and after waste characterization, solutions should be drawn between PPP arrangements, public infrastructures upscale, dedicated IP/FZ infrastructure and in the worst-case scenario, pretreatment units at companies’ level (not recommended due to compliance risks).“</p> <p>The 2023 mission directly fit into this recommendation as it provides the concept notes for watsan on the 4 levels of water supply, wastewater and solid waste management as well as storm management. PPP arrangements have been identified in all 3 sites. Pretreatment units could not be avoided though and a reflexion need to take place in collaboration with tenants to identify support/investment facilitation avenues for them to comply with this requirement.</p>
Finance	(R17) Refine financial sustainability models for IP/FZ considering the costs of additional infrastructures/ services	<p>The following recommendation is particularly accurate now that symbiotic infrastructures concept notes have been proposed. “An increase of the price of the levies charged to fund the provision of services may be needed despite earlier government promises to tenants: to respond to some companies’ unwillingness/ incapacity to pay, it is necessary to demonstrate the cost-benefit of some of the shared infrastructures and proposed RECP engagements. A complete economy analysis and willingness to pay is required</p>
	(R18) IP/FZ business case	<p>“To come up with a detailed implementation plan and budgeting so that to adjust current construction/operational activities and negotiate additional funding if needed. “ GGGI facilitated an investor event on 20th of</p>

		<p>November to mobilize early interest on the concept notes. Beyond leveraging for funds, the park management need to show their professionalism by addressing the mission recommendations and make good use of the management tools provided in particular the UNIDO toolbox for workplan development.</p>
Technology	(R19) Establish a national symbiosis platform	<p>“There is high potential to valorize industrial and agro value chains by products nationally. The IP/ FZ would be better performing if common infrastructures could offer services to companies/cooperatives and farmers outside. With the high investment on industrial parks development in Uganda, it would be a missed opportunity not to feature a symbiosis program...” To mention just one application, several concept notes are addressing waste valorization by sourcing agro-products in and outside the IPs/FZ. This is the case for example for the briquette production in Pakwach or the animal feed mill in Soroti. While sourcing distance plays an important role in the financial viability of some of those solutions, a symbiosis platform could go a long way supporting waste resource identification.</p>
Services	(R20) Provide value-chain greening support beyond the IP/SZ themselves.	<p>“Strategize for greening the value chains and integration into the masterplans. Identify potential complementary donors and link-up with existing national programs. The IP/FZ cannot lift up a value chain in isolation and the success/failure of its tenants may well depend on factors outside the scope of the IP/FZ.” For the large majority of the sectors analyzed, support was needed much beyond greening and rather already in mere logistics and capacity building. The mission contributed for example in the form of storage concept notes.</p>

		<p>However supply chain limitations as for example for the dairy sector in Soroti or the agro-food sector in Pakwach were taken into account resulting of smaller scale concept notes that can easily be replicated for expansion.</p>
	<p>(R21) Develop the One Stop Center services list/commitments to practical level.</p>	<p>The following recommendation remains valid, the 2023 mission was not aimed to deepen the questions. It is rather recommended to address it in a future support in conjunction with management capacity building. "Discussions with potential tenants should be pursued to address expectations and match with the service offer from the authorities in the One Stop Shop Center. A workplan with clear timing of commitments need to be draft as this service can't be postponed to after full IP/FZ land allocation....It is recommended that all FZ enclaves in an IP provide some of their services to IP tenants willing to move towards exports so that to facilitate their market diversification and possibly gazette them. UIA to facilitate information and access to exports markets together with IP /FZ marketing."</p>

4.4. Masterplans design

The masterplans were developed by using data from the survey report, construction drawings, planning information provided by UIA/UFZA and Dero and inputs from the team for the positioning of watsan and RECP infrastructures as well as sector zoning/companies allocations. The software used included Autodesk Autocad and Archicad for drafting. The artistic impressions were developed using Autodesk 3D Studio Max. If not specifically mentioned, all 3D figures have been developed by the team. The team didn't count with an

urbanist so the masterplans provide indicative locations on buffer, road infrastructures and building but further greening measures would be needed such as ensuring permeable pavement for parking, shadow, indigenous tree species to allow better biodiversity conservation and birds/insects niches, etc. Those features have been covered in the IPs policy guidelines and should be reviewed with the assistance of an environmental and urbanist experts.



5. Entebbe International Airport Freezone

5.1. General Situation and Current Status



Image 2: Entebbe International Airport Freezone Units Construction 2022 and 2023

Entebbe International Airport Freezone (Image 2) 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. 10. 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). During the last team visit it was close to completion (Image 2). UFZA 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 9: EIAFZ Site location
 EIAFZ has been structured in 2 main buildings each of them containing 3 units, one anchor building and a Trade House (Figure 11).



5.2. Sectors Prioritization and Units allocation

The result of 2022 mission assessment led to the preselection of the initial key sectors, the elimination of potential ones) and the identification of services and incentives that would translate in the FZ value proposition.

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

- Water supply is limited

Therefore, the companies potentially interested to settle in the FZ were presented with various options out of which the close to finish processing was retained.

5.2.1. Sectors Prioritization

As a result of the 2023 mission, the confirmed sectors are as shown in Figure 12.

Figure 11: Recommended sectors for EIAFZ (2023 mission)

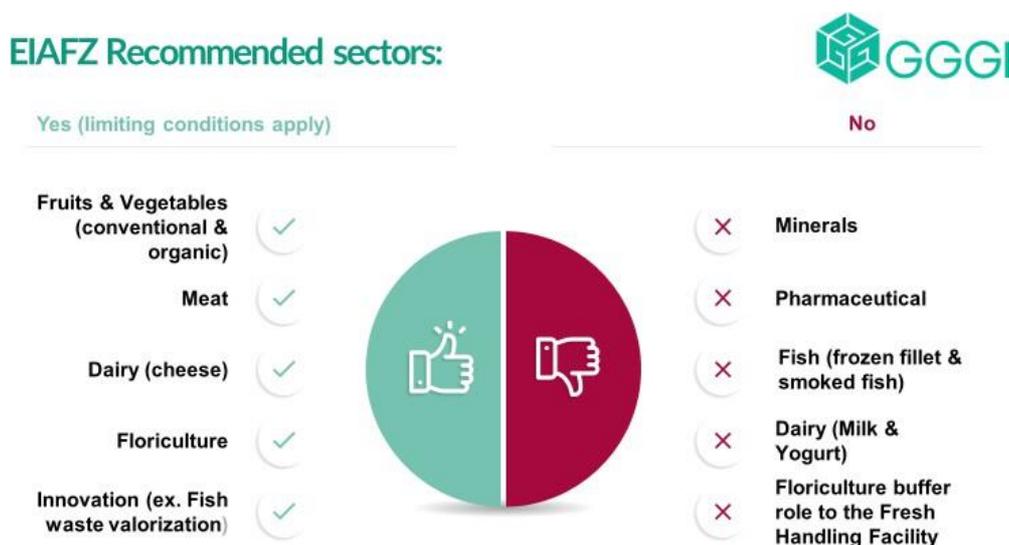


Table 4 and Table 5 provide a synthetic view on the recommended and discarded sectors specifications, reasons and unit allocation. For a detailed explanation on the sectors and volumes engaged, please refer to the Value Chain sectoral report

SELECTED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
DAIRY	Cheese both soft and hard	Yes	Processing, packaging	Less environmental impact, some companies close to export level. Potential from Uganda trade agreement with the Middle East & North Africa. Potential allocation: 1 unit
	Ice cream	Maybe	Processing, packaging	Potential linkages with Soroti pilot when/if they get to export standards.
	Ghee/Clarified Butter	Maybe	Semi-processing, packaging	No company identified yet
FRUITS & VEG.	Mango, Pineapple, Bananas, Peppers, Sweet Potatoes	Yes	Washing, packaging	1 Potential company (KK Food model): Potential allocation: 1 unit (conventional produce) 1 potential association (Horti- fresh model) provided they organize their management and packhouse: Potential allocation: 1 unit for conventional produce and 1 unit for organic produce
FLORICULTURE	Flowers	Maybe	Trimming, packaging	No duplication of the fresh handling facility. Potential offer for SMEs provided pre-identification. Unit design implication. Potential allocation: 1 unit

FISH	Fish waste innovation Ex: Omega 3 oil (bottle and/or capsules)	Maybe	Fish waste recovery	No company identified though large companies; product has not yet fully penetrated the Ugandan market but represent an innovative opportunity to valorize local fish waste Potential allocation: 1 unit for innovative projects.
MEAT	Specialty Meat	Yes	Individual pieces packaging Bulk export packaging	1 potential company (Pear Meat) identified ready for export by airfreight provided packaging meets standards. Potential allocation: 1 un
	Specialty Meat	Yes	Bulk export packaging	Some companies to be identified ready for export by airfreight only necessitating bulk packaging as per UGANDA MEAT PRODUCERS' COOPERATIVE UNION (UMPCU) recommendation . However regional exports are more likely to be transported by road with no need for the FZ. Potential allocation: 1 unit

DISCARDED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
MINERALS	Gold	No	Refining	High security risk business not suitable to meet with other businesses. Highly toxic and hazardous waste.
FISH	Fresh/Frozen fish fillets	No	Fish filleting and packaging	Frozen fish discarded due to wastewater generation and concerns on lagoons illegal dumping. Large companies have their own facilities for processing and export and do not need the FZ. Smaller companies were not identified in addition to the environmental concern.
	Smoked fish	No but possible	Smoking and packaging	So far, the smoked fish have been proposed for Soroti and Entebbe given the preferential market
PHARMACEUTICALS	Drugs	No	Drug packaging	No tactical advantage to bring such companies unless they 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 better positioning of Soroti IP, there is no argument to promote such sector in Entebbe FZ.

DAIRY	Milk & Yogurt	No		Formation of long- chain fatty acids reduce efficacy of wastewater treatment. Cheese mitigates dairy waste compared to milk and yogurt. Powdered milk poses security risks due to the boiler and prohibited by the Aviation Authority.
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The Fruits and Vegetables (Horticulture) sector has been found as an anchor sector. Its suitability for the site is determined by the fact that only washing and packaging is advised to limit the wastewater contaminants load. The sector benefits from companies at mature level for export and responds to a critical need in the value chain. Given the fact that mainly unprocessed fresh fruits and vegetables are aimed to be exported, the freezone offers meets a large part of the expectations provided it features the recommended cold and temperate storage facilities. The development of a fresh handling facility by Jambo Roses Limited does not compete with the freezone first because it is not confirmed if the facility would cater for diversified sectors beyond Floriculture, would be open to non-members and because the planned capacity is anyway not big enough to accommodate all flower farmers especially small-scale flower companies, even less additional sectors.

Floriculture remains an option in the event interested small-scale flower companies not accessing to the Fresh Handling Facility would express interest. The team could not identify any so far. However, the option to act as a back stopper to the Fresh Handling Facility in peak times has been discarded as it would imply too much financial viability risks for the freezone. On an environmental ground, the floriculture has been kept despite the potential contaminants (pesticides, fungicide, etc) only because those would have already been removed in ulterior processes, the only activity envisioned on site would be trimming and packaging.

The Meat sector was an initial anchor sector based on 2022 mission expressed interest and remains a key sector. The waste characterization on this sector implied that only final processing could be considered on site. However, the team found that the requirements expressed changed, shifting from a request to perform

final processing (pieces cutting, individual pieces packaging with improvement such as vacuum sealing) into rather bulk packaging for export. The UGANDA MEAT PRODUCERS' COOPERATIVE UNION (UMPCU) was mobilized on several occasions to try to identify potential interested companies. Only Fresh Meat maintained its expressed interest and could be a potential tenant (though its request is on packaging machines). The reasons are manifold:

- Larger companies already have their export capacity
- Most companies rather export by road to neighboring countries such as Sudan and DRC with a very limited portion that may require airfreight.
- Some companies would have been interested to do full processing (for example egg transformation, chicken hatching) and the park constraints do not meet their needs.
- Some companies may benefit from the free zone services but are not up to international standards export requirements yet

Despite those limitations, the units' size and allocation are perfectly consistent with an opportunity offered to a couple of companies and the international market prospects good enough to maintain the sector priority.

Concerning the Dairy sector, its wastewater characterization is of particular concern for the aquatic environment. The RECP analysis demonstrate that this issue can be mitigated product base by focusing on cheese, ghee or possibly ice-cream for products processing. Yogurt would be excluded due to the high volume of waste including at packaging process step. Milk

and milk powder were discarded out of safety concerns imposed by the Civil Aviation Authority. The dairy sector international demand is on the growth including in the Middle East and North Africa. A full analysis on the proportion of products demand between yogurt, cheese (and types), milk, etc. was out of the scope of this mission. For the time being it is likely that cheese demand from Uganda on international markets may be limited due to quality and recognition issues, however there are large Ugandan companies exporting cheese along with other dairy products, which at this stage do not require the facilitation from the Free zone. Because UIA ambition for EIAFZ to perform a degree of processing, the cheese option was maintained despite the lack of identification of candidate company. However, if only bulk packaging is considered, then no product type limitation applies. Linkages with Soroti IP were also considered including the possibility to channel dairy export from the start-up companies hosted there in the long term.

The Fish sector has been from the start particularly complex to investigate due to the lack of stakeholders' participation/interest. On one side the full processing of fish was discarded based on wastewater specifications. Besides Entebbe are dotted of many large-scale frozen fish fillet exporters that do not need any services from the

FZ as they have developed their own cold chain logistics. The identification of small-scale fishing company lacking such capacity was a theoretical option but none could be identified. Given the team work on smoked fish sub-sector in Soroti and Pakwach IP, the possibility to do smoke fish in Entebbe was also explored as it would minimize wastewater issue. However, at this stage it seems like the international export market is still limited to niche shops and contingent to high competition from Africa (Nigeria) and Asia, while most of the exports are anyway done by road to neighboring countries such as Sudan and DRC.

The Pharmaceuticals and Minerals sectors were discarded in 2022 Mission and the same conclusions remain.

In terms of Innovation, the availability of fish waste resource prompted the idea to investigate the possibility to produce Omega3 Oil in bottle or capsules. No company interested in such was identified though large companies may express interest provided a demonstration is made of the profitability. Omega3 products have not yet fully penetrated the Ugandan market and is slowly picking up in Africa making its export potential an opportunity to monitor in the future.

5.2.2. Units' allocation



The proposed unit allocation is presented in Figure 12

The first building featuring production units 1 to 3 is dedicated to Fruits and Vegetables including, one unit for conventional produce and one unit for organic produce both based on Horti-fresh Model and one unit on conventional produce based on KK Food Model. Though no company has been confirmed as Tenants so far, for simplification we are using both companies (who have deposited an EOI) to easily identify two models based on their organizational structure:

- a) **KK Food Model:** KK Fresh Produce Exporters Limited (KK Food) is a company performing export promotion through value chain development to export fresh fruits and vegetables to Europe and the rest of the world. It has a solid business practice and export experience as shown by its obtention of the certification to export to the US (Image 3) with a potential export volume matching the capacity for a unit. The model represents the allocation to one company able to do limited processing in the zone as per the recommendations.
- b) **Horti-fresh Model:** Horti-fresh is an all-inclusive business membership organization for the fresh fruits and vegetables sector. As an Umbrella Association, 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. This model represents an option to multiply export access enabling smaller farmers to export. It is however dependent on the quality of the association management to play the collector and exporter role and faces some logistical constraints.

outside Entebbe to gather the produce from its large members base to later forward it to EIAFZ for bulk packaging and exporting. This has been addressed in more details in the value chain report, the main reasons being that it would enhance cost efficiency and facilitate delivery for small farmers reducing movements to the freezone. (R22) It is recommended for Horti-fresh to develop its own concept note for the packhouse, and to take the opportunity of EIAFZ concept notes funding mobilization to present its request as well.



For example, Horti-fresh highlighted their needs for a packhouse.

Would Horti-fresh fail to upgrade its capacity, the two units can be allocated following KK Food model to companies operating either in the conventional, organic or both markets. The organic market requires separate unit due to the difference in requirements and/or possible certification alignment.

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Entebbe	Logistics space optimizer	Logistics Efficiency	TBD	Conceptual Phase

The second building features in Production Units 4 and 5 two models for the meat sector consisting in

- Individual pieces packaging and bulk export packaging model with possible interested company such as Pear Meat.
- Mere bulk export packaging

While Production Unit 6 would be allocated for the dairy sector either for cheese processing or general dairy bulk export packaging (without processing). This allocation is flexible based on companies EOI. Given the growing export prospects for the dairy sector notably in North Africa and the Middle East, the allocation would provide an entry point to boost the sector. However, would no partner materialize by the completion of the freezone works, the allocation could be shifted to another meat company.

Anchor Unit 7 is a separate building thus enabling constructions upgrade to meet specific sectors requirements. Its allocation is also flexible based on business opportunities. It could be allocated to floriculture if a true complementarity with the Fresh Handling Facility being developed by Jambo Roses

Limited is demonstrated, could host one more Fruits and Vegetables company given the high demand of this sector or be dedicated to Innovation. As Innovation, UFZA could favor companies aiming at valorizing waste in order to promote circular economy in the vicinity of the Freezone such as for example the production of Omega 3 oil out of fish waste.

The Trade House should feature a One Stop Center aiming 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 National Bureau of Standards (UNBS) and other Government MDAs who facilitate exports should be represented. Additional recommendations apply to the Trade House (Table 7):



<p>(R23) Developing and Implementing a Traffic and Logistics Optimization System at Entebbe Free Zone</p> <p>See Table 8 and Attached Concept Note</p>	<p>Given the IP small parking area, there is a risk of logistics jams occurring if the issue of truck deliveries and pick- up is not managed systematically. The occurrence of these jams would also increase environmental pollution due to release of GHG during truck idling, while also increasing drivers' fatigue.</p> <p>To manage these risks, we propose developing and adopting the use of a space calculator for logistics. Automated space optimization in trucks and containers can help to deliver more tonnage in fewer trucks and containers, reduce time on load planning, and minimize delivery delays, minimize the time spent in the parking lot and therefore allow more cars to move in.</p> <p>The logistics space optimizer needs to be centralized at EIAFZ management level to oversee all movements in the freezone. Therefore, it could be a service directly operated by the freezone management provided the required logistics manager is hired, or subcontracted to a service provider. It is recommended to place the</p>
<p>.</p>	<p>logistics manager on site, in the Trade House in order to be able to intervene rapidly as well as monitor the activities.</p>
<p>(R24) Testing lab and Sanitary certification</p>	<p>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 is being considered. Another MoU expected to be put in place with the Bureau of Standards. Collaboration with the Ministry of Agriculture for the issuance of sanitary certification</p>

(R25) Export facilitation services	<p>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 (MoU under discussion). This would enable companies to access support in accessing information on export markets by sectors, requirements and marketing facilitation besides obvious logistics. The 2022 mission recommendations remain valid concerning support encompassing</p> <ul style="list-style-type: none"> • 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.
	<p>In terms of export logistics, the Trade House could host clearing and forwarding agents able to perform operations such as the payment of the export duties, processing the necessary documentation e.g preparing the packing list, track inspection, preparation of the inspection report, Air Waybill (AWB), certificate of origin, export license, custom declaration/export entry, insurance certificate, exporters declaration etc</p>
(R26) Business Management	<p>Business Management trainings particularly for value proposition, branding, quality, environmental and social performance and domestic vs export positioning</p>
(R27) Smart offices	<p>The office unit could benefit from smart features concerning lightening, aeration and temperature management. Nature design such as the use of vegetation to improve isolation could be explored.</p>

Table 8: Extract from Investors Event Concept Notes list for Entebbe

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Entebbe	Power supply (Power stabilizer, change-over switch, and capacitor bank)	Energy Efficiency	TBD	Conceptual Phase
Entebbe	Cold Storage	Agro-food Logistics	0.178	Conceptual Phase



Figure 13: 3D visual of EIAFZ Trade House (UIA design)

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

The following (Table 9) are general Resource Efficient and Cleaner Production options EIAFZ should introduce. They are described in more details in the RECP sectoral report and in the relevant concept notes. They are in full alignment with the 2022 mission recommendations.

Recommended RECP infrastructures	Description and benefits
(R28) Voltage Stabilizer	Usually, the power transmission and distribution in Uganda is characterized by power surges and voltage drops. This would require a voltage stabilizer to safeguard the equipment against power surges.
(R29) Capacitor bank	The capacitor bank is required for power factor correction to compensate for the reactive power required especially by motors.
(R30) Centralized cooling with compressor racks system for the cold rooms	Share cooling system with the use of refrigerators with low Global warming potential and zero Ozone layer depletion.
(R31) Automatic change-over switch	Handling perishables products requires reliable power and an automatic change-over switch eliminates the time lag to switch to a power backup or stand-by system.
(R32) Power Back up (Solar-diesel generator hybrid system)	The power is required to provide reliable power in case of power interruptions or load-shedding.
(R33) Chemical leasing	To optimize the use of water and chemicals instead of buying chemicals the Freezone should work with chemical suppliers like Eco-lab to pay for the services chemicals do instead of buy quantities of chemicals. Promote responsible cleaning-in the place.
(R34) A centralized air compressor system	A centralized system has better energy productivity and will provide lower overall costs than a decentralized system.
(R35) Automated external solar lightning.	External lightning can be activated by movement detectors and powered by solar cells.
(R36) Fire security and disaster risk management	Fire detectors and fire rescue equipment need to be available in strategic locations, intervention modalities established with the Aviation Authority and contingency plans (multi-risk) need to be developed, including simulations and training.

The associated concept notes are summarized in Table 10.

Table 10: Extract from Investors Event Concept Notes list for Entebbe

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Entebbe	Improving Power Quality through the installation of a Power Stabilizer, Capacitor Bank, and Automatic Change Over Switch	Energy Efficiency	0.177	Conceptual Phase
Entebbe	Cold Storage	Agro-food Logistics	0.178	Conceptual Phase

Concerning the cold storage, the initial ambition was to develop a service open to both tenants and companies outside the park, dimensioned accordingly and working on a full cost-recovery base. It aimed to have 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.
- Support inter-industrial parks and FZ collaboration by offering a direct export route to other parks such as Soroti and Kasese.
- Take full advantage of the FZ assets and the vicinity to Entebbe airport.

However, upon further investigation, it became clear the preferred management choice for many companies would be to own their own storage on their premises and manage themselves so that to be able to self-ensure the proper sanitary conditions and stock management. This solution fitted also the architectural design and space allocation. Besides, the closest to a symbiotic multiplier effect the team could identify is the unit allocation to companies in the form of associations.



Figure 14: EIAFZ 3D visual of the units' entrances

5.4. Water & Sanitation Recommendations

This section is addressed in a dedicated sectoral report. As mentioned in the methodology, the Logical Tree approach built on specific limitations from a watsan and RECP point of view to determine the environmental bearing capacity for a specific sector contributing to the decision on its validation or discardment. For EIAFZ key constraints were the vicinity of Lake Victoria and the very small space which translated in limited space for watsan infrastructures in the park, restrictions on processes as described in 2022 mission report, to which this mission brought the actual calculations to specify the maximum volumes per sector that could be handled.

The recommendations for the watsan sector are the following:

- (R37) Water Supply: Construction of two water storage tanks of approximately 80 m3 capacity using pressed steel panels erected on steel towers to increase the residual head for the end-point users. The storage reservoir tanks will be supplied by the existing NWSC piped water system. In addition, a total of approximately 600m of distribution trunk mains are required to distribute the water from the reservoir to the different units at the freezone. Furthermore, approximately 8 No. 4"x4" double fire hydrants are will be installed at along the main access roads at 100 m spacing to manage the risk of fire outbreak at the freezone. The fire hydrants will be supplied from an independent reservoir of capacity 75m3. Greening option: Provision of 5 No. 62 m3 rainwater harvesting tanks for non-potable uses at the freezone
- (R38) Wastewater management: The proposed long term wastewater treatment infrastructure includes construction of a sump (collection chamber) and a pumping station for transfer of wastewater from the free zone to the existing Entebbe City waste stabilisation ponds through a sewer line of approximately 4.3 km. An alternative short to medium term option is to consider gravity flow from the freezone to the existing UCAA ponds. Greening option: Construction of a dome for recovery of biogas from the existing NWSC waste stabilization ponds and use of constructed wetlands for tertiary treatment of treatment wastewater effluent prior to discharge to Lake Victoria
- (R39) Solid waste management: The proposed solid waste management infrastructure includes construction of an offsite fixed dome biodigester of about 555 m3 in UCAA land near the Cargo terminal canteens. In addition, a 48.7 m3 bunker should be constructed at Entebbe Freezone for temporary storage of solid waste prior to collection and transportation of inorganic (and unrecyclable) fraction to an improved landfill facility. Greening option: co-digestion of organic waste generated at the freezone and generation of biogas for cooking purposes.
- (R40) Stormwater management: The proposed stormwater infrastructure includes construction of approximately 410 m of outlet green channel (bioswale) at the outlet of the Freezone to safely capture, direct runoff downstream from the freezone to the culvert outfall; construction of approximately 306 m3 rain water harvesting tanks to capture 10-year runoff from roofs and reconstruction of the outfall culvert downstream. Greening option: Construction of bioswales for stormwater collection and transportation and rainwater harvesting for non-potable uses.
- The concept notes associated are presented in Table 12. They have been promoted as urban symbiosis due to the fact that most of them address basic infrastructures that should have been considered from the inception of the freezone development. The opportunity to strengthen both the watsan management at park level and in the city is what provides the footprint for a positive symbiosis. However as per GGGI specialized greening expertise, rather than to highlight missing required basic infrastructures, it would be better employed in advising and greening on those such as the proposals for material recovery or co-digestion. Would the team have been able to focus only on those, it could have had time to develop more detailed proposals. (R41) It is therefore strongly recommended for UIA to address the watsan basic requirements for the freezones from inception as per the Green IP/FZ guidelines and request further support from GGGI for improving its green footprint.

Table 11: Extract from Investors Event Concept Notes list for Entebbe

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Entebbe	Development of an Anaerobic Digester as a Solid Waste Management option for Entebbe Free Zone.	Waste Management (urban symbiosis)	0.627 (only the co-digestion structure)	Conceptual Phase
Entebbe	Construction of a pumping station and sewer network for improved management of industrial wastewater in Entebbe Free Zone (NWSC stabilization ponds).	Waste Management (urban symbiosis)	1.87	Conceptual Phase
Entebbe	Installation of a lifting station (sump and pumping station) for offsite treatment of wastewater (UCAA waste stabilization ponds).	Waste Management (urban symbiosis)	0.880	Conceptual Phase
Entebbe	Development of Blue-Green Infrastructure and Stormwater Drainage system for Entebbe Freezone	Rainwater Management	0.198	Conceptual Phase
Entebbe	Development of the Water Supply Infrastructure for Entebbe Freezone (NWSC extension)	Water Supply (urban symbiosis)	0.211	Conceptual Phase



5.5. EIAFZ Masterplan

Figure 15 shows EIAFZ proposed masterplan. Minor variations are presented in the RECP sectoral report. A 3D visual is provided in Figure 15.

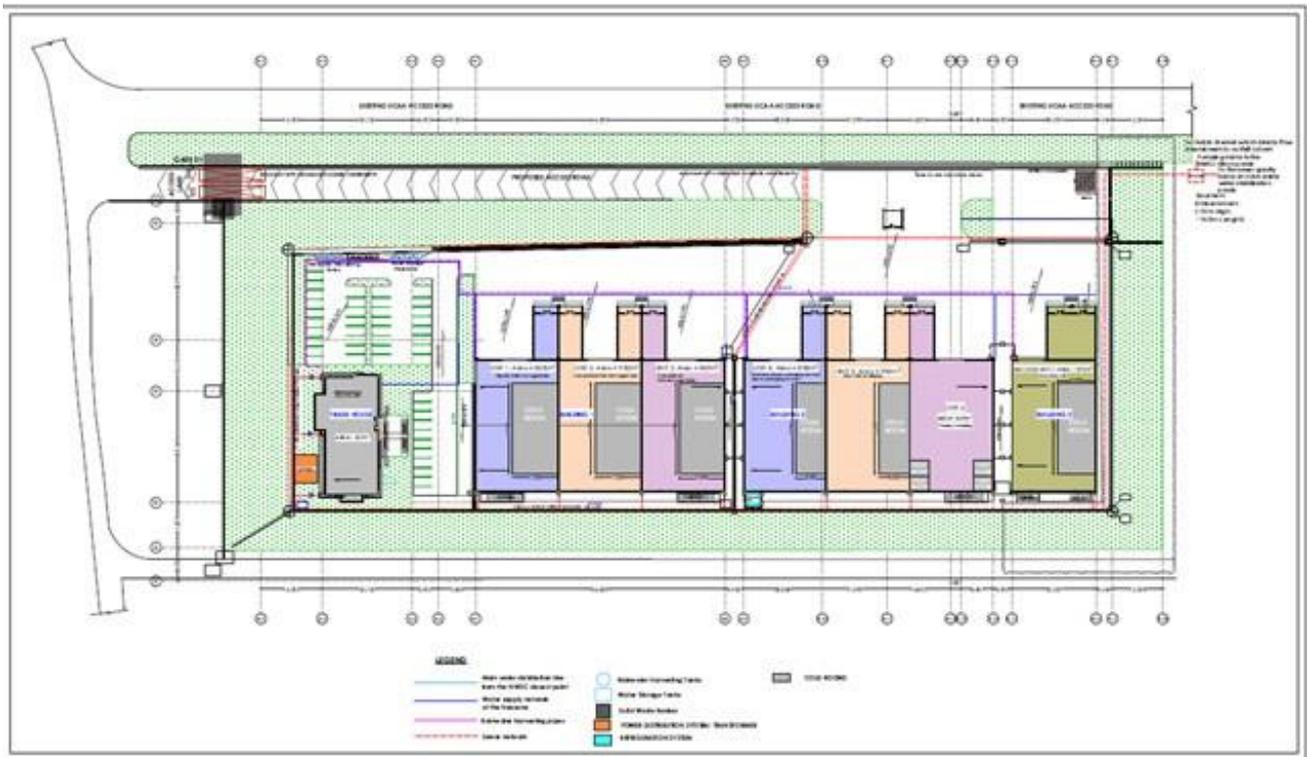


Figure 15: EIAFZ Masterplan A

Figure 16: Soroti Industrial and Business Park 2010 masterplan. Source: URTC

6. Soroti Industrial and Business Park

6.1. General Situation and Current Status

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 (Fig. 16 and 17). 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 Annex 3 “SCHEDULE OF LEASES FOR SOROTI INDUSTRIAL AND BUSINESS PARK May 2023

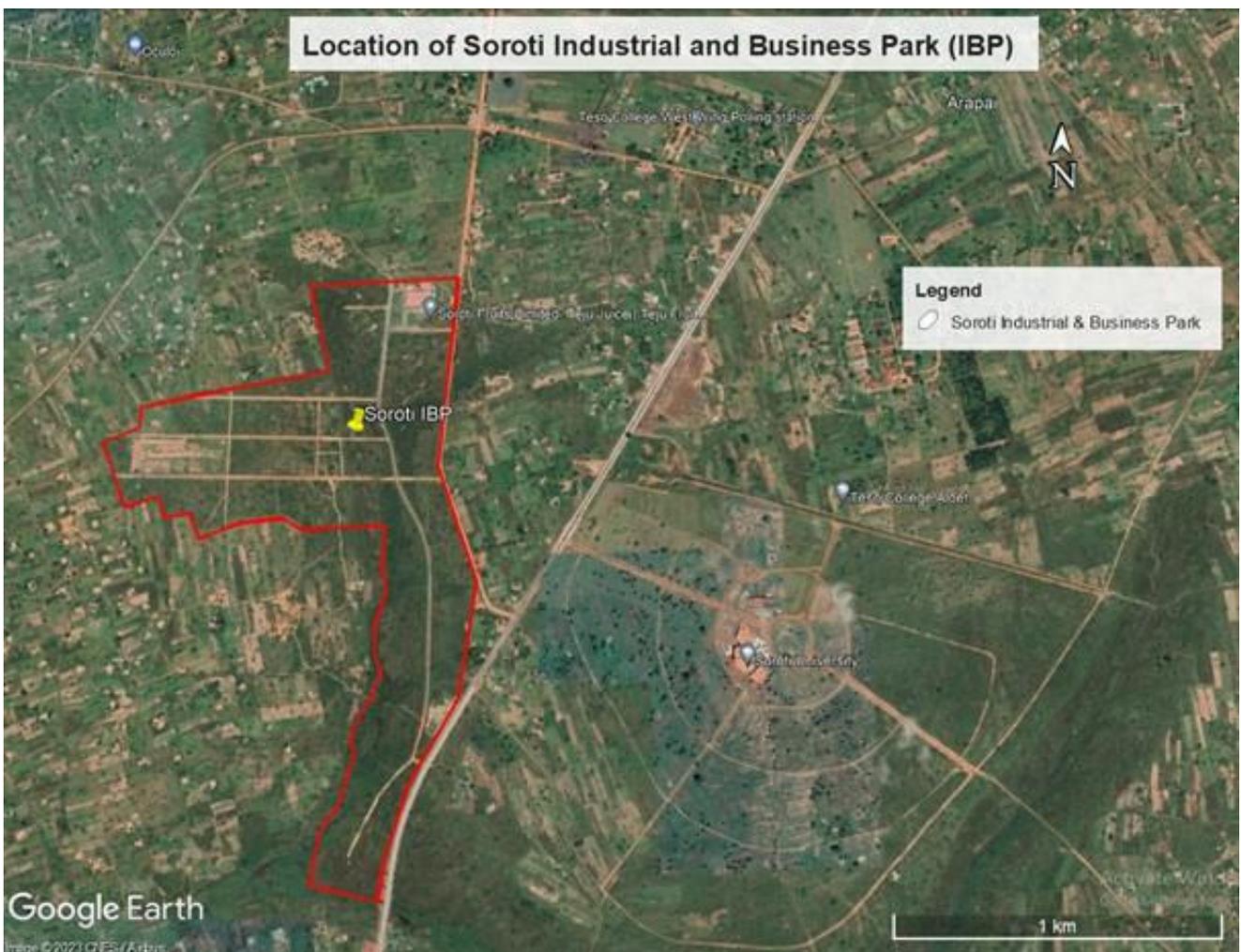


Figure 16: Soroti Industrial and Business Park 2010 masterplan. Source: URTC



6.2. Sectors Prioritization

The result of 2022 mission assessment led to the preselection of the initial key sectors, the elimination of potential ones) and the identification of services and incentives that would translate in the FZ value proposition. As a result of the 2023 mission, the confirmed sectors are as shown in Figure 18



Figure 18: Recommended sectors for SIBP (2023 mission)

The main limitation in regards to the sectors and companies' processes that could be fitted in the park is the water stressed situation, the wastewater and solid waste pressure management and the limited space for infrastructures due to the extensive allocation.

Table 12 and Table 13 provide a synthetic view on the recommended and discarded sectors specifications. For a detailed explanation on the sectors and volumes engaged, please refer to the Value Chain sectoral report.

SELECTED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
HERBALS	Herbal Medicine	Yes	Boiling, tincturing, enfleurage, CO2 or alcoholic extraction	Jena Herbals under construction. Other companies can be accepted if the water footprint is low (no distillation).
FRUITS	Fruit concentrates and juice	Yes but no further growth and implementation of RECP measures.	Mainly orange fruit concentrate and juice processing, fruit drinks processing.	A key sector for the park and in regards to the local fruits production, it is nevertheless problematic in terms of its water usage and waste generation. Production of higher quality juices (such as 100% fruit juice) and concentrate can optimize both fruits uptake and water demand, together with a diversification of products. Key partners Soroti Fruits Limited (TEJU JUICE) and TESO FOODS LTD
	Fruits purees (tins)	Yes	Mango puree, plans for tomato puree (ketchup)	A more water efficient solution for fruits making though recent solutions by partners to reduce the cold chain needs may have a negative impact on nutritional status. Ideally should be diversified into frozen fruits purees in the long term. Same partners as fruit juices.

	Indigenous fruits jams and marmalades. Wine- making	Yes	Jams and marmalades processing and packaging. Wine making.	A request for SMEs access from NATURE & LIVELIHOODS and NL BIOPRODUCTS LTD aiming at valorizing and promoting research on indigenous species. Could have good potential for collaborations with the herbal medicine sector as well. Their incursion into wine-making would however need to be analyzed in regards to water-demand, but the small scale of the company may render the activity acceptable.
	Other fruits products	Yes	Conventional dried fruits processes, Freeze dried fruits. Applies to citrus, mangoes, papaya...	A large range of fruit transformation products have been summarized in 2022 mission and remain valid. Further enquiries into the supermarkets in Kampala have shown a range of such products being imported. The main fruit companies should engage into market analysis and potential further investment with UIA facilitation in order to diversify from fruit juice making.

	Fruits waste valorization for human consumption	Yes	Citrus peel drying or candied, mango kernel butter extraction, etc.	A large range of valorization products have been summarized in 2022 mission and remain valid. The main fruit companies should engage into market analysis and potential further investment with UIA facilitation in order to diversify from fruit juice making and address the waste issue particularly problematic for citrus given the essential oils (terpenes, coumarins) content.
	Fruits and other organic waste valorization for animal consumption.	Yes	Animal pellet food/ cakes, floating fish feed	Though companies with organic waste already sell cakes for animal feed, the idea is to develop an innovation centre oriented towards specialty animal feed looking at the best nutritional composition mixing citrus/fruits waste, other organic waste, fish waste and insects' powder. For the fish breeding industry, a particular need is identified in floating fish feed. Key potential partner NICH VENTURES FARM LTD.

	Fresh fruits (and vegetables)	Yes	Storage and packaging	A full packhouse is proposed with cold chain logistics to improve the shelf life of vegetables for local, regional and interregional markets sales. Key partner Teso Tropical Fruits Cooperative Union Limited (TEFCU).
INSECTS	Insect breeding for animal feed	Yes to transformation but no breeding	Insect powder	Innovative insect products are considered as a key feature of the innovation centre on animal feed but should be bred outside the park for safety reason. A shift from black flies towards alternatives such as cockroaches is promoted to reduce risk to cultivated areas. Key potential partner NICH VENTURES FARM LTD.
VEGETABLES	Sweet Potatoes Puree (tin)	Yes	Puree processing and packaging	The process applies for a range of product and provides higher nutritional benefits and better water/energy efficiency than drying. Potential partner JP Management Foundation Limited.
	Fresh vegetables	Yes	Storage and packaging	See under fresh fruits storage.

CONCRETE	Concrete products	Yes but no further growth and implementation of RECP measures.	Construction material	The current partner operating is SANQUA ENGINEERING LIMITED that is also engaged in renewable energy and watsan products. The sector is one of the most water demanding and therefore shouldn't be allowed further growth.
DAIRY	Yogurt, Ice-cream, Cheese, Ghee	Yes, with implementation of RECP measures	Full processing.	The Dairy Development Authority (DDA) is running a successful demonstration site with yogurt and ice-cream in town however lacking an exit strategy for successful entrepreneurs. Though the water demand and wastewater specifications are problematic for the park, it is considered acceptable at a low SME level scale. Further growth could then be promoted in town.
	Fresh Milk Collection	Yes	Collection and storage.	A small-scale facility taking into account structural collection issues in the value chain as well as wastewater limitations in the IP, and enabling local consumption of fresh milk. Main partner:

FISH	Smoked farmed indigenous catfish	Yes	Smoking and packaging.	As part of the innovation SMEs centre, would play a large role in improving the quality and production scale of farmed indigenous catfish products for both domestic and regional markets. The use of pilot hoven already tested in Uganda and validated to reduce carcinogenic substances would be a key feature together with energy efficiency. Key potential partner NICHU VENTURES FARM LTD.
	Omega 3 Oil from catfish (bottle or capsules)	Yes	Oil processing and packaging	Of possible interest for the innovation center as fish waste valorization solution. Key potential partner NICHU VENTURES FARM LTD.; product has not yet fully penetrated the Ugandan market but represents an innovative opportunity to partner with herbal medicines or nutritionally oriented companies. Could be linked to Entebbe FZ when processes are validated and export standards level reached. Catfish waste contains less Omega3 Oil than Nile Perch or Tilapia. Could be replicated in Pakwach when demand rises.

SEEDOILS AND LEGUMINOUS PLANTS	Simsim (sesame), groundnut, sunflower	Yes	Processing into oil, powders and flour	This is a major sector for the park providing as well waste for the organic waste valorization solutions and animal feed. Key potential partner Green Gold Vegetable
GRAINS	All types	Yes	Cleaning and drying.	This is a major sector for the park providing as well waste for the organic waste valorization solutions and animal feed. Key partner PELA COMMODITIES LTD that Uganda's first Aflatoxin removal machine (TOXI- SCRUB).
	Sorghum for beer	Yes	Cleaning and drying	The subsector has good potential as a provider of brewing companies outside Soroti but brewing on site wouldn't be admitted due to the high water demand and wastewater. Key partner Mega Holdings
ORGANIC WASTE VALORIZATION	Biogas	Yes, see under methane recovery	Biogas capture.	Recovery on wastewater, see under watsan recommendations.
	Composting	Yes, but outside the park	Composting	This is a last resort valorization pending capacitation and upgrade of the Aमित Composting site.

Table 13: SIBP Discarded sectors synthesis

SELECTED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
MEAT	Fresh meat	No, storage could be possible but not applicable at the time.	Meat cutting and packaging	The Uganda Meat Packers is not operational and prospects to become are not clear. Besides the water requirements for this sector and wastewater specification would surpass the park capacity.
BEEHIVE PRODUCTS	Honey	Not in the park but linkages possible	Honey	The sector needs important upgrade in terms of quality and safety. Beehive companies do not require space in the IP but could benefit from collaborations with the IP for various honey applications that could be certified of Origin. Potential partners Eneku Enterprises/Teso Organic Honey

SELECTED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
MEAT	Fresh meat	No, storage could be possible but not applicable at the time.	Meat cutting and packaging	The Uganda Meat Packers is not operational and prospects to become are not clear. Besides the water requirements for this sector and wastewater specification would surpass the park capacity.

BEEHIVE PRODUCTS	Honey	Not in the park but linkages possible	Honey	The sector needs important upgrade in terms of quality and safety. Beehive companies do not require space in the IP but could benefit from collaborations with the IP for various honey applications that could be certified of Origin. Potential partners Eneku Enterprises/Teso Organic Honey
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The associated concept notes are presented in Table 14
 Table 14: Extract from Investors Event Concept Notes list for Soroti

Country	Title	Programmatic Solution	Investment Amount (USD million)	Status
Soroti	PAH safe fish smoking Kiln	Agro-Food Transformation	TBD, Equipment costs to be provided by NARO	Conceptual Phase
Soroti	Dairy production unit and milk collection & storage	Agro-Food Transformation	Concept Note to be developed by DDA. The milk storage is estimated at 0.433	report recommendation
Soroti	Orange fleshed sweetpotatoes puree production	Agro-Food Transformation	TBC	Conceptual Phase

The Fruits sector with predominantly citrus and mangoes 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, 2022 mission highlighted limitations in terms of value chain/varieties production represented mainly by Teso Tropical Fruits Cooperative Union Limited (TEFCU) on one side and absorption capacity of the key players Soroti Fruits Limited (TEJU JUICE), TESO FOODS LTD based on their processing capacity but also on the type of products sold. 2022 mission recommendation identified that 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. It also pointed out the needs to address the important waste production through diversified valorization pathways ranging from cold press citrus essential oil production to dried fruits. It seems those recommendations were taken on board by Teju as the company informed on its exploration towards the production of fresh orange juice, venturing into extracting citrus oil prior to disposal and diversifying its puree process towards tomato puree.

Due to time limitation, the team couldn't investigate further the valorization options presented in mission 2022 report (Fig 19 orange byproducts valorization example) but it did a more in-depth survey on the availability of such products in Kampala markets, and interviews of companies exporting dried fruits and frozen fruit purees. It confirmed the space for such

products both for domestic consumption and export and thus the recommendation to perform full-fledge market surveys for specific valorization products. Given the time constraint, the team focused its work on organic waste valorization in the form of animal feed mill and composting.



From an environmental perspective, the 2023 mission highlighted the water stress and dire waste water management in addition to the already identified solid waste challenge. Therefore, the recommendation is to limit further growth in fruits beverage and concentrates and strengthen the production of purees. This includes as well venturing into Sweet Potato puree production (proposed for the SME section) that can take advantage of a solid supply chain and contribute to reduce grains import.

Other recommendation to address the discarded fresh Fruits and Vegetables, improve the value chain efficiency and boost production is the proposal to build a storage facility (see concept notes under RECP

measures) for TEFCU, enabling to supply local (non-industrial) demand and possibly even further (possible linkages with DPEIZ packhouse).

The Grains, Seedoils and Leguminous plants (Simsim/ sesame, groundnut, sunflower) including sorghum production for beer (no beer processing) were further confirmed, the team looking into addressing mainly their concern in solid waste management.

The Fish sector recommendations from 2022 remain valid, the 2023 mission ventured into exploring greener technology through the proposed introduction of PAH safe fish smoking Kiln, based on a NARO recent pilot (Image 6). So far, the most credible

partner is NICHU VENTURES FARM LTD that has the advantage to also be interested in floating fish food and animal feed production, mixing agro-inputs with its in-house production of insects (see 2022 mission recommendations in this regard), as well as reusing fish waste.



The mission confirmed the opportunity for an Innovation Center exploring options to produce improved animal feed reusing waste from citrus, grains, seed oils (currently merely sold as cake) and adding protein component from the fish production (either fish waste or insects).

Within the same Innovation Center, the team followed through last year recommendation to offer DDA an exit strategy to its Dairy pilot. Indeed, while dairy production on a large scale was found unsustainable in regards to the wastewater generated but also due to the current disfunctions of the supply chain, a small-scale production to promote performing SMEs is manageable. A concept note on milk storage to act as a seed factor for milk availability and consumption promotion was also added.

2022 Mission recommendations for the Herbals sector remain valid, the 2023 mission didn't have time to explore this sector further. Similarly other sectors such as Concrete were validated due to their preexistence, though RECP measures are strongly encouraged to address the water stress.

Discarded sectors from 2022 Mission remain valid (Beehive products) as no noticeable development took place, with inclusion of the Meat sector due to further investigation into the water supply and waste water bearing capacity of the park and the fact that the Uganda Meat Packers remained not operational.

It was noted that SOROTI TEACHERS COOP SAVINGS & CREDIT SOCIETY LTD shifted its focus from Printing into food transformation, energy and more, though the management and technical capacity, lack of previous experience thereof and opportunism raised doubts regarding its credibility as a potential tenant.

6.3. Proposed Common Infrastructure Services and Resource Efficient & Cleaner Production Measures

6.3.1. RECP infrastructures

The following (Table 15) are general Resource Efficient and Cleaner Production options EIAFZ should introduce.

They are described in more details in the RECP sectoral report and in the relevant concept notes. They are in full alignment with the 2022 mission recommendations.

Table 15: SIBP recommended RECP infrastructures

Recommended RECP infrastructures	Description and benefits
(R41) Oil extractor from orange peels	Recovery oil from orange peels makes oranges peels a better potential biogas feedstock as well as suitable material for composting.
(R42) Carbon dioxide recovery plant from ethanol production	The fermentation process in ethanol production generates carbon dioxide as a bi-product which can be recovered and sold to beverage companies
(R43) Biogas recovery plant from wastewater treatment	The anaerobic pods in wastewater treatment plant generates methane gas. This gas can be recovered as biogas for heating or cooking purposes
(R44) Phosphorus is recovered by precipitation in the form of struvite	Wastewater from food processing industries is characterized by total phosphates above 50 mg/l. This makes it feasible to recover phosphorus in the form of struvite that can be sold as a fertilizer.
(R45) Shared steam generation and distribution system	A centralized system has better energy productivity and will provide lower overall costs than a decentralized system
(R46) Shared step-down distribution transform and Power factor correction system for SME hub	In order to ease SMEs access three-phase power, it is proposed to establish a common step-down transformer for the SME hub
(R47) Shared accredited aflatoxin testing laboratory	The testing lab will minimize time delays in getting test results for aflatoxins.
(R48) Shared cold rooms from fruits and vegetables	A centralized system has better energy productivity and will provide lower overall costs than a decentralized system.
(R49) Carbonizing machine for the production of biochar from cassava peels	The large volumes of cassava peels from the starch process can be converted into biochar and used as a fertilizer.
(R50) Animal feed mill	The feed mill will manage bi-products from seed oil production orange peels and fish waste.

(R51) Automated external solar lightning.	External lightning can be activated by movement detectors and powered by solar cells.
(R52) Fire security and disaster risk management	Fire detectors and fire rescue equipment need to be available in strategic locations. A fire brigade equipped with at least one truck should be on site and available upon request by Aminit Composting Site. Contingency plans (multi-risk) need to be developed, including simulations and training.

Location Title: Programmatic Solution The associated concept notes are summarized in Table 16.

Table 16: Extract from Investor

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Soroti	Cold Storage for Fruits and Vegetables	Agro-food Logistics	0.519 (inclusive of the building)	Conceptual Phase
Soroti	Animal feed mill & pelleting for fish float food	Agro-Food Transformation	0.810 (only floating fish pellet facility)	Conceptual Phase
Soroti	Adoption of a Biomass Powered Shared/Community Steam Generation and Distribution system for Soroti Industrial Park.	Energy Efficiency	8.6	Design Phase
Soroti	Installation of a Shared Power Distribution Transformer, Power Stabilizer, and Capacitor Bank for SMEs in Soroti Industrial Park	Energy Efficiency	0.286	Conceptual Phase

6.3.2. Social infrastructures

In addition, non-exhaustive social infrastructures are recommended for the site as shown in Table 17.

Table 17: SIBP proposed social infrastructures

(R53) First aid medical unit	To address first aid needs and facilitate referrals to medical clinics in town
(R54) Canteen	An employer sponsored canteen for staff within the market area. As an example, Nicho Venture has expressed interest in holding a food place where smoked catfish could be promoted to familiarize locals with its consumption.

Besides those obvious recommendations, a social assessment is required and was beyond the scope of this mission. Indeed, the IP growth may lead to a considerable population (in addition to a skilling center nearby with 240 students) to be better assessed based on workers family composition and living patterns. Movements, housing, access to medical services, schools and other basic services need to be characterized to identify the needs for additional facilities or arrangements withing the urban fabric (for example housing preidentification or rent negotiations, etc.). Additionally, 2022 reported land tenure issues in relation to brick making activities that will need to be addressed.

6.4. Water & Sanitation

This section is addressed in a dedicated sectoral report. As mentioned in the methodology, the Logical Tree approach built on specific limitations from a watsan and RECP point of view to determine the environmental bearing capacity for a specific sector contributing to the decision on its validation or discardment. The main constraints found are the water stressed situation, the wastewater and solid waste pressure management and the limited space for infrastructures due to the extensive allocation.

The recommendations for the watsan sector are the following:

- (R55) Water Supply: Construction of six water storage tanks of approximately 500 m3 capacity using pressed steel panels erected on steel towers to increase the residual head for the end-point users. The storage reservoir tanks will be supplied by approximately 7.58 km of the distribution pipeline from the Soroti Rock. In addition, a total of approximately 3.1 km of distribution trunk

mains are required to distribute the water from the reservoir to the different units at the industrial park. Furthermore, approximately 25 No. 4"x4" double fire hydrants are will be installed along the main access roads at 100 m spacing to manage the risk of fire outbreak at the park. The fire hydrants will be supplied from an independent reservoir of capacity 150m3. Two parallel water treatment units of capacity 8,500 m3/day will be constructed to meet the mid-term and long-term water demand at the industrial park. This will also consist of 16 km transmission mains from the treatment plant to the reservoirs at Soroti Rock and an additional 7.85 km distribution pipe to the reservoirs at the park. Greening option: Rainwater harvesting by different industries from their respective roofs at the park, use of solar power system as a replacement for diesel generators to power water pumps at the site in case of hydropower outage.

- (R56) Wastewater management: Construction of approximately 12km long sewer lines and an industrial wastewater treatment plant with a capacity of 23,200 m3/d. The final unit of the treatment plant will consist of activated carbon to remove inorganic pollutants before effluent is released to the environment. Greening option: Provision of activated carbon in the constructed wetlands will ensure good quality of the effluent.
- (R57) Solid waste management: The proposed solid waste management infrastructure includes valorisation to produce essential oils, butter, animal feeds and biochar from waste generated from the cassava sector. The rest of the solid waste will be processed at the Atara solid waste management facility where 8,186 tons of compost will be produced per month, inorganics recycled and the rest landfilled. Two landfill cells of about 2 acres each

will be constructed at the Aminit dumpsite lined with synthetic material at the bottom. Greening option: Composting of organic waste generated at the park to reduce the area required for the landfill and greenhouse gas emissions, waste valorisation to produce animal feeds, essential oils, and biochar, constructing lagoons for treating leachate to reduce pollution of water resources.

- (R58) Stormwater management: The proposed stormwater infrastructure includes the construction of approximately 12km m of on-site grass-lined or stone-pitched drainage channels; and the construction of approximately 10,000 m3 rainwater harvesting tanks to capture 10-year runoff from roofs. A detention pond of approximately 30,000 m3 will be constructed to temporarily store runoff

from peak flow events. Greening option: Rainwater harvesting for non-potable uses and construction of a detention pond to temporarily store runoff and reduce peak flows.

The concept notes associated are presented in Table 18. They have been promoted as urban symbiosis due to the fact that most of them address basic infrastructures that should have been considered from the inception of the park development. The opportunity to strengthen both the watsan management at park level and in the city is what provides the footprint for a positive symbiosis. Greening option:

Table 18: Extract from Investors Event Concept Notes list for Soroti

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Soroti	Construction of a wastewater treatment and a Sewer network for management of wastewater within SIBP	Waste Management	34.7	Conceptual Phase
Soroti	Proposed Upgrading and Rehabilitation of the Aminit landfill site to handle additional solid waste generated at SIBP	Waste Management (urban symbiosis)	1.42	Conceptual Phase
Soroti	Development of Blue-Green Infrastructure and stormwater drainage system for SIBP.	Rainwater Management	4.39	Conceptual Phase
Soroti	Development of the Water Supply Infrastructure for SIBP	Water Supply (urban symbiosis)	28.3	Conceptual Phase

6.5. SIBP Masterplan

Figure 20 and 21 show SIBP proposed masterplan. A 3D visual of a section of the Park is presented in Fig. 22.



Figure 20: Annotated 3D visual of the proposed SIBP masterplan



Figure 22: SIBP 3D visual of a section

7. Dero Pakwach Industrial and Business Zone DPEIZ (about 500 acres)

7.1. General Situation and Current Status

Pakwach serves as the gateway into the West Nile region of Uganda in a region with high commercial movements with South Sudan and Democratic Republic of Congo. It is close to Murchison Falls National Park and the start point of Albert Nile. A preliminary survey and Mapping of the proposed land was undertaken by the Pakwach District Engineer. The extents and boundary of the park land is as illustrated in Figure 23 below. This is however pending the formal ownership transfer to the district and subsequent lease-out to the developers.



Figure 23: Cadastral Map of the proposed Park Site

In terms of transport infrastructures, Pakwach is the terminus of the Uganda Railway in its current form with planned extension to the border town of Nimule and into South Sudan. Given the town location at the points at which the Albert Nile flows into lake Albert, there is also potential for port infrastructure, a consortium led by a South African investment team being developing a Lake Albert Port and Ferry Project. There is a planned upgrade of the nearby Pakuba airfield to accommodate modern narrow-bodied aircraft

In regards to energy, Pakwach has some of the highest solar irradiation in the region providing prospects to renewable energy production. This was fully considered in the team concept notes development. Karuma Hydro-

Power dam is located close to Pakwach and a discussion on the facilitation of transmission and connectivity to the Park is in progress.

The government of Uganda through UIA, identified a private developer, Dero Capital Investment, with to develop Pakwach Industrial Zone (see proposed 3D visual Fig. 24) as a private led park. The initiative to develop the Pakwach Industrial Park was driven by the UIA Board's decision in 2017, which approved the establishment of four regional science and technology industrial parks (STIPs), including Pakwach, Rubirizi, Kyankwanzi, and Kamuli. Thus, the interest for Pakwach to establish collaborations with universities.



7.2. Sectors Prioritization

Given the private nature of DPEIZ, Dero had already prepared a concept to define the core sectors built on the park strategic positioning in the vicinity of large farms in Nwoya and Zombo districts, the Tilenga oil and gas fields, critical infrastructures as well as its location near the DRC border. As a result of the 2023 mission, the sectors were further specified as shown in Figure 25. The main limitation in regards to the sectors and companies' processes that could be fitted in the park is the very low level of urban infrastructures development coupled by a water and energy-stressed situation, the vicinity to the national park which represents both an opportunity and an environmental and biodiversity risk, wastewater and solid waste pressure management and the limited stakeholders' presence or their geographical distance resulting in a difficulty to accurately determine volume production capacities in the agro- sector. As large portion of the strategy relies on the development of transport infrastructures



Figure 25: Recommended sectors for DPEIZ (2023 mission)

by the government, its potential at scale resides in the materialization of those. A failure or delay in their realization may have a dire impact on the zone development. This is why the team opted for a dual approach addressing on one side the ambition of the managers (ex: solar energy proposal, tourism), while on the other side trying to build gradually from the current reality on the ground Dero just started collaboration with Axa, a Canadian infrastructure group that has received a mandate from gov to work on mobility, utilities, evacuation infrastructures, railway, etc.

Table 19 and Table 20 provide a synthetic view on the recommended and discarded sectors specifications. For a detailed explanation on the sectors and volumes engaged, please refer to the Value Chain sectoral report and Tourism Concept Note. The Internal Container Depot (ICD) concept is currently being developed by Dero with support from Axa. Dero envisions DPEIZ positioning as a supply chain partner for Kibali mines and tilenga oil fields as well as possibly to WFP (refugee) response in the region. On the latter, it is to note WFP organizational shift to favor cash modality response whenever feasible, resulting in less direct food items purchase in profit to cash distribution beneficiaries can spend in local markets

and shops. Therefore, in order to respond to both customers pools, the focus should be to produce affordable, nutritious foods adapted to local cultural preferences.

SELECTED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
ENERGY	Solar	Yes	Solar pannels	This is a major sector for the park given the energy deficit. Requires to devote a large section of the park for solar infrastructures
	Briquettes from organic waste	Yes	Compacting organic waste into briquette	This is a major Public-Private partnership between the IP and the city to address waste management, energy deficit and deforestation. Potential partner
CASSAVA	Cassava products such as flakes, flour and farinha	Yes with RECP measures and limitations on starch.	Cleaning, drying, milling	This is a major sector for the park providing RECP measures are engaged to limit water demand. Starch should be limited to low volume, possibly a single company. Potential partner: ABONG WOMEN'S GROUP
FRUITS	Fresh fruits	Yes	Packhouse.	This aims to gather local produce as well as regional produce for local and interregional distribution (in particular DRC and South Sudan).

COFFEE	Coffee grains and moulded.	Yes with dry process	Processing and packaging.	Due to the water stress only dry processes may be allowed.
	Coffee products display	Yes	Degustations	Valorization of local products with origin branding in tourism venues in the IP.
LOGISTICS	Internal Container Depot (ICD)	Yes	Mid to long term prevision.	Shifting cargo transport from road to rail, pending the Tororo - Gulu line and Gulu - Pakwach line rehabilitation. 10% "capture" of cargo currently moving by road transport used as starting point.
OIL EXTRACTIVE COMPANIES SUPPORT		Yes	Mid to long term prevision.	Pending Tilenga Field Development Project progresses. Potential logistics hub for local in- country construction materials. Food provision to the oil companies' workers.
TOURISM	Cultural center with restaurant (Fig. 28)	Yes	Performing arts, restauration, etc	Following the example of Kampala Ndere Center with the main aim to promote local culture including arts and foods. It could be home to multiple youth drama groups. Could attract tourists in the evenings.

FISH	All types including indigenous	Yes, as long as no pool factor is created for resource sustainability.	Smoking and packaging	As part of the innovation and research collaboration, this sector would play a large role in improving the quality and production fish products for both domestic and regional markets while encouraging research on the supply side and sustainability. Use of pilot hoven already tested in Uganda and validated to reduce carcinogenic substances together with energy efficiency reducing deforestation and overall improved efficiency reducing fish loss. Key potential partner
	Small (pelagic) fishes	Yes, same as above	Improved drying process and packaging	These fish play an important role for food security and protein intake, the same as above apply with the difference that only drying is necessary. Key potential partner
SEEDOILS AND LEGUMINOUS PLANTS	Simsim (sesame seed) and groundnut	Yes	Cleaning, drying, milling	This is a major sector for the park providing as well waste for the briquette making and animal feed. Key potential partner

	ARTS, YOUTH & MEDIA CENTER	Yes	Digital medias Photography, Video, Movie-making Awareness Raising	that can be home to multiple youth drama groups. Photography and videography, internet and Radio. Champion efforts to digitalize the Murchison Falls National Park experience and sell it as content on or to various platforms, e.g., YouTube, Meta, National Geographic, Netflix. In collaboration with universities, can help train and encourage youth to take up the more lucrative skill thus keeping them away from crafts that drive deforestation. Should promote awareness raising programs to address potential social behavior, diseases and other issues related to the Increased sexual advances to the influx of high spending tourists and industry technicians in the community
	Accommodation	Yes	Eco-Hotel and event venue	This facility should provide a central location for business services such as venues, internet café and space for events (for example weddings).

		Yes pending security arrangements	Eco-camp site	<p>Demonstration camp site based on eco- principles and fully managed, oriented towards nature and sports activities.</p> <p>From stakeholder engagements, it could cater to domestic and regional tourists, and international budget travellers/ backpackers and higher income overlanders. It should host the tour operators boot and rental gear desk</p>
	Boot for tour operators for sport tourism and training center.	Yes	Representation and services	<p>A hub for various sports tourism service providers, especially those with a focus on West Nile. The region is unexplored, and this can be the center from which excursions into the region or further north along River Nile can start. Meant to be pull factors for all visitors to the Pakwach area and also for the expected growing middle class in the neighboring oil & gas mining area.</p> <p>The focus would be on sport and nature tourism with a strict environmental footprint. Indeed, due to proximity to national park and limited energy resources, it should offer should be low impact activities. For example, hiking,</p>

cycling, kayaking, paint balling, zip lining, archery, sports fishing...).

A central working space for these service providers would encourage collaboration and drive innovation in the packages offered. The Tourism boot would liaise with tour operators in Kampala and Entebbe and offer rental gear services for both tour operators and individual visitors.

With targeted support, this could also be a training center for tour guide as well as translation services.

DISCARDED SECTOR	SUBSECTOR	SUITABLE	PROCESS	COMMENT
MEAT	Fresh meat	No		Too low volume compounded by water and wastewater stress.
DAIRY	All products	No		Too low volume from few local breed cows compounded by water and wastewater stress.
CASSAVA	Ethanol	No		It may compete with food security, pending volume calculations
FRUITS & VEGETABLES	Fruits and vegetables processes products	Not at the moment		No evidence of any transformation activity. Water intensive processes would also be excluded (ex: fruit juices).
GRAINS	Sorghum, Rice, ...	No		Too low production.

Table 21 shows the concept notes developed in support to Pakwach productive sector.

Table 21: Extract from Investors Event Concept Notes list for Pakwach

Country	Title	Programmatic Solution	Investment Amount (USD million)	Status
Pakwach	PAH safe fish smoking Kiln and Solar drier & packaging equipment for pelagic fish	Agro-Food Transformation	TBC, Equipment costs to be provided by NARO	Conceptual Phase
Pakwach	Cassava flour production equipment	Agro-Food Transformation	TBC	Conceptual Phase

The Energy sector is an anchor sector given the necessity to produce the energy necessary for industrial process and the potential to contribute to the energy gap for the urban population. It is complemented by a proposal on Organic Waste valorization in the form of briquettes that contributes to alleviate a portion of the energy demand while enabling farmers to generate additional sources of income.

Cassava transformation is also an anchor sector directly feeding into the wider supply chain vision supporting the work of existing companies, which face production challenge due to lack of access to predictable energy. Due to the water stress, products recommended are flakes and flour while starch production should be limited. It has been observed anyway that the latter is not the principal demand. Ethanol production is not recommended at this stage due to potential competition with food security. For the Seed oils and leguminous plants, the most promising activity has been found around Simsim (sesame seed) and groundnut. Other grains were not recommended so far due to too low volumes of production.

The Fruits sector has been included via a Packhouse concept note to boost the value chain which is embryonic at this stage, facilitate interregional distribution possibly with linkages to Soroti IP and contributing to the supply chain concept. However, fruits and vegetables transformation has not been witnessed at the moment in the area and the volumes may pose difficulty for such activities, besides some transformed products such as fruit juices wouldn't be recommended due to water stress.

Coffee is another recommended sector whereby dry

processes are recommended due to the water stress. This corresponds also to the market demand, wet processes enabling instant coffee or specialty coffee (Nespresso) are rather favored for international (non-regional) exports.

The Fish sector presents an important activity drawing from a diversified fish pool with transformation mainly via two processes, smoking and drying (Image 9). Exports routes are already particularly active and fish products play an important role in food security. However, this sector suffers from many pitfalls, first a lack of conservation of the resource and study thereof on the fish capital and biodiversity indicators. Secondly the artisanal methods for smoking and drying present sanitary issues (ex: the presence of carcinogenic substances due to smoking), unsustainable energy consumption and a lack of valorization due to poor packaging. Thus, the recommendation to introduce PAH-safe fish smoking Kiln and improved drying techniques. NARO has been experimenting with such smoking kiln though information proved complex to obtain, it is recommended for the park management to address NARO directly to access the pilot results, however, if not feasible, other providers of similar technologies can be found online. Partnerships with universities and conservation groups are to be promoted, the goal in anchoring this sector in the park would be for efficiency and quality improvement of the current fish transformation activity (also organizing the supply chain and bringing sustainable fishing practice) rather than to create an unsustainable pool factor. Candidate companies would therefore need to adhere to very strict terms of reference to honor those constraints while still making profitable business



a lack of conservation of the resource and study thereof on the fish capital and biodiversity indicators
Image 9: Pakwach current fish drying process (left) and smoked fish (right)

The Meat and Dairy sectors have been discarded both due to too low production and potential water stress.

The Tourism sector is also an anchor thanks to the park abundant access to exceptional natural features. Sustainability is also a chore there in regards both to the preservation of the environment and the infrastructures bearing capacity (water demand, waste management, social integration, etc). Tour operators confirmed they would gladly add Pakwach in their itinerary in particular

for safari and sports activities provided a competitive offer to the current lodge system, and professionalization of the services (guide system, trails, gear rental, etc). A visual of the proposed Cultural Center is presented in Figure 26. The team presented options for this offer development in a dedicated concept. At this stage, DERO expressed its interest in calling for a focused consultancy service and being happy with the team merely confirming the hosting capacity in terms of visitors' entries and accommodation.



Figure 26: DPEIZ cultural center 3D visual

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

7.3.1. Energy and RECP infrastructures

The following (Table 22) are general Resource Efficient and Cleaner Production options DPEIZ should introduce. They are described in more details in the RECP sectoral report and in the relevant concept notes.

Recommended RECP infrastructures	Description and benefits
(R59) Grid-tied Solar PV Plant	<p>The solar radiation of Pakwach ranges from 4.6 to 4.8 kWh/kWp. Given the availability of land, the park can accommodate at least a 22MWp solar PV plant, thus improving energy mix and security.</p> <p>The proposal has been dimensioned to generate additional energy for redistribution through the grid, therefore contributing both to ensuring more energy supply in Pakwach town but also as a cost efficiency measure.</p>
(R60) Biomass Briquette making facility	<p>Agro-processes generates large volumes of agro- residues which that can be densified into briquettes to meet the thermal energy demand of anchor industries</p> <p>The team investigate several options to improve the scale and impact of the facility for example exploring ways to resell briquettes to the general population thus contributing to fight deforestation. However, the supply of agro-residues options is not fully known, especially as the commercial competitiveness of the briquettes is highly dependent on the possibility to obtain cheap resource, including reduced transport costs. The possibility to grow energy crops has been discarded on two main grounds. First of all, it may compete with food security in a region where it is more appropriate to promote food crops to ensure both revenue and household consumption. Secondly, cash crops promoted by Government of Uganda such as Elephant grass are discarded due to their often-invasive nature and the risk it poses to the national park.</p>

(R61) Shared Fruits and Vegetable cold storage	. Shared cold storage improves energy productivity and reduces operational costs. Given the important development to be expected in the logistics sector for the park once the transportation infrastructures are completed, including the Internal Container Depot (ICD), this proposal merely serves as a booster for the agro sector and can be easily replicable for increased volumes.
Green Hydrogen Production	Given the availability of land and renewable energy. It is possible to explore opportunities of storing excess renewable energy into green hydrogen for improved energy security. However, that shouldn't be detrimental to water availability for both the park and the community. For this reason it is not recommended to market this opportunity before water supply recommendations are put in place, a thorough environmental assessment performed and prior to developing the park other sectors to better capture the overall park water demand including in the tourism sector.
(R62) Automated external solar lightning.	External lightning can be activated by movement detectors and powered by solar cells.
(R63) Fire security and disaster risk management	Fire detectors and fire rescue equipment need to be available in strategic locations. A fire brigade equipped with at least one truck should be on site and available for intervention in the national park. Contingency plans (multi-risk) need to be developed, including simulations and training.

The associated concept notes are summarized in Table 23.

Table 23: Extract from Investors Event Concept Notes list for Pakwach

Location	Title	Programmatic Solution	Investment Amount (USD million)	Status
Pakwach	Solar PV plant	Solar PV	16.2	Conceptual Phase
Pakwach	Biomass Briquette production facility	Green Energy	1	Conceptual Phase
Pakwach	Cold Storage	Agro-food Logistics	TBD	Conceptual Phase



Figure 27: 3D visual of DPEIZ solar PV plant

6.3.2. Social infrastructures

Additional social infrastructures (table 24) can be considered given the very low level of development of the town and the pressure due to influx of tourists and workers imposed by the park. However, a full fledged social assessment is required to address questions over workers conditions, movements, housing, access to basic services and the impact of the influx of workers, tourists and transporters over the local population.

Table 24: DPEIZ proposed social infrastructures

(R64) Staff and Visitors Medical Center	Given the influx of tourist and burden on the town capacities, it is recommended to deploy a medical center open to staff and families (costs covered by the employer/insurance) as well as visitors (charged).
(R65) Nursery and Child Activity Center	A real added value for the park, this would not only offer options for staff members (funded by the employer) but also an attraction by itself for domestic tourists aiming to do child free sport activities. It would also promote cultural exchanges and inclusion by mixing local and tourist children and should propose a range of adapted outdoors activities facilitated by the tourist boot.
(R66) Canteen	An employer sponsored canteen for staff.

7.3.3. Recommended environment measures to support the tourism development and fish sector

Proposed action or project	Description
(R67) Set up Natural Resources Governance committee	Meetings/workshops of stakeholders to address responsibilities, design a mitigation plan and perform regular implementation monitoring.
(R68) Ranger post	Create or beef up a ranger post at in the gate to the national park with manpower, equipment, accommodation and skilled staff to keep an eye on spill overs from the industrial park.
(R69) Guide training center	Sustainable practice and possible ecosystem monitoring should be provided to compensate for the lack of awareness due to tourism being a relatively new activity.
(R70) Waste management actions	<p>Sensitization meetings, communication campaigns and enforcement measures (ex: littering fines) against littering.</p> <ul style="list-style-type: none"> • Manage roadside markets and other tourists selling activities along the industrial park and contribute to the management of such at the national park gateway. • Sensitization meetings, communication campaigns and enforcement measures (ex: littering fines) against littering.
(R71) Follow NEMA regulations with extra sensitivity due to the proximity to the national park.	<ul style="list-style-type: none"> • 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.
(R72) Manage illegal fires in the national park	<ul style="list-style-type: none"> • 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.

(R73) Manage poaching of wildlife	<ul style="list-style-type: none"> • Fund anti-poaching programs such as extended patrols. • Offer drones to swiftly patrol the area. • Training scholarships for wildlife management skills. • Organize awareness campaigns for the management of wildlife incursions (elephants Image 10) and to protect biodiversity (including for sport fishing activities)
(R74) Reduce wildlife disturbance and noise pollution	<ul style="list-style-type: none"> • Reduce noise pollution and promote wildlife respectful behavior for tourists' activities. • Develop and enforce the use of designated trails for activities such as walking and cycling trails and limit off-tracks incursions
(R75) Invasive alien (exotic) plant species spread mitigation	<ul style="list-style-type: none"> • Control spread of invasive species for example by operating washing bays for all trucks before they enter the industrial park. • Get alternative routes other than passing through the national park by all tracks going in the industrial park.
(R76) Pay for ecosystem services	<ul style="list-style-type: none"> • Water abstraction fees. • Each industry in the park should pay annual fees on the national park account to help in its conservation programs • Industrial products that share names with wildlife as a brand name should pay for their conservation.
(R79) Fish observatory (capital studies) and conservation measures	<ul style="list-style-type: none"> • Partnerships should be sought with universities to develop an observatory on fish biodiversity, assess the fish capital and develop conservation measures that can enable a sustainable industrial fishing production as well as sport fishing practice



Image 10: Pakwach elephants' incursion

7.4. Water & Sanitation

This section is addressed in a dedicated sectoral report. As mentioned in the methodology, the Logical Tree approach built on specific limitations from a watsan and RECP point of view to determine the environmental bearing capacity for a specific sector contributing to the decision on its validation or discardment. The main constraints found were the very low level of urban infrastructure development coupled by a water and energy stressed situation, the vicinity to the national park, wastewater and solid waste pressure management

The recommendations for the watsan sector are the following:

- (R80) Water Supply: Construction of three water storage tanks of approximately 200 m³ capacity using pressed steel panels erected on steel towers to increase the residual head for the end-point users. The storage reservoir tanks will be supplied by the existing NWSC piped water system. In addition, a total of approximately 2.13 km of distribution trunk mains are required to distribute the water from the reservoir to the different units at the industrial park. Furthermore, approximately 60 No. 4"x4" double fire hydrants are will be installed along the main access roads at 100 m spacing to manage the risk of fire outbreak at the park. The fire hydrants will be supplied from an independent reservoir of capacity 150m³. A medium-term and long-term option for meeting the demand at the park requires the construction of two parallel water treatment units of 850 m³/day with 1.2km transmission mains to the booster station at Pajobi. Greening option: Rainwater harvesting by different industries from their respective roofs at the park.
- (R81) Wastewater management: An approximate 25km long sewer line will be laid on site to convey wastewater to a 1,900 m³/d capacity waste stabilization pond. Wastewater from cassava processes will be pre-treated to remove inorganic pollutants from a packaged wastewater treatment plant of a capacity of approximately 1,100 m³/day before it is conveyed to the waste stabilization pond. Greening option: Use of anaerobic ponds with a dome constructed over to capture methane at 85% efficiency and pretreatment of wastewater from cassava processes to remove inorganic pollutants.
- (R82) Solid waste management: The proposed solid waste management infrastructure includes a valorisation of approximately 49%. The rest of the solid waste will be dumped at the Atara dumpsite where 357 tons of compost will be produced per month, inorganics recycled and the rest dumped. Two landfill cells of about 2 acres each will be constructed at the Atara dumpsite with synthetic material at the bottom. Greening option: Composting of organic waste generated at the park, manufacture of briquettes (fuel), and recycling of inorganic waste.
- (R83) Stormwater management: The proposed stormwater infrastructure includes the construction of approximately 25km m of on-site grass-lined or stone-pitched drainage channels; and the construction of approximately 16,600 m³ rainwater harvesting tanks to capture 10-year runoff from roofs. A detention pond of approximately 11,000 m³ will be constructed to temporarily store runoff from peak flow events. It is also recommended to construct bioswales instead of concrete or stone pitched drainage channels for stormwater drainage. Greening option: Rainwater harvesting for non-potable uses and construction of a detention pond to temporarily store runoff and reduce peak flows.

The concept notes associated are presented in Table 25. They have been promoted as urban symbiosis due to the fact that most of them address basic infrastructures that are yet embryonic for Pakwach town. The opportunity to strengthen both the watsan management at park level and in the city is what provides the footprint for a positive symbiosis.

Table 25: Extract from Investors Event Concept Notes list for

Country	Title	Programmatic Solution	Investment Amount (USD million)	Status
Pakwach	Development of blue-green infrastructure and storm water drainage system for Pakwach Industrial Park	Rainwater Management	7.2	Conceptual Phase
Pakwach	Development of a solid waste management strategy for reduction of solid waste, composting of organic waste and disposal of inorganic waste at Atara near Pakwach Science, Technology and Industrial Park	Waste Management (urban symbiosis)	2	Conceptual Phase
Pakwach	Development of the Water Supply Infrastructure for Pakwach Science and Technology Industrial Park.	Water Supply (urban symbiosis)	20	Conceptual Phase
Pakwach	Construction of Waste Stabilisation ponds and a Sewer network for management of wastewater within Pakwach Industrial Park	Waste Management (urban symbiosis)	9.2 (only the stabilization pond structure)	Conceptual Phase

6.5. DPEIZ Masterplan

Figure 28 and 29 show DPEIZ proposed masterplan. 3D visuals are provided in Figure 30 and 31.



Figure 28: Annotated 3D visual for DPEIZ

Pakwach

Pakwach Industrial Park



Figure 29: DPEIZ proposed masterplan



Figure 30: DPEIZ 3D visual



Figure 31: DPEIZ 3D visual

7. Conclusion

The mission could achieve its goals mainly by confirming the productive sectors, required symbiotic infrastructures, and proposing a functional masterplan. It also highlighted the need for greening support at various stages of development (greenfield, semi-brownfield) but particularly at the design level as several recommendations addressed water, sanitation, and energy requirements that should have been taken into consideration before construction. As possible next steps for GGGI, support could be offered in the following areas:

- Concept Notes Project Proposal Development
- Urban Symbiosis Concept Notes integration in the Urban Development Program
- Masterplan and Concept Plan Implementation Support
- Park Management Capacity Building
- Replication to other sites as per the Government of Uganda’s ambition (see Figure 32)

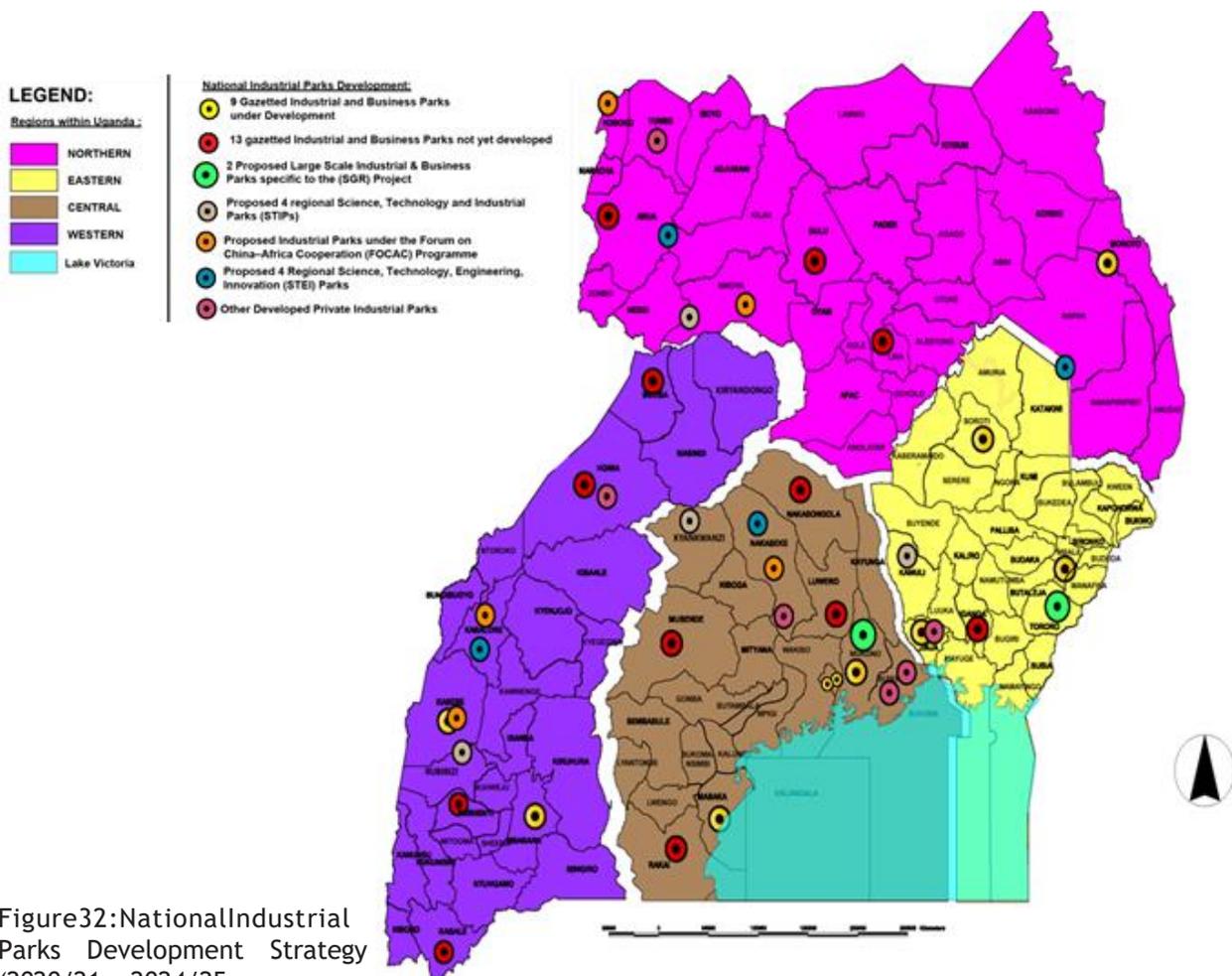


Figure32:NationalIndustrial Parks Development Strategy (2020/21 - 2024/25)



8. ANNEXES

A. Terms of Reference of the Mission (Team Leader)

Greening Uganda’s Urbanization and Industrialization

Terms of Reference

Objective: Development of Green Industrial Masterplans, Infrastructure plans and project concept notes for Entebbe, Pakwach and Soroti

Contract	
Project	Greening Uganda’s urbanisation and industrialisation
Expertise	
Category	Team Leader and Green Industrial Park Expert
Location	
Duty station	Entebbe, Pakwach, Soroti, with support from Kampala

Introduction

Based in Seoul, the Global Green Growth Institute (GGGI) is an intergovernmental organization founded to support and promote green growth. It targets key aspects of economic performance such as poverty reduction, job creation, social inclusion, and environmental sustainability. GGGI works with countries around the world, building their capacity and working collaboratively on green growth policies that can impact the lives of millions. The organization partners with countries, multilateral institutions, government bodies and the private sector. This is to help build economies that grow more economically and efficiently. Ultimately, they become more effective and sustainable in the use of natural resources, less carbon intensive, and more resilient to climate change.

GGGI is partnered with the European Union (EU) as part of the EU inclusive green economy uptake programme (GreenUP). At present, it delivers a project entitled “greening Uganda’s urbanization and industrialization” (2020- 2023). The programme is aligned with the government of Uganda’s vision 2040, the third National Development Plan (NDP III), and the Uganda green growth development strategy (UGGDS). The project promotes sustainable development and inclusive green growth in Uganda. It focuses on green city development, green industrialization, efficient waste management and green growth integration into planning and budgeting.

Immediate context

To support Uganda in becoming mid-income status via industrialization, the project hopes to support the development of 3 industrial locations at Entebbe, Soroti and Pakwach.

Goal

The overall goal is to design the infrastructure to allow the industrial park and its contextual city to thrive, as an economic system.

Objective

Develop green masterplans including symbiotic infrastructure plans and infrastructure project concept notes for the 3 locations.

Scope of work

The scope of work is predicated by the ambition to achieve industrial-urban symbiosis. Thus, future strategic infrastructure is to be planned and designed to serve both the industrial park and the wider city in a green way. This extends to planning and engagement with not only those responsible for the development of the industrial park but also, the city council and local businesses.

The consultant will supervise a team of sectoral experts and act as the primary green industrial parks expert and quality controller to deliver the activities outlined below.

Specific activities

Sectoral ToRs available under each sectoral reports

INCEPTION PHASE

1. Project start-up, inception meeting online, partners mobilization
2. Document/data collection and background analysis
3. Development of methodology by sector incl. methodological design, interview and survey
4. tools Identification of information gaps and limitations
5. Collecting data and analyzing quantitative and qualitative
6. information Online interviews

FIELDWORK PREPARATION:

7. Field missions' tools/methodology preparation.
8. Field surveys/Data Collection Kampala and other additional locations

FIELD MISSION DATA ANALYSIS AND SECTORAL REPORT

DEVELOPMENT

9. Field Missions data analysis
10. Field Missions sectoral reports drafts
11. Field Missions sectoral Concept Notes drafts
12. Complementary data collection/missions (ex technical experts)
13. Revised sectoral reports and concept notes

FINAL DATA SYSTHESIS AND REPORT

14. Mission draft final report
15. Mission draft concept notes
16. Field Mission revised draft concept notes and mission report



B. Investors Event



Global Green Growth Institute, Ministry of Water & Environment, Plot 3 - 7 Kabelega Crescent Road, Luzira
P.O. Box 20026 Kampala, Uganda Tel: +256 782 757 919 or +256 781 148 818 E-mail: dgmar.zwebe@gggi.org

Ref: GGGI UG 23 117

Date: November 14, 2023.

To:

See Distribution List.

Dear Sir/Madam,

RE: CONSIDERATION OF INFRASTRUCTURE INVESTMENT OPPORTUNITIES IN THE INDUSTRIAL LOCATIONS OF ENTEBBE, SOROTI, AND PAKWACH

The Global Green Growth Institute (GGGI), with funding from the European Union (EU), has been implementing a project entitled *Greening Uganda's Urbanization and Industrialization* since 2020. The key objective of the project is to support the implementation of the third National Development Plan (NDP III) on aspects of urbanization, industrialization, and solid waste management.

Under this project, GGGI has extended technical support to the Government of Uganda, through a team consultant to develop a master plan, propose symbiotic infrastructure, and identify opportunities for greening these industrial locations (Free Zones and Industrial parks). Further to the earlier engagements on the same or the last couple of weeks, we have organized a meeting to present these investment opportunities with potential development partners. The meeting is scheduled for **Monday, November 20, 2023, at Golden Tulip Hotel**. Below is an agenda for the planned half-day meeting.

Schedule	Detail	Responsibility
08:30 - 09:00	Arrival and registration of participants.	GGGI
09:00 - 09:15	Opening remarks	NPA
09:15 - 09:30	Remarks	UFZA/ UIA
09:30 - 10:00	Technical background	GGGI
10:00 - 10:15	Coffee Break	All
10:15 - 11:00	Presentation of project teasers - industry	GGGI/ consortium of consultants
11:00 - 12:15	Review of viability and interest of potential financiers.	GGGI/ consortium of consultants
12:15 - 13:00	What actions from here?	GGGI/UIA/UFZA
13:00	Lunch and departure.	All

The purpose of this letter, therefore, is to invite you to this technical meeting from 08:30hrs to 13:00hrs, to review the proposed investments for the proposed urban

infrastructure projects. For any further correspondence regarding this event, please kindly liaise with Mr. Philip Muwanika at +256782960665 philip.muwanika@gggi.org.

We thank you for your cooperation and look forward to your timely response.

Yours faithfully,

Ronald McGill
Project Lead
Greening Uganda's Urbanization and Industrialization
Global Green Growth Institute (GGGI) Uganda

Distribution list:

1. The Ambassador,
European Union Delegation to Uganda
2. The Country Officer,
International Finance Corporation,
3. The Country Manager, African Development Bank Group,
4. The Permanent Secretary/ Secretary to the Treasury,
Ministry of Finance, Planning and Economic Development
5. The Executive Director,
National Planning Authority
6. The Executive Director,
Uganda Free Zones Authority
Plot 1 Colville Street, communication House
7. The Director General,
Uganda Investment Authority
Plot 1 Baskerville Ave, Kampala Industrial and Business Park, Namanve
8. The Chief Executive Officer,
Dero Capital Uganda
9. The Country Director,
Uganda Industrial Development Organisation (UNIDO)
10. The Chief Executive Officer,
Uganda Capital Markets Authority
11. The Managing Director,
Uganda Development Bank, Ltd
12. The Country Director,
TMA- Uganda country office
13. The Director General,
East Africa Development Bank
14. The Country Manager,
Stanbic bank Ltd
15. The Country Manager,
Equity Bank
16. The Country programme Head
Master Card Foundation, Uganda
17. The Managing Director,
National Water and Sewerage Corporation
18. The Managing Director,
NSSF
19. The Chief Executive Officer,
The Micro Finance Support Centre Ltd
20. The Country Representative,
Food and Agriculture Organisation of the United Nations
21. Country Head for Uganda,
MasterCard Foundation
22. The Area Manager,
Colas Ltd
23. The Executive Director, Abi Finance
24. The Country Manager,
Afriexim Bank
25. The Country, Director,
Gatsbay Africa



C. Soroti Industrial and Business Park Schedule of Leases May 2023

SCHEDULE OF LEASES FOR SOROTI INDUSTRIAL AND BUSINESS PARK MAY 2023											
No.	Name of Developer	Business Activity	Acres	Development Status	Contact Person(s)	Gender	Nationality	Employment	Level of Investment (USD)	Email	Contact
OPERATIONAL											
1	UGANDA DEVELOPMENT CORPORATION (TESO FRUIT (TEA) ZONE)	Agro-processing	4.8	Operational		M	Uganda	150	7 800 000	info@tdc.co.ug	0200-455485
2	PELA COMMODITIES LTD	Factory in the grain value chain	35	Operational	Isiah Mwangi Amos Wabuna	M	Uganda	90	10 000 000	info@pelacommodities.co.ug	0753-750015
CONSTRUCTION											
3	SANGUJA ENGINEERING LIMITED	Production of concrete products	4	Construction Stage	Ernest Ignatius Ocul Fook	M	Uganda			sangujaeng@gmail.com	0755-213440 0752-895219
4	ASALAMMAL LTD	Manufacture of vegetable and animal oils and fats	5	Construction Stage	Mwambi R. Yusuf	M	Kenya			asalammal2019@gmail.com	0776-554202
5	SOROTI DISTRICT LOCAL GOVERNMENT	Skilling Youth	10	Construction Stage	Soroti Local Gov't- CAO - Soroti District	M	Uganda	1 000	6 500 000 000		0782-860004
6	TESO FOODS LTD	Fruit processing plant	4.79	Construction Stage	Capt Mike Mukula	M	Uganda				0813-106662 0813-106668 0772-860000
7	FINA HERBALS (U) LTD	Manufacturing facility for Cookies and other health products	5	Construction Stage	Prof. Ojwang Martin E.	M	Uganda			www.fina.co.ug	0779-417612 0764-290355
DMF LANDS											
8	UGANDA FREE ZONES AUTHORITY	Free Zone Area	20	Pre-Start Stage	Rebecca N Wamono (Dir. Business Devt & Investor Support)	M	Uganda			rebecca.wamono@ufza.gov.ug	0417-722634 0704-038374
9	KILEE HOTEL LIMITED	Hotel	2	Pre-Start Stage	Kenneth Oculang	M	Kenya			kenneth.ocul@kileehotel.com	0-467362481003
10	KILEE MEDICAL EQUIPMENT LTD.	Hospital	1	Pre-Start Stage	Kenneth Oculang	M	Kenya			kenneth.ocul@gmail.com	0-467362451950
11	MIGA HOLDINGS	Agro-processing	5	Pre-Start Stage	Mukolele Christopher	M	Uganda				0718-555417 0718-539421
12	SOROTI TEACHERS CO-OP SAVINGS & CREDIT SOCIETY LTD.	Co-Operatives	1	Pre-Start Stage	Olaga Augustine	M	Uganda			olaga_2004@yahoo.com	0789-305082
13	WOCMA INVESTMENT LTD	Building and Construction Plant	9	Pre-Start Stage	Lubong Jacobin Omeri	M	Uganda			lubongjacobin@yahoo.com web@wocma.com	0736-696667 0718-552385
14	ITAA TANNIA LTD	Food processing plant	5	Pre-Start Stage	Yvesi Gabay	M	Kenya			yvesi.gabay@gmail.com	0775-698048
15	ROMOLO FOODS AND BEVERAGES LTD	Grain and Fruit Processing	20	Pre-Start Stage	Isiah Mwangi	M	Uganda				0705-408000 0776-901248
16	NATIONAL MUSEUM WOMEN DEVELOPMENT COUNCIL	Developing a Regional Agricultural Mechanization Equipment Centre	1	Pre-Start Stage	Haniida Setenda Mukasa	F	Uganda			haniida.setenda@nawdc.gov.ug	0755-730088 0712-730088
17	LEKERE AGRICULTURE ENTERPRISE LIMITED	Agro Processing And Bulk Grain Handling	4	Pre-Start Stage	Stephen Oryall	M	Uganda	200	600 000	stephen.oryall@gmail.com	0774-855748
18	WASH AND WILLS COUNTRY HOME LTD	Hotel	5	Pre-Start Stage	Arling Joseph	M	Uganda			arlingjoseph@gmail.com	0752-507158
19	DEVELOPMENT MEASURES INTERNATIONAL LTD	Skilling The Youth	5	Pre-Start Stage	Martin J Oculok	M	Uganda			mjoculok@gmail.com	0772-424867
20	OPERATION WEALTH CREATION/NAADS	Cassava processing factories	5	Pre-Start Stage		M	Uganda				0414-47171718 0754-249078
21	SUKUMA (U) LTD	Factory to manufacture drugs, fertilizers, nitrogen compounds, packaging and distribution	5	Pre-Start Stage	Mwiga Jimmy	M	Uganda	784	2 000 000		
22	GOLDSEED INTERNATIONAL LTD	Agro processing factory	5	Pre-Start Stage	Roseette Kakoi Stella	F	Uganda	102	1 500 000	roseettekakoi@gmail.com	0782-282171 0704-147404
23	SOROTI FRUITS LIMITED	Expansion of the existing apple processing factory	5	Pre-Start Stage	Nderanda Douglas Kaliyakiyo	M	Uganda	130	11 200 451	nderaanda.douglas@sofrl.com	0772-488205
24	AZ PLUMBING COMPANY LTD	Manufacturing plant for organic fertilizer and biogas	2	Pre-Start Stage		M	Uganda	41	140 000	az.org@gmail.com	0702-264821
25	PROPOSED DMF LAND	DMF Activities	4.21				Uganda				
								2 000	6 500 000 000		





The Global Green Growth Institute

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Jung-gu, Seoul, Republic of Korea 04518

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