Uganda Trade Support Project with TradeMark Africa: Preassessment Report

Image 1: Construction site of Softcare in Lugazi Industrial Park

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Acronyms

B2B	Business-to-Business	**MFPED**	Ministry of Finance, Planning and Economic Development
B2C	Business-to-Consumer	**MoU**	Memorandum of Understanding
BAU	Business as Usual	**MWE**	Ministry of Water and Environment
CAPEX	Capital Expenditure	**NEMA**	National Environmental Management Authority
COMESA	The Common Market for Eastern and Southern Africa	**NPV**	Net Present Value
CSR	Corporate Social Responsibility	**NWSC**	National Water and Sewerage Corporation
DANIDA	Danish Development Agency	**SCOUL**	Sugar Corporation Uganda Limited
DM	Domestic Market	**UCPC**	Uganda Cleaner Production Center
DRM/DRR	Disaster Risk Management/Disaster Risk Reduction	**UEGCL**	Uganda Electricity Generation Company Limited
EAC	the East African Community	**UFZEPA**	Uganda Free Zones and Export Promotions Authority
eCBA	Extended Cost Benefit Analysis	**UIA**	Uganda Investment Authority
EIP	Eco-Industrial Park	**OPEX**	Operating Expenditure
EOI	Expression of Interest	**PPP**	Public-Private Partnerships
EU	European Union	**RECP**	Resource Efficiency & Cleaner Production
FZ	Freezone	**SDR**	Social Discount Rate
GGAP	Green Growth Assessment Process	**SEA**	Strategic Environmental Assessment
GGF	Green Growth Framework	**SEZ**	Special Economic Zone
GGGI	Global Green Growth Institute	**SME**	Small and Medium Enterprise(s)
GHG	Green House Gas	**SRO**	Self-Regulating Organisation
GIZ	The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	**SWOT**	Strengths Weaknesses Opportunities Threats
GoU	Government of Uganda	**TMA**	TradeMark Africa
GRI	Global Reporting Initiative	**UCPC**	Uganda Cleaner Production Center
IP	Industrial Park	**UNIDO**	United Nations Industrial Development Organization

IRR	Internal Rate of Return	**UNEP**	United Nations Environment Programme
IT	Information Technology	**UNBS**	National Bureau of Standards
KPIs	Key Performance Indicators	**VAT**	Value Added Tax
MTIC	Ministry of Trade, Industry and Cooperatives	WAC	Weighted Average Cost of Capital

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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, including poverty reduction, job creation, social inclusion, and environmental sustainability. GGGI works with 51 member countries worldwide, building their capacity and collaborating 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.

TradeMark Africa, formerly TradeMark East Africa, is an Aid-for-Trade organization that was established in 2010, with the aim of growing prosperity through increased trade. Trademark Africa operates on a not-for-profit basis and is funded by Belgium, the Bill and Melinda Gates Foundation, Canada, Denmark, the European Union, Finland, France, Ireland, the Netherlands, Norway, the United Kingdom and the United States of America. Trademark Africa works closely with regional intergovernmental organizations, including the African Union (AU), the African Continental Free Trade Area (AfCFTA) Secretariat, the East Africa Community (EAC), the Intergovernmental Authority on Development (IGAD), the Common Market for East and Southern Africa (COMESA), the Southern Africa Customs Union (SACU), national governments, the private sector and civil society organizations. Trademark Africa has a country office in Uganda directly responsible for the implementation of the activities under the trade support project.

Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries in order to contribute to growth, employment, and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that emphasize product certification, sanitary and phytosanitary standards, and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and the Global Green Growth Institute will partner to deliver the "Greening Uganda's Freezones" Project.

Denmark's support is aligned to assisting Uganda achieve the goal of Uganda's economic policy which is to transition from a least developed country to a middle-income country. The government of Uganda through Vision 2040 committed itself to improve trade balances by implementing strategies aimed at transforming the country's trade capacity, and these include, among others, growing market access to selected export destinations in regional and emerging markets and ensuring that the exports are competitive and meet international standards. In order to increase market access and competitiveness of agricultural products in domestic and international markets, the third National Development Plan proposes to strengthen enforcement and adherence to product quality requirements, including food safety, social and environmental standards, grades, etc. The National Development Plan envisages that this will be done through a) enforcing product certification; b) training farmers and manufacturers to comply with sanitary and phytosanitary standards c) renovating, building, and adequately equipping certification laboratory facilities in various strategic locations, and d) regulating cross-border informal trade in agro-products. The Uganda National Bureau of Standards (UNBS), a critical implementing partner, has already commenced collaboration with the Ministry of Agriculture, Animal Industry, and Fisheries to monitor and respond to phytosanitary issues as they arise along the production and export value chain. This trade project, therefore, contributes to activities aligned with NDPIII priorities.

Project Title: "Developing the Capacity of UFZEPA to setup export freezones that met global green trade standards"

Funding Agency: Trademark Africa

Locations: TBD

Duration: 2 years

Partners:

Trademark Africa

Global Green Growth Institute

Danish International Development Agency

Government of Uganda

2. Project Objectives

The overall project objective is "Enhanced competitiveness and climate resilience of Uganda's trade and export value chains." At impact level, the trade project will result into increased decent jobs, improved incomes, and food security for Ugandans and refugees. The program, aims at "creating, enhancing, and developing institutional capacity at national level, to drive expanded and more competitive exports and build the climate resilience of Uganda's export value chains." Trademark Africa's climate and environmental action will be guided by OECD Development Assistance Committee Rio Markers. This intervention will strengthen market access for Uganda's priority agricultural exports[1] in the region and internationally. Targeted activities will build the capacity of exporters to establish and operate better export quality management systems. The project will also specifically incubate and expand green elements in trade through capacity building of trade related institutions to design and implement climate adaptation standards, develop and implement green standards for agro-value-added commodities as well as promote integration of new green technologies into Uganda's export production base. The project will holistically intervene across the agro-value-added export sector.

The specific objectives are:

Outcome 1	**Enhanced capacity of relevant institutions and stakeholders to plan and establish green economic zones**
Output 1.1	Project sites are identified and approved by government based on methodological criterion
Output 1.2	Masterplans developed and approved by project steering committee

[1] *The project objectives are not addressing agro products exclusively. It mentions contributions to agro-value chains because it is known that due to the current level of industrial development, those are present (and often the majority) of value chains/products for which industrial parks are established but they are not exclusive and, besides, GoU priority sectors do not focus on agro only. On the contrary, the team attempted to diversify the sectors covered to non-agro ones during the site selection but ended up still finding that parks have an agro predominance.*

Output 1.3	Symbiotic and/or productive (green) infrastructure concept notes and project teasers developed
Outcome 2	**Improved awareness and capacities of policy makers and stakeholders on green growth**
Output 2.1	Stakeholder engagement mechanisms established to support planning and implementation of sustainable park management practices.
Output 2.2	Policy makers and private sector stakeholders trained on green investment mobilization

3. Pre-assessment Methodological Approach

3.1. Situation/context

According to Uganda's Vision 2040, the country aspires to become a transformed society from a peasant to a modern and prosperous country within 30 years.

Industrialization as Uganda's targeted vehicle for achieving its aspirations is specified in the **third National Development Plan 2020/21-2024/25** (NDPIII), whose theme is '***sustainable industrialization for inclusive growth, employment and sustainable wealth creation***' to increase average household incomes and improve the quality of life. Industrialization continues to be a focal area in the NDPIV to be gazetted in mid-2025.

A strong and competitive industrial base is important to create employment, advance technology and create a resilient economy. Industrialization also offers more export earnings, a wider tax base, increased purchasing power, increased integration with agriculture, product diversification, greater efficiency and technical modernization and higher productivity throughout the entire economy.

Uganda needs to safeguard that the growth is not solely economic but is also happening in a sustainable, socially inclusive, and green manner. A green growth approach aims at decoupling economic development from unsustainable resource use and negative environmental impact while ensuring human well-being progresses.

The Uganda Green Growth Development Strategy (UGGDS) strongly urges the adoption of a green industrial development pathway in line with the Green Growth concepts.

In countries like Uganda where the infrastructure to support the industrialization agenda is inadequate, industrial parks (IP) have been looked at as suitable vehicles through which the industrialization agenda can be advanced. They also promote and encourage industrial symbiosis, thus increasing mutual benefits from industries and mitigating social and environmental impacts.

By delivering public goods and the accompanying policy interventions in support of investment, Industrial Parks including Special Economic and Free Zones, have acted as a catalyst to facilitate industrial development. IPs have become an increasingly popular instrument to promote economic development.

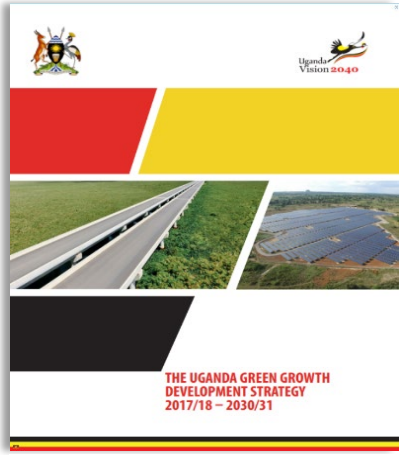


Image 1: Uganda Green Growth Development Strategy Document

In summary, the key advantages constitutive of the rationale to build IPs/SEZ are presented in

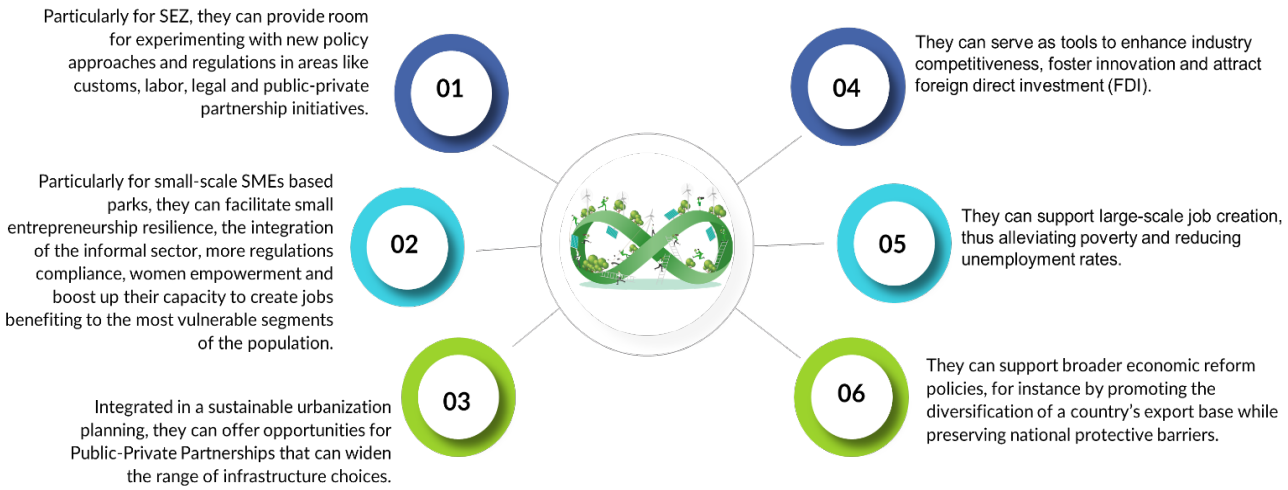


Figure 1: Rationale to build IPs/SEZ

Uganda targeted to have constructed 25 Industrial Parks and Free Zones by 2025. However, a 2020 study by the Friedrich Ebert Stiftung on implementing Uganda's industrialization agenda found that the IP that had been constructed so far did not follow any empirical feasibility studies. Additionally, there were no guiding principles at the national level to inform their development.

The currently operating and planned IPs are yet to be conceived or transitioned to EIPs. Their incentives are primarily aimed at attracting investment and promoting exports, yet none are geared towards green investment, and there are no rewards or performance measures associated with safeguarding environmental and social capital.

To tackle these issues, Uganda has recently developed and issued the "Guidelines for Developing Uganda's Industrial Parks and Free Zones". This document guides stakeholders in undertaking proper feasibility studies and developing designs which include strategic environmental assessments, environmental impact statements, life cycle cost analysis, land use planning, and risk management tools.

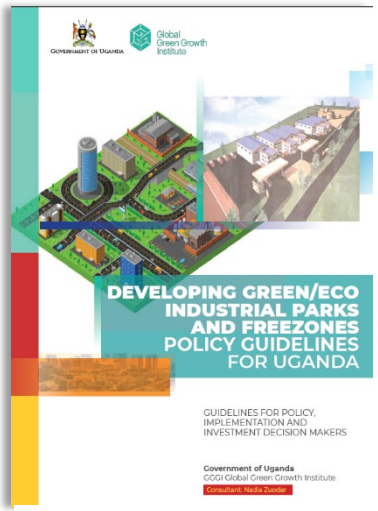


Image 2: GGGI Guidelines for Developing Uganda's Industrial Parks and Free Zones

To respond to these challenges, GGGI and TMA partnered to support the Government of Uganda green its internal and external trade with the present project. Figure 2 presents the summary of strategic alignments between TMA and GoU.

Project Objective

To contribute to Uganda's transition towards GREEN economic growth by integrating green growth strategies in special economic zone planning

Alignment with Uganda's policies

- NDPIV 2025/26 - 2029/30
- Uganda Green Growth Development Strategy (UGGDS) 2017/18-2030/31
- Uganda's Nationally Determined Contributions (NDCs)
- National Industrial Policy 2020/21-2029/30
- Industrial Masterplan 2020-2040
- Guidelines for Developing Uganda's Industrial Parks and Free Zones

Alignment with Trademark Africa Strategy 2030

Key results under TMA Strategy supported by this project:

1. Increase in the share of Africa's exports as a percentage of global trade
2. Increase in the volume of intra-Africa trade
3. Value of green investments leveraged
4. CO2 emissions reduced above the trend on select corridors & value chains
5. Direct jobs created (not including jobs created from trade facilitation advances)

Figure 2: Projects objectives and strategic alignments between TMA and GoU.

3.2. Terminology Green Industrial Parks and Special Economic Zones

Green Industrial Parks (Green IP or Eco IP) integrate environmental, social and economic sustainability. The term IP encompasses all types of parks such as Industrial Business Parks, Freezones or free-trade zones (FTZs), export processing zones (EPZs), special economic zones (SEZs), and more. The terms **SEZ and FTZ** address a subcategory of parks that offer special taxes to companies operating in the park, usually free taxes, rebates, or subsidies for the import and export of goods. Figure 3 illustrates IP and SEZ definition as per the "Guidelines for Developing Uganda's Industrial Parks and Free Zones".

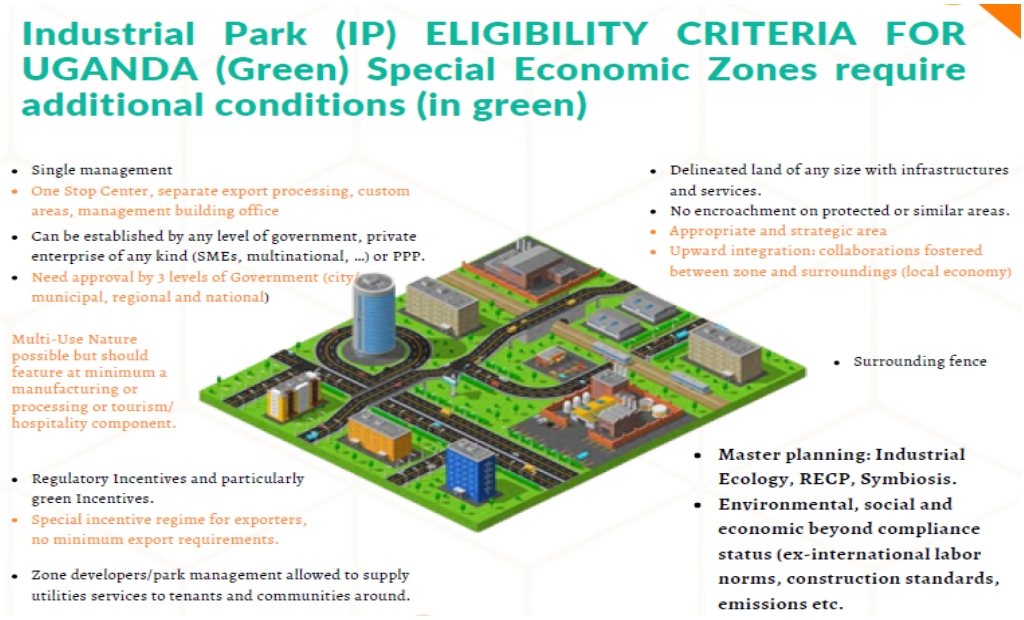


Figure 3: EIP and SEZ definition as per "Guidelines for Developing Uganda's Industrial Parks and Free Zones".

For project success and GGGI value added, priority should be given to partners motivated by gains from Resource Efficiency and Cleaner Production (RECP) and Symbiosis (Shared Infrastructures) proposals, rather than solely by financial incentives like tax rebates.

The importance on RECP and Symbiosis for green or Eco IPs comes from UNIDO EIP Framework and Toolbox which has been thoroughly used in this assessment. The EIP definition is given in Figure 4.

Figure 4: EIP approach

There are also arguments in favor of an export-oriented strategy that considers Domestic Market (DM) interests as summarized in Figure 4.

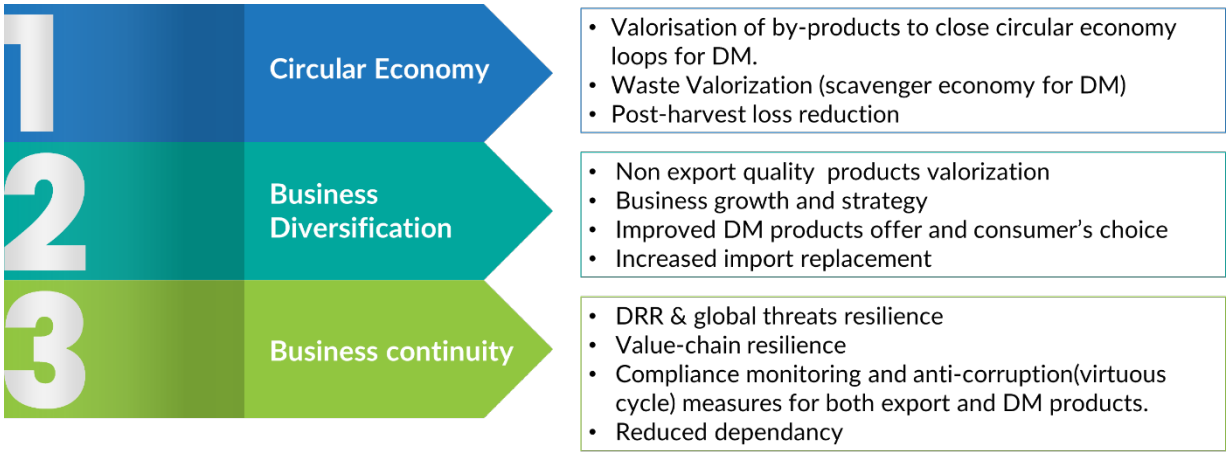


Figure 5: Arguments in favor of an export- oriented strategy that considers Domestic Market (DM) interests.

With those premises it has been agreed that GGGI preassessment would consider all forms of private and public parks and not only SEZ or Freezones as long as an export readiness component could be identified. In some exceptional cases, SMEs clusters with a potential interest in Industrial Park formation were also considered.

4. Pre-assessment Validation Approach

4.1. Mobilization process

The stakeholders' mobilization was mainly based on GGGI contacts and previous working relations on Industrial Parks and Freezones. It also received spontaneous assessment requests from both public authorities and private partners. As GGGI works on routing, it regularly undertakes field visits whereby awareness is raised on the IP concepts. Besides, GGGI has partnered with Uganda Cleaner Production Center (UCPC), which network of collaborating companies and services that has also been put in contribution.

4.2. Validation Process

A presentation of the screening results took place with the donors and government representatives to confirm the 4 sites covered by the preassessment mission. The results of this mission were presented at the TMA National Oversight Committee (NOC) workshop, with participants provided in Annex C. This is the forum whereby TradeMark Africa presents the status of selected projects they are funding, and although it is not a validating instance, it gave the opportunity to multiple stakeholders to address GGGI on the preselection. Besides, the preassessment mission was composed of a mix of GGGI team and partners, which ensured ownership of the mission results (see participants to the mission in §8.4). The present report serves as final validation after approval by both the donor and representative offices and organizations from the field mission.

PART I: SITES SCREENING

5. Screening Methodology

5.1. Site screening approach with TradeMark Africa and GoU priorities

The project requires the identification of 1-2 promising sites. It would take into consideration the Government of Uganda's interests, ranging from planned sites for freezones, export potential strategies, contribution to NDP IV, the East African Community (EAC), and the Common Market for Eastern and Southern Africa (COMESA) trade development. Those national interests are complemented with the following criteria (Figure 5):

Figure 6: Site selection criteria with TMA and GoU priorities

Sites for which land tenure issues have not been resolved won't be selected due to time constraints. Sites that are not aligned with GGGI green policy or presenting major environmental and social protection concerns will also be excluded.

The high-level site preselection approach presents 5 steps in alphabetical order summarized in Figure 6:

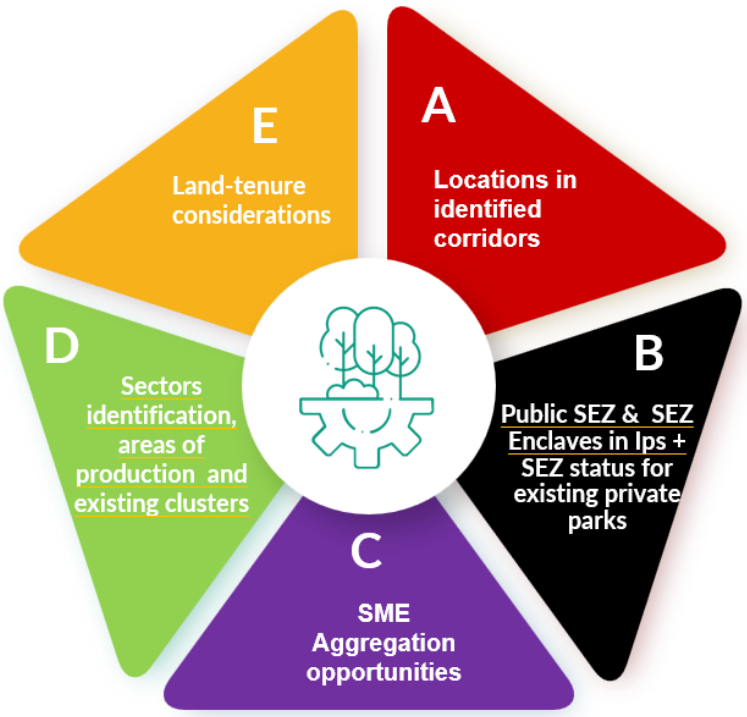


Figure 7: High-level methodology for site preselection.

Complementarily to the site preselection (site screening), the EIP criteria developed in the Industrial Park and Freezone guidelines for site selection (Figure 7) is also applied. That covers more in details the favoring factors including local context appropriateness, economic and social relevance, environmental bearing capacities, management structure, infrastructures, technical opportunities and more.

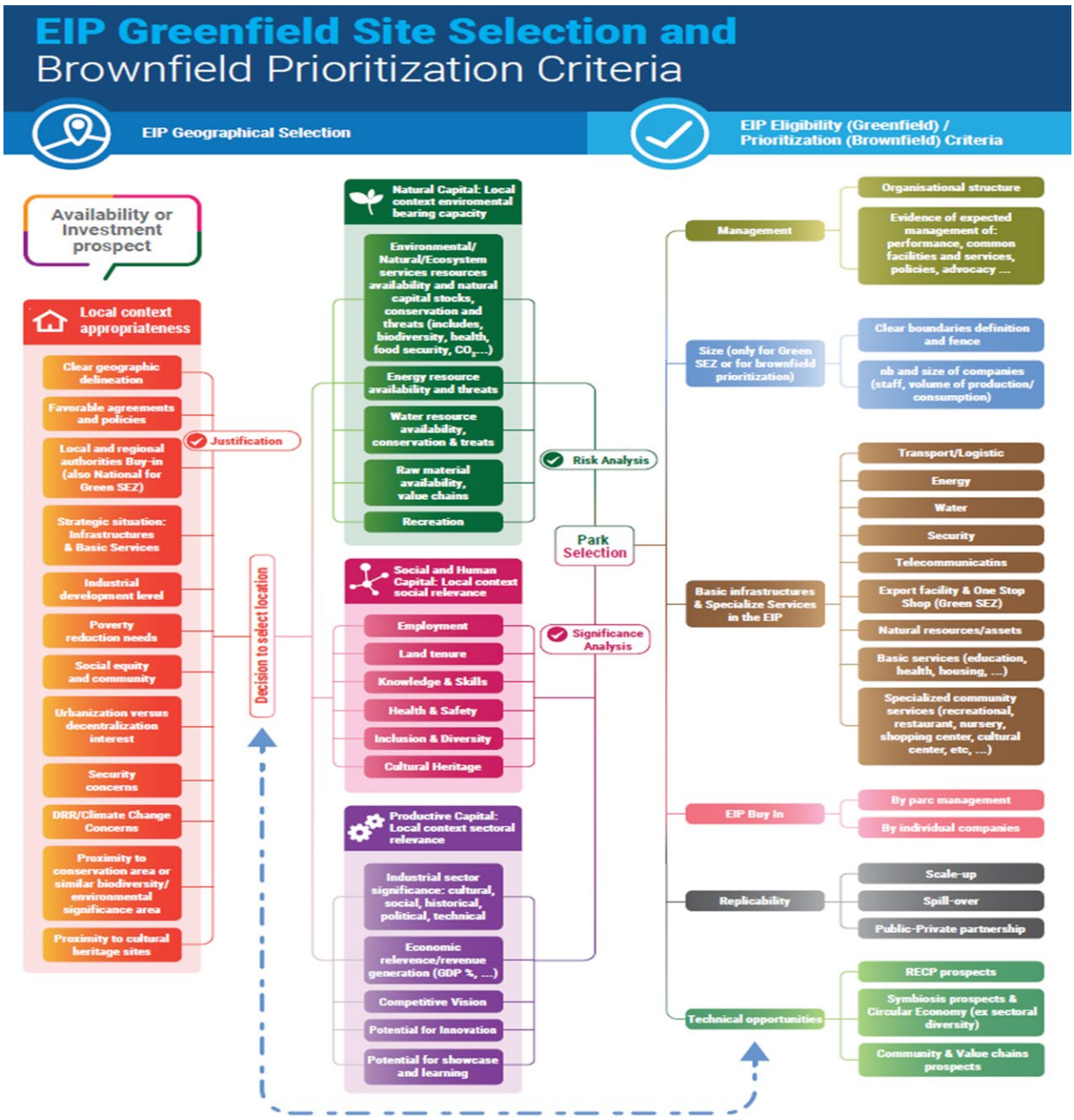


Figure 8: Site selection criteria from the Industrial Park and Freezone guidelines

5.2. Step A: locations in identified corridors

5.2.1. Location in CUSA project corridors

The present TMA project is aligned with the business development opportunities presented by the 'Strategic Corridors and Urban Systems in Africa' (CUSA) project initiated by the Joint Research Centre (JRC) and the Directorate-General for International Partnerships (DG INTPA) of the European Commission (EC). The CUSA project was born in the context of the 2021-2027 EU programming exercise, and the first phase resulted in the identification and prioritization of key Strategic Corridors in Africa to support territorial development

(both rural and urban) through reliable networks and services, including the deployment of digital and energy-related infrastructure. The selection of a first set of 11 envisaged Strategic Corridors (Figure 9) to be supported in the frame of the Global Gateway Africa – Europe Investment Package has been formalized at the sixth European Union-African Union Summit, held on 17-18 February 2022.

Figure 9: the envisaged 11 Strategic Corridors, as emerged from quantitative and qualitative analyses from the CUSA project

In addition, the Global Gateway EU-Africa Investment Package (Figure 10) supports transport projects in Kenya targeting the strategic "Northern Corridor" – the busiest trade and transport corridor in East Africa - to improve regional connectivity and trade.

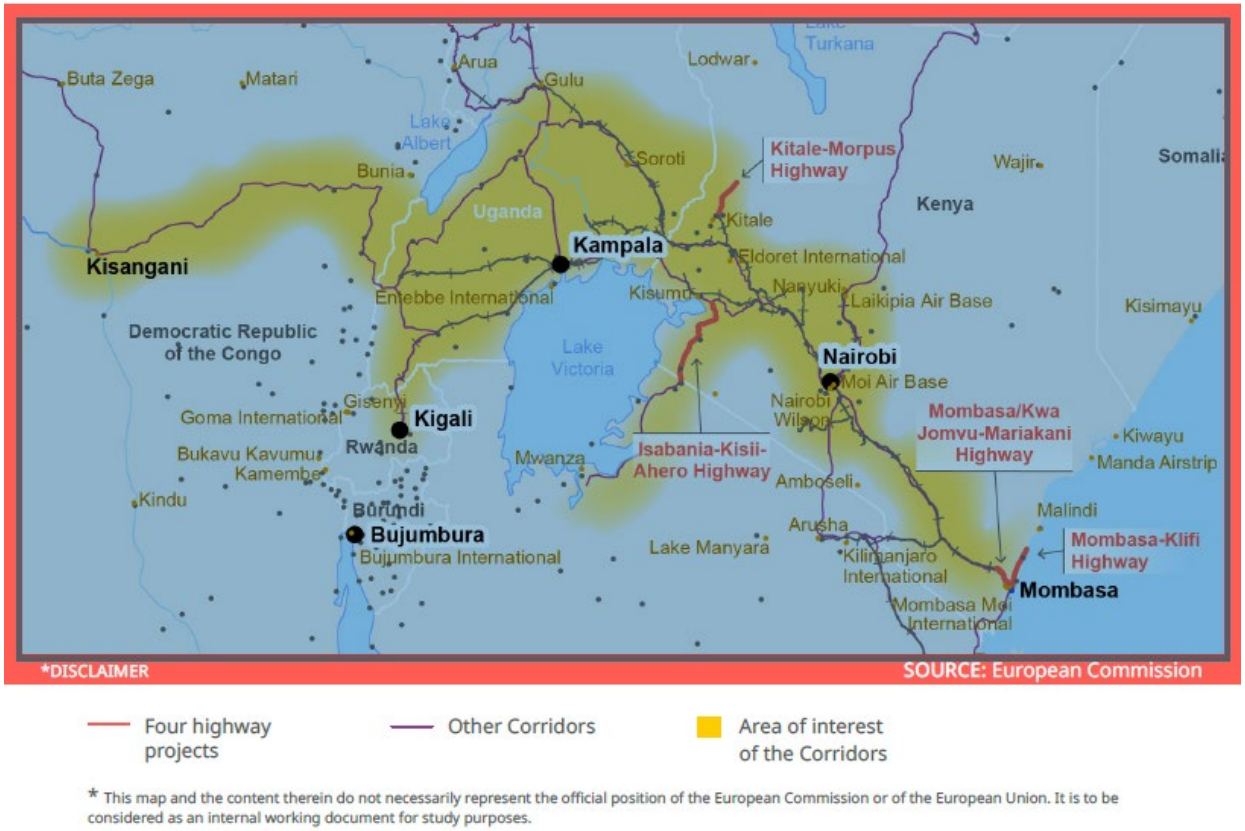


Figure 10: Global Gateway transport projects

Within the 11 corridors (Figure 9) identified by CUSA, the assessment has selected 3 corridors of priority interest for Uganda, namely:

- **Corridor 6 DOUALA/KRIBI-KAMPALA**
  Central Africa: Cameroon, Central African Republic, Democratic Republic of the Congo, Uganda.
- **Corridor 8 MOMBASA-KISANGANI**
  East Africa: Kenya, Uganda, Rwanda, Democratic Republic of the Congo
- **Corridor 11 CAIRO-KHARTOUM-JUBA-KAMPALA**
  North and East Africa: Egypt, Sudan, South Sudan; Uganda

5.2.2. Location along WFP supply chain

WFP operations in the region offer great perspectives both for import substitution for the Ugandan operations particularly in refugee camps, as well as to part of WFP regional supply chain. As per WFP 2023 AGILE Regional Procurement report, the Regional Bureau of Eastern Africa injected over USD 900 million into the local economies where WFP operates through food procurement, goods and services procurement, and Cash Based Transfer activities. Figure 11 shows the value of good purchases in the region while Figure 12 details the purchased food by origin country, highlighting Uganda potential to increase its shares.

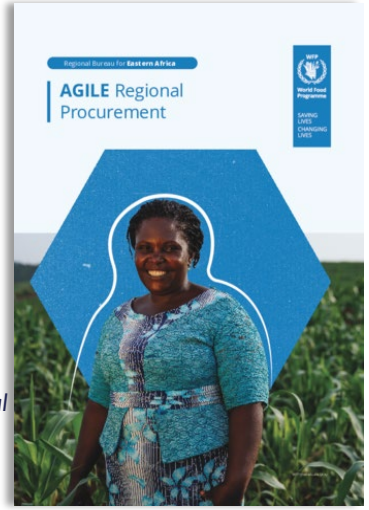


Image 3: WFP 2023 AGILE Regional Procurement report

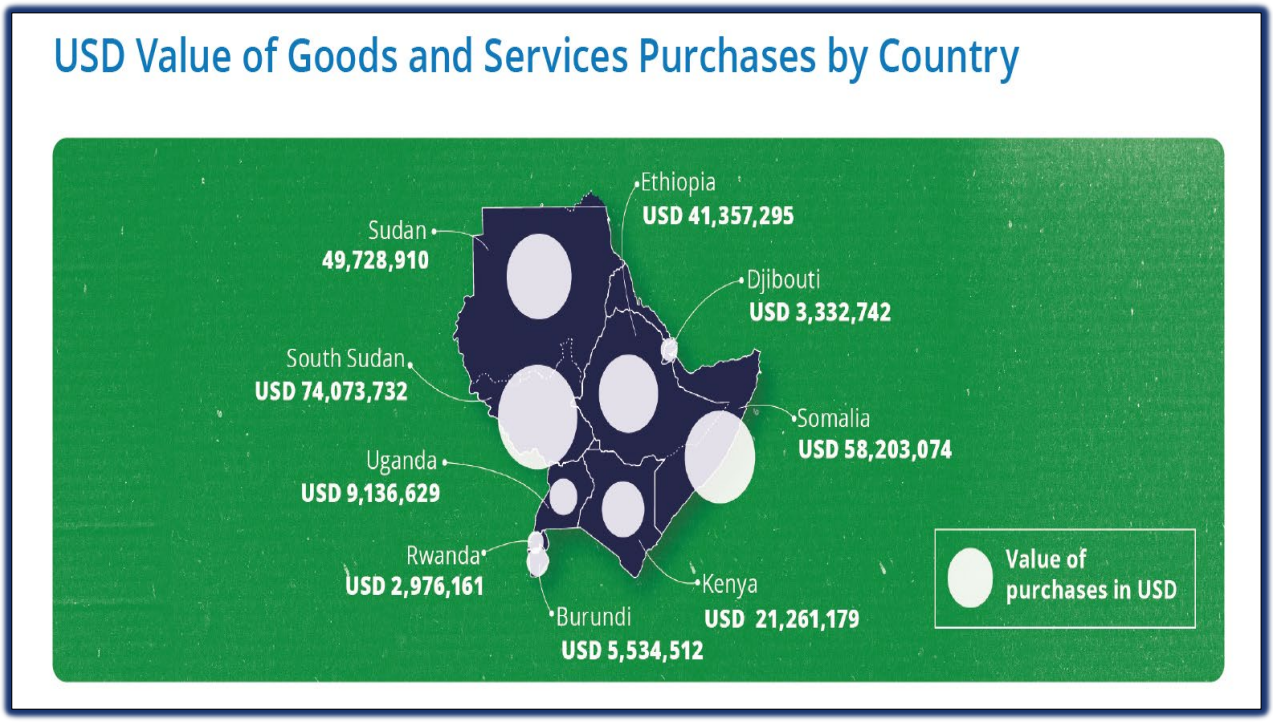


Figure 11: WFP value of goods and services purchases in Eastern Africa.

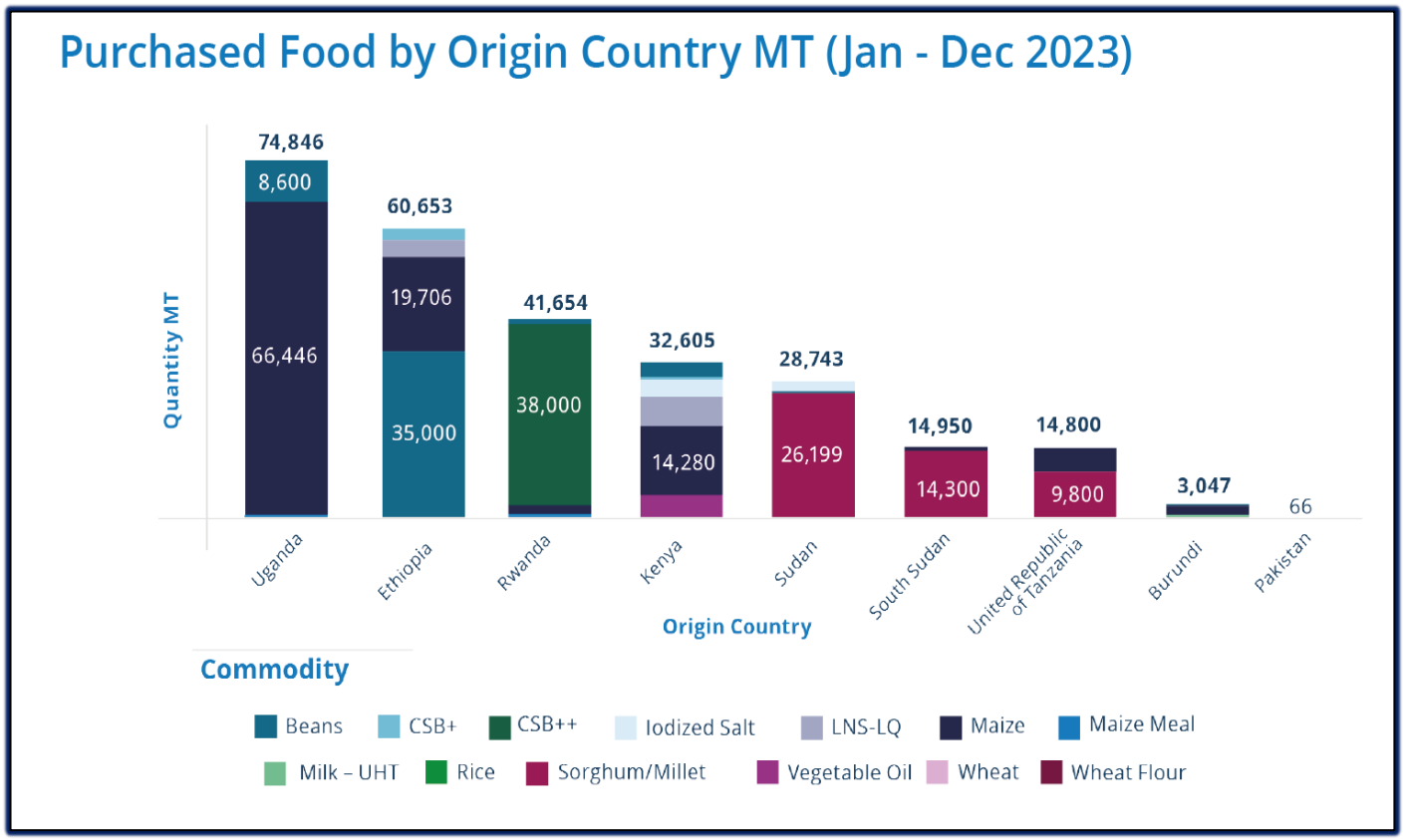


Figure 12: WFP 2023 purchased food by origin country

[2]

Meetings with WFP procurement manager in Uganda provided information on the WFP in country storage capacity and movement as shown in Image 5. WFP was planning to set up a logistic hub in Uganda for the region and looking for a new location for their Tororo Central Delivery Point (CDP). The team investigated potential synergies with freezones in Lira where WFP owns land and Tororo.

However, in regards to the budget cuts operated by the Trump administration, uncertainties about WFP procurement volumes vs cash deliveries over the coming years WFP reluctance to share space with other businesses, and project time constraints, GGGI considered the business risks too high at that moment to pursue a collaboration under the current project.

[2] CSB+ stands for Corn Soy Blend plus, a fortified blended food product distributed by the World Food Programme (WFP). It is a supplementary food, often used in emergency situations and as food aid to address undernutrition. CSB+ is typically used to prepare a porridge or gruel, and it is formulated with heat-treated maize and soybeans, sugar, vitamins, and minerals.
CSB++ (Corn-Soy Blend "Plus-Plus") is a fortified blended flour, developed by the World Food Programme (WFP), designed to combat moderate acute malnutrition (MAM) in children. It's a revised version of the older CSB, incorporating dry skim milk and an enhanced micronutrient profile, making it more energy-dense and effective.
Ready-to-use Supplementary food Paste - also called Lipid Nutrient Supplement Large Quantity (RUSF- LNS LQ) is a high-energy fortified food used by humanitarian agencies, Ministries of Health, Governmental and Non-Governmental Organizations for the treatment of moderate acute malnutrition (MAM).

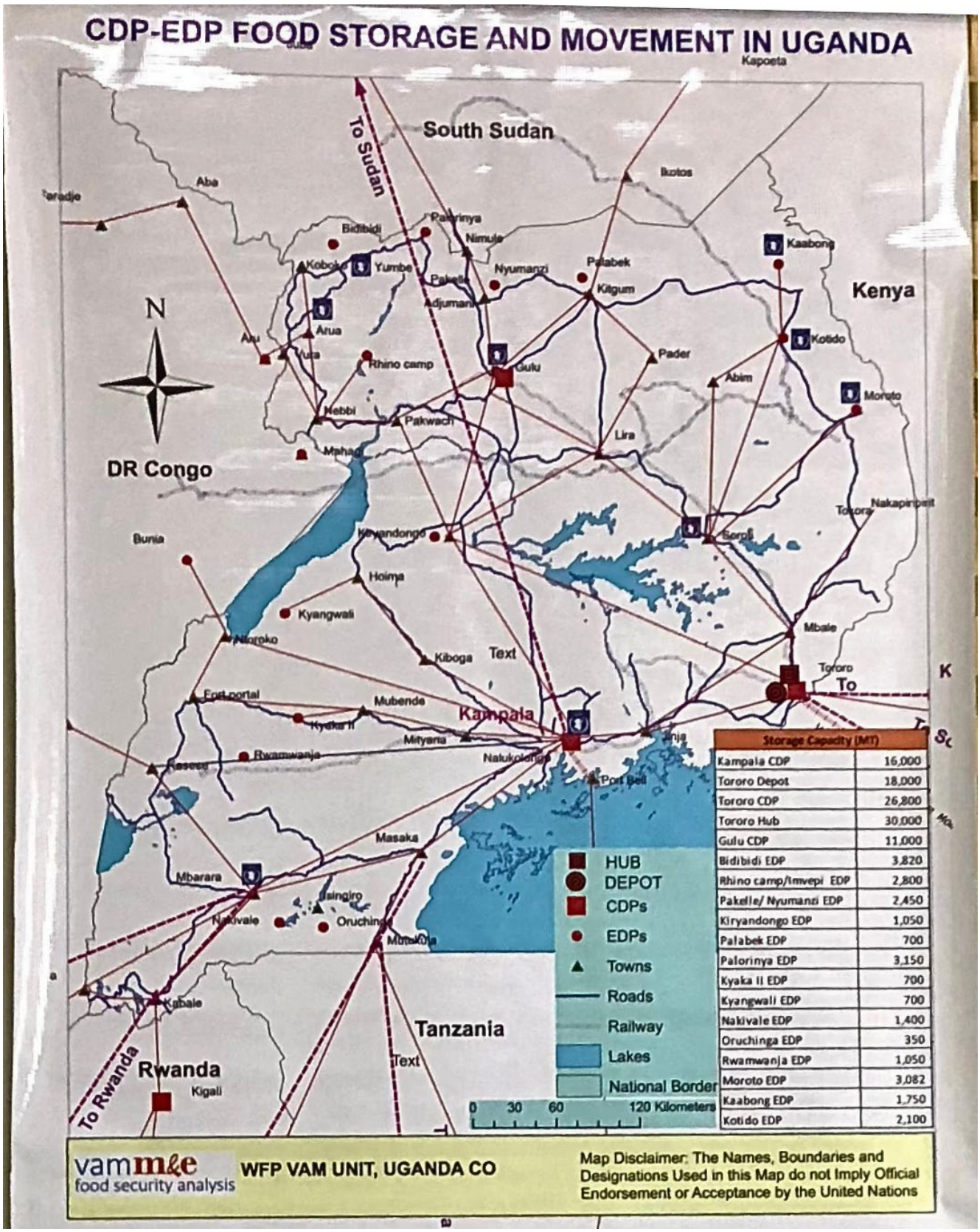


Image 4: WFP food storage and movement in Uganda

5.3. Step B: Public SEZ & SEZ Enclaves in IPs + SEZ status for existing private parks

The National Industrial Parks Development Strategy (2020/21 – 2024/25) foresees the development of a number of IPs and SEZ/Freezones as presented in Figure 13 and Figure 14.

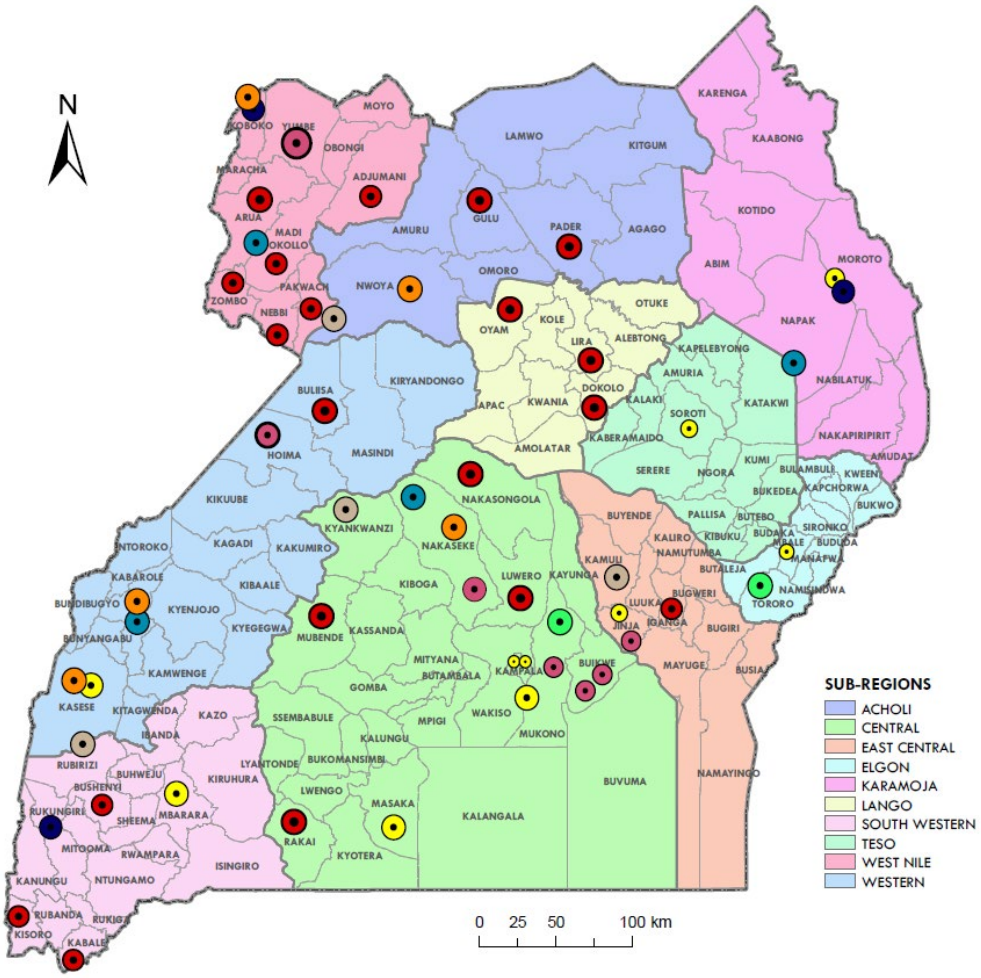


Figure 13: Locations of IPs and SEZ as per the National Industrial Parks Development Strategy (2020/21 – 2024/25)

National Industrial Parks Development Strategy:

- Gazetted Industrial and Business Parks under Development
- Gazetted Industrial and Business Parks not yet developed
- Proposed Large Scale Industrial & Business Parks specific to the (SGR) Project
- Proposed Regional Science, Technology and Industrial Parks (STIPs)
- Proposed Industrial Parks under the Forum on China–Africa Cooperation (FOCAC) Programme
- Proposed Regional Science, Technology, Engineering, Innovation (STEI) Parks
- Proposed Regional Parks
- Developed Private Industrial Parks

Kampala Industrial and Business Park, Namanve	2,200 acres
Luzira IBP	70 acres
Bweyogerere IE	50 acres
Mbarara (SME Park)	12 acres
Kasese IBP (also FOCAC)	216 acres
Jinja IBP	182 acres
Soroti IBP	219 acres
Tian Shan Mbale Park	619 acres
Karamoja IBP	417 acres
Liao Shen Industrial Park Co. Ltd	1,280 acres
Lugazi Industrial Park	150 acres
MMP Industrial Park Buikwe Ltd	1,000 acres
Yumbe Industrial Park	
Jinja Industrial Park	200 acres
Katosi Industrial Park	10 sq. miles
Mukono (SGR) Industrial Park	300 acres
Tororo (SGR) Industrial Park	600 acres
Oraba Industrial Park	139 acres
Kaweweta Industrial Park	11,520 acres
Anaka Industrial Park	3,612.6 acres
Kabarole Industrial Park	500 acres
Moroto	
Rukungiri	
Koboko	
Arua, Adjumani, Gulu, Pader, Madi-Okollo, Zombo, Pakwach, Nebbi, Oyam, Lira, Dokolo, Buliisa, Bushenyi, Kabale, Kisoro, Nakasongola, Mubende, Luwero, Rakai, Iganga.	

Figure 14: List of IPs and SEZ as per the National Industrial Parks Development Strategy (2020/21 – 2024/25).

This list superimposed with the CUSA strategic corridors served as the first base for shortlisting potential sites.

5.4. Step C: SMEs aggregation opportunities

The recent evaluation of UNIDO Global Eco-Industrial Parks Programme (GEIPP) (Image 6), a five-year initiative launched in December 2018 has highlighted the particular challenges faced by SMEs to move towards EIP production (Image 7) .

The **facilitation of SMEs to integrate green IPs/EIPs projects,** for example through dedicated incubators, their contributions within the EIP global value chains, urban symbiosis with EIPs or by facilitating industrial clusters of SMEs to form green IPs has not been sufficiently explored in IPs projects, though GGGI Uganda has taken an active approach to support it.

The proactive preselection of SMEs clusters in the vicinity of IPs as potential green IPs projects recipients has been therefore proposed by GGGI.

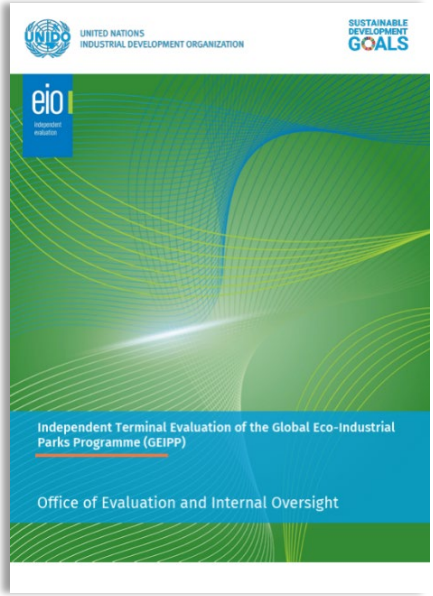


Image 5: Evaluation of UNIDO Global Eco-Industrial Parks Programme (GEIPP)

Recommendation 7: The GEIPP approach should be enhanced to promote a more equitable distribution of potential benefits, specifically through development and implementation of targeted approaches to reach more Small and Medium Enterprises (e.g., through strongly incorporating them into local supply chains for EIPs) as well as older and less sophisticated parks. In addition to supporting and recognising high level "lighthouse" parks, GEIPP should promote and recognise less modern or sophisticated parks, which make tangible progress towards improved production and management approaches. This might be activated through the creation of a specific funding envelope for SMEs, within the existing country project or as an "add-on" with additional funding.

Finding 7: Although GEIPP documents and activities make mention of Small and Medium Size Enterprises, the evaluation found no evidence of systematic approaches or specialized financing to address their particular challenges with moving towards eco-industrial production.

GEIPP has been most effective in-country through its collaboration and support to enable governments to increasingly focus on EIP approaches. Parks and companies operating at high standards with strong resources have been most able to adopt new practices. Older, crowded IPs with many SMEs have not yet been major beneficiaries of the GEIPP approach and the evaluation found that country projects have largely struggled to bring them into the projects at any scale.

Image 6: Recommendation 7 from UNIDO Global Eco-Industrial Parks Programme (GEIPP) evaluation

Moreover, **social inclusion, including Gender aspects**, are fully integrated in the project methodology through a dedicated assessment tool (see Gender & Social inclusion assessment) and the design of symbiotic infrastructures, particularly in the social sector, that may address inclusivity needs. The promotion of SMEs, including women-entrepreneur led and business incubators play also a role to curb green IPs access challenges for women, which participation may be hampered due to their small-scale business sizes or lack of financial inclusion.

An innovative avenue the project team has taken into consideration is the opportunity offered by sustainable digitalization not only to support greening (a digitalization readiness tool has been introduced in the methodology see Digital readiness assessment) but also to address B2C businesses. Indeed, as per IFC 2021 report on Women and e-commerce in Africa (Image 8), "on the Jumia platform, 35 percent of businesses in Côte d'Ivoire and 51 percent of businesses in Kenya and Nigeria were owned by women", hinting likely similar ratios in Uganda.

Image 7: IFC 2021 report on Women and e-commerce in Africa

Thus, by enquiring on the opportunities to identify SMEs clusters that may use B2C business model for export during sites screening, GGGI has done a step more in finding innovative ways to bridge the gap between green industrialization, sustainable digitalization and gender inclusion.

In a nutshell, step C on the sites screening methodology bring in the elements summarized in Figure 15:

Figure 15: SMEs aggregation opportunities, inclusivity and innovative models

5.5. Step D: sectors identification, areas of production and existing clusters

The GGGI "Guidelines for Developing Uganda's Industrial Parks and Free Zones" provides recommendations to stakeholders in undertaking a macro-level economic analysis and sectoral prioritization. Within the time constraints of this project, a field-level potential sectors analysis and export markets identification was performed based on:

- Trade Corridors (Step A: locations in identified corridors)
- Market analysis tools, in particular information from Uganda Trade Portal, ITC export potential maps, including tables/maps on products imported/exported, products diversification, ITC/UBOS/UN COMTRADE publications on the list of products exported from Uganda/countries importing from Uganda. See an extract on Annex D.
- The National Export Development Strategy 2015/162019/20 (NEDS) priorities (see **Box 1**).
- Niche/Green Markets potential, such as Organic markets (ex, Japan, Canada, Australia)
- High population markets with less stringent export quality criteria (ex: Indonesia, Pakistan, Malaysia)
- Balancing a product market potential with current export volume or recent growth rate and barriers to estimate possible market readiness.
- Value Chain selection from the 2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report (see **Box 2**)
- Global Value Chain Potential including potential intermediary markets (ex, Mauritius, India, Indonesia). Pragmatically from a business perspective, Uganda's value addition to products is seen as a process where being part of a global supply chain on raw or semi-processed products is a preliminary step towards an end goal to gain final market shares on value-added ones. Therefore,

it may be critical to keep both raw material and value-added products in a pipeline in order to reach an economy of scale on raw material and balance risk on value-added products volumes or quality. As an example, Vanilla has a credible export potential (see Figure 16) added to a potential for transformation and upgrade within new sectors. Analyzing its current export markets shows Mauritius at a non-negligible 11th position (see Figure 17), acting as a Vanilla re-exporter (see market channels Figure 18) . Though temptation to curtail the re-exporter and head directly to the same market channels may be great, it may be unwise to jump abruptly. Indeed, as stated by CBI analysis "Exporting directly to flavor manufacturers and processors will require high quality consistency and volume availability, usually starting at a few containers per year". Thus, this criterion takes into consideration a learning curve balancing raw material and added-value products at the same time.

Figure 16: Uganda 2024 exports featuring Vanilla

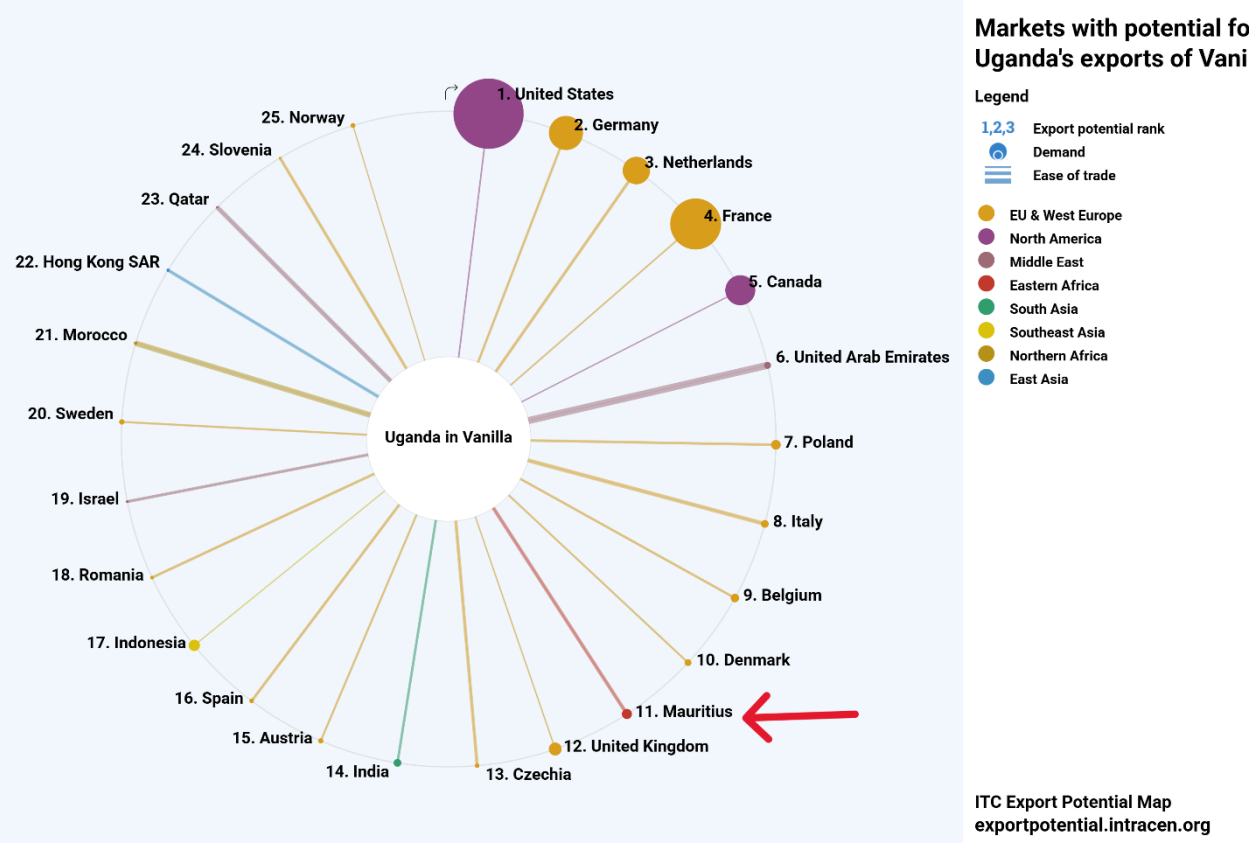


Figure 17: Markets with potential for Uganda's exports of Vanilla featuring Mauritius

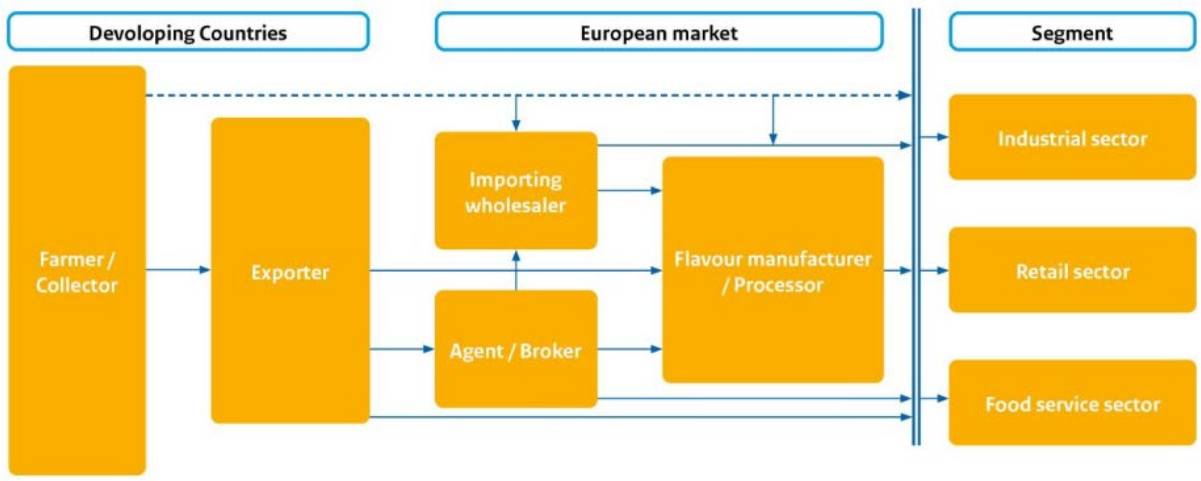


Figure 18: Market channels for vanilla from CBI and Profound market entry analysis

Box 1: The National Export Development Strategy 2015/162019/20 (NEDS)

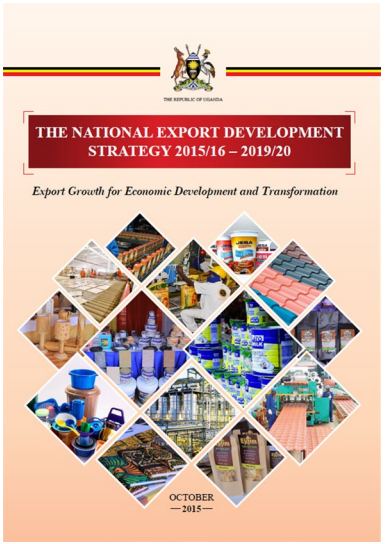


Image 8: The National Export Development Strategy 2015/162019/20 (NEDS)

The NEDs aims at fostering economic and social transformation.by growing Uganda's foreign exchange earnings through increased exports of both goods and services. The following priority markets emerged:

i. In the European Union – UK, Germany, Italy, Spain, Netherlands, Belgium and France

ii. Within COMESA (other than EAC Partners States) – Sudan and Democratic Republic of Congo (DRC)

iii. All the EAC Partner States (Kenya, Rwanda, Burundi and Tanzania).

iv. Other Africa: South Sudan

v. From the Middle East – the United Arab Emirates

vi. From the Americas – the USA

vii. From Asia – China, India, Hong Kong and Singapore.

Box 2: [2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report]

Image 9: 2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report

"The International Trade Center (ITC) prepared this diagnostic study as part of the project titled "Strengthening the capacity of LDCs to formulate policies on trade diversification for resilient recovery from the COVID-19 pandemic and implementation of the Doha Programme of Action through South-South cooperation and multi-stakeholder partnerships". The project aimed to enhance the capacity of participating LDCs to formulate policies on export diversification and achieve trade related goals and targets of the Doha Programme of Action for the LDCs (DPoA). It explores Uganda's potential to diversify its exports (see Figure 19 for current exports) and enhance value addition through targeted development of high-potential value chains. The analysis identifies key value chains—processed foods, animal feed, and beauty and personal care products—that offer opportunities for value-added growth. To address the barriers that hinder the realization of this potential, the report recommends policy actions focusing on infrastructure development, enhancing financial inclusion, strengthening quality and compliance systems, and fostering capacity building. Additionally, climate resilience, digital trade, public-private dialogue, and regional integration, particularly through the African Continental Free Trade Area (AfCFTA), are highlighted as critical to sustainable export diversification. "

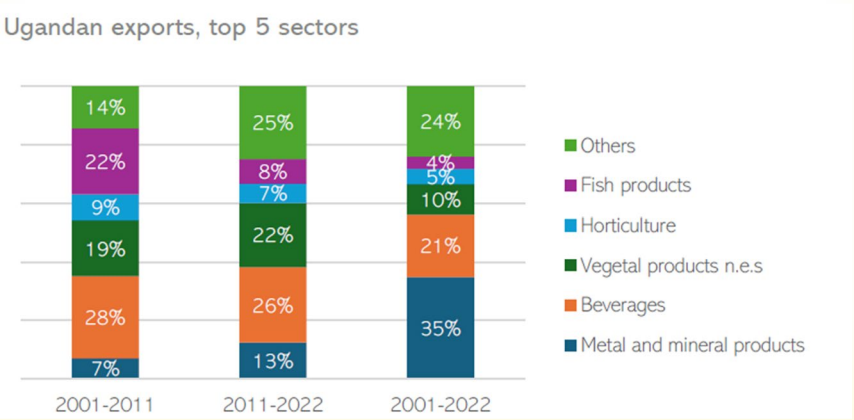


Figure 19: Uganda top 5 exports

Box 2 (continued): [2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report]

As shown by Figure 20 Africa accounted for over 38% of all exports in the period 2018-2022, provided most of the diversification opportunities (Figure 21) and purchased most of the processed products (Figure 22).

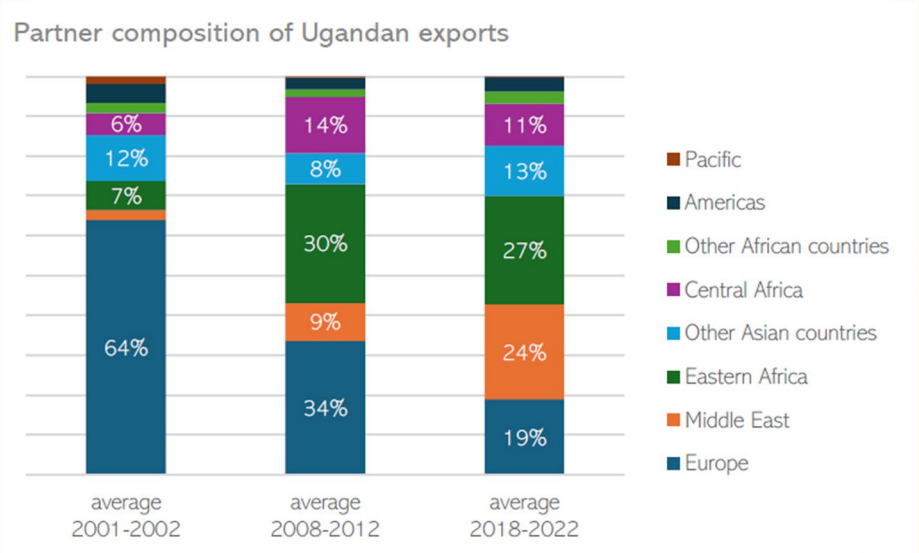


Figure 20: Ugandan exports by region

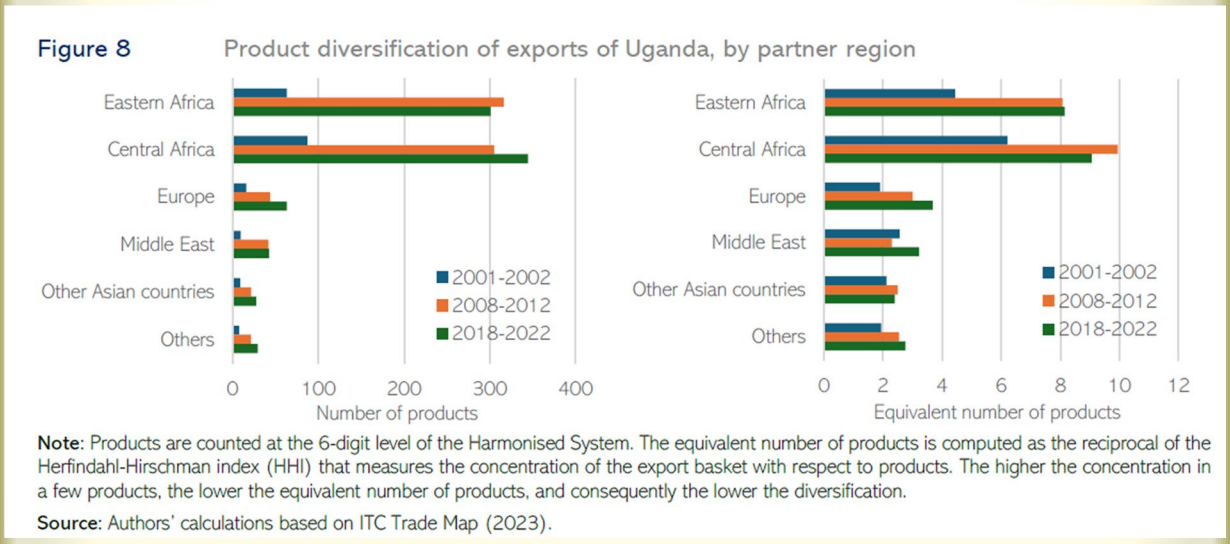
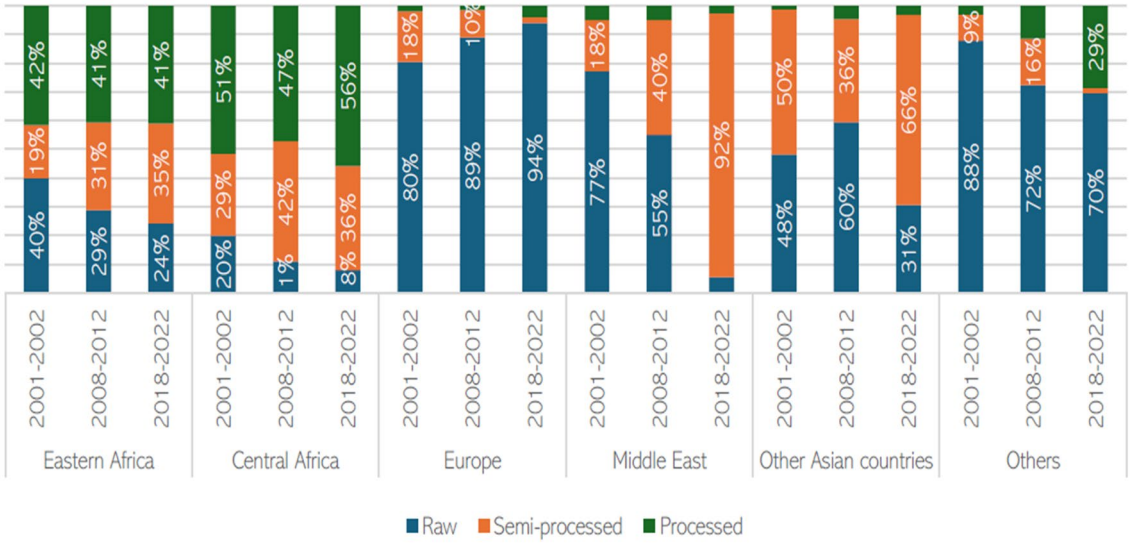


Figure 21: Export products diversification by region

Box 2 (end): 2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report

Figure 9 Product diversification of exports of Uganda, by partner



Note: The classification of products into raw, semi-processed and processed is based on the Multilateral Trade Negotiation Categories (MTNC) of the World Trade Organization (WTO).

Source: Authors' calculations based on ITC Trade Map (2023).

Figure 22: Exports diversification by region and processing degree

The results of the diagnostic are presented in Annex E, "which lists agriculture-based manufactures identified as both feasible and desirable for export expansion or development, showcasing several value chains within the processed foods, animal feed, and beverages sectors. These results align with Uganda's tradition of competitive local agricultural resources."

For a detailed analysis of the sectors at potential sites and EIP opportunities assessment, we thus customized selected UNIDO EIP tools (see **Box 3**) and integrated with the GIZ/UNIDO Equip toolbox (see **Box 4**) to cover more RECP and environmental, socio and economic parameters. The team also applied its own sectoral expertise and previous GGGI projects learnings.

Box 3: UNIDO Eco-Industrial Parks (EIP) Toolbox

The EIP Toolbox covers all key components of Eco-Industrial Parks including Resource Efficient and Cleaner Production (RECP), development of industrial synergies, strengthening park management, park selection and scoping EIP interventions, policy support and capacity-building. The toolbox contains 11 different tools that have all been adapted, complemented and used in the course of GGGI Green IP development. **For this preassessment, focus has been placed on (4) Selection tool, (8) Concept Planning tool and (11) Gender self-assessment tool.**

1. ASSESSMENT TOOL:

The objective of this tool is to assess an industrial park against the International Framework for Eco-Industrial Parks (UNIDO, WBG and GIZ, 2017) and subsequently identify, prioritize, plan, manage and monitor eco-industrial park initiatives. It can be used and adapted to all types of existing (brownfield) industrial parks and management structures (e.g. private company, public authority, public private set-up, real estate).

2. OPPORTUNITIES MONITORING TOOL:

The objective of this tool is to monitor and report resource savings and impacts from EIP opportunities identified and implemented in industrial parks with the support of (inter)national development projects.

3. POLICY SUPPORT TOOL:

The objective of this tool is to assist international development agencies (e.g. UNIDO) and its national partners with providing technical support to policy makers on EIP policy planning and development. It can be used as a practical tool to inform and guide the project team throughout the different stages of the policy development process in relation to Eco-Industrial Parks (e.g. from high level visioning to implementation, as presented in the main menu of this tool).

4. SELECTION TOOL:

The objective of this tool is to support the selection of industrial parks with a high potential for EIP development and creating successful, visible and replicable EIP projects. It is especially useful to assist in the selection of existing industrial parks that could be transformed in EIPs (brownfield), but it can also be used for the selection of area(s) that will host a new EIP (greenfield).

5. INDUSTRIAL SYMBIOSIS IDENTIFICATION TOOL:

The objective of the tool is to support the identification of industrial symbiosis opportunities (by-product and waste exchanges) between companies. This tool can be used in existing industrial parks (brownfields) to provide stakeholders with an indication of the symbiosis opportunities related to companies operating in the park. Alternatively, the tool can be used for new industrial parks (greenfields) to highlight possible industrial symbiosis between companies locating to the park, and thereby assist in the planning of infrastructures and utilities to enable these connections.

Box 3 (continued): UNIDO Eco-Industrial Parks (EIP) Toolbox

6. RECP MONITORING TOOL:

The objective of this tool is to monitor and report the resource savings and results of RECP assessments undertaken with companies in industrial parks. The tool provides a standardized method to calculate and monitor the economic, environmental and social benefits of RECP opportunities identified and implemented as part of UNIDO's EIP projects.

7. MANAGEMENT SERVICES TOOL:

The objective of this tool is to strengthen and advance the services provided by park management to tenant companies, and thereby increase "value for money" provided by park management to tenant companies and securing / expanding revenues of park management entity. The tool assist industrial park management entities and tenant companies with reviewing, prioritizing, scoping, and action planning of fit-for-purpose and added-value services to their park and tenant companies.

8. CONCEPT PLANNING TOOL:

The objective of this tool is to assist in the sustainable and integrated design and operation of industrial parks from an economic, environmental and community perspective by providing a systemic approach to incorporate demand-driven eco-industrial park opportunities into the concept planning of greenfield parks and brownfield parks.

9. MASTER PLAN EIP REVIEW TOOL:

The objective of this Master Plan EIP Review Tool is to guide the sustainability review of existing Master Plans of industrial parks, based on eco-industrial parks concepts and International Framework for Eco-Industrial Parks (UNIDO, WBG, GIZ), and thereby provide concrete suggestions for strengthening Master Plans.

10. ACCESS TO FINANCE TOOL:

The goal of the Access to Finance Tool is to guide park management entities and tenant companies to identify, review and access available financing options for feasible eco-industrial park initiatives. The tool is built on a carefully researched database of available funding options in specific country contexts, of which this South African version is the pilot. To replicate the tool for other national contexts, please consult the UNIDO EIP Access to Finance Tool Replication Manual: Download the replication manual.

11. GENDER SELF-ASSESSMENT TOOL

The Gender Self-Assessment Tool aims to help park management entities and tenant companies assess, review, and promote gender equality. Developed using internationally recognized methodologies, standards, and tools, it incorporates feedback from participating companies and Eco-Industrial Parks involved in the project. To ensure effective use of the tool, UNIDO GEIPP has provided a preparatory setup and step-by-step guidelines, which we recommend reviewing before proceeding. Download the supporting documents here: *Preparatory Setup* *and* *Step-by-Step Guidelines*.

Box 4: EquiIP Toolkit

EQuIP Enhancing the Quality of Industrial Policies

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the United Nations Industrial Development Organization (UNIDO) are partners in the development and deployment of the EQuIP toolkit. The EQuIP toolkit is a collection of analytical tools that address the three key aspects of inclusive and sustainable industrial development, namely i) economic; ii) social, and iii) environmental outcomes. Using the EQuIP diagnostic tools, policy practitioners can develop and rely on a comprehensive, multidimensional assessment of the industrial sector. The sector's strengths and weaknesses can thereby be empirically identified. The EQUIP diagnostic tools were specifically designed to provide a solid foundation for this assessment, encompassing a range of economic, social and environmental aspects. The primary goal is to equip policy practitioners with a clear understanding of i) the sector's economic performance and trajectory; ii) how inclusive it has been in terms of providing productive and decent jobs for both men and women, and iii) the extent of the sector's impact on the environment, and whether effective efforts have been made to limit these impacts.

The EQuIP toolkit presents 8 tools with strong overlap with the EIP toolbox on the environmental and social aspects. Therefore, the focus has been on integrating the economic aspects with Tools 1 to 4 (Figure 23).

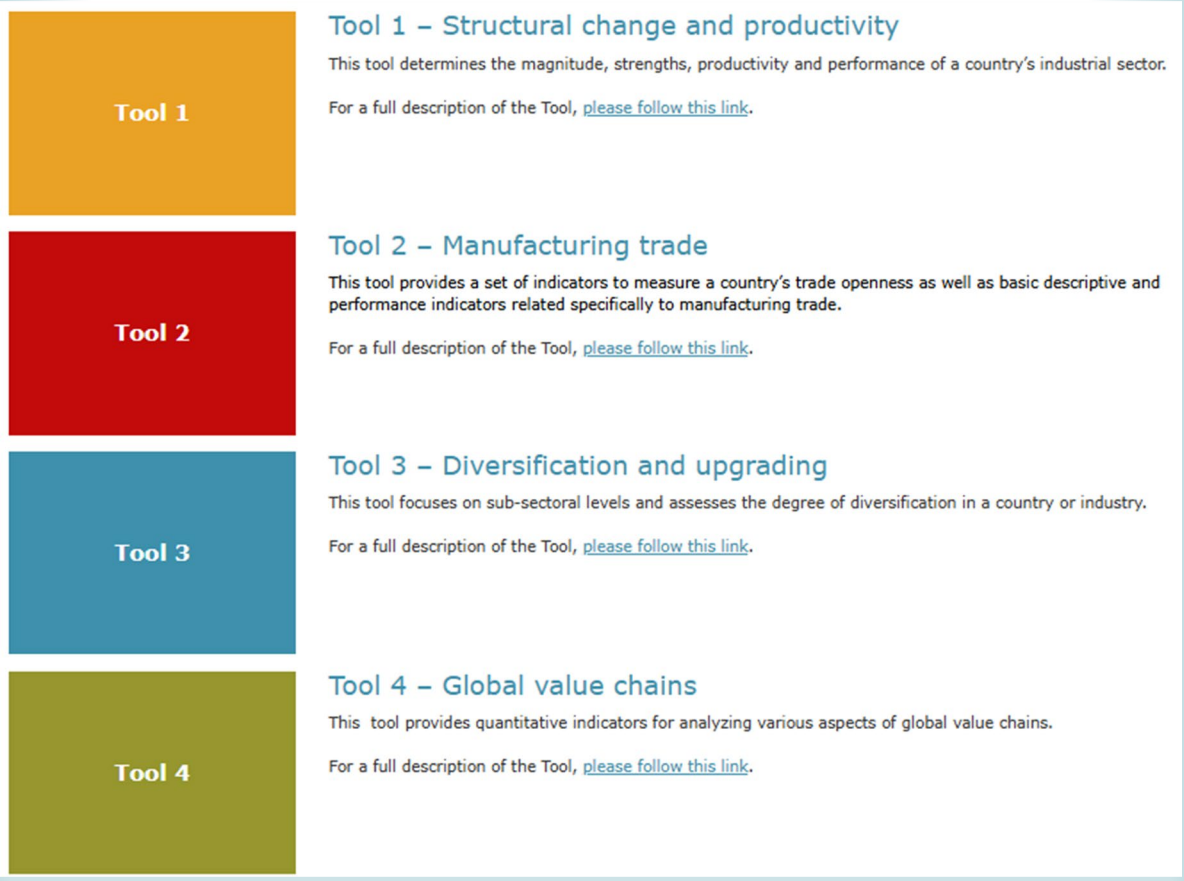


Figure 23: EQuIP Tools 1-4 summary.

In summary the overall sectors prioritization process is represented by Figure 24.

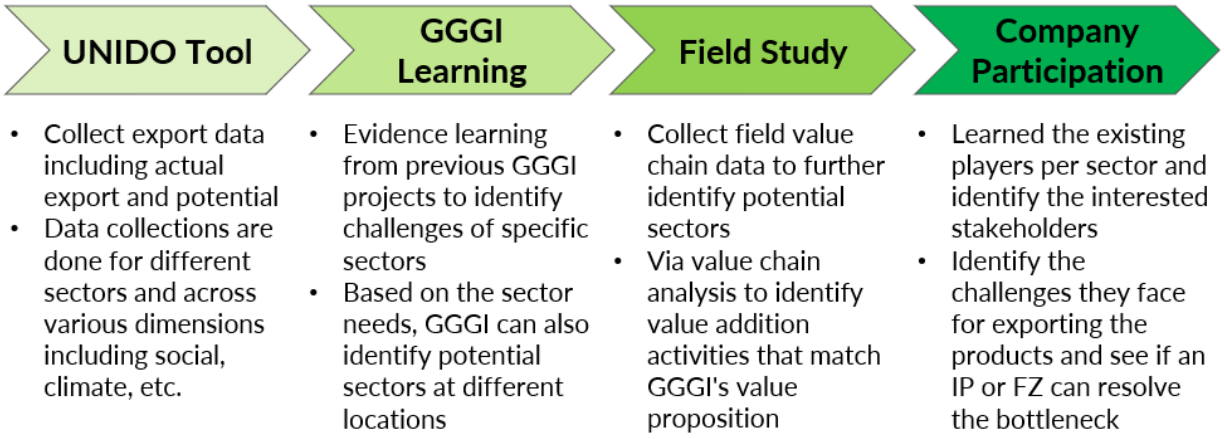


Figure 24: Project sectors prioritization process

5.6. Step E: land-tenure considerations

The GGGI "Guidelines for Developing Uganda's Industrial Parks and Free Zones" present a chapter on EIP land acquisition with recommendations in case of relocation or resettlement. It is also a position from the Donor not to engage the project on any site for which land-tenure wouldn't be granted.

There is no doubt that GoU would benefit from a governance focused project facilitating stakeholders' concertation and, in particular, community consultations and complaint mechanisms. However, the current project timeframe was too short to engage into such matters.

6. Sites Shortlisting

This chapter presents the synthetic findings based on the 5 assessment steps (see **Screening methodology**) including partner's ad-hoc proposals investigations, by the park ownership model.

6.1. Park sites with GoU ownership

Table 1 presents a list of prioritized parks site by Uganda Free Zones and Export Promotions Authority (UFZPA) for which land-tenure status is not finalized and have therefore not been shortlisted for preassessment.

STATUS ON PROPOSED (PRIORITY) GOVERNMENT SITES FROM UGANDA FREEZONES AUTHORITY

SITE	Land-tenure status	Additional considerations	Shortlisting Y/N
MUBENDE	Land acquisition at site not finalized.	Industrial grade power, water supply and sanitation infrastructure not developed at site. Value chains around the site are not yet developed to park level let alone export. Project time lines and budget do not allow for resolving of all these issues.	No. Project time lines and budget do not allow for resolving of all these issues.
KUMI	Land acquisition at site not finalized. Government does not own a land title in its name.	Industrial grade power, water supply and sanitation infrastructure not developed at site. Value chains around the site are not yet developed to park level let alone export.	No. Project time lines and budget do not allow for resolving of all these issues.
BUGIRI	Land acquisition at site not finalized. Government does not own a land title in its name.	Industrial grade power in the vicinity, water supply and sanitation infrastructure not developed at site. Value chains around the site are not yet developed to park level let alone export.	No. Project time lines and budget do not allow for resolving of all these issues

Table 1: Land tenure status on UFZPA proposed sites

Table 2 presents GoU sites with land tenure granted. Besides BWEYOGERERE IE for which the green potential is unclear, no site could be shortlisted either due to mandate duplication, lack of interest in green approaches or lack of green potential (typically insufficient diversification for the implementation of circular economy loops).

GOVERNMENT SITES WITH LAND TENURE GRANTED (all the other sites from GoU map do not have land tenure granted at this stage). All meet the Corridors Criteria.

SITE	Land-tenure status	Additional considerations	Shortlisting Y/N
SOROTI IP	Acquired, partly operational.	GGGI masterplan already done.	No. Already covered by previous GGGI project.
CHISORO IP	Acquired.	Master planner already allocated.	No. Duplication.
NAMANVE IBP	Acquired.	Master planner already allocated.	No. Duplication.
BWEYOGERERE IE	Acquired.	Limited number of sectors, few tenants but operational. No contact so far from UCPC.	Maybe Potential to investigate.
KISORO IP	Acquired.	unknown	No.
LUZIRA IBP	Acquired.	UCPC approached already the packaging companies and they were not interested in green chemistry. Insufficient diversity of sectors to identify circular economy loops. Land fully allocated, no scope for SMEs, complementary industries or infrastructures.	No. Lack of green potential.
JINJA Industrial Business Park	The 182-acre IP is owned by UIA and has been entirely parceled out to investors, with Kira Motors Corporation taking over 50% of the land.	The Kira Motors Corporation (KMC) site is currently heavily-guarded by the Uganda Peoples' Defense Forces (UPDF), which due to importance of the Company to the Government, greatly limits movement within the IP. This raises considerations around the feasibility of symbiotic infrastructures. Besides, during our mission, we were unable to engage directly with park tenants. Nevertheless, the park presents several infrastructure (transport) opportunities.	Yes Kiira motors had showed willingness to implement RECP. GGGI has supported it in raising money for diversifying its energy mix and expressed commitment to improving their environmental footprint. However, this is not necessarily reflected by other listed tenants' companies. The park would highly benefit from

			ecosystem valuation and conservation measures.
Masindi (Bunyoro Industrial Hub)	Acquired	Complete greenfield with no infrastructures yet	Maybe, only as a collaboration with skilling centers (see explanation below)

Table 2: Land tenure status on GoU owned sites

An additional aspect taken into account was the potential collaboration with GoU skilling centers (for a list see Table 3). A request from UIA to include Masindi (Bunyoro Industrial Hub) to enhance linkages between a potential IP and the skilling center was received. A thorough consideration was given highlighting pro/con arguments.

Pros:

- There is a learning curve and need for GoU to improve the connection between skilling centers and industrial parks, which could work as a model for other sites. Indeed, in the previous sites where GGGI operated (ex: Kasese, Soroti), this linkage was clearly missing.
- Inclusion on the preassessment would provide useful insights for future programming and projects proposals even if final selection is dismissed.

Cons :

- There is no guarantee that export-products can be identified from the skilling center competence products.
- If the adequation between the skilling center competencies and the industrial park needs is lacking, there will be little prospects for action within the current project.
- For greenfield industrial parks lacking basic infrastructures and/or concept, the current project may not be of sufficient duration to design a business idea from scratch.

PRESIDENTIAL INDUSTRIAL HUBS

REGION/SUBREGION	DISTRICT	LOCATION
Bugisu Subregion	Mbale District	Rwahaha Road
Busoga Subregion	Jinja District	District Farm Institute-Kamuli Road
Bukedi Sub Region	Kibuku District	Palisa Road
Sebei Subregion	Kween	Kween
Teso Subregion	Soroti	Near Teju Factory
Karamoja Subregion	Napak	Napak
Lango Subregion	Lira	Lira University
Acholi Subregion	Gulu District	Unyama- Kitgum Road
Madi Subregion	Adjumani	Kakere Town Council
West Nile Region	Zombo District	District Farm Institute
Bunyoro Sub Region	Masindi Town	Masindi
Tooro Subregion	Kyenjojo District	Kyenjonjo
Rwenzori Sub Region	Kasese	Kasese town
South western sub region	Ntoroko And Bundibugyo	Ntoroko And Bundibugyo
Kigezi Sub Region	Kabale District	Kabale-Kigezi Sub Region
Greater Ankole Subregion	Mbarara District	Rushozi Subcounty
Greater Masaka Sub Region	Masaka	Ndegeya Village in Bugabira Parish
Greater Mubende Subregion	Mubende District	Greater Mubende-Mjubende
Buganda Subregion	Mengo	Kayunga Road
Kampala	Kigo,Along Express Highway/Munyonyo	Kigo Workshop-Carpentry

Table 3: Skilling Centers locations

As it appeared that no site on the list wouldn't present one of the Cons identified, it was decided not to pursue this line of investigation for the current donor project. Indeed in general, such skilling centers are by not geared towards export and though a balance of domestic and export products is acceptable in IPs, the donor interest in export makes it unsuitable to pursue collaborations that wouldn't strengthen exports. IP and skilling centers linkages would be most beneficial on projects addressing the domestic market, with a strong capacity building component and over a longer timeframe.

6.2. Privately owned Park sites

Table 4 presents a list of privately owned parks and SMEs clusters investigated.

The sites visited were:

SITE	Land-tenure status	Additional considerations	Shortlisting Y/N
LUGAZI Industrial Park	Land acquired 120 acres with potential to expand. It is an established brownfield site, with approximately 50% of its land already allocated to a wearable apparel manufacturer and a pharmaceutical company.	The Board and Management is led by a nationally-recognized corporate and investment professional who has led reputable organizations, most recent as the former Chair of the Board of NSSF, the national pension fund. They were pursuing the freezone license with UFZA before rationalization of the agency. Has 2 tenants including Joint Medical Stores and Softcare. Collaboration with Uganda Development Bank to provide equity funding for infrastructures with the aim to house SMEs including in Agro-Food. The shareholders are open to a PPP ownership structure with long-term capital from the Government. High interest in greening and poverty reduction. Quality documentation was provided to the team that demonstrates the good maturation of the project.	Yes. Good opportunity for PPP with Kisassi Lugazi. High motivation. Potential for a phased support.
BUIKWE MMP	Land owned, operational.	Mainly foreign (Indian) ownership. Preliminary discussions show more interests in grants getting than greening. No space for SMEs. Little poverty reduction opportunities.	No. Insufficient green motivation.
ARUA Freezone	Land owned but not operational yet.	Promising location at DRC border and South Sudan with potential to become a hub for the region. Power is a limiting factor	Maybe, has potential as a freezone. However, project time lines and budget insufficient. Best to refer it to a longer-term project.

Masese/Jinja Cluster	The local government has gazetted the land and could maybe allocate some for symbiotic infrastructures, thus potential PPP with local government.	The Masese Industrial Cluster is a well-established brownfield site in Jinja City's South Division, with over 80% of its land already occupied by operational industrial tenants. They have an association potentially interested to form an official park. Mix agro-processing, heavy industry, warehouses. Already exporting. There is potential for symbiotic infrastructures with Jinja IP: clean-up needed to protect the river.	Yes Despite the cluster status, there is high potential for symbiotic infrastructure and circular economy approach given the diversity of sectors.
TORORO Industrial Park	The 100-acre proposed IP (greenfield) is privately-owned with opportunity for expansion. Local tenure system is family-ownership.	The Owner has not yet provided a credible business plan and may require support to take on park management. As a positive, he is open to a PPP arrangement with a government institution. The border location offers great symbiotic infrastructures perspectives with existing export products.	Yes Good opportunity to address border green IP services including reducing pain factors for the community seeing large movements of trucks.
Lira SMEs cluster	Privately owned	SMEs supported by Korea International Cooperation Agency (KOICA) with potential interest to build complementarities with GGGI. Opportunities for green value chains addressing biodiversity (Cosmetics, in particular with Nilotica Shea Butter).	Maybe, as most SMEs under KOICA project would need capacity building and value chain support, the complementarities with GGGI green IPs approach would require more time that currently allocated.
KARAMOJA Green Industrial & SEZ	As per the MOU, the clans will provide 2000 acres of land in Kaabong district	Post-workshop proposal. Joint-venture between DiaCente Group and TIITI-LOMAMPESE AND CHAKALOMUN SUB-CLANS. Diacente Group and Sustainable Planet Ltd, both award winners of the UNIDO Global Call 2024, are collaborating to expand operations in Uganda. This partnership aims to enhance food security and address climate change through the production of protein from water lentils.	The potential park is based on a single product value chain on an innovative product for which a number of questions remain (adequation for the site, storability, energy consumption for drying, pest vulnerability). The project time lines and budget is insufficient to perform an environmental evaluation and a single

			value chain dependency is a too high risk for the park business model.

Table 4: privately owned parks and clusters

6.3. Sites shortlist results

The result of the site screening left the following for consideration:

1) Jinja IBP
2) Masese (Jinja) Cluster
3) (Bweyogerere IE)
4) Lira Cluster
5) Tororo IP
6) (Arua FZ)
7) Lugazi IP
8) Masindi (Bunyoro Industrial Hub)

Of which based on the previously summarized elements, the shortlisted Parks/Clusters were (see Image 11: Preassessment shortlist map):

1) **Jinja IBP**
2) **Masese/Jinja SME Cluster**
3) **Tororo IP**
4) **Lugazi IP**

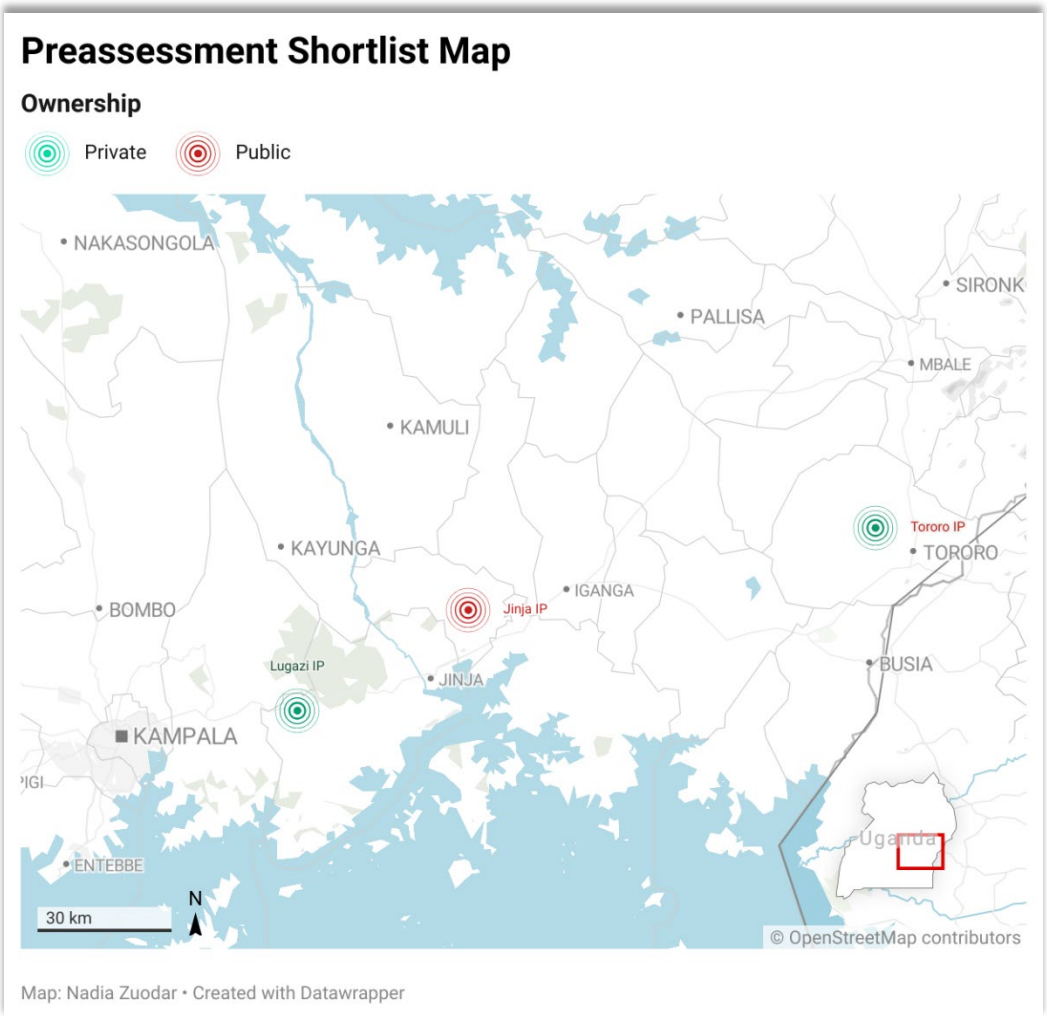


Image 10: Preassessment shortlist map

PART II: PRE-ASSESSMENT MISSION & METHOGOLOGY

7. Mission Organization

7.1. Concept Note for the Site Selection Mission

A. Background and context

Uganda aims to transition from a predominantly agrarian society to a modern and prosperous one by 2040, with industrialization as a key driver. This vision is encapsulated in Uganda's Vision 2040 and operationalized through its National Development Plans (NDPs), particularly NDPIII (2020/21-2024/25) and the forthcoming NDP-IV. The country's aspiration to achieve middle-income status hinges on fostering sustainable industrialization and urbanization. However, the rapid pace of development has often come at the expense of natural resources, underscoring the need for a green growth approach.

Industrial parks and free zones have emerged as pivotal instruments in Uganda's industrial strategy. They provide targeted infrastructure and policy incentives to attract investment, create jobs, and support sustainable economic growth. Yet, existing parks often lack comprehensive planning and fail to integrate green and inclusive growth principles, limiting their effectiveness and sustainability.
To address the gaps in Uganda's industrialization framework, the Global Green Growth Institute (GGGI), in partnership with the Government of Uganda and supported by TradeMark Africa (TMA) and Danida, is implementing the project titled "Developing the Capacity of Uganda Freezones Authority to set up Export Freezones that meet global green trade standards". The project's overarching goal is to achieve "strong, inclusive, and sustainable economic growth" in Uganda. By fostering green trade and climate-resilient industrial practices, it seeks to catalyze economic growth while ensuring environmental sustainability and social inclusivity.

In line with Outcome 1, the project will prioritize the selection of two commercially viable, green, and climate-resilient free zones. These zones will serve as models of sustainable industrial practices, incorporating principles of resource efficiency, low-carbon development, and social equity. Furthermore, the project will identify and develop priority value chains for these zones, ensuring alignment with Uganda's economic priorities and global market trends. Conducting site visits is a critical step in the process of assessing potential locations for the development of comprehensive masterplans. These visits aim to evaluate and compare various sites to identify the most suitable options for further development. During the visits, each location will be assessed based on established site selection criteria for brownfield and greenfield developments. These on-the-ground assessments will provide valuable insights into the strengths and challenges of each site, enabling evidence-based recommendations.

B. Objective

After a thorough review of the documentation available and analysis of best opportunity for meeting site selection criteria that was developed, Jinja, Lugazi and Tororo were identified. The objective of the missions is to assess these sites through bilateral meetings with government, private sector and other stakeholders on site complimented with field analysis to give input for the preparation of the final site selection report for development of masterplans.

Lugazi Industrial Park:

i. Meet with local government in Lugazi
ii. Conduct workshop to introduce the project
iii. Physically visit Lugazi Industrial Park site
iv. Meet business representatives in Lugazi with Commercial officer
v. Collect data to complete the preassessment tool for EIP Selection.
vi. Assess the value proposition for the site (applicability of RECP and symbiosis).
vii. Collect data to complete the impact and dependencies tools.
viii. Assess social considerations relevant to the site.
ix. AoB

Jinja Industrial Park and SME Industrial Settlement in Masese

i. Meet with commercial officer in Jinja
ii. Conduct workshop to introduce the project
iii. Meet with Masese business cluster representative with commercial officer
iv. Physically visit Jinja and Masese Industrial sites site
v. Collect data to complete the preassessment tool for EIP Selection.
vi. Assess the value proposition for the site (applicability of RECP and symbiosis).
vii. Collect data to complete the impact and dependencies tools.
viii. Assess social considerations relevant to the site.
ix. AoB

Private industrial park in Tororo

i. Meet with commercial officer in Tororo
ii. Conduct workshop to introduce the project with government and private sector participants
iii. Physically visit the private industrial site.
iv. Collect data to complete the preassessment tool for EIP Selection.
v. Assess the value proposition for the site (applicability of RECP and symbiosis).
vi. Collect data to complete the impact and dependencies tools.
vii. Assess social considerations relevant to the site.
viii. AoB

7.2. Mission Itinerary

The sites include the Lugazi Industrial Park, Jinja Industrial Park, the SME industrial settlement at Masese in Jinja and a private industrial park in Tororo.

Figure 25: Mission Itinerary

7.3. Dates and venues

The mission to the four sites took place in May 2025 as per the agenda on Table 1 .

Date	Time	Activity	Location	Contact
5/26/2025 (Monday)	11:00am - 1:00pm	Meeting with the Lugazi Municipality.	Lugazi	Robert Musoke Nkwanga 0777525674
	1:00pm - 2:00 pm	Lunch		
	2:00pm - 4:00pm	Site Visit with Lugazi Industrial Park Management		Kato Lutaaya 0787219330
	4:00pm - 5:00pm	Bilaterial consultative meetings		

	6:00pm - 7:00pm	GGGI team de-brief		
5/27/2025 (Tuesday)	9:00am - 1:00 pm	Workshop with government and private sector.	Lugazi	Robert Musoke Nkwanga 0777525674
	1:00pm - 2:00pm	Lunch	Lugazi	
	2:00pm - 4:00pm	Travel to Jinja	Jinja	
	4:00pm - 5:00pm	Meeting with natural resources officer	Jinja	Mark Mpadwa 0755518178
5/28/2025 (Wednesday)	9:00am - 1:00pm	Workshop with government and private sector.	Jinja	Mark Mpadwa 0755518178
	2:00pm - 4:00pm	Bilaterial consultative meetings	Jinja	
	6:00pm - 7:00pm	GGGI team de-brief	Jinja	
5/29/2025 (Thursday)	9:00am - 10:00am	Visit Jinja IP	Jinja	Mark Mpadwa 0755518178 and Rosette UIA
	11:00am - 12:00pm	Visit Masese (Busoga Forestry Company)	Jinja	
	12:15pm - 1:15pm	Visit Masese (Nile Agro)	Jinja	Mark Mpadwa 0755518178
	1:15pm - 2:15pm	Lunch	Jinja	
	2:15pm - 5:00pm	Travel to Tororo	Tororo	
5/30/2025 (Friday)	9:00am - 1:00pm	Workshop with government and private sector.		George Etyang 0772634735 & Peter 0782371007
	1:00pm -2:00pm	Lunch	Tororo	
	2:00pm - 4:00pm	Bilaterial consultative meetings	Tororo	
	4:00pm - 6:00pm	GGGI team de-brief	Tororo	
5/31/2025 (Saturday)	9:00am-11:00am	Visit Tororo IP	Tororo	Milton Owor : 0789827826
	11:00am	Travel to Kampala	Tororo	

	Afternoon	Meeting with business community	
29-May (Thursday)	Morning	Visit to Jinja Industrial Park and the SME industrial settlement in Masese	Tororo
	Afternoon	Travel to Tororo	
30-May (Friday)	Morning	Workshop with government and business community in Tororo	Tororo
	Afternoon	Collect data	
31- May (Saturday)	Morning	Site Visit to the private industrial park in Tororo	Kampala
	Afternoon	Travel back to Kampala	

Table 5: Preassessment mission agenda

7.4. Assessment team and participants to the mission

The GGGI team was composed of the following experts:

Name	Role	Organization	Contact	In-field/HQ backstopping/remotely
Nadia Zuodar	Green Freezones Expert Individual Consultant	GGGI	Nadia_zuodar@yahoo.com	Remotely
Regina Mwenyango	Team Leader/Senior Officer Industrial Development/Project Manager	GGGI	regina.mwenyango@gggi.org	field
Seith Mugume and team	Water and Sanitation Expert	MEIR	smugume@meir.co.ug	field
Edson Twinomujuni	RECP expert	UCPC	etwinomujuni@ucpc.co.ug	field
Ting-Ying Huang	Value Chains Expert Consultant	GGGI	tining9970@gmail.com	field
Silas Bahizi	Financial Expert Consultant	GGGI	silas@phialliance.com, silasbahizi@gmail.com	field
Basil Oberholzer	GGGI Economist	GGGI	basil.oberholzer@gggi.org	backstopping
Hilda Nankya	Urban Development Associate	GGGI	hilda.nankya@gggi.org	field

Table 6: GGGI Team composition

GGGI consultants Terms of Reference are available in Annex A.

The additional participants to the mission were the following:

No.	Entity	Name	Role
1	Ministry of Trade, Industry and Cooperatives	Eng. Deo Byaruhanga	Assistant Commissioner, Technology
2	National Planning Authority	Eng. Oscar Olaro	Science Planning Department:
3	Uganda Investment Authority	Kaye Emmanuel	Environmental officer
		Palma Rosette Keuber	Park Manager - Eastern Region
4	The Presidential Advisory Committee on Exports and Industrial Development (PACEID)	Rowland Nkahebwa	Communications
5	Ministry of Finance Planning and Economic Development (Climate Finance Unit)	Turyasiima Titus	Climate Finance Officer
6	Private Sector Foundation of Uganda (PSFU)	Emmanuel Angulo	Marketing Officer
7	Uganda Small Scale Industries Association	Wasswa Samuel Gyagenda	Policy Analyst

Table 7: Additional participants to the preassessment mission

8. Methodology

The methodology builds up on UNIDO EIP Toolbox & GGGI core instruments, UNEP initiatives such as the ENCORE Methodology for materiality assessment, the Capitals Approach and TEEB: The Economics of Ecosystems and Biodiversity.

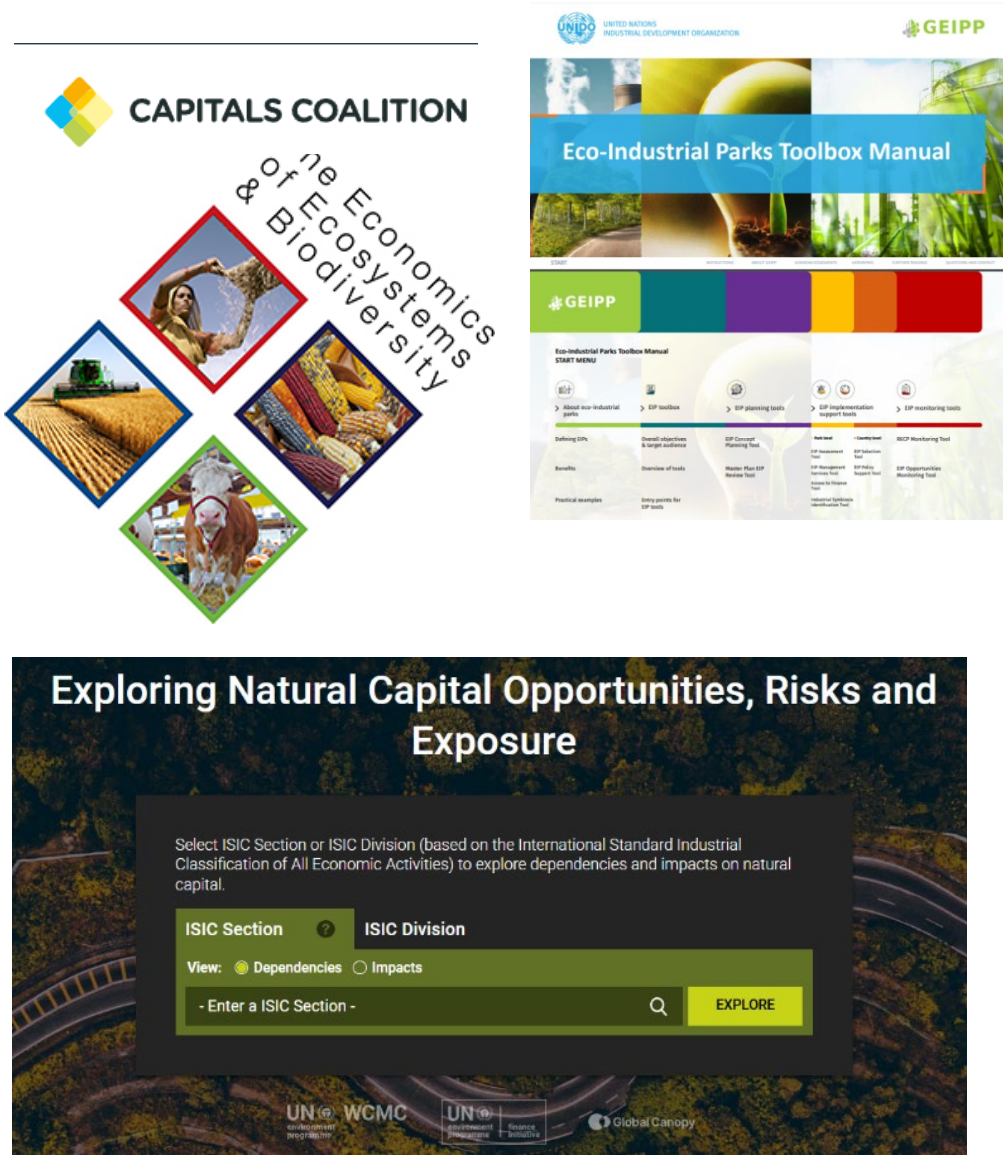


Figure 26: Various methodological tools used

8.1. Pre-assessment tool

The main tool being used and adapted is the Selection tool from UNIDO Toolbox presented in **Box 3**.

This tool looks at different aspects contributive to EIP prerequisites and performance framework (Figure 27) and prioritizes parc sites comparatively on 5 customized dimensions:

a. Park Management
b. Environmental
c. Social

d. Economic
e. Project sustainability and replicability
f. Performance & Visibility

The prioritization is based on a rating that weights the specific project interest and success factors in the context with a grade attributed to each component based on the team observations. There is a degree of subjectivity in the rating that is limited by the coherency with which it is attributed. As important information gaps exist given the short time of the field mission and the greenfield nature of most sites, unavailable information will be rated low not to artificially increase the overall ranking.

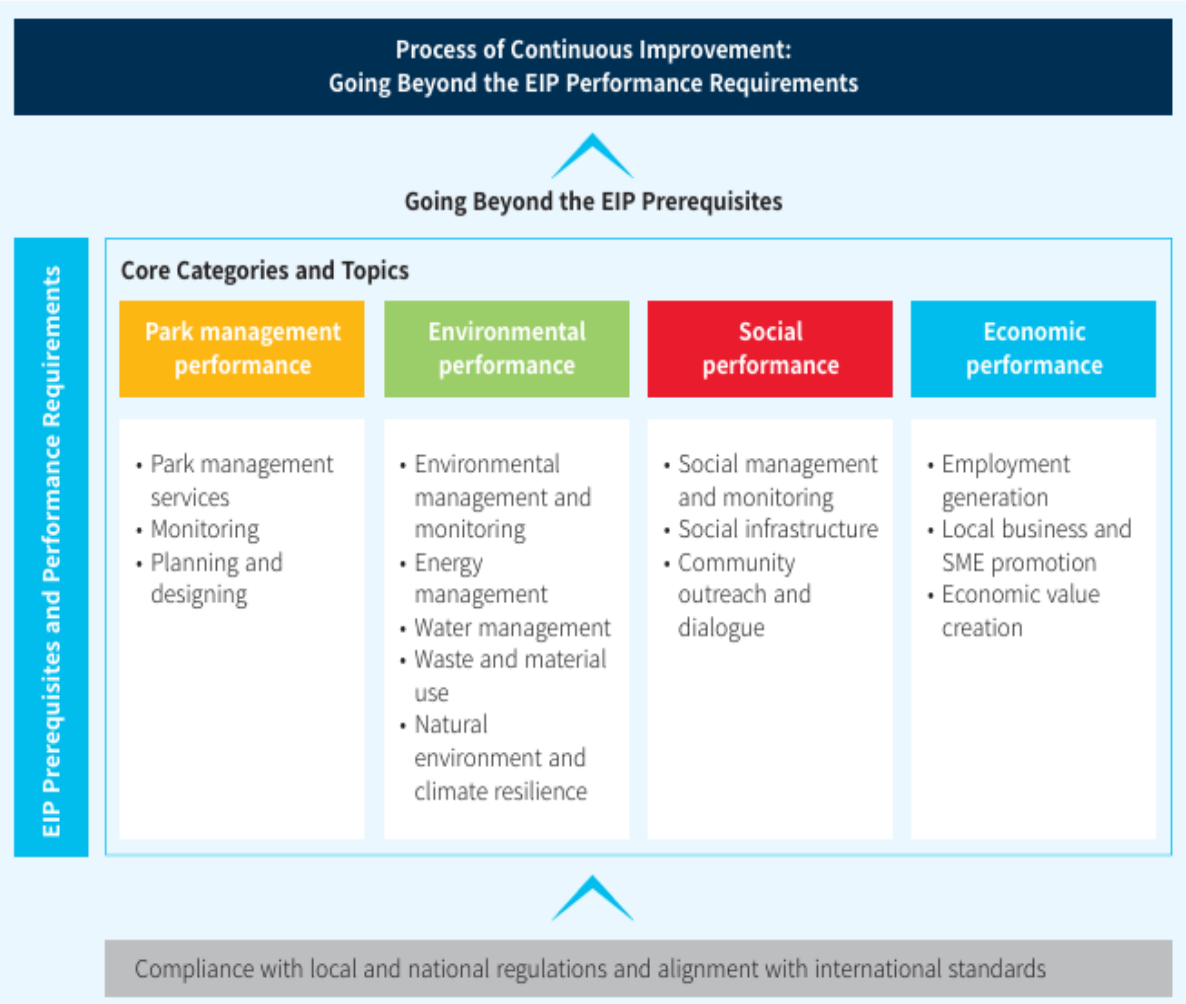


Figure 27: UNIDO EIP Performance Framework

8.2. Sectors prioritization tool

The sectors prioritization is rated on a specifically designed tool inspired from UNIDO Concept Planning Tool (see **Box 3**). It is based on a combination of various factors including:

- Criteria from §5.5Step D: sectors identification, areas of production and existing clusters. A particular attention is given to determining sectors with export potential as per the donor focus of interest.
- Analysis of local strengths, production assets, value chains gaps or green opportunities including facilitating circular economy loops.
- Credible potential partners have been identified through a three-pronged approach:

i. Schedule of Lease (pre-allocation) and lease term. In case lease are not backed up by confirmed commitments such as construction or other forms of investment, the team may opt for a reallocation advocacy.
ii. Expressed interest from stakeholder's meeting and consultants' direct mobilization (ex: identification through associations, field visits, listings, etc.). As a matter of fact, not all companies would adhere to the IPs/FZs unique selling points.
iii. Demonstrated capacity (production, sales, export shares, technology, representation, etc.).

- Priority to sectors/infrastructures whereby potential investors have already been identified or facilitated.
- When material is available (business plan, feasibility studies, market research, etc), the team incorporates valid proposals or explains why some may not be.

8.3. Materiality Assessment

The materiality assessment is a necessary complement to identify risks and dependencies to the business. At the pre-assessment stage, it serves the purpose of identifying potential red flags/unmanageable concerns that may disqualify a sector or the park as a potential green IP. Though the project scope does not provide for time and field days to assess the value chain level, we still include them as a red flag at value chain level can jeopardize the possibility to integrate a sector in the park.

The multi-capital assessment approach (see **Box 5**) considers the environmental, social, and economic capitals relevant to business. Our methodology adapts the approach to a sector/product analysis focusing on the park processing/operation and the value chain production levels. Due to time constraints, we were only able to analyze the natural capital. Similarly, the analysis is focused on production aspects, not on all risks and dependencies to the business. As an example, marketing and sales are not being addressed. In addition to the framework provided by the capitals approach, we integrate the ENCORE methodology (Figure 28). ENCORE offers a database listing direct potential dependencies and impacts of production processes on ecosystem services and natural capital assets classified by ISIC groups (see **Box 6**). A specific rating tool was designed by the team, capturing the pressures (impacts) and ecosystems services elements (dependencies).

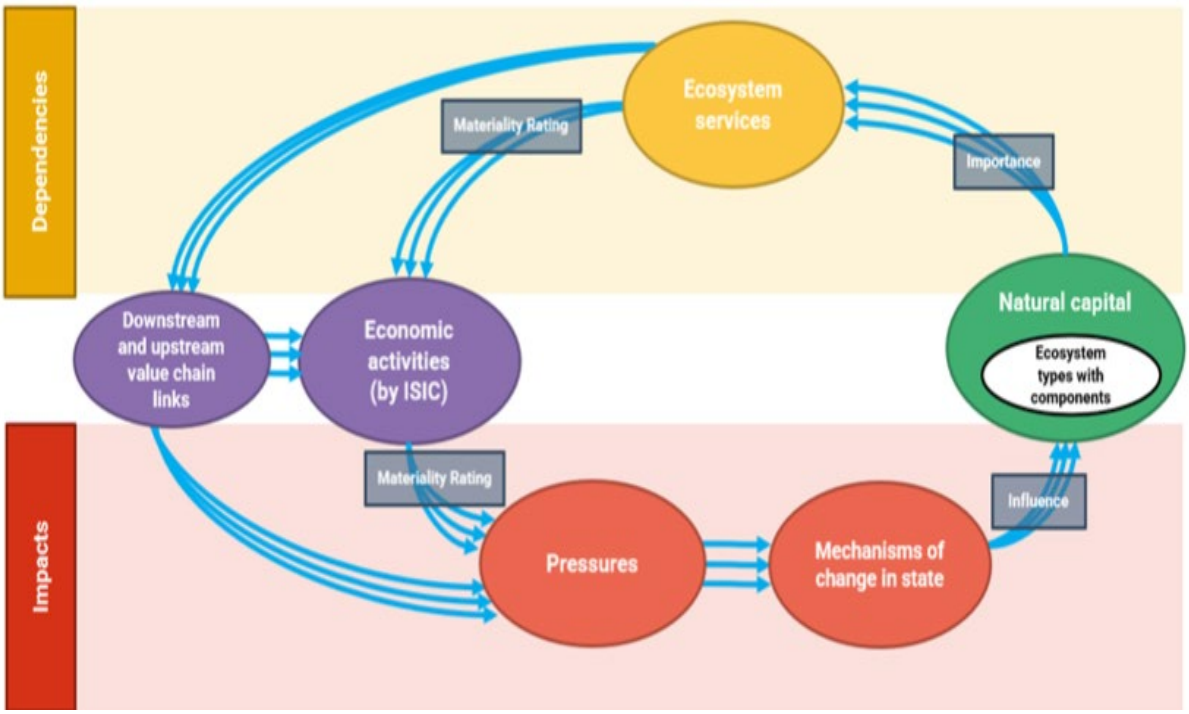


Figure 28: ENCORE methodology

Box 5: Capitals Protocol-capital impact and dependencies and how those translate into business risks and opportunities.

The Capitals Coalition develops, advocates for and advances the capitals approach. The Capitals protocol provides detailed guidance on how to conduct an integrated capitals assessment to provide decision-useful information for systems-level solutions.

a. Natural capital Impacts that are potentially relevant to your business

A natural capital impact is the negative or positive effect of business activity on natural capital. Natural capital impacts can arise directly from business operations or indirectly from the use of products and services. Impacts may occur at any point in the value chain, through exploration and extraction of raw materials, intermediate processing, the production of finished goods, distribution, consumption, disposal, or recycling.

Natural capital impacts will also vary depending on the industrial sector concerned, the stage of the supply chain, and the geographic location of operations. Impacts on natural capital may be negative—for example due to land degradation or pollution—or positive. Examples of positive/impacts include ecological recovery due to business investment in site rehabilitation, or improved ground and surface water quality due to filtration and treatment of process water, which can sometimes result in higher quality water released back to the environment than was extracted in the first place. Figure 29 gives some examples of how business can impact natural capital.

Box 5 (continued): Capitals Protocol-capital impact and dependencies and how those translate into business risks and opportunities.

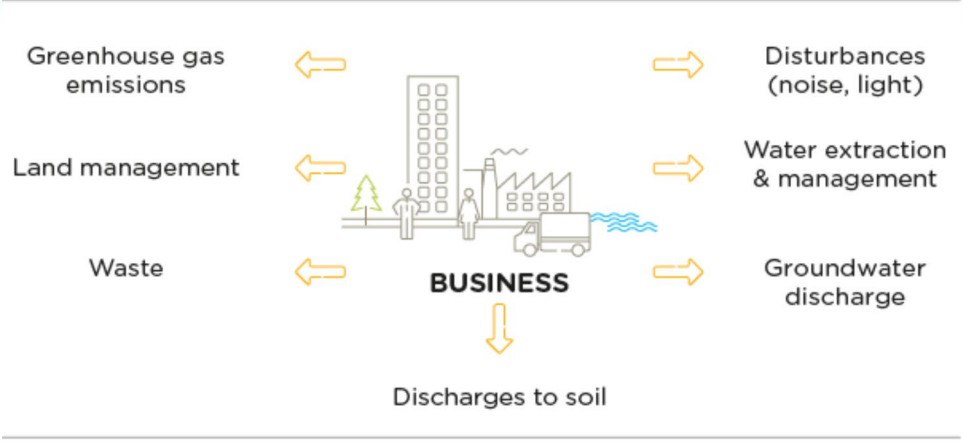


Figure 29: Examples of business impact on natural capital

b. Natural capital dependencies that are potentially relevant to your business

All businesses depend on natural capital and associated ecosystem and/or abiotic services, directly and indirectly. For example, businesses depend on natural capital for critical production inputs such as land, raw materials, water, and energy. Businesses also depend on many regulating ecosystem services, such as natural filtration of water, waste assimilation, and protection from floods and storm damage. Many businesses depend on cultural ecosystem services, for tourism and recreation operations, or even employee morale. Figure 30 gives some examples of business dependencies on natural capital.

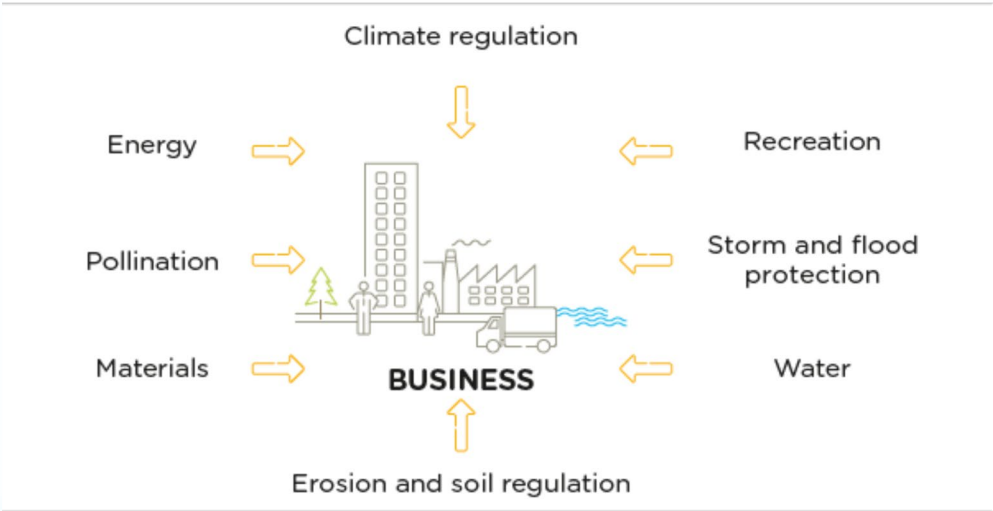


Figure 30: Examples of business dependencies on natural capital

Box 5 (final): Capitals Protocol-capital impact and dependencies and how those translate into business risks and opportunities.

Figure 31 from the Social & Human Protocol show similarly this capital impact, dependencies and frequent issues associated to it.

Figure 28: Examples of social and human capital impacts

Figure 31: Business impact and dependencies on social and human capital

Box 6: ENCORE Methodology

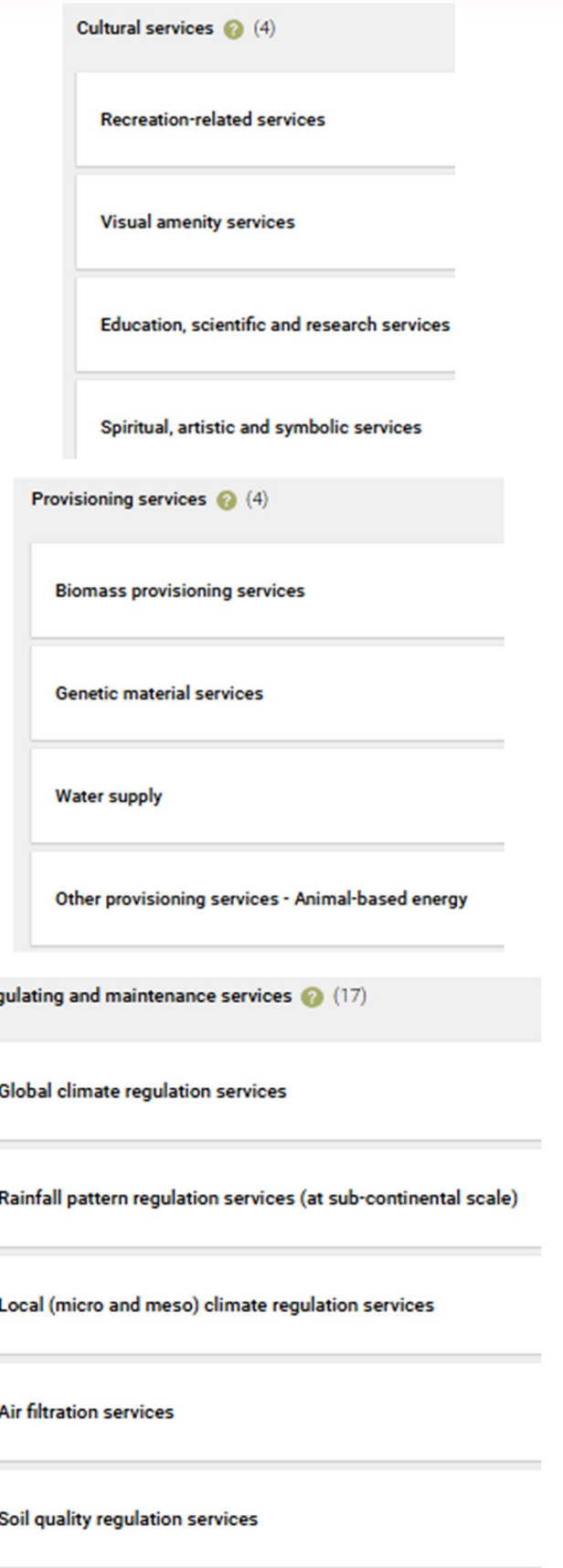
ENCORE (Exploring Natural Capital Opportunities, Risks and Exposure) is a free, online tool that helps organizations explore their exposure to nature-related risk and take the first steps to understand their dependencies and impacts on nature. The ENCORE tool is maintained and continuously improved by Global Canopy, UNEP FI and UNEP-WCMC, who together form the ENCORE Partnership, previously known as The Natural Capital Finance Alliance (NCFA). The initial ENCORE tool was financed by the Swiss State Secretariat for Economic Affairs (SECO) and the MAVA Foundation.

The database considers 13 pressures (see: Table 8):

Pressures	Ecosystem components and types
Disturbances (e.g noise, light)	
Area of freshwater use	
Emissions of GHG	
Area of seabed use	
Emissions of non-GHG air pollutants	
Other biotic resource extraction (e.g. fish, timber)	
Other abiotic resource extraction	
Generation and release of solid waste	
Area of land use	
Emissions of toxic pollutants to water and soil	
Emissions of nutrient pollutants to water and soil	
Volume of water use	
Introduction of invasive species	

Box 6 (continued): ENCORE Methodology

And 25 ecosystems services (see Table 9)



Box 6 (final): ENCORE Methodology

Soil and sediment retention services
Solid waste remediation
Water purification services
Water flow regulation services
Flood mitigation services
Storm mitigation services
Noise attenuation services
Pollination services
Biological control services
Nursery population and habitat maintenance services
Other regulating and maintenance service - Dilution by atmosphere and ecosystems
Other regulating and maintenance service - Mediation of sensory impacts (other than noise)

Table 9: Ecosystem services elements

Practically, we operated as the following:

- We screened priority sectors (and applicable products) for high and medium impacts and dependencies, primarily for industrial processes taking place in the park site and to some extent at the Value Chain level.
- At the pre-assessment stage, if the types of processes are not entirely known, we opted for the safest option, considering the processes with the most impact or specifying the assumption when not.
- We screened through all sectors and between parks to make sure the ratings are consistent.
- Time limitations prevented a systematic address of all three capitals. We screened the social and economic capitals only for key red flags (high materiality).
- In the second phase of in-depth assessment, the screening will be revised with the updated information, quantitative and/or qualitative indicators for measurement (sometimes proxy) defined whenever possible. They will serve as a comparison basis between BAU and the mitigation measures proposed.
- Whenever possible a monetarization (Figure 32) will be done for integration in the eCBA tool.

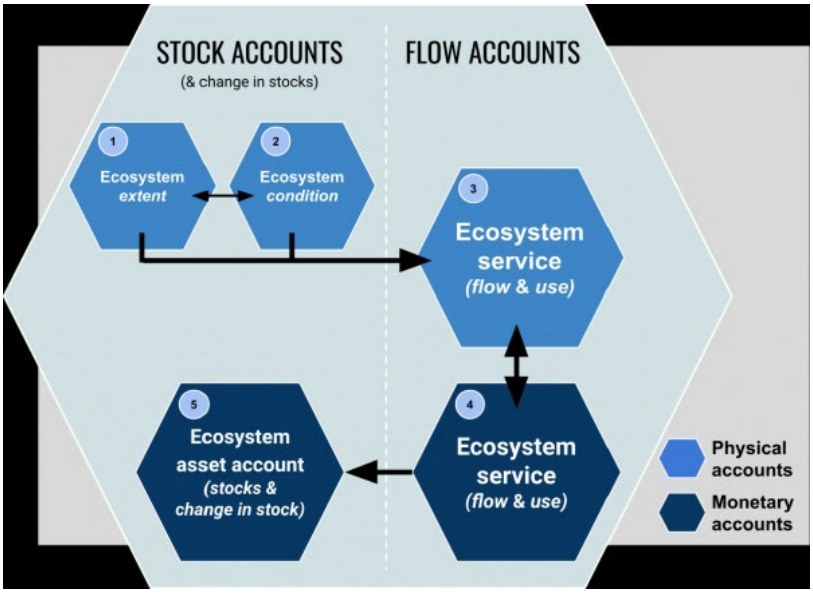


Figure 32: Ecosystem accounts and how they relate to each other (from GGGI IP Policy Guidelines)

8.4. Gender & Social assessment

A gender and social assessment is a necessary complement to identify potential red flags/ethical concerns that may disqualify a sector or the park as a potential green IP. The gender self-assessment tool from UNIDO Toolbox presented in **Box 3** has been adapted to address both Gender and Social Inclusion aspects. It investigates 11 components as shown by Table 10.

Component 1. Corporate policies and commitments to social good practice
Component 2. Recruitment, promotion and job advancement with equal opportunities
Component 3. Participation and representation in the composition of the workforce
Component 4. Equal pay, benefits, and work-life balance
Component 5. Access to training, education and coaching
Component 6. Occupational health, safety and hygiene
Component 7. Organizational climate and culture
Component 8. Prevention and attention to cases of violence, and complaint mechanisms
Component 9. Suppliers, value and supply chains
Component 10. Community relations and corporate social responsibility
Component 11. Accountability to customers

Table 10: Gender and Social assessment components

However, time was insufficient to perform the assessment so the team only focused on identifying potential absolute red flags that would disqualify a parc from being a green IP candidate such as human rights violation at IP or value chain levels or similar ethical concerns. **No social absolute red flag was identified.** However, as the civil society sector and communities were not mobilized at this stage, this preliminary stance is provisional.

8.5. Digital readiness assessment

Uganda is aiming to take on the Industry 4.0 revolution with initiatives such as the Makerere University Innovation Pod (unipod), featuring a partnership between Makerere University, Lwera Electronics and Semiconductors Limited, and the United Nations Development Programme (UNDP) or the Science, Technology & Innovation (STI) Secretariat. As an example the 2025 ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification report states that: "Leveraging e-commerce and digital solutions: e-commerce offers significant potential for Uganda to overcome geographic barriers and access regional and global markets. Key priorities include expanding broadband access, developing local e-commerce marketplaces, and training businesses in digital marketing and online content management."

Green IPs can be instrumental in harness the Industry 4.0 gains, thus Digital Readiness is a key component to assess on a park potential. In order to remain as close to the realities on the ground we adapted the OKAME readiness assessment model designed as part of a 2023PhD thesis from Kingston University London on Africa (Okam, 2024).

The assessment model includes five dimensions: manufacturing and operations, products and services, supply chain, strategy and organization, and business model all with relevant sub-dimensions.

The project phase duration was not sufficient to launch a digital readiness assessment, the tool rather served to create awareness amongst team members to identify obvious digital readiness potential in

parks and for the subsequent master planning and concept note development phase, to think on digital options.

9. Sites' Description

9.1. Lugazi Industrial Park General Situation and Current Status

Lugazi Industrial Park is located in Lugazi Municipality, Buikwe district, about 50 metres off the Kampala Jinja Highway, accessed along a murrum road. The geographical coordinates of the park site are: **0°22'51.57"N, 32°57'36.63"E**. The park is located in Kisaasi village, Bulyantente parish in Kawolo Division.

The park is a privately owned and is currently occupying 100 acres. The park is bordered by a sugarcane plantation of the Sugar Corporation of Uganda Limited (SCOUL), and it is located about 500 metres from the building infrastructure of SCOUL. This presents a significant opportunity for symbiosis between the industrial park and SCOUL in regards to infrastructure such as energy. Presently, only two companies have acquired land in the industrial park namely,

- Softcare, which deals in the manufacture of baby and feminine hygiene products, including baby diapers, baby pants, sanitary pads and wet wipes. The company has taken up about 30 acres
- Joint Medical Stores, that deals in the importation, warehousing, exportation, wholesale, and distribution of medicines and related healthcare supplies. The company has taken up 20 acres.

Other potential industries envisaged to be in the park include: coffee processing, tea processing, sugarcane processing, and a logistics hub. The park manager informed the team that there is possibility of expanding the industrial park through purchase of land from private individuals along the eastern and north eastern boundary of the park.

It was observed that the park's terrain is gently sloping from the eastern and north eastern boundary towards the north western boundary. There is a high likelihood of flooding of the low-lying areas of the park (along the western and north western boundary) if a robust drainage system is not provided.

Information on WATSAN infrastructures and field visit stakeholder engagement is provided in Part IV.

Image 11: Google Earth imagery of the Lugazi Industrial Park site.

Image 12: The team at the construction site of Softcare.

Image 13: Interaction with the developer of Lugazi Industrial Park

1.1. Tororo Industrial Park General Situation and Current Status

A private developer plans to set up an industrial park in Tororo. The team visited the park, in the company of the private developer, on Saturday, 31st May 2025. The 100-acre site is located about 2km from the Uganda-Kenya Malaba border, and about 4km from Tororo town. The geographic coordinates of the park site are: **0°38'34.52"N, 34°12'14.75"E**. The park is located in Asinge C village, Nyalakot parish in Osukuru sub-county.

The site has a gently sloping topography from the eastern boundary to the western boundary. The site is bounded by River Malaba along the western boundary.

The significant infrastructure in the vicinity of the site includes the Tororo water treatment plant (about 2km away), the Tororo wastewater treatment lagoons (about 12km away) and a 3-phase power line along the access road (eastern boundary). The site is currently occupied by farmland and a forest of eucalyptus trees planted by the developer. The western part of the site could be vulnerable to flooding due to its flat topography and proximity to River Malaba; however, there are no recent reports of flooding. The private developer is open to public-private partnerships in the development of the park, mainly for infrastructure support such as roads and water supply.

Information on WATSAN infrastructures and field visit stakeholder engagement is provided in Part IV.

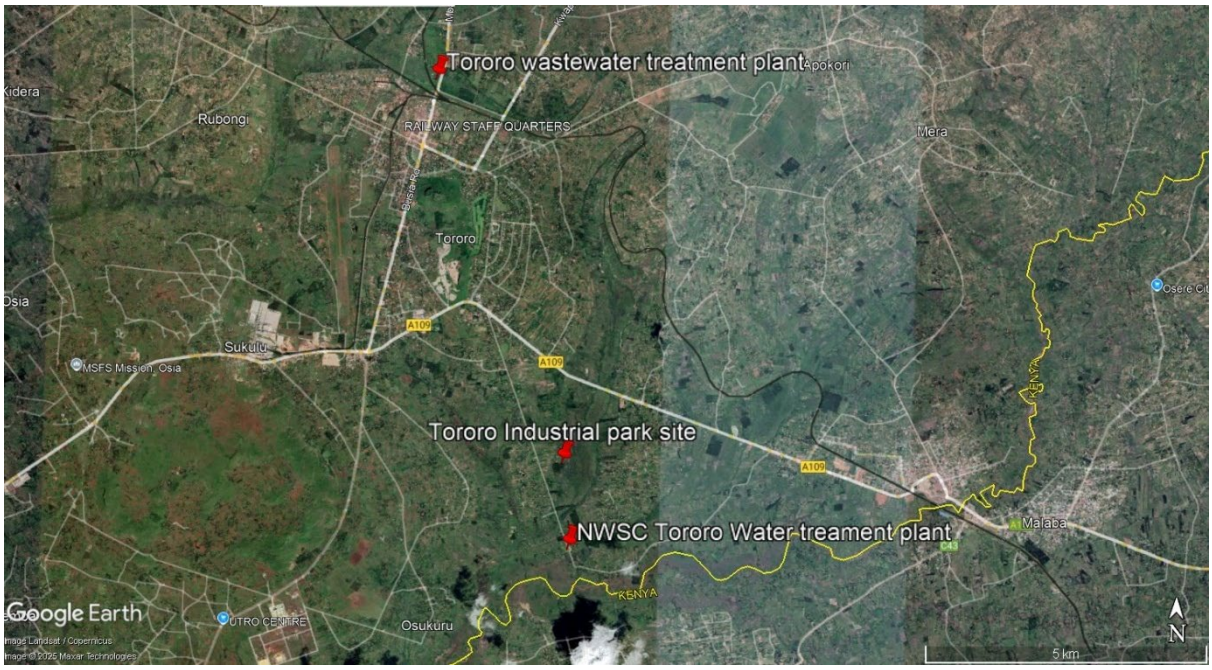


Image 14: Google Earth location of Tororo Industrial Park site.

Image 15: Meeting with the developer at the site of the proposed Tororo Industrial Park.

1.2. Jinja Industrial Business Park General Situation and Current Status

- **Security measures at the Kira Motor Corporation (KMC) site curtailed access.**

The team visited the site of Jinja Industrial Park on Thursday, 29th May 2025. This is a government-owned park with an acreage of 182, and it's currently occupied by only Kiira Motors Corporation on 100 acres (see **Figure 2-6**). The geographical co-ordinates of the site are: **0°33'12.89"N, 33°14'4.48"E**. The park is located in Kagogwa village, Mawoito parish in Kakira Town Council. The park is located outside the boundaries of Jinja city, approximately 16km north of the city centre. The park is accessed via 13km on a tarmac road and approximately 3.3km on a murrum road.

The companies which were allocated land in this park have not yet developed it, reportedly due to the high costs of construction in this area. This is because the land is located in a waterlogged area, resulting in high costs for construction. It was also reported that some companies have failed to secure approvals for Environmental Impact Assessment studies.

The site is gently sloping from the northern boundary towards the southern boundary of the park. There is a stream along the western boundary of the park that reportedly floods during the rainy season. The railway line is located 50 meters away from the western boundary of the park. The northern boundary of the industrial park borders a forest reserve (across the road).

Information on WATSAN infrastructures and field visit stakeholder engagement is provided in Part IV.

Image 16: Jinja Industrial Park site.

Image 17: The team having a meeting at the Jinja Industrial Park site.

1.3. Masese/Jinja SMEs Cluster General Situation and Current Status

Masese Industrial Area is a hub for most of the industries within Jinja, dealing in a wide range of production, including grain processing, coffee processing, edible oil production, textile processing, soap manufacturing, steel processing, aluminium processing, fish processing, plastics processing, timber processing and used oil processing, among others. This industrial area has a significant advantage of an abundant water supply from Lake Victoria. The NWSC water treatment plant is located in this industrial area (see **Figure 2-7**). The industrial area is located in Masese Walukuba division of the city.

The Masese industrial area is also serviced by the existing railway line and Rippon port. It was reported that there are plans underway to develop Rippon Port.

The team visited two industries within Masese Industrial Area, i.e., Busoga Forest Company and Nile Agro Industries, on Thursday, 29th May 2025.

Information on WATSAN infrastructures and field visit stakeholder engagement is provided in Part IV.

Image 18: Masese Industrial Area, NWSC water treatment plant and Kirinya wastewater treatment lagoons.

PART III: PRE-ASSESSMENT RESULTS

10. Sites Pre-assessment Tool Results

The detailed assessment sheets are available upon request. Sheer results show that Lugazi IP and Masese/Jinja SME cluster are the two sites that rate higher, followed by Tororo IP and Jinja IBP in that order (see Figure 33).

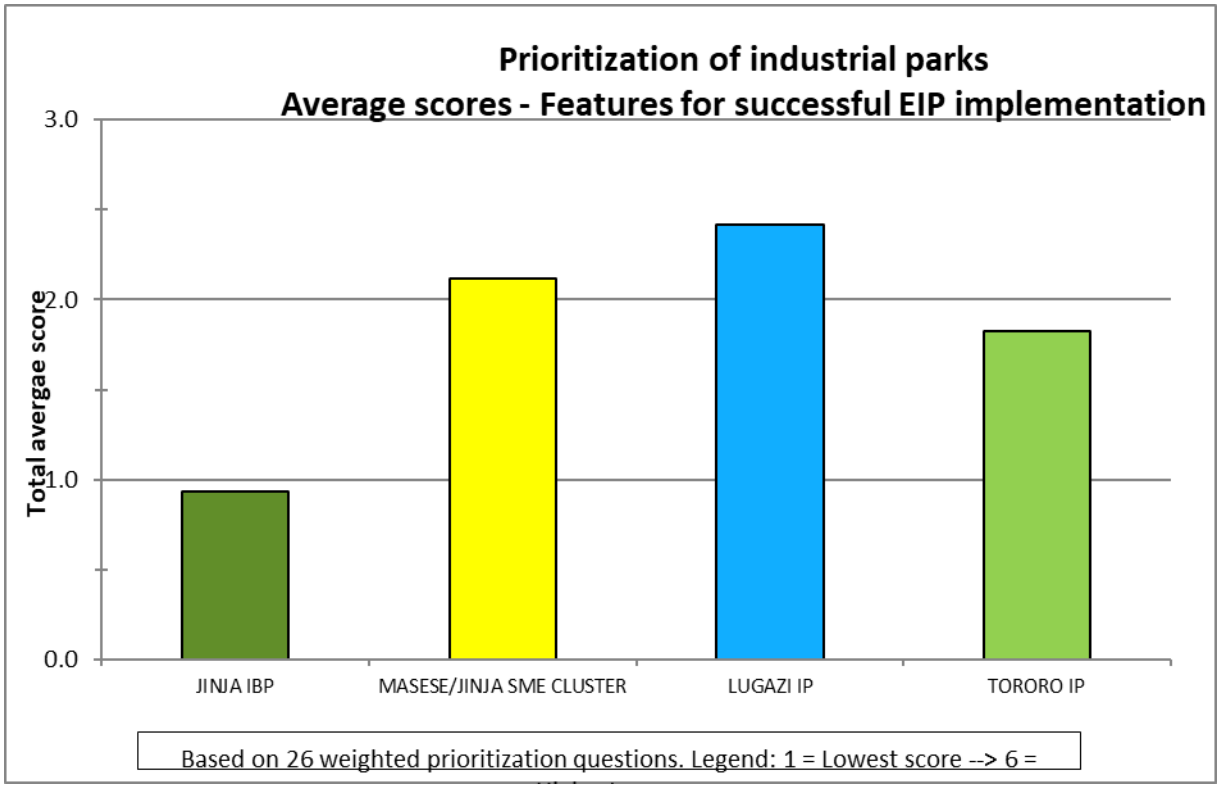


Figure 33: Site prioritization results

Figure 34 and Table 11 show the IP ranking by criterion. Lugazi IP slightly outweighs the three other sites almost in all dimensions. The small difference between Masese /Jinja SME cluster and Tororo IP pertains to the increased prospects in replicability and slightly better economic outlook, given the fact that Masese Cluster is already demonstrating performance, while Tororo is only a potential rating. Jinja IP ranks consistently lower than other sites, although its grade on the economic aspects may be slightly underestimated by lack of information on Kira Motors' value chain.

Criteria	JINJA IBP	MASESE/JINJA SME CLUSTER	LUGAZI IP	TORORO IP
Park management	3.3	3.1	5.0	2.8
Environmental interventions	1.7	4.9	5.7	4.3
Social interventions	1.5	3.0	4.2	2.5
Economic interventions	1.9	4.7	4.2	4.1
Sustainability & Replicability	1.0	4.4	5.0	3.0
Performance & Visibility	1.2	2.8	2.8	2.8
TOTAL	0.9	2.1	2.4	1.8

Table 11: IP prioritization by criterion

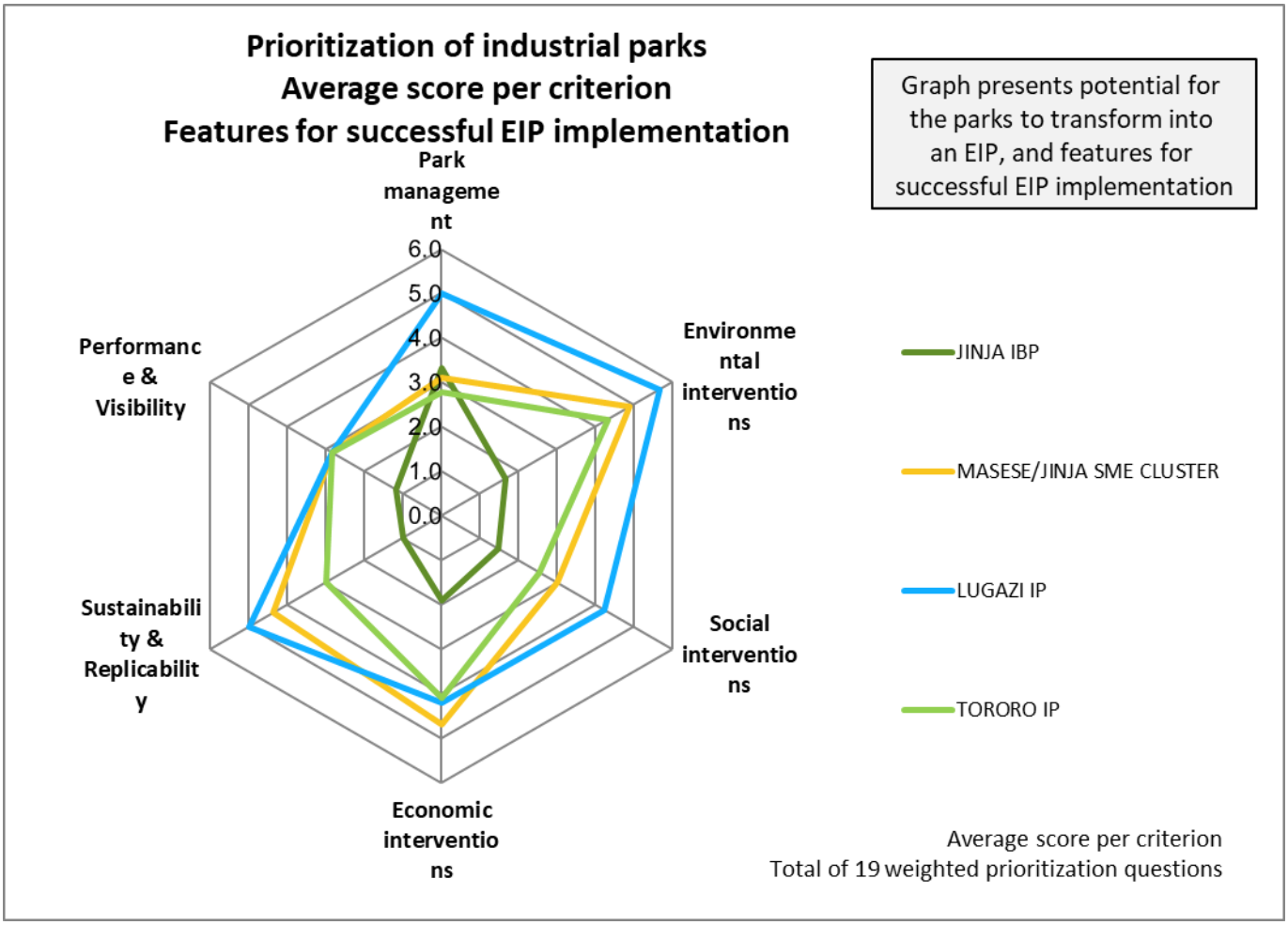


Figure 34: IP prioritization scores by criterion

Despite the superior results for Masese Cluster, the final selection proposed for the second phase of the project designing masterplans is Lugazi IP and Tororo IP. Indeed, Masese suffers from 2 hindrance related to the time at disposal for the project:

- The material flow analysis would require to combine the data of over a hundred companies, the establishment of an online circular economy platform and substantial consultations.

- The formalization of the park management structure would require governance capacity building.

Masese Cluster is thus dismissed with the recommendation to identify dedicated longer-term funding to address the site. Would funding be identified, the site would provide for an unmatched opportunity to design an approach upgrading clusters into IPs and address some critical challenges in terms of environmental pollution and labor conditions.

11. Lugazi Industrial Park Detailed Analysis

1.4. Sectors Pre-identification and Materiality Assessment

1.4.1. Sectors Pre-identification

The selection of sectors for the Lugazi Industrial Park (IP) is based on a combination of confirmed tenant commitments, regional economic strengths, business plan priorities and strategic opportunities to support inclusive industrialization and enhance value chain integration. Table 12 summarizes the companies and sectors of interest at pre-assessment stage. Further investigation into the sectors and potential partnerships or tenants' attraction will be investigated in a second phase.

Company/Org	Sector and Business Introduction	Status in IP	Interests	Export Readiness
Joint Medical Store (JMS)	**Pharmaceuticals:** JMS is a Private Not-for-Profit Organization (PNFP) engages in the importation, warehousing, exportation, wholesale, and distribution of medicines and related healthcare supplies. The activities in the IP would focus on warehousing, packaging and small scale product assembly. https://jms.co.ug	Signed Lease Contract	Anchor tenant	Yes
Soft Care	**Sanitary pads:** Soft Care is a hygiene-focused manufacturing company originally established in China with operations across emerging markets. Their second factory in Uganda would focus on manufacturing of sanitary pads. https://www.softcarehome.com	Constructing factories	Anchor tenant	Yes, but focus on domestic market
Shared by Lugazi	**Maize/Grains**	Partners to be identified	According to Commercial Officer, lots of farmers lack of	Potential

Commercial Officer			value addition facilities	
Sugarcane Outgrower Cooperative Society Limited	**Sugar cane:** SME group of sugar cane farmers	Shows interests	Interested in value addition for secondary sugar cane products	Need to review the quality and quantity
Shared by Lugazi Commercial Officer	**Coffee**	Partners to be identified	According to Commercial Officer, lots of farmers lack of color-sorting facilities and storage space	Potential
Shared by Lugazi Commercial Officer	**Tea**	Partners to be identified	According to Commercial Officer, lots of farmers lack of storage space	Potential
Shared by Lugazi Commercial Officer	**Cocoa**	Partners to be identified	According to Commercial Officer, lots of farmers lack of value addition facilities	Potential
Wood workers association	**Wood:** SME group of wood workers	Shows interests	Interested in shared workshops and machinery, and formal training ranging from digital tools and business development.	Mostly for domestic market
Shared by Lugazi Commercial Officer	**Vanilla**	Partners to be identified	According to Commercial Officer, lots of farmers lack of value addition facilities	Potential
Shared by Lugazi Commercial Officer	**Motor mechanical workshops**	Partners to be identified	One main sector in Lugazi and require a central space to	Potential

			develop synergies	
Shared by Lugazi IP Manager	**Logistics hub**	Partners to be identified	It's a core area of the IP business plan.	Mostly domestic

Table 12: Sectors and companies of interest at Lugazi IP.

Thus, the following sectors were prioritized based on both existing activity and potential for growth, diversification, and impact on the local economy.

Pharmaceuticals: One of the two confirmed (anchor) tenants of Lugazi IP is Joint Medical Store (JMS), a prominent pharmaceutical distributor in Uganda. Although construction of their facility is yet to begin, JMS has formally informed the park management of their intent to undertake product packaging, warehousing, and light assembly within the park. The selection of pharmaceuticals as a focus sector is also economically justified, given Uganda's heavy reliance on imported pharmaceutical products and the growing domestic demand for affordable, quality healthcare supplies. By enabling local value addition and distribution, JMS's operations are expected to strengthen national supply chain resilience and reduce import dependency in the health sector. Some sectoral growth has been taken into consideration for additional potential pharma SMEs; however, no additional major pharma player is expected as it may compete with JMS.

Sanitary Pads: The second confirmed (anchor) tenant is Soft Care, a hygiene-focused manufacturing company originally established in China with operations across emerging markets. Their Lugazi factory, currently under construction, will be their second facility in Uganda and will concentrate on sanitary pads production for the Uganda domestic market. As the only active construction on site, Soft Care's presence is critical for anchoring infrastructure development in the park. Meanwhile, the company has raised critical concerns related to the availability of reliable infrastructures, such as road connectivity, electricity, and water supply—factors which need to be incorporated into the IP's master plan.

Logistics Hub: Lugazi IP's strategic location along the major corridor connecting Kampala, Jinja, and eastern Uganda makes it ideal for serving as a regional logistics hub. The park management envisions a central logistics facility that would offer SMEs access to shared warehousing and streamlined transportation of inputs and finished goods. A logistics hub would significantly lower transaction costs for local producers and enhance trade linkages, particularly with neighboring countries like Kenya. It is also expected to complement the park's role in import substitution and export facilitation.

Sugarcane By-products: Lugazi is historically tied to sugarcane cultivation, with the Sugar Corporation of Uganda Limited (SCOUL) being one of the country's first and largest sugar factories. Approximately 70% of the local population is engaged in sugarcane farming. However, significant quantities of sugarcane and its by-products remain underutilized due to limited processing capacity. Rather than focus on sugar production, the IP will target opportunities for value addition through by-product utilization—such as molasses, bagasse, and filter mud—offering potential for diversification into bioenergy, animal feed, and organic fertilizers. This approach aligns with the park's emphasis on supporting SMEs and enhancing circular economy practices.

Maize and Maize Flour: According to the Lugazi Commercial Officer, maize is the second-largest sector after sugar in terms of contribution to local economic activity. Farmers typically either sell raw maize grain or process it into flour using small-scale mills. Despite the sector's prominence, operations are fragmented and lack modern processing infrastructure. Integrating maize value chain actors into the IP can support quality enhancement, consistency, and economies of scale, thereby improving food security

and increasing local tax revenues—which currently account for 80% of Lugazi's government income through industry.

Coffee, Tea, Cocoa, and Vanilla: Lugazi lies on a critical agricultural corridor that connects Kampala to key production zones in Jinja and Mbale. While many of the region's farmers are engaged in the cultivation of coffee, tea, cocoa, and vanilla, they face structural bottlenecks—particularly lack of access to shared processing facilities such as coffee sorting machines, tea bagging lines or proper storage environment. Incorporating these sectors into Lugazi IP will help fill infrastructure gaps, boost product quality, and increase Uganda's participation in global value chains, particularly for high-value exports.

Wood Products: Woodworking is a widely practiced trade in Lugazi, with numerous carpenters utilizing timber from surrounding forests to manufacture furniture. However, the absence of modern machinery forces many SMEs to ship semi-finished products to Kampala for specialized finishing, a costly and time-consuming process. By establishing shared machinery and training facilities within the IP, local carpenters could significantly increase their productivity and profit margins, while also creating opportunities in vocational skills development.

Motor Vehicle Mechanical Workshops: The motor vehicle repair sector is thriving in Lugazi, with a wide array of informal workshops spread across the town. These workshops, though vital to the local economy, are currently disorganized and lack collective visibility. Consolidating them within the industrial park would create synergies, ease customer access, and enhance service delivery. Moreover, with plans to establish a logistics hub, vehicle maintenance services would be well-positioned to support transportation firms operating within and around the park. Some workshop owners have already expressed interest in relocating to the park, highlighting the need for increased outreach and awareness about the IP's benefits.

The sectors preidentified present the profiles below for the priority economic areas defined in §5.5

Potential for Import Substitution (Figure 35**)**

Lugazi IP presents strong potential for import substitution across several sectors. Uganda currently imports a significant volume of **instant coffee, sanitary pads, and pharmaceutical products**, which could be locally produced within the park to reduce dependency on imports. Additionally, **motor vehicle maintenance, repair services, and logistics/warehousing** are sometimes outsourced to neighboring countries—particularly Kenya—due to gaps in local service provision. Meanwhile, sectors such as **cocoa, sugarcane by-products, vanilla, maize/maize flour, and coffee beans** rely on domestic raw material supplies, ensuring a strong local production base.

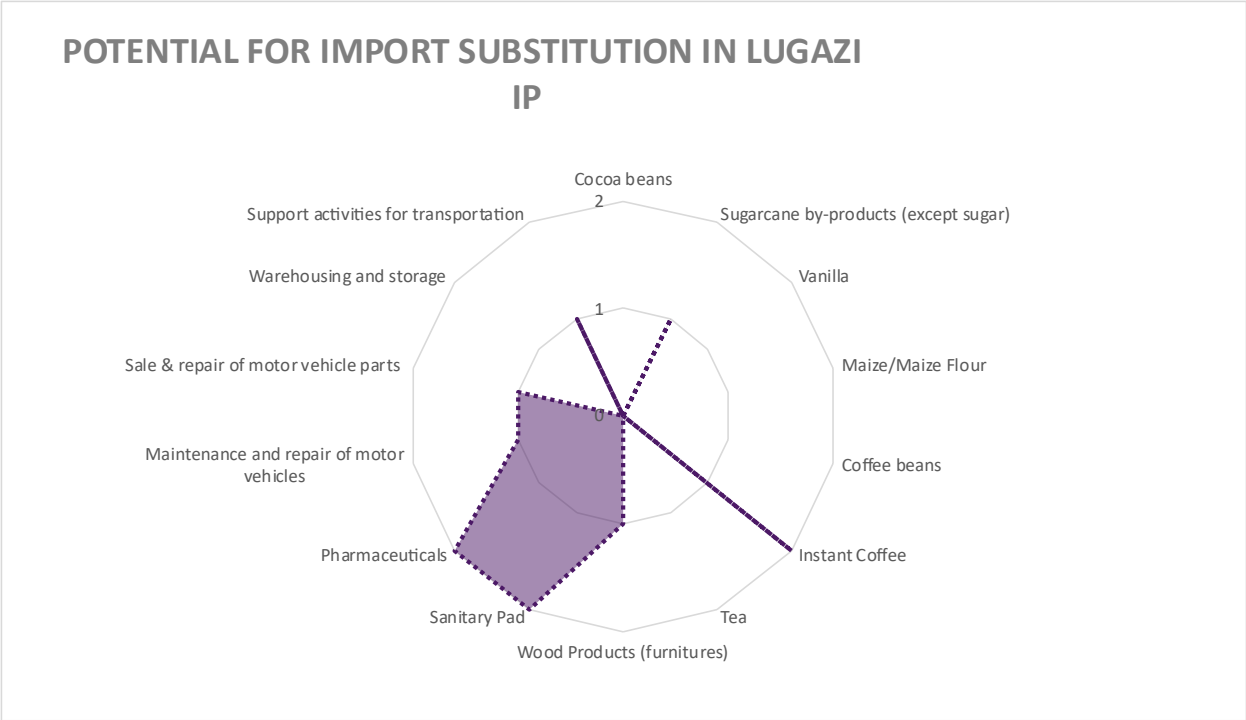


Figure 35: Potential for Import Substitution at Lugazi IP.

Food Security Contribution (Figure 36**)**

Within the identified sectors, **maize and maize flour** have a direct impact on national food security. **Sugar** is also recognized as part of the food basket by organizations such as the **World Food Programme (WFP)**. Other sectors are less directly linked to food security.

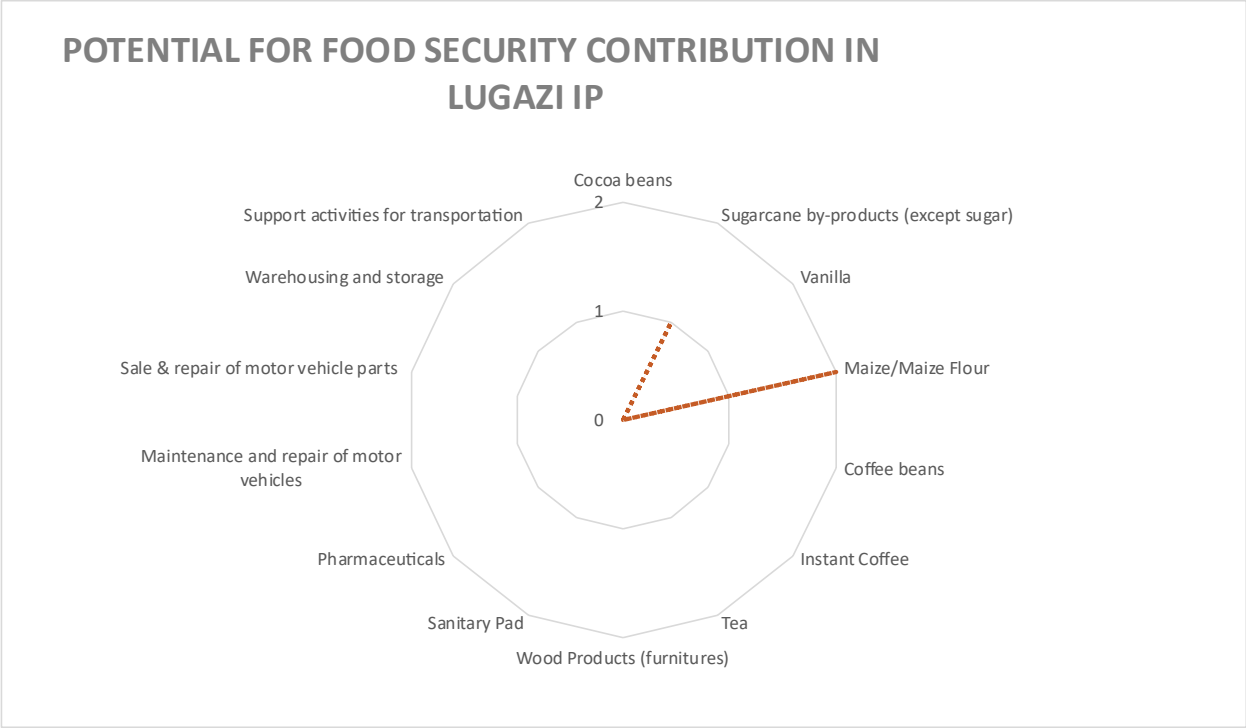


Figure 36: Potential for food security contribution at Lugazi IP.

Diversification and Upgrade Readiness (Figure 37)

High potential for product and market diversification exists in **cocoa beans, sugarcane by-products, and coffee beans**; however, many firms lack the capacity or scale to operationalize this potential. In sectors such as **wood products, pharmaceuticals, and logistics**, diversification could be catalyzed with the availability of **shared facilities and infrastructure** within the industrial park. Although the sanitary pad manufacturer shows some diversification potential, it maintains a focused product strategy and currently has no plans for upgrading or expanding its product line.

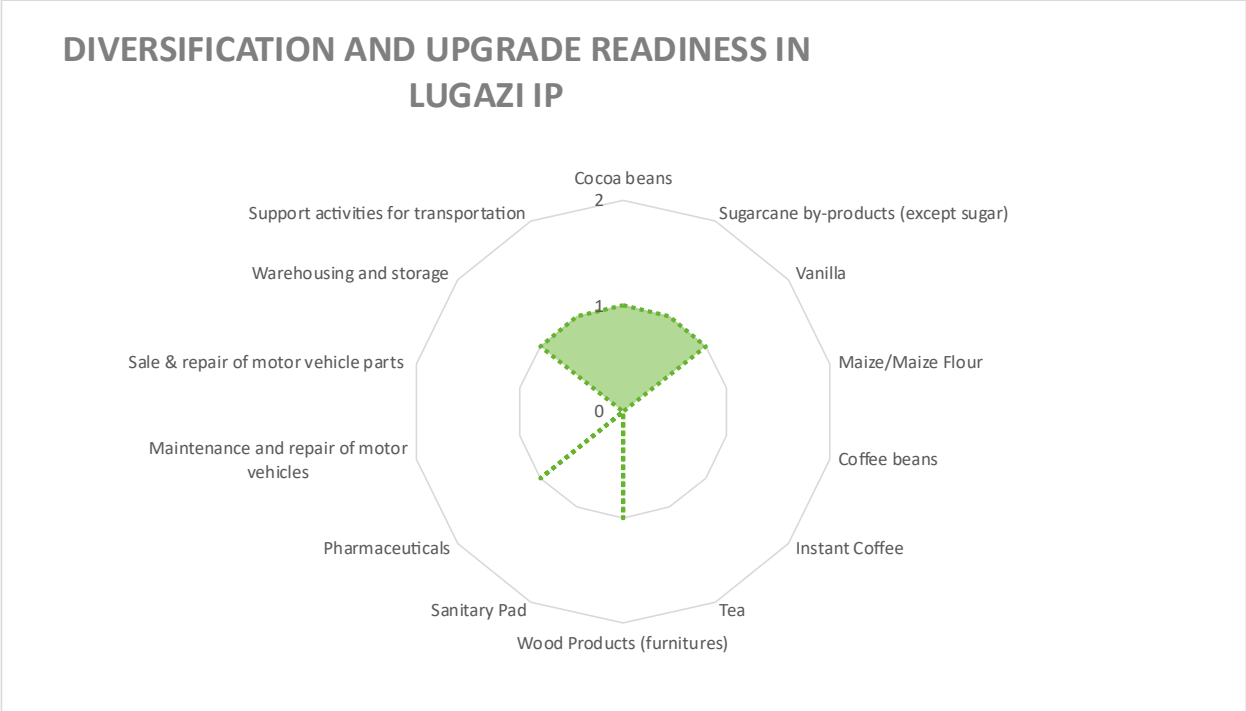


Figure 37: Diversification and upgrade readiness in Lugazi IP.

Potential for Global Value Chain Participation (Figure 38)

Uganda's food and beverage sectors—notably vanilla, cocoa, coffee, and tea—already participate in global value chains. However, instant coffee still requires significant investment in processing facilities and quality control systems to meet global standards. The motor vehicle repair and sales sector imports parts primarily from Asia and the UAE, with opportunities to expand regional service offerings. The sanitary pad manufacturer, while domestically oriented, sources key raw materials such as wood pulp from the United States and South Korea, indicating partial participation in global value chains.

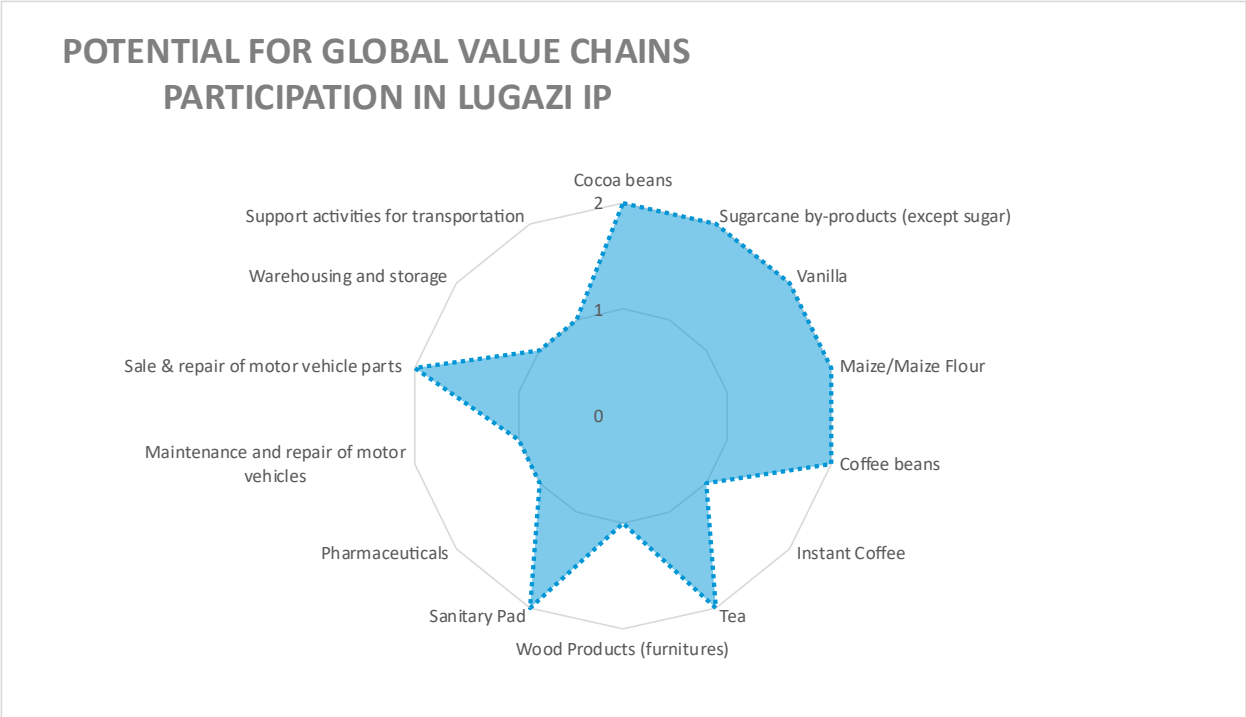


Figure 38: Potential for Global Value Chains participation at Lugazi IP.

Export Readiness (Figure 39**)**

The following sectors are considered export-ready, contingent on demand: Cocoa beans, Vanilla, Maize/Maize flour, Coffee beans, Tea, Sanitary Pads and Pharmaceuticals. Indeed, concerning the Sanitary Pads, though the company focuses its production for the domestic market, experience with Covid-19 has shown that in times of crisis, multinational companies may reassign their production facilities to fit their geo-political strategy. It could therefore be a possibility that the Ugandan facility becomes an exporting hub.

Other sectors such as instant coffee, wood products, motor vehicle services, and logistics require further improvement in product quality, infrastructure, and standards compliance to achieve export competitiveness. Meanwhile, motor vehicle maintenance and repair services are considered part of the export services. We consider those services rendered in Uganda (Lugazi) to trucks coming from neighboring countries as an export service (rather than having trucks going back to origin country for fixing). On the other hand, we consider trucks staying in Uganda for fixing instead of having to go to Kenya to get the service (by lack of parts, technical knowledge, quality of service or costs) as an import substitution.

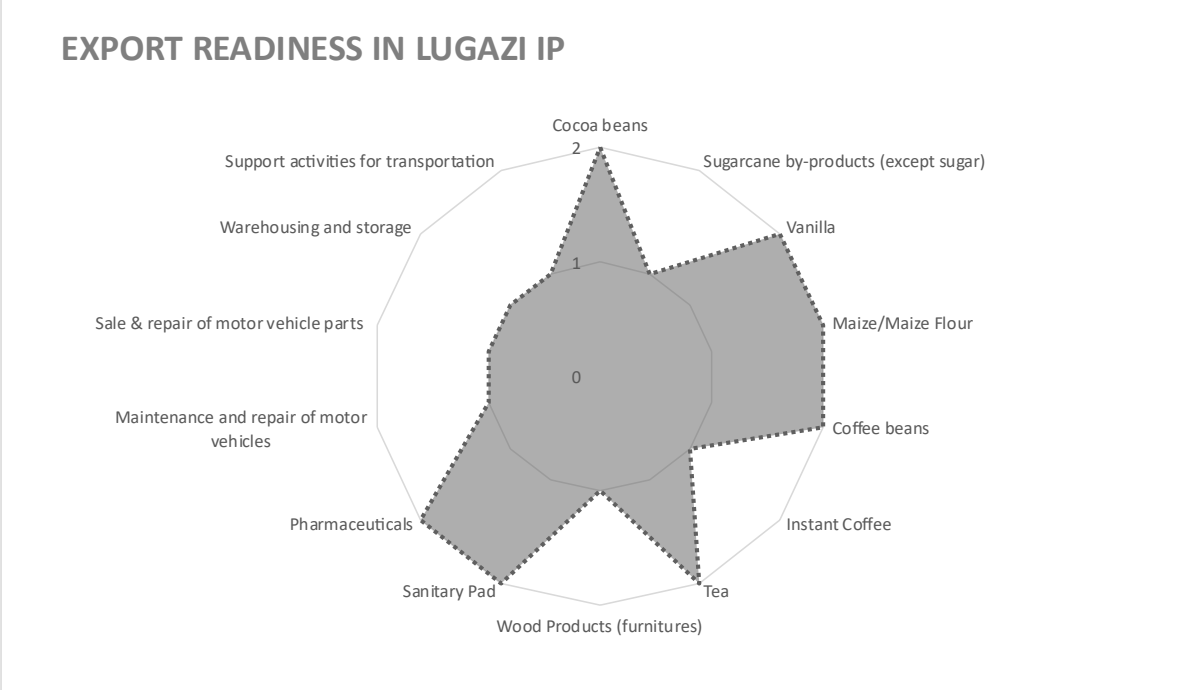


Figure 39: Export Readiness at Lugazi IP.

Figure 40 shows domestic versus potentially export ready products at Lugazi IP.

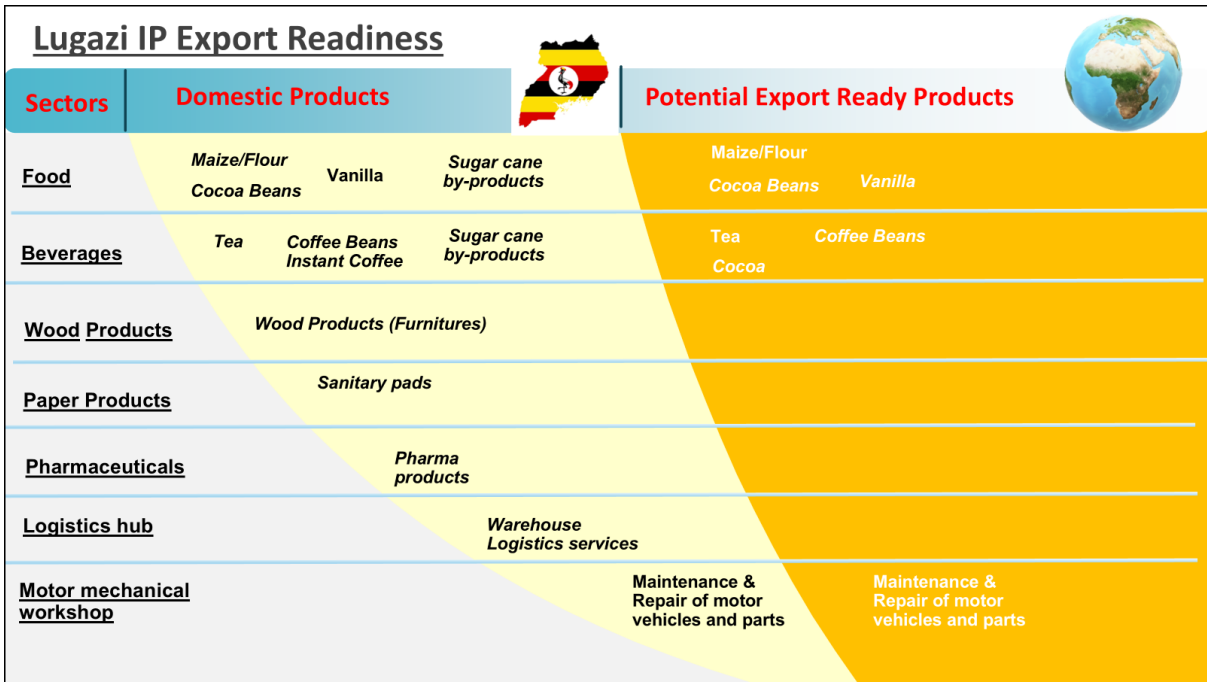


Figure 40: Lugazi IP Export Ready products vs domestic

1.4.2. Examples of sectors with export potential

Coffee beans: one of the sectors in Lugazi IP, Masese cluster and Tororo IP

Uganda's coffee value chain is a cornerstone of its agricultural export economy, primarily centered around the export of green (unroasted) coffee beans. The European Union and Western Europe represent the largest export destination (Figure 41), currently taking over $512 million in Ugandan coffee exports, with a growing potential of $170 million. Within this bloc, Italy, Germany, Belgium, and Spain are the most significant buyers. Other established markets include North America and East Asia, while the Middle East and Eastern Europe present strong growth opportunities, with favorable demand trends and product diversification potential. Uganda's coffee is largely produced by smallholder farmers and sold through processors and exporters including local or global traders like Louis-Dreyfus Company (LDC). While the country excels in green coffee exports, limited domestic roasting and branding suggest opportunities for value addition within the value chain to further capitalize on global demand, such as instant coffee.

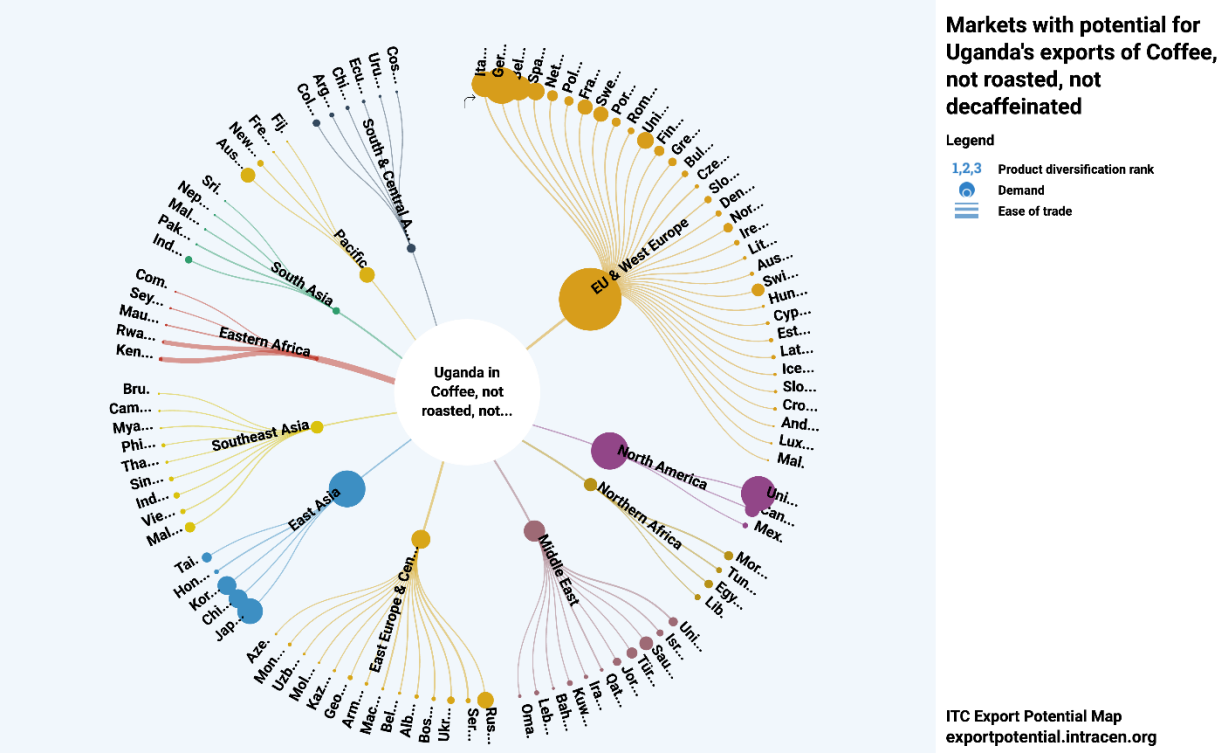


Figure 41: Markets with potential for Uganda's exports of Coffee.

Cocoa beans: one of the sectors in Lugazi IP and Masese cluster

Uganda's cocoa value chain is an emerging driver of agricultural exports, with a total estimated export potential of $115 million, of which $63 million remains untapped. While cocoa beans are currently exported largely in raw form, Southeast Asia is the leading destination, particularly Malaysia and Indonesia, which together account for $34 million in current export value (Figure 42). However, the European Union and Western Europe present the highest long-term potential: Uganda currently exports around $27 million to this region, but the potential exists to scale this to $76 million, particularly through buyers in the Netherlands, Belgium, Germany, and Italy. With further potential in North America and the Middle East, these regions also represent key frontiers for growth. Improving post-harvest quality (e.g., fermentation and drying), investing in certification and traceability, and expanding processing capacity could enable Uganda to upgrade within the cocoa value chain—from raw bean exports to premium cocoa and chocolate products.

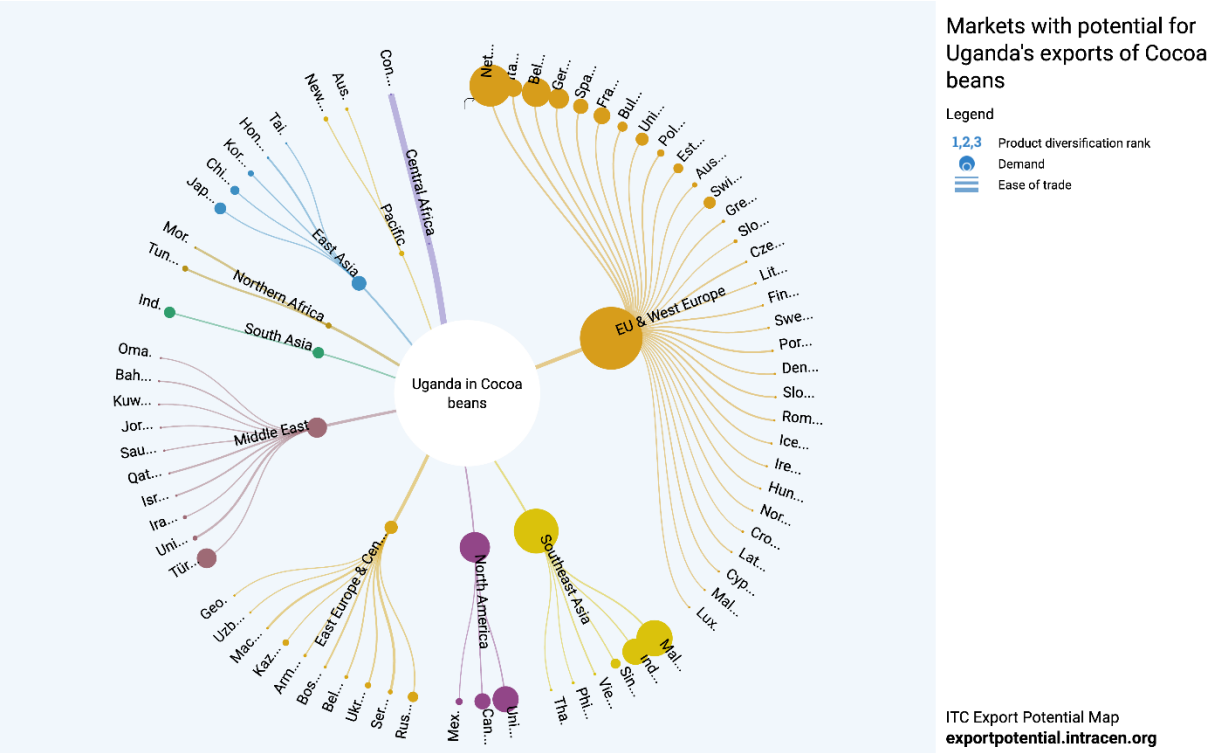


Figure 42: Markets with potential for Uganda's exports of Cocoa

Vanilla: one of the sectors in Lugazi IP and Masese cluster

Vanilla value chain in Uganda holds significant promise in the premium spice market, with a total export potential of $42 million, and $17 million still unrealized. The United States is the largest single market, representing $16 million in potential, followed by Canada at $4.8 million, making North America the top regional destination (Figure 43). Uganda currently exports nearly $9 million worth of vanilla to the European Union, but that figure could rise to $22 million with improved access and quality—particularly in high-potential markets like Germany, the Netherlands, and France. Though current exports to the United Arab Emirates remain minimal, it also shows strong potential for growth. Uganda is known for producing high-quality Bourbon-type vanilla, often cultivated by smallholder farmers. To fully capitalize on global demand, value chain actors must address challenges around traceability, post-harvest handling, certification (e.g., organic, Fairtrade), and consistency in quality, all of which are critical in securing long-term premium contracts with global buyers.

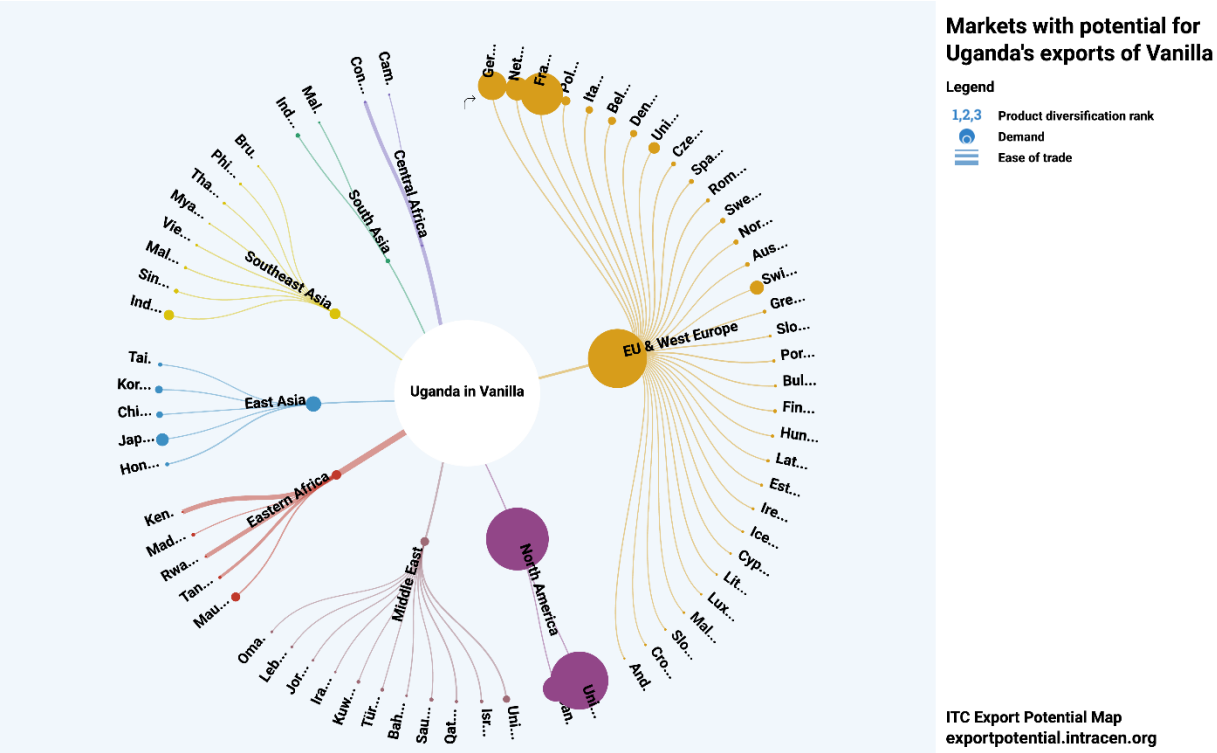


Figure 43: Markets with potential for Uganda's exports of Vanilla.

1.4.3. Materiality assessment

The 11 sectors/products and processes the materiality assessment focused on were (see Table 13**)**

SECTOR CHECK-LIST	ACTIVITIES
Pharma	Packing + small scale manufacturing
Sanitary pads	Manufacturing + packaging
Maize/Grains	Milling
Sugar cane	Processing (Molassese, Bagasse)
Coffee	Color sorting + warehousing
Tea	Packaging
Cocoa	Processing + warehousing
Wood	Processing
Vanilla	Processing + warehousing
Motor mechanical workshops	Repairing

Logistics hub	Warehousing + Parking

Table 13: Lugazi IP sectors checklist

Note that the processes identification is not final, thus the materiality rating did not limit itself to the strict processes listed but encompassed other likely processes if their impact would be more material, unless there was a clear indication that those could not take place, for example due to technical limitations.

The materiality assessment shows no disqualifying concern. However, the percentage of High materiality impacts at Value Chain Level is far greater than at IP level (53% of all impacts vs 20%). Besides the overall impacts at IP level are not negligible with 54 elements rated high or medium all sectors considered (Figure 44).

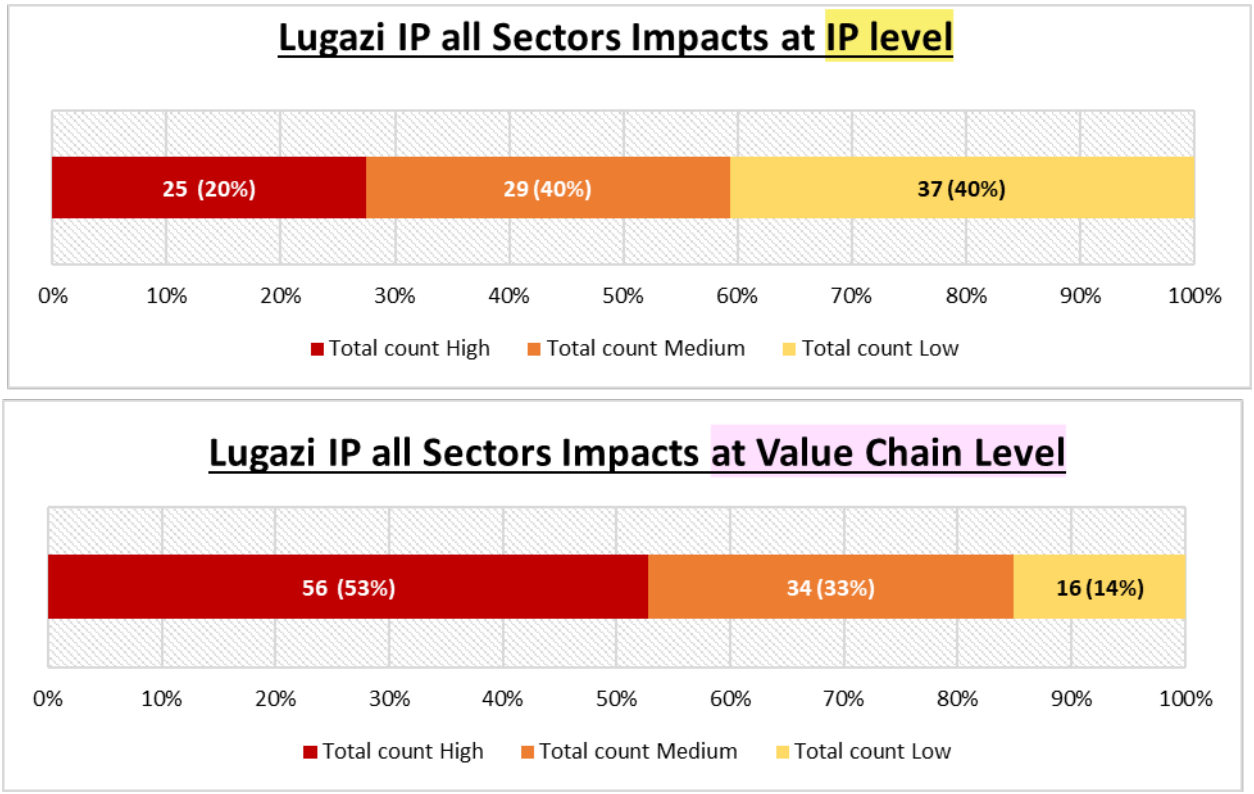


Figure 44: Lugazi IP impacts at IP and value chain levels

Overall, the elements most impacted at IP level are the volume of water use, emission of toxic pollutants to water and soil, disturbances, solid waste generation and the emission of GHG and non GHG air pollutants. As can be expected, the value chain present elements of concern adding biotic resource, area of land use and of freshwater use concerns to the list (Figure 45).

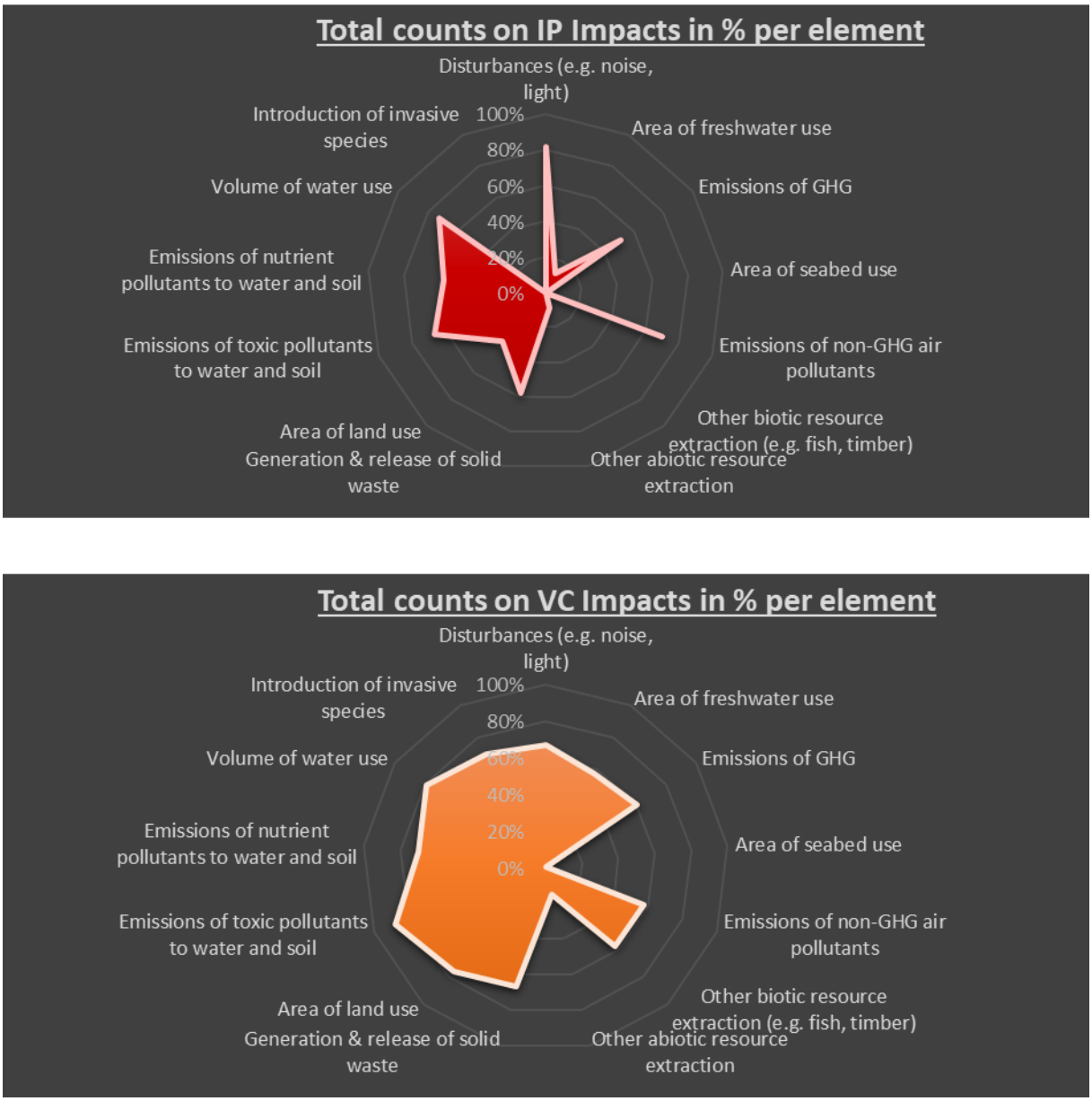


Figure 45: Impacts in % per element at IP and VC levels

In particular, key IP level impacts to be addressed in the watsan sector are:

Volume of water use:

The proposed sectors in the Lugazi IP require high volumes of water use. Currently, Lugazi town experiences intermittent supply from the piped water supply system fed by groundwater sources. However, there are plans to augment the supply by extension from the recently completed Katosi Water Treatment Plant, which abstracts raw water from Lake Victoria. There is a need to assess the current and projected water requirements for the domestic, institutional, commercial, and industrial water uses.

Emission of toxic and nutrient pollutants to water and soil:

The proposed sectors in the park can potentially emit high volumes of nutrients and toxic pollutants that can result in pollution of groundwater and surface water resources. The surface water resource nearest to the park is a stream flowing along the south-western boundary to the north-western boundary of the

park. The stream flows into Musamya river, a tributary to River Sezibwa that drains into Lake Kyoga. Hence, there would be far reaching implications of pollution of the water sources.

Generation and release of solid waste:

The proposed sectors can cause significant generation of solid waste at the industrial park. Currently, the municipality relies on a solid waste dumping site at Kawolo. However, the site does not follow standard landfilling operation and management principles and practices. A detailed assessment of the solid waste generation and composition for the park and municipality is required.

And key VC level impacts to be addressed in the watsan sector are:

Volume of water use:

The VCs for the proposed sectors in the Lugazi IP require moderate volumes of water use. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting and other surface water sources (streams) to meet the demand for water for production.

Emission of toxic and nutrient pollutants to water and soil:

The VCs for the proposed sectors in park can potentially emit significant volumes of toxic pollutants as compared to nutrient pollutants. The toxic pollutants accumulate due to the use of pesticides in the agricultural activities. There is a potential danger of pollution of groundwater and surface water resources.

Generation and release of solid waste:
The VCs for the proposed sectors can cause medium to low generation of solid waste. The solid waste is primary from agricultural practices, with high quantities of biodegradable waste. Some of the agricultural waste is used for mulching the soils.

The most prominent dependencies at both IP and VC levels are on watsan ecosystem services (Figure 46).

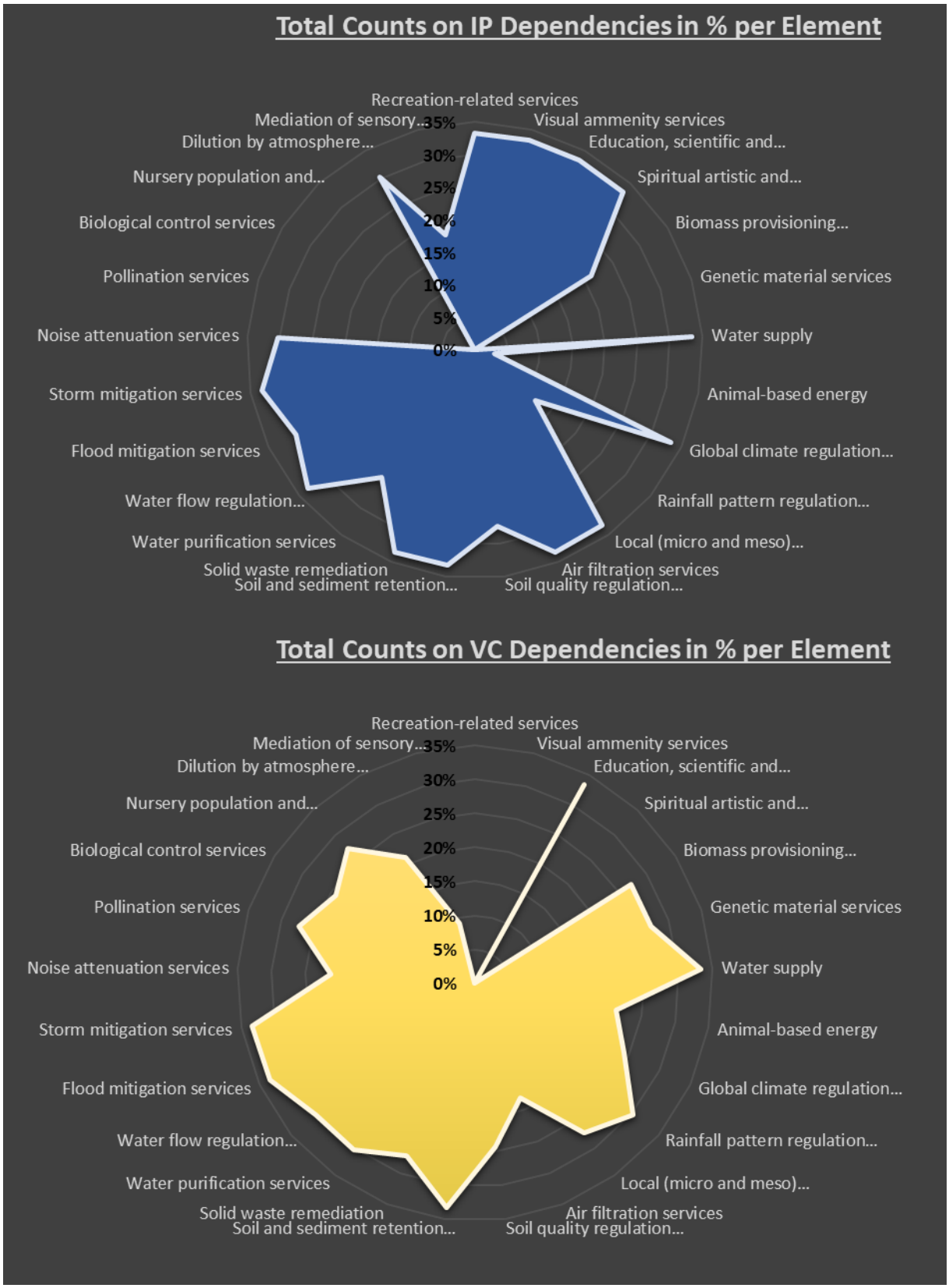


Figure 46: Dependencies in % per element at IP and VC levels

Key IP level dependencies to be considered in the the watsan sector are:

Water Supply:

The proposed sectors in the park have a high dependency on water supply services. The IP needs should not foreshadow other water uses in the municipality. The proposed improvement of piped water supply in the municipality can potentially ensure adequate safe water access for domestic, institutional, commercial and industrial water users. However, a more detailed assessment is required.

Solid Waste Remediation:

The proposed sectors in the park will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and municipality, through improved solid waste management practices. This can be further assessed in a detailed assessment of solid waste generation and composition for the IP and municipality.

Water flow regulation services:

The IP will also heavily rely on the water flow regulation services. The observed land use within the vicinity of the IP is primarily agriculture (large scale sugar cane growing). The observed land use limits the ability of the ecosystem to provide water flow regulation services. There is need for a detailed land use assessment in proximity to the site.

Storm mitigation services:

The IP will rely on storm mitigation services, however, the observed land use in close proximity to the park (large scale sugarcane growing) cannot provide storm mitigation services. There is need to further assess the land use within and in close proximity of the site.

Flood mitigation services:

The IP will also rely on flood mitigation services. The site topography is observed to be gently sloping from the eastern and north eastern boundary toward the western and north western boundary. The stream along the western and north western boundary of the park; as well as the low-lying north-western boundary presents a risk of flooding that requires detailed assessment.

Water purification services:

The proposed sectors will require water purification services, however, there is no existing wetland in close proximity to the park. The assessment for potential water purification services should be expanded to consider constructed wetlands, depending on the availability of land.

And key VC level dependencies to be considered in the the watsan sector are:

Water Supply:

The VCs of the proposed sectors in the park have a high dependency on water supply services. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting and other surface water sources (streams) to meet the demand for water for production.

Solid Waste Remediation:

The VCs for the proposed sectors in the park will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and municipality. The areas

outside the municipality manage solid waste at household and institutional level. The solid waste is primary from agricultural practices, with high quantities of biodegradable waste.

Water flow regulation services:

The VCs of the proposed sectors will also heavily rely on the water flow regulation services. The observed land use in some areas of the district is agriculture, forestry, vegetation and both sparsely and densely populated built-up areas. There are a few areas where agroforestry is being practiced and this will enhance the services. The land use limits or supports the ability of the ecosystem to provide water flow regulation services.

Storm mitigation services:

The VCs will rely on storm mitigation services to support the protection of infrastructure and crop produce. There are some areas within the district where agroforestry is carried out, thereby supporting the services. The services are critical to maintain the VC for the respective production processes.

Flood mitigation services:

The VCs will also rely on flood mitigation services to support the protection of infrastructure and crop produce. In some areas where sugarcane growing was observed, the cultivation is done in close proximity to the streams. The land use activities, coupled with degradation of river banks impacts the flood mitigation services.

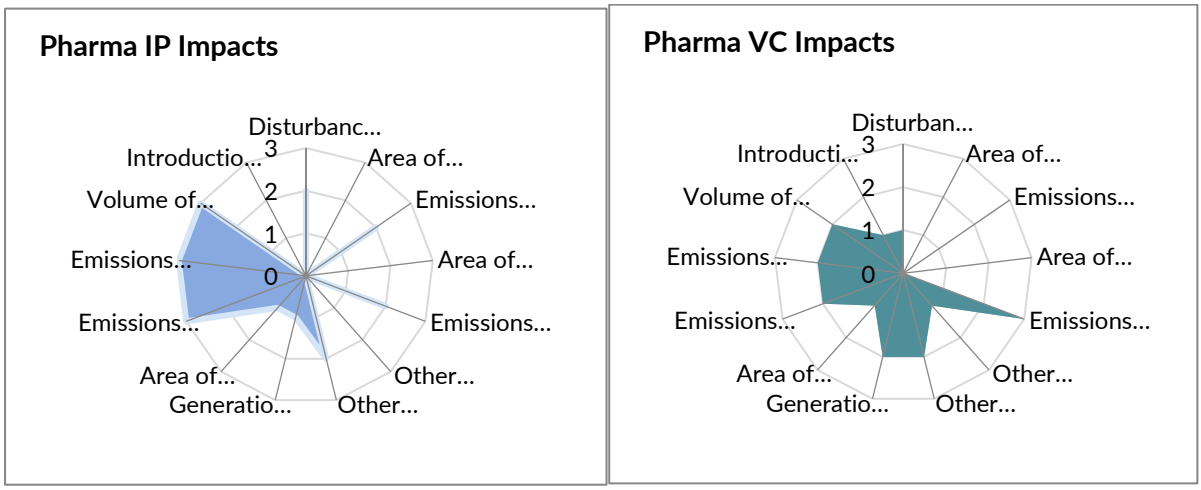
Water purification services:

The VCs of the proposed sectors will require water purification services. There are a number of wetlands in the district which can provide water purification services along the VC. However, there is no existing wetland in close proximity to the park.

Below is an overview of impacts and dependencies by sector and element.

Lugazi IP and VC Impacts by sector and element

Pharma IP and VC impacts



Emission of GHG pollutants: API (Active Pharmaceutical Ingredient) production is energy-intensive at the IP (Industrial Production) level, generating emissions from fossil fuel-based steam generation. Additionally, handling large wastewater volumes contributes to methane emissions. While direct IP

emissions are moderate, value chain emissions are significant due to extraction operations and logistics, particularly cold chain logistics, which rely on high-GWP (Global Warming Potential) refrigerants.

Emission of non-GHG pollutants to air: At the IP (Industrial Production) level, non-GHG air pollutants include methanol, toluene, and other VOCs from solvent evaporation during drug formulation, contributing to air pollution, as well as particulate matter from fossil fuel-powered boilers. At the VC (Value Chain) level, significant non-GHG emissions arise from the incineration of unused medicines, releasing toxic dioxins and furans, and from transportation, particularly cold chain logistics, which emits chlorinated hydrocarbons.

Emission of toxic pollutants to water and land: At the IP (Industrial Production) level, wastewater from drug manufacturing contains active pharmaceutical ingredients (APIs), solvents, antibiotics, hormones, and high biological oxygen demand (BOD) from fermentation processes. At the VC (Value Chain) level, toxic pollutant emissions are moderate, primarily originating from pesticide runoff during medicinal plant cultivation and water contamination due to improper disposal of unused drugs (e.g., flushing).

Emission of nutrient pollutants to water: At the IP (Industrial Production) level, wastewater contains high nutrient concentrations, primarily nitrogen-rich waste from fermentation-based antibiotic production and phosphorus compounds from other manufacturing processes. In contrast, VC (Value Chain) nutrient emissions are rated as moderate - while total quantities are significant, their impact is diluted due to diffuse agricultural runoff from medicinal plant cultivation.

Other biotic resource extraction: Activities within the IP are limited to packaging and product assembly by JMS, and therefore do not involve any extraction or consumption of biotic resources. However, at the VC level, particularly in the case of herbal medicine production, there may be extraction of other biotic resources. This is due to the cultivation of local medicinal plants, which are often grown using mixed planting methods that can impact surrounding vegetation and ecosystems.

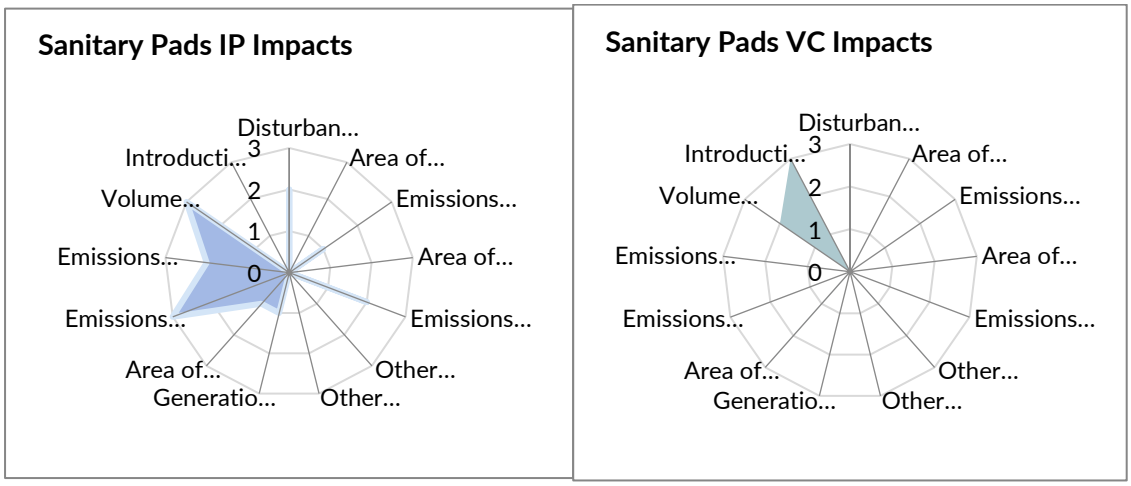
Area of land use: The footprint at the IP level remains minimal, as JMS's operations involve only small-scale packaging and assembly. At the VC level, pharmaceutical manufacturing remains relatively land-efficient. However, if herbal medicine production using locally sourced ingredients is scaled up, the associated cultivation would require additional land, potentially leading to greater pressure on land resources depending on the type and extent of plantation.

Introduction of invasive species: There is no anticipated risk at the IP level since operations are restricted to packaging and assembly, with no involvement of biological materials. At the VC level, however, the introduction of non-native medicinal species such as turmeric or Cannabis sativa may pose ecological risks. These species, if not properly regulated and managed, could become invasive and disrupt local biodiversity and ecosystems.

Generation and release of solid waste: At the IP, solid waste generation and release at the IP is low because most of the waste generation is primarily wastewater (from industrial processes). Solid waste generation at VC level is rated medium due to significant waste generation in medicinal plant cultivation.

Volume of water use: The pharmaceutical industry involves water intensive processes during manufacturing such as chemical synthesis of active pharmaceutical ingredients (APIs), final isolation and purification of APIs, processing of injection water, steam generation and cooling water (which is about 4 times the water used for pharmaceutical manufacturing). The volume of water use at VC level is rated medium due to lower water demand requirement for medicinal plant cultivation.

Sanitary Pads IP and VC impacts



Disturbance (noise): Noise pollution is rated as moderate, primarily generated by industrial machinery including sewing machines, generators, and forklifts. Light pollution stems from intensive factory lighting in production areas and security floodlights around storage zones. These disturbances impact both adjacent communities and local ecosystems. Value Chain (VC) impacts were not rated due to insufficient data availability.

Emission of GHG pollutants to air: GHG emissions remain relatively low, primarily occurring during power outages when operations switch to diesel generators. No Value Chain (VC) assessment was conducted due to insufficient emissions data availability.

Emission of non-GHG pollutants to air: Non-GHG emissions are moderate, primarily originating from hazardous chemical use including synthetic dyes and pretreatment agents (e.g., bleaching compounds). Value Chain (VC) emissions were not assessed due to insufficient data availability.

Emission of nutrients to water and land: At the IP (Industrial Production) level, nutrient emissions are rated as moderate. These primarily stem from fiber pretreatment processes, such as phosphoric acid degumming for sanitary pad production, which release phosphate-rich effluents. These discharges contribute to water pollution and potential eutrophication in receiving water bodies. No Value Chain (VC) assessment was conducted due to insufficient data availability.

Emission of toxic pollutants to water and land: At the IP (Industrial Production) level, toxic emissions are rated as high. These include persistent silicone-based polymers from synthetic dyes that bioaccumulate in aquatic ecosystems, along with hazardous byproducts (e.g., dioxins) generated from bleaching agents like hypochlorite. No Value Chain (VC) assessment was possible due to insufficient data availability.

Other biotic resource extraction: At the IP level, there is no extraction of biotic resources, as Soft Care imports all raw materials—primarily wood pulp—from suppliers in the US and South Korea. However, at the VC level, if wood pulp were to be sourced locally, it would involve the extraction of roundwood and firewood. Such extraction often exceeds natural forest regeneration rates, placing pressure on local forest ecosystems and raising sustainability concerns.

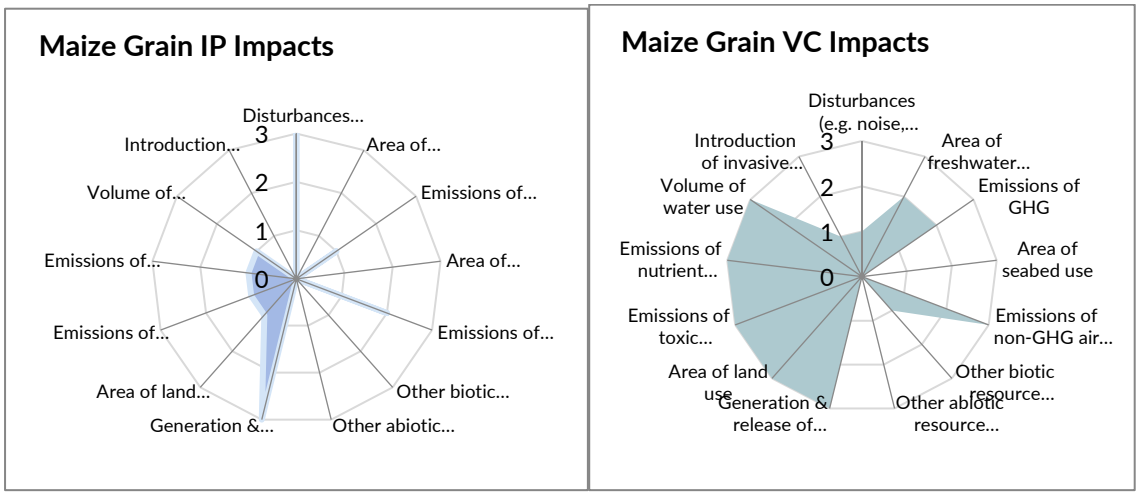
Area of land use: Land use at the IP level remains minimal, given that sanitary pad manufacturing requires limited space. In contrast, at the VC level, local sourcing of wood pulp would increase land use due to the need for extensive forest plantations, particularly of fast-growing tree species used for pulp production.

Introduction of invasive species: There is no risk of introducing invasive species at the IP level, as all materials are imported under strict quality controls. At the VC level, however, local sourcing would likely depend on non-native species such as pine or eucalyptus. These species, though widely used in pulp industries, are not indigenous to Uganda and may pose ecological risks if not carefully managed.

Generation and release of solid waste: The generation and release of solid waste is low both at IP and VC level. At IP level, companies dealing in manufacture of sanitary wear in Uganda import already processed pulp of which most of it is processed into finished products. The other waste is generated from packaging. At the VC level, solid waste is generated from imported raw materials is low.

Volume of water use: High water use at the IP level is mainly attributed to the processing of pulp. Water use at VC level is significant from the growing of trees for pulp and the manufacturing stage.

Maize Grain IP and VC impacts



The major IP and VC impacts of maize milling operations include.

Disturbance (noise and light): At the IP (Industrial Production) level, maize grain processing generates significant noise pollution (70-90 dB) from processing equipment like dehullers, grinders, and rollers, supplemented by additional noise from conveyors, blowers, and packaging machinery. In contrast, VC (Value Chain) disturbances are minimal, primarily consisting of agricultural machinery noise (tractors, harvesters) during upstream operations, which is substantially quieter than milling activities.

Emission of GHG pollutants to air: At the IP (Industrial Production) level, GHG emissions remain low due to the predominant use of sun drying for maize and grid electricity with low emission factors. At the VC (Value Chain) level, emissions are moderate, resulting primarily from limited tractor fuel combustion and suboptimal manure management practices.

Emission of non-GHG pollutants to air: Air pollutants, including dust and particulate matter (PM_{10}, $PM_{2.5}$) impact both IP and VC levels. At IP, concentrations reach severe levels in enclosed processing facilities. At VC, emissions become diffuse yet remain significant due to widespread synthetic agrochemical application.

Generation and release of solid waste: Maize grain processing generates substantial solid waste volumes across both Industrial Production (IP) and Value Chain (VC) stages. At the IP level, processing yields

byproducts include husks, cobs, bran, germ, and broken kernels. At the VC level, agricultural operations produce crop residues such as stalks and leaves remaining in fields post-harvest.

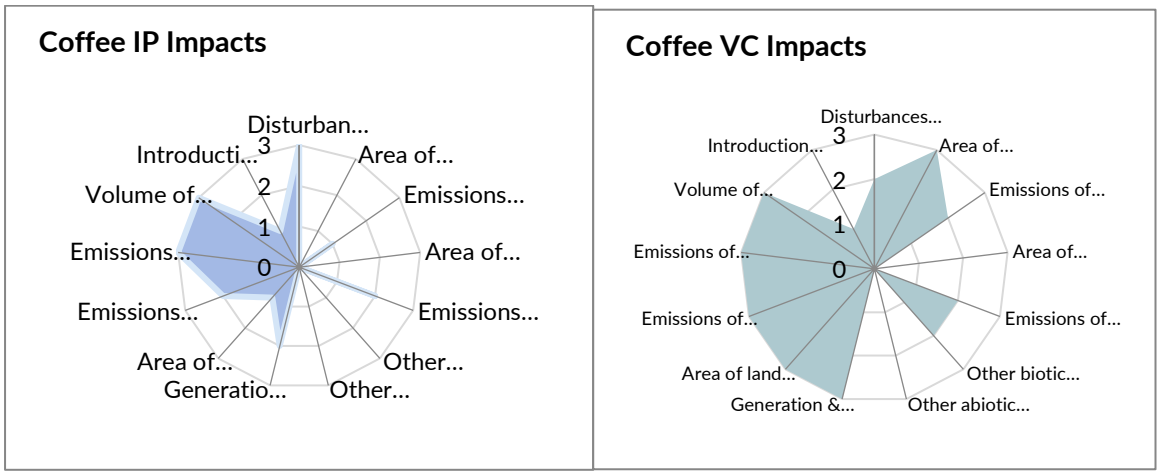
Other biotic resource extraction: Within the IP, maize activities are limited to milling, packaging, and storage, which do not involve any direct extraction of other biotic resources. At the VC level, however, maize cultivation can interact with other biotic elements. Mixed cropping systems and integrated farming practices—such as raising poultry near fields—result in the incidental use or interaction with additional biotic resources.

Area of land use: Land use within the IP is limited, as processing operations require relatively little space. At the VC level, however, maize production relies heavily on land, particularly through Uganda's network of smallholder farmers. This contributes to significant agricultural land use on a national scale.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, the spread of invasive species can occur through several pathways: improper waste disposal, the transfer of seeds via machinery and clothing, and unsustainable agricultural practices such as overuse of herbicides, pesticides, and irrigation. These factors can degrade surrounding ecosystems and reduce their ability to resist invasive species encroachment.

Volume of water use: At IP level, low volume of water is required for industrial processes such as milling. At the VC level, a significant amount of water is required during the cultivation of maize due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of crops leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited.

Coffee IP and VC impacts



The IP and VC impacts of coffee processing include:

Disturbances (noise and light); IP operation of coffee processing is the dominant noise source, while value chain noise is minor except for transport. At the IP maize processing, noise comes from pulping machines, hullers, dryers, and grinders (noise range 70–90 dB), while at VC, there is minimal noise (occasional farm machinery).

Emission of GHG pollutants to air: The Value chain (farming) dominates GHG emissions (~40–70% of total), mainly from deforestation and fertilizers, while IP operations are significant (~20%) due to drying.

Emission of non-GHG pollutants to air: At IP, non-GHG pollutants (PM/VOCs) are concentrated and hazardous for workers, while at VC, agro chemicals contribute to diffuse but persistent air/soil toxicity.

At IP, particulate matter (PM) from hulling/drying and Volatile organic compounds (VOCs) from fermentation (wet process), while at VC, PM is from soil tillage and agrochemical spraying (pesticide drift of toxic VOCs)

Emission of Toxic pollutants to water and land: Value chain pesticide use and releases dioxins from burning agro-chemical containers is the most severe toxic threat (chronic ecosystem damage), while IP wastewater with high BOD, COD, and phenols from fermentation poses acute local risks.

Emission of Nutrient pollutants into water: Value chain fertilizer runoff is the largest nutrient pollution source, while Industrial Pack wastewater is a localized but severe issue. At IP, nutrient-rich wastewater (nitrogen, phosphorus) is produced from wet milling and coffee pulp/husk decomposition.

Generation and release of solid waste: IP operations generate large volume waste, but reusable (pulp for compost/biogas), while the Value chain solid waste includes toxic agro-plastics, but less volume than pulp.

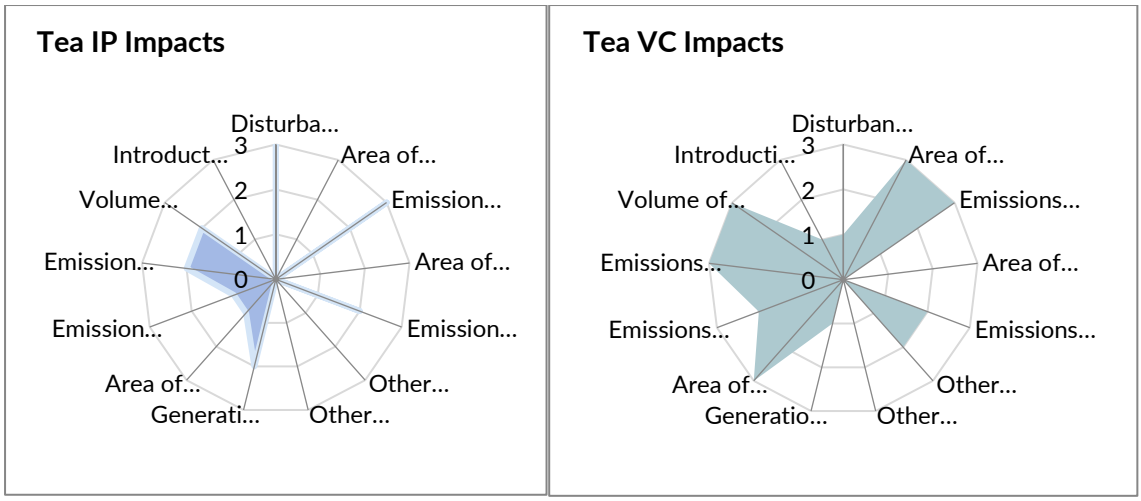
Other biotic resource extraction: At the IP level, coffee-related activities are confined to color-sorting, packaging, and storage, which do not involve any extraction of other biotic resources. However, at the VC level, the cultivation of coffee trees is often intercropped with other plants such as vanilla, vegetables, or shade trees. This system may lead to incidental extraction of non-timber forest products such as mushrooms, berries, nuts, cork, balata, and resins. In some cases, harvesting of these materials may exceed the regeneration capacity of local species, contributing to biotic stress in forest-edge ecosystems.

Area of land use: Land use within the IP remains limited due to the post-harvest nature of operations. At the VC level, however, coffee cultivation is land-intensive and predominantly carried out by smallholder farmers, often in hilly or forest-adjacent areas. This contributes to significant land transformation and can increase pressure on ecologically sensitive zones.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, the cultivation and maintenance of coffee plantations can contribute to the spread of invasive species through improper waste management, accidental transport of seeds via farm machinery or workers, and the use of unsustainable agricultural inputs such as herbicides, pesticides, and irrigation. These practices can weaken surrounding ecosystems and facilitate the establishment of invasive species.

Volume of water use: Large volumes of water are required especially during coffee processing for fermentation, pulping, rinsing, and cooling of machinery. This accounts for large volumes of water use at IP level and the value chain. Coffee growing also contributes to the VC water use especially where irrigation is required.

Tea IP and VC impacts



Disturbances (Noise): IP operation, including Heavy machinery like orthodox/CTC rollers, dryers, sorters) generates a lot of noise up to (80-95 dB) while the Value chain has quiet operation, including have hand-plucking, sun-withering, and minimal mechanization.

Emission of GHG pollutants into the air: GHG emissions are high both at IP and VC. Tea processing especially tea drying and weathering are energy intensive process in Uganda these processing depends on firewood contributing to deforestation thus high GHG emission to air. The Value chain operation like transportation of green bulky green leaves from tea estates and small-scale farmers emit carbon dioxide. At VC tea consumption is the most energy intensive stage thus more GHG emissions

Emission of non-GHG pollutants to air: At IP, steam boiler operations and tea drying generate particulate matter and sorting accounting for medium rating non-GHG pollutants while At VC their moderated mono oxides of nitrogen, carbon and sulphur from exhausts of green leaf collection from fields.

Emission of toxic pollutants to water and land: At IP emission of toxic pollutants are medium, largely from tea wastewater containing high tannins, and low pH as well as lubricants from CTC and cleaning agents. At VC the toxic emissions are high due to the use of herbicides and burning prunes mixed with plastics.

Emission of nutrient pollutants to water and land: At IP emission of nutrients is medium intensive cleaning required by HACCP uses a lot of soap and detergents in cleaning operations thus release of nitrates and phosphorus. At VC, nutrients are high due to intensive use of fertilizers, especially by large tea estates, which results in runoffs that end up water.

Other biotic resource extraction: Within the IP, tea sector activities involve packaging and storage, and do not entail any extraction of biotic resources. At the VC level, however, the cultivation of tea, often in monoculture plantations, may be associated with incidental extraction of natural products such as mushrooms, nuts, resins, and mosses—especially in forested or biodiverse areas. When these are harvested unsustainably, it can place pressure on local flora and fauna populations.

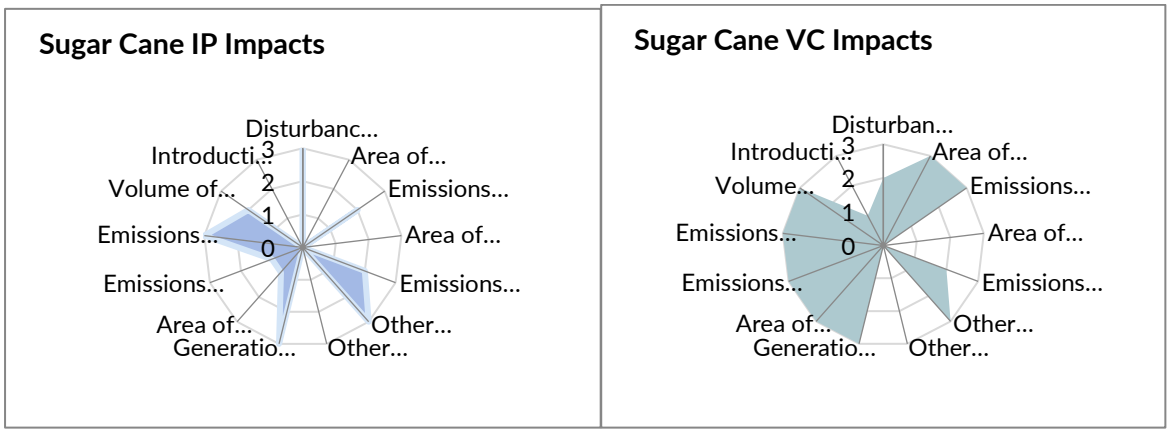
Area of land use: Land use at the IP level is minimal due to the limited footprint of tea processing facilities. In contrast, tea plantations at the VC level require large tracts of land and involve continuous harvesting cycles. This often leads to long-term land conversion, limits opportunities for intercropping, and significantly alters the local land-use structure and biodiversity.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. However, at the VC level, the long lifecycle of tea as a perennial crop increases the likelihood of invasive species spreading. Contributing factors include mismanaged waste, transport of invasive seeds by machinery or clothing, and unsustainable use of agrochemicals and irrigation.

Volume of water use: At IP level, moderate amounts of water are required for washing of freshly plucked tea leaves, steam generation and cooling of machinery. Across the tea value chain, a significant amount of water is required during the cultivation of tea due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of tea leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited. Tea processing and consumption contributes significantly to the water requirement across the tea value chain.

Generation and release of solid waste: At IP level, the generation of solid waste is rated as medium. The solid waste generated at the IP level mainly discarded leaves, trimmings, and packaging waste. High rating for solid waste at VC level attributed to mainly organic waste generated from residue crops, excess compost, packaging waste.

Sugar Cane IP and VC impacts



The IP and VC impacts of Sugar processing include.

Disturbances, noise: and light: At IP there is high noise from heavy machinery, including cane crushers (90–110 dB), shredders, boilers, and turbines and sugar facilities often operate 24/7 during harvest seasons, creating persistent noise pollution while at value chain noise is medium due to limited or occasional use of tractors and transportation of cane from plantations.

Emission of GHG pollutants to air: GHG emissions AT IP are rated medium, largely methane, which comes from managing large volumes of wastewater with high organic load. In the Value chain, GHG emissions are high, coming from the application of fertilizers (NO_2), cultivating tractors, and trucks collecting sugar cane.

Emission of non-GHG pollutants to air: At IP, non-GHG emissions medium are Particulate Matter (PM from milling and bagasse combustion in boilers and Volatile Organic Compounds (VOCs) released from fermentation of byproducts (molasses). At VC, non-GHG emissions are medium, including dust and PM from cultivation operations as well as mono oxides of nitrogen from fertilizer application.

Emission of toxic pollutants into water: At IP and VC, toxic pollutants are high from Mill effluents, which contain Oil/grease from machinery and general wastewater with high BOD and COD, contaminating rivers if untreated. AT VC toxic pollutants are diffused and persistent from the use of herbicides

Other biotic resource extraction: SCOUL, the first sugar factory is operating not too far from the Lugazi IP. At the IP level, sugarcane-related operations are focused on processing by-products such as molasses and bagasse, with no extraction of biotic resources involved. However, at the VC level, sugarcane cultivation is extensive in the Lugazi region, because of SCOUL. The monoculture of sugarcane can displace food crops on farms and reduce on-farm food availability. In addition, integrated farming systems involving poultry are sometimes practiced, which increases interactions with other biotic elements.

Area of land use: The land use footprint at the IP level is modest, as by-product processing does not require expansive facilities. At the VC level, however, sugarcane cultivation is highly land-intensive and involves large-scale agricultural operations that can significantly alter landscape use, particularly in regions with high-value farmland.

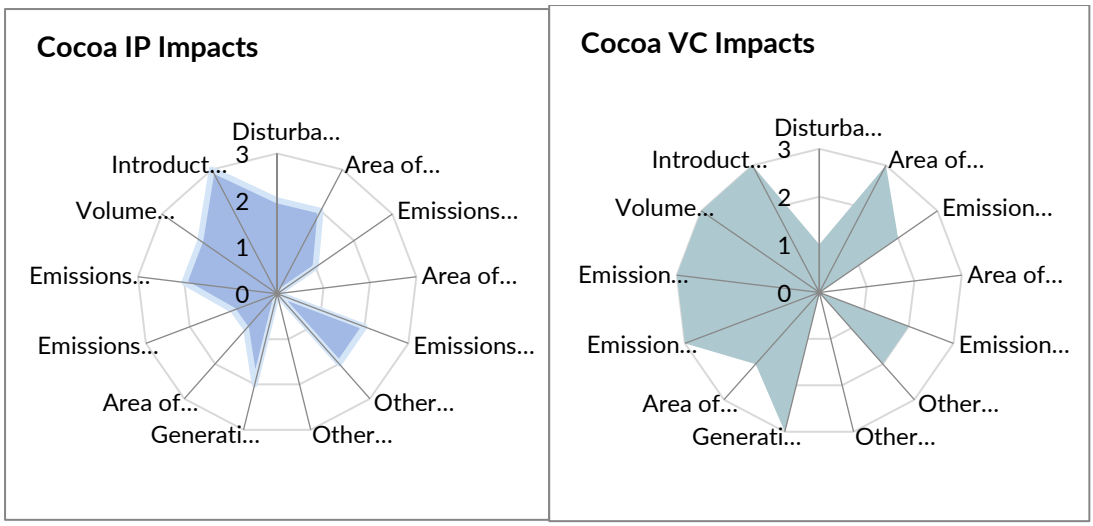
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, the expansion of perennial crops like sugarcane can increase the risk of invasive species through improper disposal of organic waste, seed dispersion via farming equipment or workers, and the use of intensive chemical inputs. These practices may degrade surrounding ecosystems and impair their ability to resist biological invasions. In some cases, sugarcane itself or associated companion species may exhibit invasive characteristics if not managed properly.

Volume of water use: At the IP level, moderate amounts of water are required during sugarcane processing for washing, crushing, juice extraction, steam generation and cooling of machinery. High volume of water is required across the sugarcane VC. A significant amount of water is required during the cultivation of sugar cane due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of sugarcane leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited.

Emission of nutrient pollutants into water and soil: The high emission of nutrient pollutants at the IP level is attributed to high concentrations of nutrients in the sugarcane processing wastewater. At VC level, cultivation of sugarcane uses fertilizers like nitrogen from ammonium sulfate, phosphorus from rock phosphate, potassium from potassium chloride, and urea from animal manure which can lead to accumulation of nutrients in water and soil.

Generation and release of solid waste: High quantities of solid waste are generated at both IP and VC level including sugarcane trash (straw, tops, leaves), bagasse, filter cake, bagasse and fly ash and packaging waste.

Cocoa IP and VC impacts



Emission of nutrient pollutants to water. At IP, nutrient pollutants are low in the process of removing pulp from fermented cocoa, which generates wastewater with a high organic load that can cause eutrophication. AT VC, nutrient pollutants are high, coming from fertilizer run off from the cocoa plantation, including nitrates, phosphorus, and potassium that end up in the water.

Emissions of GHG pollutants: At IP GHG emissions are low because processing of cocoa largely use of electricity from gride which has low emission factor. At the VC from farm transportation cocoa to processing facilities release moderates' amount of GHG emission.

Emission of non-GHG pollutants: AT IP and VC emission of non-GHG pollutants are medium. At IP, they come from the fermentation process that generates volatile organic compounds, while at VC, they come from fertilizers and the transportation of cocoa.

Disturbance (noise): The cleaning operations, milling, and packaging generated moderate noise due to moving machines and compressed air required for packaging machines, while VC disturbances because most operations being manually done with hands

Generation of Solid Waste: At IP generation of solid waste medium comes from cocoa husks while the generation of solid waste high due large volume of cocoa pod.

Other biotic resource extraction: At the IP level, cocoa bean activities are limited to packaging and storage, which do not involve the extraction of biotic resources. However, at the VC level, cocoa is typically intercropped with species such as vanilla, vegetables, and shade trees. This system may lead to the incidental extraction of non-timber forest products including mushrooms, berries, nuts, cork, and resins, potentially placing pressure on surrounding ecosystems if not sustainably managed.

Area of land use: Land use at the IP level is minimal, reflecting the low spatial requirement of post-harvest activities. At the VC level, cocoa cultivation occupies moderate land area, though its footprint is smaller compared to other cash crops like coffee and sugarcane in Uganda.

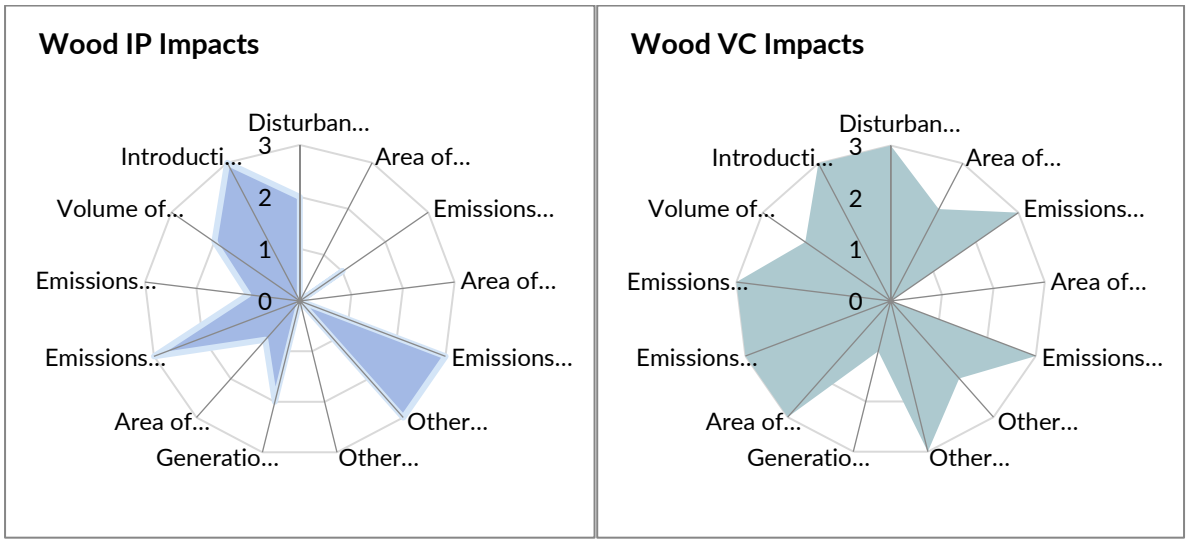
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. From a VC perspective, cocoa is a non-native species introduced to Uganda in the early 20th century. While it now thrives under the country's favorable equatorial climate, its cultivation, like other perennial crops, can contribute to the spread of invasive species through unsustainable practices, accidental seed dispersal, or agrochemical use.

Volume of water use: At IP level the volume of water use is medium as compared to the high quantity at VC level. At IP, water requirements for fermentation and machine processes for steam generation and cooling of machinery. A significant amount of water is required during the cultivation of cocoa due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of

cocoa leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited.

Emission of toxic pollutants to water and soil: At IP level, cocoa processing wastewater contains high levels of organic pollutants that contribute to oxygen depletion and toxicity if the untreated wastewater ends up in water bodies At VC level, the emission of toxic pollutants is high as growing of cocoa involves use of pesticides and herbicides which runoff and lead to high levels of toxic soil and water pollution.

Wood Production IP and VC impact



Disturbances (noise): At IP noise is medium from machines like sawmills while used in process of wood use while VC the noise high because of use large circular saw machines to cut timber.

Emissions of non-GHG air pollutants: At IP non GHG pollutants are high mainly VOCs, largely come from chemicals used in the treatment and preservation of wood as well as well as solvents, vanishes and paints and dust and particulate matter from sawmills. At VC non-GHG pollutants are medium and come from fossil fuels used to run circular saw and dust from cutting operation

Emission of GHG pollutants to air: At IP GHG emissions are low because the tools and machines are run on electricity with low emission factor while at VC the emission are high because circular machines use fossil fuel as well as transportation of wood from forest to processing plants.

Emission toxic pollutants to water: At IP toxic pollutants are high and include chemicals used in the treatment of wood, including Arsenic, copper, and chromium, account for the emission of toxic pollutants to water. At VC the toxic pollutant water and land are medium they include lubricating oils and grease use in sawmills.

Other biotic resource extraction: At the IP level, wood production activities consist primarily of furniture-making using shared facilities. These activities do not involve the extraction of additional biotic resources. In contrast, at the VC level, timber procurement relies on logging, which entails the extraction of roundwood and firewood. This extraction is often conducted at rates that exceed the regenerative capacity of natural forests, posing significant threats to biodiversity and forest ecosystems.

Area of land use: Land use at the IP level remains minimal due to the limited footprint of workshop and carpentry operations. However, at the VC level, the cultivation and harvesting of forest resources require substantial land, especially where commercial forestry plantations are established.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, commercial forestry often relies on fast-growing, non-native

species such as pine and eucalyptus. Although economically viable, these species are not indigenous to Uganda and, if unmanaged, may outcompete native vegetation, disrupt local ecosystems, and deplete water resources.

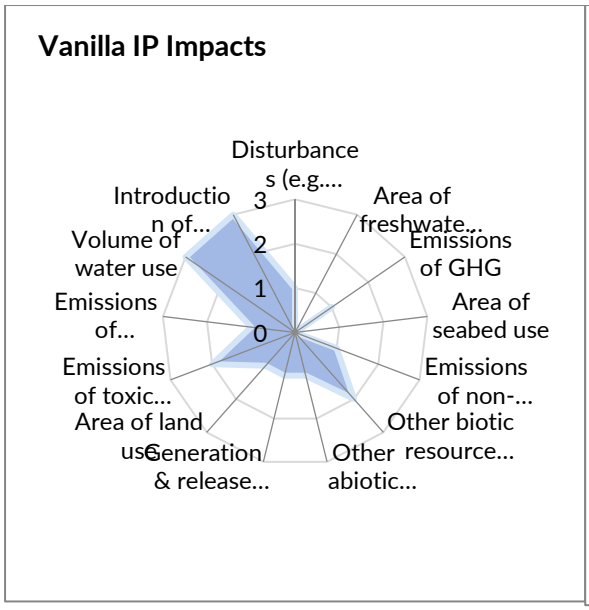
Volume of water use: At IP level, medium volumes of water are required since wood processing is mainly a dry process. At VC level, water use is also medium. Logging uses a moderate amount of water for transporting logs, cleaning equipment, and fire suppression. Silviculture and other forestry activities use a significant amount of water for planting trees, irrigating forests, and controlling pests.

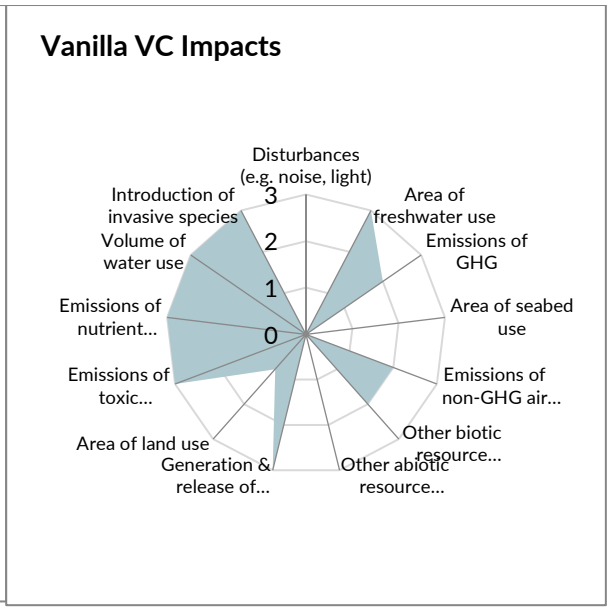
Generation and release of solid waste:

At IP and VC level, the levels of solid waste generation are medium and high respectively. At IP level, the solid waste comprises of discarded timber and edgings. At VC level the solid waste comprises of bark, sawdust, offcuts, trimmings and edgings from saw milling. In agroforestry, the organic waste generated from pruning.

Emission of nutrient pollutants to water and soil: At IP level, wood processing wastewater is low and contains very low nutrients. At VC level, emission of nutrient pollutants is high. In managed forests, nitrate and phosphorus are used to address nutrient deficient deficiencies to increase forest productivity. They can lead to build up of nutrient pollutants in the area and leakage of the pollutants to surrounding areas and water bodies through nutrient runoff.

Vanilla IP and VC impacts





Disturbance (noise). At IP and VC, the disturbances are low because the operation at IP use light machinery while at VC the operation arse manual and done using hands.

Emission of GHG pollutants: At IP the GHG emissions are low because operation rely mainly electricity from national gride with low emission factor while at VC are medium of transportation of vanilla.

Emission of nutrients to water: At IP, nutrients are at low concentrations coming from cleaning agents, while at the farm, they are medium concentrations coming from fertilizers run off.

Emission toxic Pollutants to water and land: At IP emission of toxic pollutants is high using disinfecting agents like chlorine and chlorine-based compounds, while in VC, the emission of toxic substances due mechanical-based week weed control at vanilla farms.

Other biotic resource extraction: Within the IP, vanilla-related operations are limited to warehousing and storage, with no extraction of biotic resources. At the VC level, vanilla is cultivated on climbing vines that are commonly intercropped with other crops such as cocoa, coffee, or within agroforestry systems. This mixed cultivation reduces monoculture pressure but can lead to incidental interactions with other biotic resources.

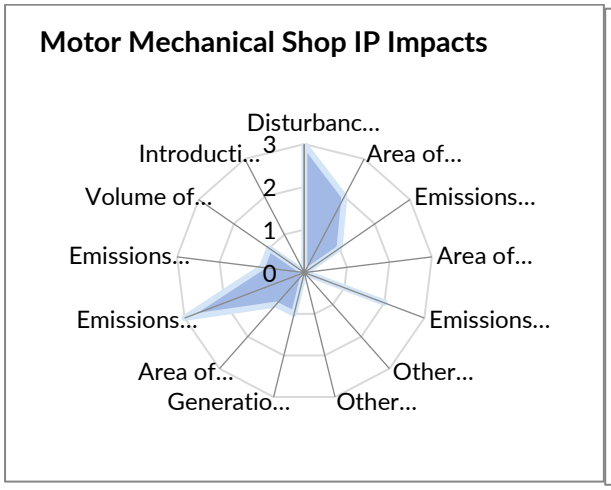
Area of land use: The land use requirement at the IP level is limited. At the VC level, vanilla cultivation is typically done on smallholder plots. Given its high economic value per unit of land, vanilla represents a low land-use crop with relatively minimal environmental footprint.

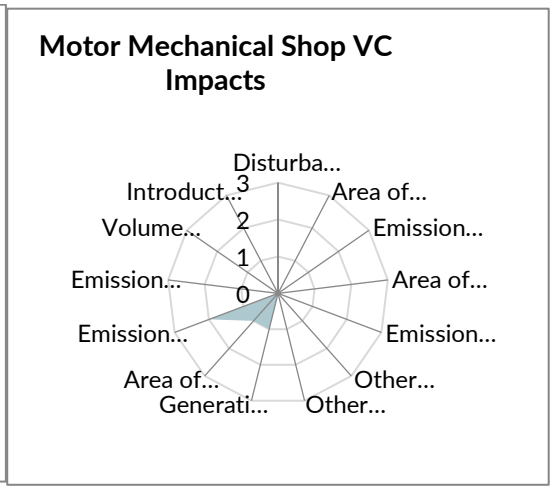
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. From a VC perspective, while vanilla is not indigenous to Uganda—originally native to Mexico—it has adapted well to the Ugandan climate. However, like other introduced species, careful management is essential to ensure it does not adversely affect local biodiversity.

Volume of water use: Water use is high at IP and VC level. At IP, vanilla processing requires high amounts of water for cleaning vanilla beans, hot water scalding of the beans and equipment cleaning. At VC level, a significant amount of water is required during the cultivation of vanilla due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of vanilla leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited.

Generation and release of solid waste: Low amounts of solid waste are generated at IP level, attributed to pulp, skin, residues and packaging. At VC level, there is high volume of solid waste generated because cultivation of vanilla generates different types of solid waste such as residue crops, processing waste, excess compost, and packaging waste.

Motor Vehicle mechanical workshop IP and VC impacts





Disturbance (noise): At IP, motorised machines including screw drivers, hydraulic jerks, and c compressed air system generate significant noise that can disturb surround eco-system and works thus rate high**.**

Emission of toxic pollutants to water and land: At IP emission of toxic pollutants is high, coming from waste oil, including lubricant oils, and hydraulic fluids. There is no clear data on the VC of the motor garage; therefore, it wasn't rated.

Emissions of GHG pollutants: At IP, the GHG emissions are low because the operation relies on electricity from the national grid, which has a low emission factor. There is no clear data on the VC of the motor garage; therefore, it wasn't rated.

Emission of non-GHG pollutants: At IP, non-GHG emissions are medium and come from lubricants, solvents, and hydraulic fluids that emit volatile organic compounds. There is no clear data on the VC of the motor garage; therefore, it wasn't rated.

Generation and release of solid waste: At the motor garage generated large amounts of solid waste especially scrap metal; however, this rate was low because these metal and plastic scraps are collected and sold to iron and steel foundries

Other biotic resource extraction: At both IP and VC levels, motor vehicle mechanical workshops do not engage in any form of biotic resource extraction. Their operations are limited to servicing, repairing, and maintaining vehicles, all of which are mechanical and non-biological in nature.

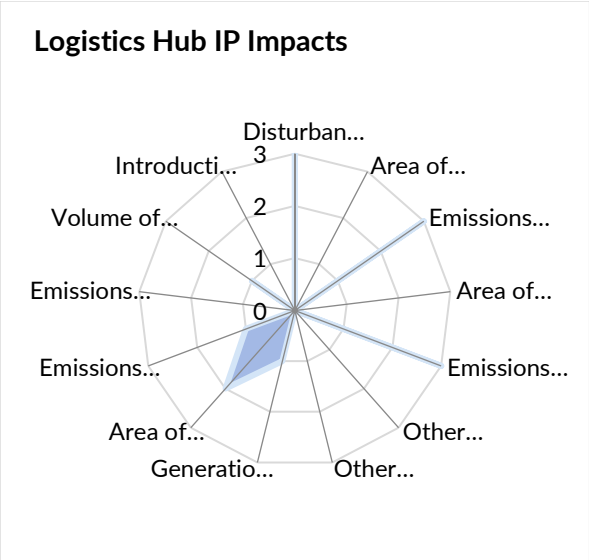
Area of land use: The land use required at both IP and VC levels is relatively small. Workshops and service stations occupy compact plots, and the manufacturing or assembly of parts, where applicable, does not demand extensive space.

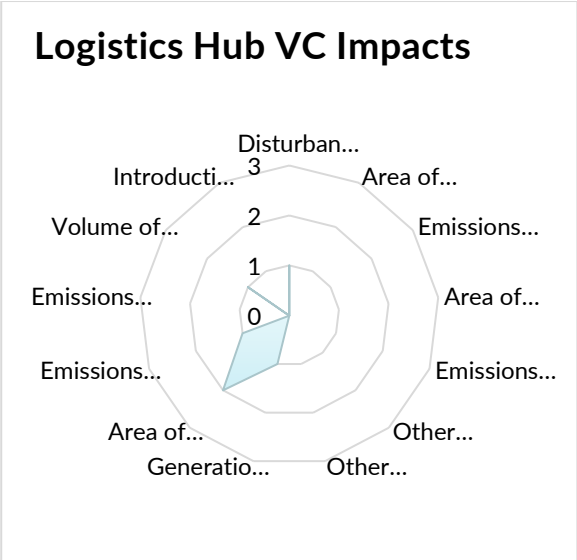
Introduction of invasive species: Invasive species pose a risk as they can be transported by vehicles, however as this affects all motor movements and is not specific to their maintenance, it has not been rated positively.

Volume of water use: At IP and VC level, low volume of water is used since most of the works are dry processes. Water is only used for vehicle washing and domestic uses.

Emission of nutrient pollutants to water and soil: At IP and VC level, little or no nutrient pollutants are released into water and soil. Nutrient pollutants such as phosphates could arise from detergents used in vehicle washing.

Logistics Hub IP and VC impacts





Disturbance (noise and light): AT IP, noise generation is high because logistics hubs operate 24 hours, generating noise from moving trucks and flood lights on trucks, and the warehouse can disturb the ecosystem. There was no clear data on VC, and therefore it wasn't rated.

Emission of GHG pollutants to air: At IP, GHG emissions are high, they come from the combustion of fuel by logistics trucks, including Carbon dioxide, as well as refrigerated trucks that use refrigerants with high global warming potential, like hydrofluorocarbons and chlorofluorocarbons. There was no clear data on VC, and therefore it wasn't rated.

Emission of non-GHG pollutants to air: At It, non-GHG emissions are rated high because logistics usually uses heavy diesel engines, often associated with inefficiencies and incomplete combustion fuel resulting in release of particulate matter, mono oxides of nitrogen, carbon, and sulphur.

Other biotic resource extraction: At both the IP and VC levels, logistics hubs operate purely as transit and storage facilities, involving no extraction or interaction with biotic resources. Activities are limited to loading, off-loading, warehousing, and vehicle parking.

Area of land use: The land use associated with logistics hubs is modest. These operations are typically infrastructure-based and land transport uses significant areas of land for road, railway and other infrastructure. The transport infrastructure can cause a barrier to animal movement causing decreased landscape connectivity, cut through migratory corridors and cause collisions with wildlife.

Introduction of invasive species: Introduction and spread of invasive species such as pests can occur through movements, cross-contamination between products and poor handling practices. However this will be addressed sector by sector.

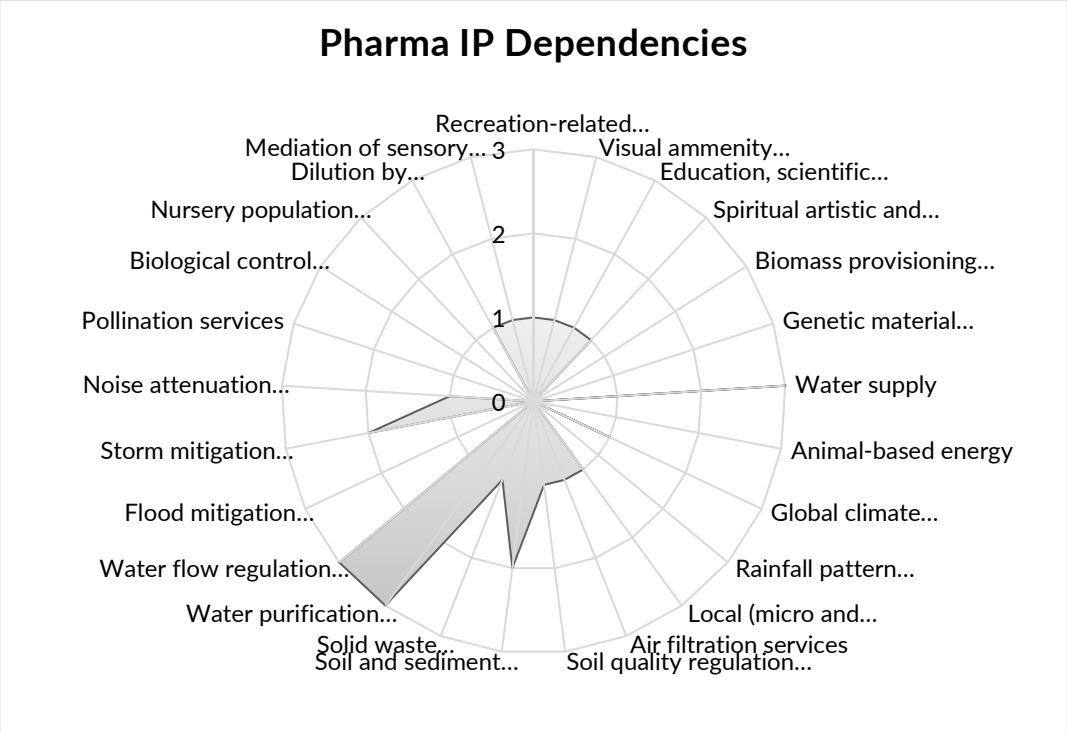
Volume of water use: At IP and VC level, low volume of water is used. There are mainly dry activities occurring at a logistics hub. Water would be required for washing trucks.

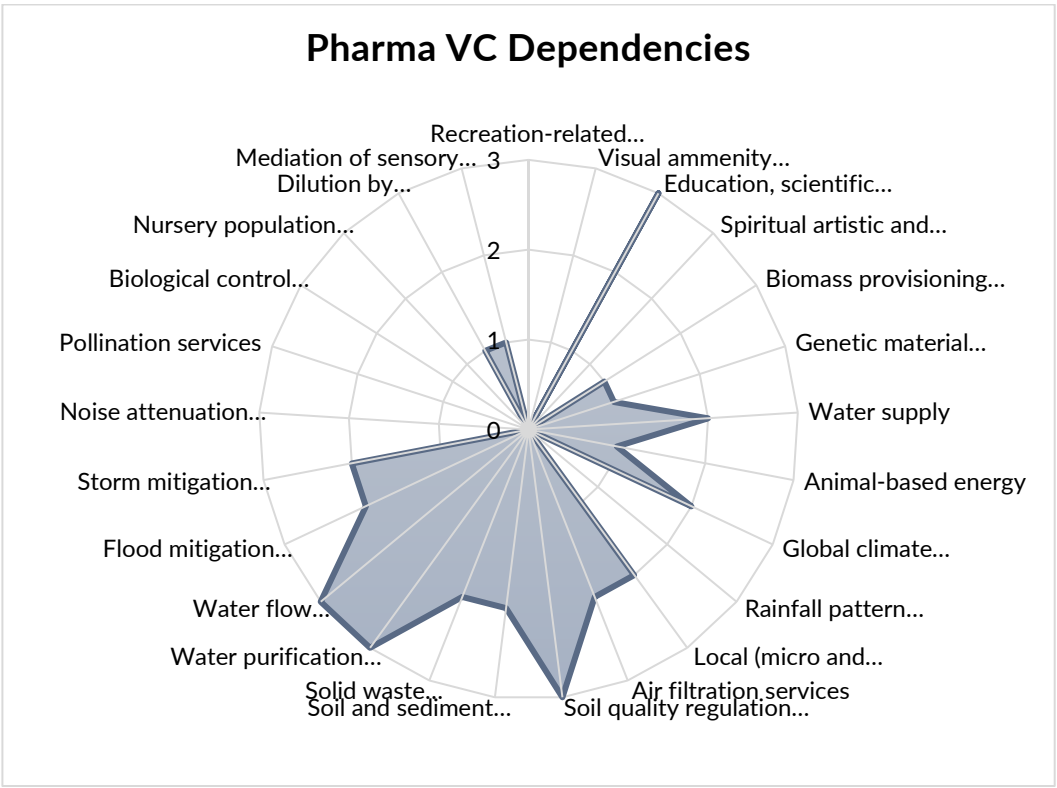
Generation and release of solid waste: At IP and VC level, generation and release of solid waste is very low since trucks are just docked here with no activities to generate solid waste. Solid waste generated from personnel is expected.

Emission of toxic pollutants into water and soil: Low levels of toxic pollutants are generated at a logistics hub and they may include petroleum hydrocarbons due to oil spills, heavy metals from brake dust and tyre wear, and volatile organic compounds from vehicle exhausts.

Lugazi IP and VC Dependencies by sector and element

Pharma IP and VC Dependencies





Animal-based energy: At IP (Industrial Park) operations rely solely on machines and human labor, whereas VC (Value Chain) activities sometimes involve animal-assisted farming for medicinal plants, resulting in a medium rating

Local (micro and meso) climate regulation services: In IP, temperature regulation in production areas relies on air conditioning, resulting in low dependence on climate regulation services. In contrast, VCs cultivating medicinal plants depend on natural climate conditions for ambient temperature, leading to a medium sustainability rating

Solid waste remediation: At IP, biodegradable solid waste generation is minimal, resulting in low dependence on ecosystems for waste remediation. In contrast, VCs (Value Chains) produce significant agro-residues from medicinal plant processing, creating high reliance on ecosystems for remediation

Noise attenuation: Both at IP and VC, in pharmaceutical production, noise generation remains low, resulting in minimal dependence on ecosystems for noise attenuation.

Mediation of Sensory Impacts (light): Both in pharmaceutical IPs (Industrial Parks) and VCs (Value Chains), light emissions remain within acceptable limits, resulting in minimal ecosystem dependence for sensory mediation

Soil quality regulation: In pharmaceutical IPs, operations are unaffected by soil quality, resulting in a low dependency rating. In contrast, VC (Value Chain) cultivation of medicinal crops is highly dependent on healthy, quality soils.

Biomass provisioning services: At the IP level, operations are limited to packaging, assembly, and storage, and do not involve the use of biomass inputs. At the VC level, however, if the production of herbal medicines is included, a limited degree of biomass provisioning is required for sourcing medicinal plant materials. Nonetheless, the overall scale remains small relative to other agricultural value chains.

Genetic material services: There is no reliance on genetic material services at the IP level. In contrast, from VC perspectives, manufacture of pharmaceuticals, medicinal chemical and botanical products depend on the provision of genetic material to enable DNA and antibodies to be used in the manufacture of pharmaceuticals.

Pollination services: Pollination services are not applicable at the IP level, where no biological production occurs. At the VC level, a limited dependency exists where locally cultivated herbal ingredients are used, although the overall reliance on pollinators is minimal.

Biological control services: No biological control services are required at the IP level. At the VC level, however, the cultivation of medicinal herbs may benefit from biological control services to mitigate pest outbreaks and reduce disease pressure, thereby supporting the quality and sustainability of raw material supply.

Nursery population and habitat maintenance services: IP activities do not interact with natural habitats and thus do not depend on nursery or habitat maintenance services. In contrast, the VC for herbal medicines may require functioning ecosystems that support gene pools, soil health, and natural habitats critical for cultivating plants with desirable medicinal traits.

Recreation-related services, visual amenity services, and spiritual artistic and symbolic services are not applicable because the pharma value chain does not draw any resources from these ecosystem services.

Education, scientific, and research services is rated high due to the high-level of skills required in the pharma value chain. Also, many other jobs in the value chain will require at least, medium-level skills. The storage of pharma products at the IP will require basic skills, at this stage it is foreseen that only pharma packaging will take place in the IP.

Water supply: The dependency on the eco system for water supply services is high and medium at IP and VC level respectively. The manufacturing process at IP level heavily relies on water supply services provided by ecosystems to ensure sufficient quantity and quality of water for production of medicines and cooling purposes. At VC level water supply services required for cultivation of medicinal plants by the use of irrigation.

Soil and sediment retention services: The reliance on the ecosystem for these services is rated medium at IP and VC level. Manufacture of pharmaceuticals, medicinal chemical and botanical products are

dependent on soil and sediment retention to provide a stable substrate, erosion control, and landslide mitigation for infrastructure.

Solid waste remediation: The reliance is low at IP level. Most of the solid waste generated from the manufacture of pharmaceuticals, medicinal chemical and botanical products is hazardous and non-biodegradable so it is treated through engineered rather than natural eco system services.

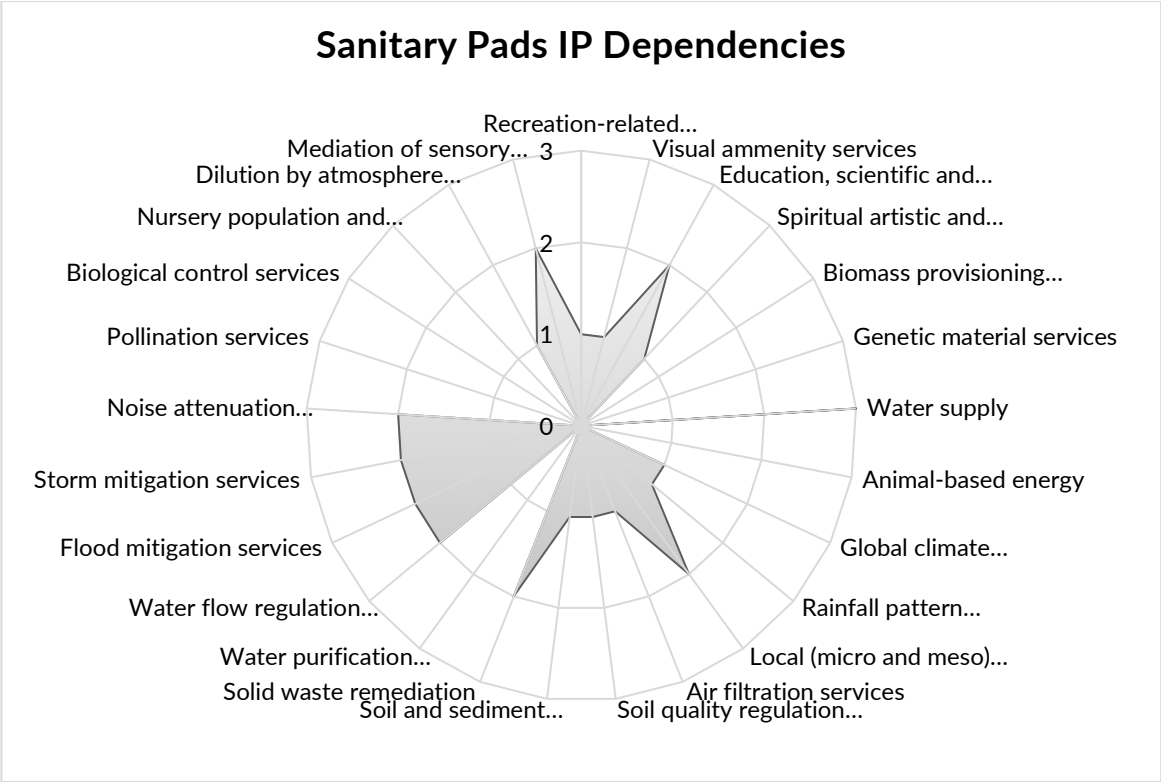
Water purification services: The reliance on these services of the eco system is high both at IP and VC level. Manufacture of pharmaceuticals, medicinal chemicals and botanical products is highly dependent on water purification by ecosystems to uphold the chemical composition of water necessary for the detoxification of potential effluents, and other critical stages throughout the production process.

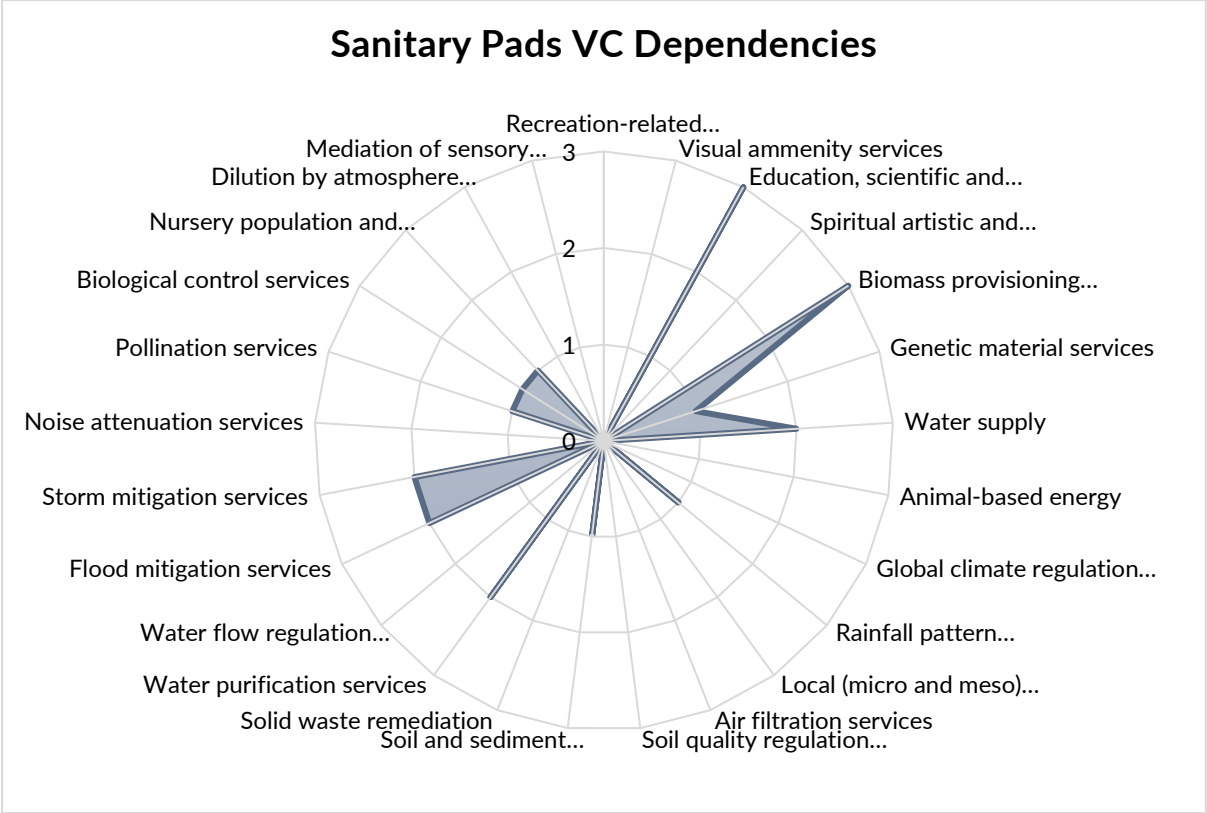
Water flow regulation services: The sector depends on natural or built systems to treat wastewater before it re-enters the environment. Manufacture of pharmaceuticals, medicinal chemicals and botanical products is dependent on water purification by ecosystems to uphold the chemical composition of water necessary for the detoxification of potential effluents, and other critical stages throughout the production process.

Flood mitigation services: This is rated medium at both IP and VC level. Manufacture of basic pharmaceutical products and pharmaceutical preparations depends on flood mitigation ecosystem services to protect manufacturing plants and other infrastructure from flooding.

Storm mitigation services: This is rated medium at both IP and VC level. Manufacture of pharmaceuticals, medicinal chemicals and botanical products is dependent on storm mitigation ecosystem services to protect manufacturing sites and other infrastructure from the impacts of wind, sand and other storm related effects.

Sanitary Pads IP and CV Dependencies.





Animal-based energy: In Industrial Parks (IPs), sanitary pad manufacturing relies exclusively on industrial machinery and human labor, resulting in zero dependence on animal-based energy

Local (micro and meso) climate regulation services: In Industrial Parks (IPs), large production and storage facilities utilize rotary vans to regulate ambient air temperature, resulting in moderate dependence on local climate regulation services.

Solid waste remediation: In Industrial Parks (IPs), the majority of solid waste consists of non-biodegradable materials, resulting in minimal ecosystem dependence for decomposition service

Noise attenuation: In Industrial Parks (IPs), sanitary pad manufacturing equipment generates moderate noise levels, requiring partial ecosystem support for noise attenuation. No clear data to rate VC.

Mediation of Sensory Impacts: In IP, sanitary product facilities utilize flood lighting in production halls and security lighting, creating significant dependence on ecosystems for the mediation of sensory impacts

Air filtration service: In Industrial Parks (IPs), emissions of both GHG and non-GHG pollutants remain minimum, resulting in low ecosystem dependence for air filtration services.

Biomass provisioning services: Within the IP, all raw materials are imported, and there is no local biomass dependency. At the VC level, however, if wood pulp is sourced domestically, sanitary pad production would depend significantly on biomass provisioning through the harvesting of pulpwood.

Genetic material services: The manufacturing process at the IP does not utilize or rely on genetic material services. At the VC level, pulpwood species such as pine and eucalyptus are typically cultivated and selected for commercial use, with limited reliance on wild genetic traits due to their standardized propagation methods.

Pollination services: Pollination services are not required at the IP level. At the VC level, only minimal pollination services are relevant, as pulpwood plantations are generally monocultures and rely heavily on managed inputs rather than natural pollination.

Biological control services: No biological control services are required at the IP level. However, at the VC level, pest pressures in pine and eucalyptus plantations—such as those from termites or the eucalyptus snout beetle—necessitate the use of biological control mechanisms to maintain plantation health and wood quality.

Nursery population and habitat maintenance services: The IP does not rely on ecological nursery functions. At the VC level, however, successful pulpwood forestry depends highly on robust nursery systems, which in turn require healthy soils, symbiotic fungi (e.g., mycorrhizae), and stable habitat conditions to ensure effective seedling establishment and long-term forest regeneration.

Recreation-related services, visual amenity services, and spiritual artistic and symbolic services are not applicable because the sanitary pads value chain does not draw any resources from these ecosystem services.

Education, scientific, and research services is rated high due to the high-level of skills required in the sanitary pads value chain. Also, many other jobs in the value chain will require at least, medium-level skills. The manufacture and marketing of the pads will require high and medium-level skills with many low-level skill jobs too.

Water supply:

The industry's reliance is high at IP level and medium at the VC level. The manufacturing process heavily relies on the eco system's water supply services to ensure sufficient quantity and quality of water for production and machine cooling purposes. At VC level water supply services required for cultivation of trees.

Rainfall pattern regulation: The rainfall pattern regulation by ecosystems to ensure water provision is rated low at IP and VC level respectively. This is an intermediate service related to water requirements at IP and VC level.

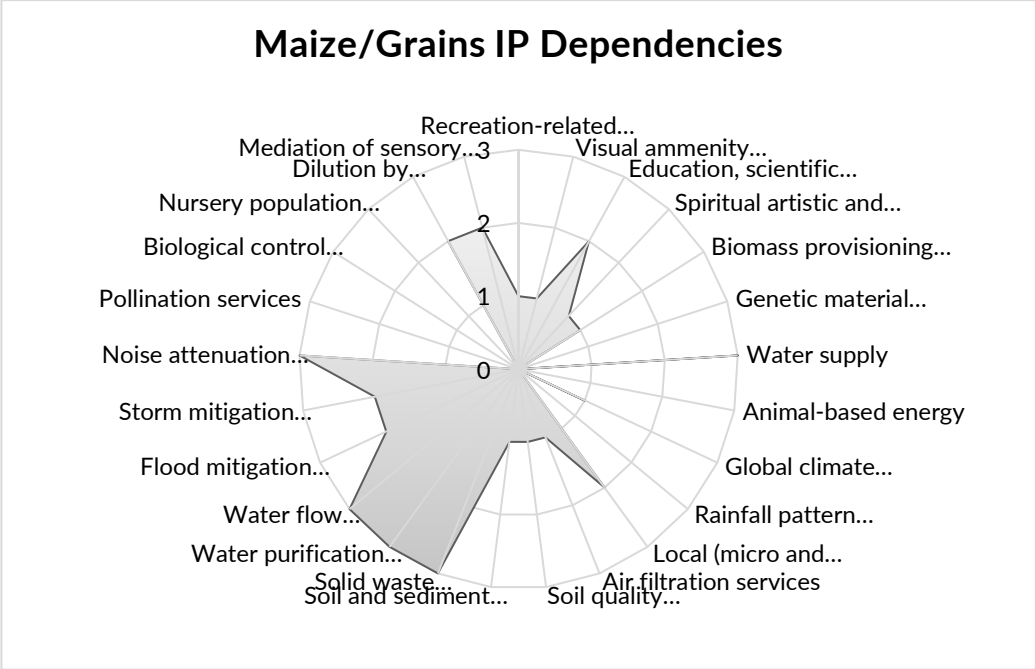
Soil and sediment retention services: The reliance is low at both IP and VC level. Manufacturing processes are dependent on soil and sediment retention to provide a stable substrate, erosion control, and landslide mitigation for raw materials (bamboo) and infrastructure at the factory.

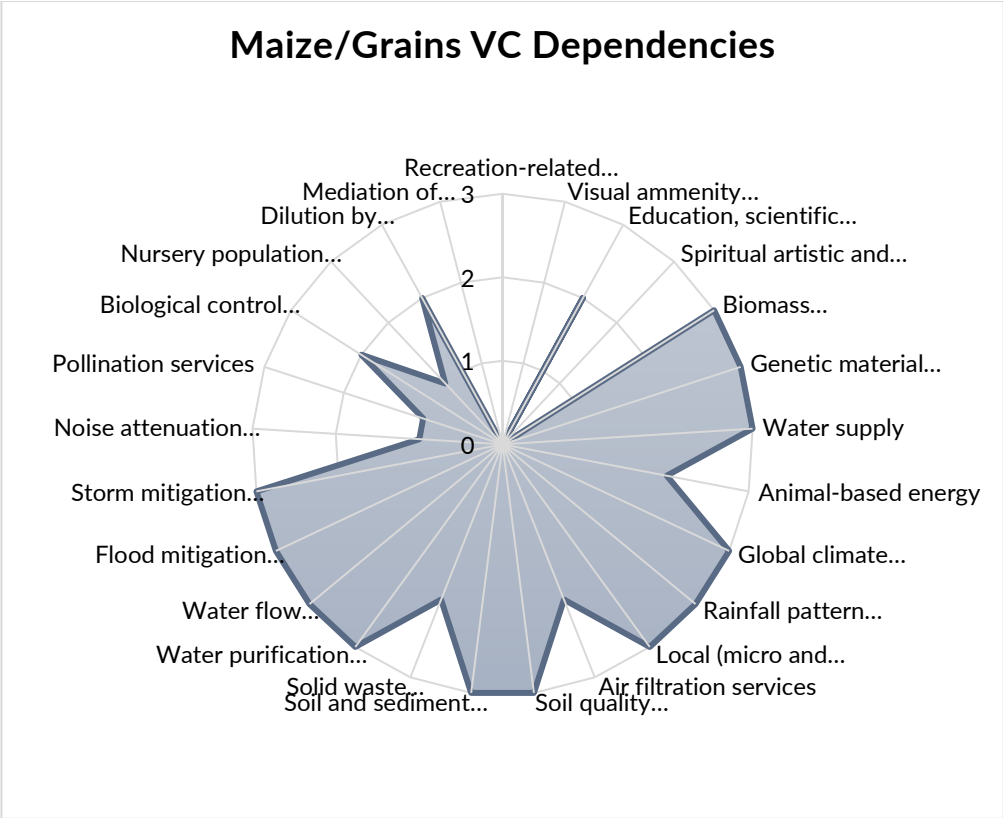
Water purification services: The activities at IP and VC level are highly dependent on water purification by ecosystems, to uphold the chemical composition of water necessary for the detoxification of potential effluents, and other critical stages throughout the production process.

Water flow regulation services: At IP level, water flow regulation services are critical to protection of infrastructure and water availability in the ecosystem (rating based on water availability requirements).

Storm mitigation services: The reliance on storm mitigation services is moderate at both IP and VC level. These services are critical for protection of manufacturing sites and other infrastructure from the impacts of wind, sand and other storms.

Maize Gain Processing IP and VC impacts





Animal-based Energy; At IP, animal labor is not used. However, at VC, animals such as oxen and donkeys are commonly employed for cultivation and transporting grain from the fields

Local (micro and meso) climate regulation services: At IP, maize processing has a moderate dependence on climate regulation services, as warehouses storing maize grain use rotor vanes to extract atmospheric air for temperature control. In contrast, at VC, maize crops are highly reliant on local climate regulation services to maintain suitable ambient temperatures

Solid waste remediation: At IP, maize processing generates a large volume of solid waste, but most of it is valorized as animal feed, resulting in low dependence on ecosystems for waste remediation. In contrast, at VC, solid waste such as cobs and stalks relies moderately on natural ecosystems for decomposition.

Noise attenuation: At IP, maize processing generates significant noise pollution, resulting in high dependence on ecosystems for noise attenuation. In contrast, VC operations are relatively quiet, with minimal reliance on ecosystems for noise regulation

Mediation of Sensory Impacts. At IP, maize processing produces moderate light emissions from warehouse security floodlights, resulting in a medium dependence on ecosystems to mediate sensory impacts. In contrast, VC operations generate negligible light pollution.

Soil quality regulation: At IP, operations do not depend on healthy soil quality, whereas VC maize cultivation is highly dependent on maintaining fertile and productive soils.

Biomass provisioning services: At both the IP and VC levels, maize processing directly relies on biomass in the form of maize grain. Additionally, maize cultivation depends on natural systems to support the growth of organic material and benefits from nutrient cycling processes, including the use of compost and organic waste.

Genetic material services: While IP operations do not require genetic materials, the VC depends significantly on access to genetic resources. These are essential for breeding programs that enhance

crop resilience by introducing disease resistance, drought tolerance, and other valuable traits through genetic crosses with wild relatives.

Pollination services: Pollination is not relevant at the IP level. In the VC, maize is primarily wind-pollinated, resulting in minimal dependence on pollinators compared to other crops.

Biological control services: No biological control services are needed at the IP level. At the VC level, however, effective biological control is essential to manage common maize pests such as armyworms and stalk borers, which can significantly impact yields and crop quality.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, maize is commonly grown in simplified, intensive agricultural systems, which often provide limited ecosystem support functions and reduce the overall contribution to habitat maintenance.

Recreation-related services, visual amenity services, and spiritual artistic and symbolic services are not applicable because the maize and other grains value chain does not draw any resources from these ecosystem services.

Education, scientific, and research services are rated medium because while some R&D and business management jobs require high-level skills, most jobs are farm jobs requiring low-level skills. The processing of grain will require high and medium-level skills with many low-level skill jobs too.

Water supply: At IP level, reliance on eco system's water supply is moderate as less water is used in industrial processes. At VC level, the reliance is high due to the high-water requirements in the cultivation of maize.

Rainfall pattern regulation: The rainfall pattern regulation by ecosystems to ensure water provision is rated high at VC level. The cultivation of maize is highly dependent on rainfall pattern regulation by ecosystems to ensure sufficient levels of rainfall for productive cultivation.

Soil and sediment retention: At IP level, dependency on soil and sediment retention is low, primarily for protection of infrastructure at the industry against erosion. At VC level, there is a high dependence on soil and sediment retention services for the protection of maize farmlands from erosion.

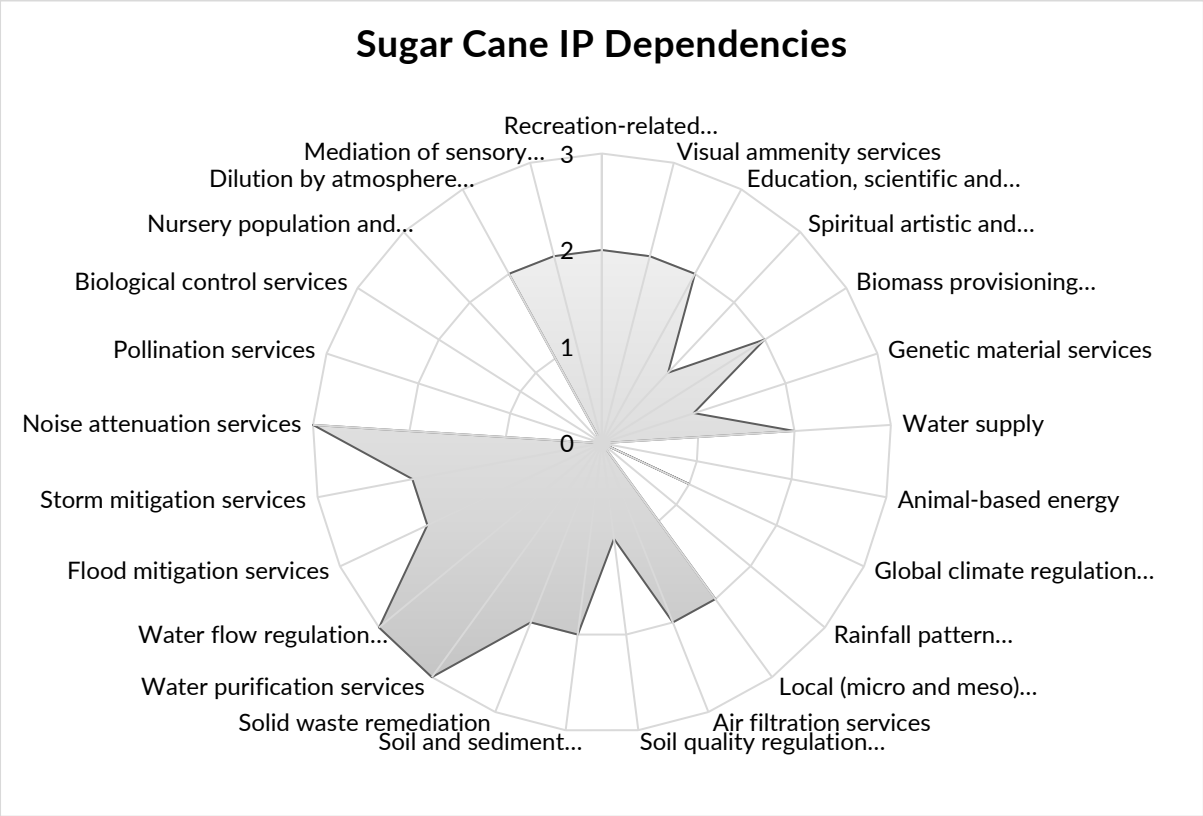
Water purification: At IP level, there is a high dependence of the eco system water purification services for the treatment of maize processing wastewater containing high concentrations of organic loads. At VC level, there is a high dependence on the ecosystem services to purify agricultural runoff containing pesticides, herbicides and fertilizers.

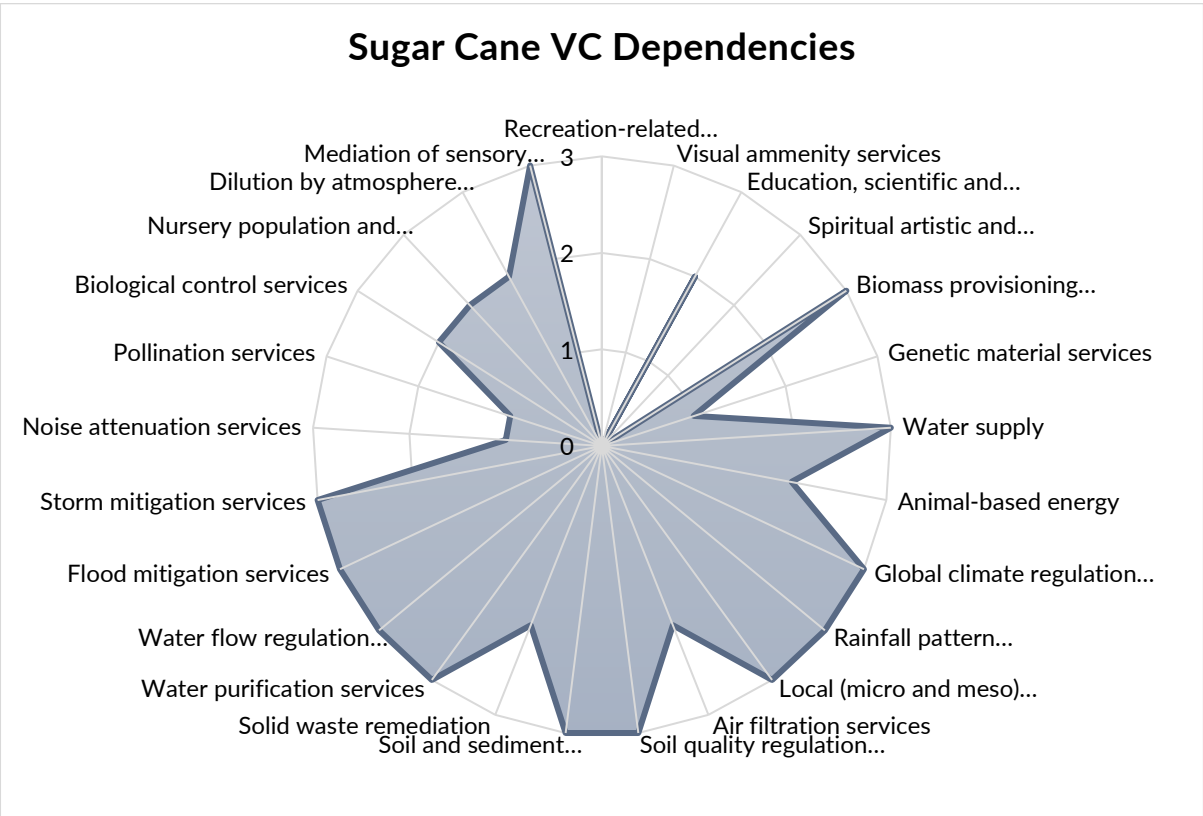
Water flow regulation: The dependency on water flow regulation is significant at both IP and VC level. Growing of non-perennial crops depends on the water flow regulation services provided by ecosystems to ensure sufficient flow of water even during drier seasons (e.g., for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation: The dependency on ecosystem flood mitigation services is moderate at the IP for the protection of infrastructure against flooding. At VC level, flood mitigation is significant to the farming and storage of maize grains.

Storm mitigation: Storm mitigation at the IP is moderate relating to the protection of infrastructure against storms. Across the VC, storm mitigation is significant to prevent crop damage and loss.

Sugar Cane Processing IP and VC dependencies





Animal-based energy; At IP, neither large-scale sugar processors nor jaggery production units utilize animal labor. In contrast, VC's small-scale outgrowers moderately depend on animal labor, particularly using oxen for land preparation prior to cultivation

Local (micro and meso) climate regulation services: IP sugar production facilities utilize mechanical systems (exhaust fans, rotor vanes, and ventilation) to regulate internal temperatures, thus median dependence climate regulation service. Similarly, VC sugarcane cultivation remains highly dependent on local climate regulation services to maintain optimal ambient growing temperatures

Solid waste remediation. IP sugar processing generates substantial bagasse volumes, with approximately 50% utilized for energy production. This results in moderate ecosystem dependence for residual decomposition. In contrast, VC operations generate agricultural residues that rely entirely on natural ecosystems for decomposition.

Noise attenuation: IP sugar mills produce substantial operational noise, resulting in significant dependence on surrounding ecosystems for natural noise attenuation. In contrast, VC operations generate minimal noise pollution, demonstrating much lower ecosystem reliance for sound regulation.

Air filtration service: Both IP and VC sugar operations remain largely unaffected by ambient air quality, demonstrating minimal dependence on air filtration services.

Soil quality regulation: IP sugar processing operations do not require high-quality soil, whereas sugarcane cultivation depends heavily on soil health and fertility to achieve optimal yields.

Biomass provisioning services: At both the IP and VC levels, sugarcane by-product processing directly relies on biomass in the form of molasses and bagasse, and local harvest affects the production directly. Growing sugar cane also depends on the ecosystem to produce biomass materials, that are captured and harvested in uncultivated production contexts. The activity also depends on the ecosystem contributions to the growth of organic material, as well as waste, and compost.

Genetic material services: While IP operations do not require genetic materials, the VC depends significantly on access to genetic resources. Growing sugar cane depends on the provision of genetic materials to enable scientists and breeders to seek to cross modern crops with their wild relatives to reintroduce desirable genetic traits such as disease resistance or drought tolerance.

Pollination services: Pollination is not relevant at the IP level. In the VC, sugar cane is propagated via cuttings, hence low pollination needs.

Biological control services: No biological control services are needed at the IP level. At the VC level, growing of sugar cane depends on the biological control that insects, birds, and small mammals provide, as a natural solution for destroying pests such as aphids, to protect crops, making it essential for successful cultivation.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, non-perennial crops are dependent on natural gene pools for valuable traits.

Recreation-related services, visual amenity services, and spiritual artistic and symbolic services are not applicable because the maize and other grains value chain does not draw any resources from these ecosystem services.

Education, scientific, and research services are rated medium because while some R&D and business management jobs require high-level skills, most jobs are farm jobs requiring low-level skills. The processing of sugar cane will require high and medium-level skills with many low-level skill jobs too.

Water supply: The IP sugar operations require medium water supply services. The sugarcane VC heavily depends on water supply services of the eco system since sugarcane is one of the most water intensive crops, requiring reliable rainfall or irrigation.

Rainfall pattern regulation: The IP operations are not directly dependent on rainfall patterns. The VC of sugarcane specifically the growth and maturity of sugarcanes is highly dependent on rainfall patterns considering that the crop is water intensive.

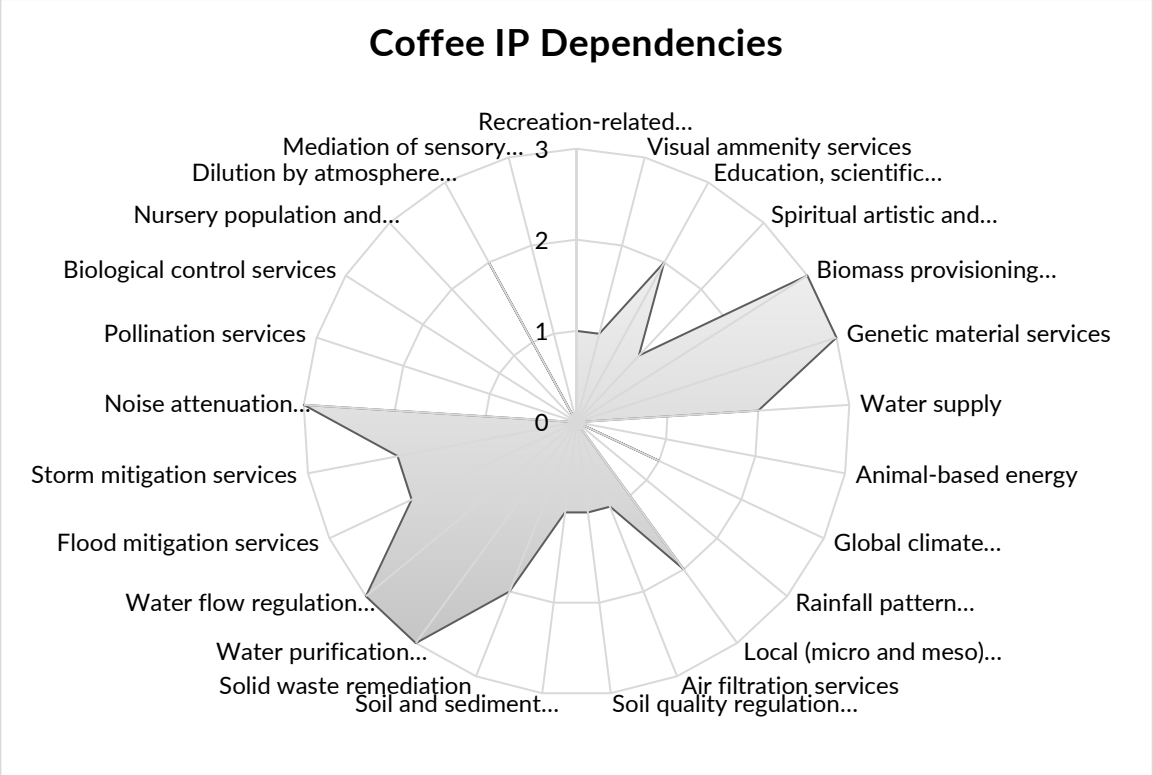
Soil and sediment retention: At IP level, dependency on soil and sediment retention is low, primarily related to protection of infrastructure at the industry against erosion. At VC level, there is a high dependence on soil and sediment retention services for the protection of coffee plantations from erosion and washing away of nutrient rich soils.

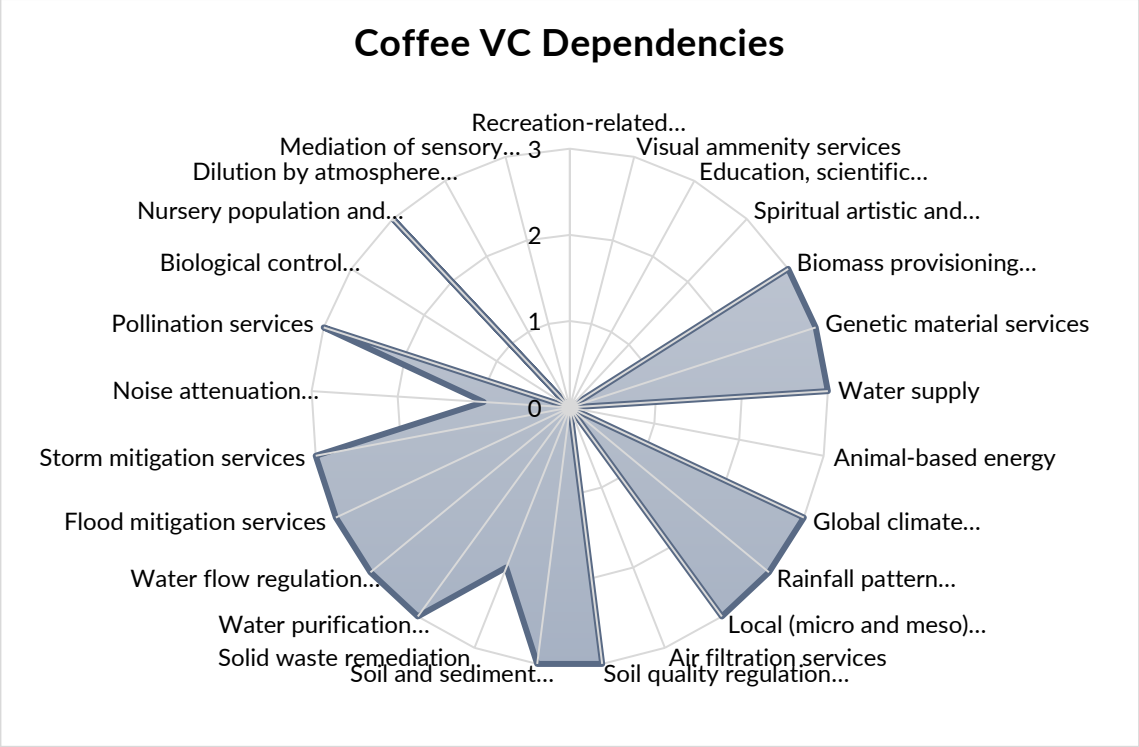
Water purification: At IP level, ecosystems water purification services are crucial for the treatment of the highly organic sugarcane processing wastewater. At VC level, there is a high dependence on the ecosystem services to purify agricultural runoff from sugarcane fields containing pesticides, herbicides and fertilizers.

Flood mitigation: The dependency on ecosystem flood mitigation services is moderate at the IP for the protection of the factory infrastructure against flooding. At VC level, flood mitigation is significant to the farming of sugarcane because floods can damage the sugarcane plantations and disrupt the whole value chain.

Storm mitigation: The reliance on storm mitigation at the IP is moderate relating to the protection of infrastructure against stormwater floods. Across the VC, dependence on storm mitigation services is high especially during the growing of sugarcanes.

Coffee Processing IP and VC dependence





Animal-based energy. Neither the industrial processing (IP) nor the smallholder farm (VC) stages of coffee production utilize animal labor. At VC, coffee is usually intercropped with other perennial crops limiting use of animal labor like oxen.

Local (micro and meso) climate regulation services: The industrial processing (IP) facilities utilize mechanical systems (exhaust fans and rotor vanes) to regulate production temperatures. In contrast, smallholder coffee cultivation (VC) relies primarily on local climate conditions to maintain optimal ambient temperatures for flowering and fruit development.

Solid waste remediation: In industrial processing (IP) of coffee, significant volumes of coffee husk are generated. While a portion is utilized for heat generation, this results in moderate ecosystem dependence for residual decomposition. Conversely, smallholder production (VC) generates lower volumes of solid waste, leading to intermediate reliance on ecosystems for waste decomposition

Noise attenuation. In industrial processing (IP) of coffee, hauling machinery generates significant noise pollution, creating substantial dependence on surrounding ecosystems for natural noise attenuation. In contrast, smallholder coffee production (VC) operates with minimal noise output, requiring negligible ecosystem support for sound regulation

Air filtration service. Industrial processing (IP) of coffee generates minimal greenhouse gas (GHG) and non-GHG emissions, resulting in low ecosystem dependence for air filtration. In contrast, smallholder production (VC) releases moderate levels of non-GHG pollutants, requiring intermediate reliance on ecosystem air purification services

Soil quality regulation. Industrial processing (IP) of coffee is unaffected by soil conditions, whereas coffee cultivation requires fertile, high-quality soil to achieve optimal yields.

Biomass provisioning services: At both the IP and VC levels, coffee processing directly relies on biomass of coffee beans from the plant, and local harvest affects the production directly. Growing sugar cane also depends on the ecosystem to produce biomass materials, that are captured and harvested in uncultivated production contexts. The activity also depends on the ecosystem contributions to the growth of organic material, as well as waste, and compost.

Genetic material services: While IP operations do not require genetic materials, the VC relies on diverse wild gene pools to manage disease, especially Arabica. Also, growing perennial crops depends on the provision of genetic materials, for example to enable scientists and breeders to cross modern crops with their wild relatives to reintroduce desirable genetic traits such as disease resistance or drought tolerance.

Pollination services: Pollination is not relevant at the IP level. In the VC, coffee (especially Arabica) depends on insect pollinators (bees).

Biological control services: No biological control services are needed at the IP level. At the VC level, the high caffeine content acts as a natural pest repellent, making the coffee crop more resilient, but pesticides are still required for coffee leaf rust.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, growing perennial crops is dependent on the maintenance of natural gene pools for valuable traits.

Recreation-related services, visual amenity services, and spiritual artistic and symbolic services are not applicable because the value chain does not draw any resources from these ecosystem services.

Education, scientific, and research services are rated medium because while some R&D and business management jobs require high-level skills, most jobs are farm jobs requiring low-level skills. The processing of coffee will require high and medium-level skills with many low-level skill jobs too.

Water supply:

At IP level, reliance of the coffee processing industry on eco system's water supply is moderate for uses such as fermentation, pulping, cooling and cleaning of machinery. At the VC, the dependence on the eco system's water supply services is high as coffee farming heavily relies on rainfall and irrigation in some areas

Rainfall pattern regulation:

The industrial processing of coffee is not directly affected by rainfall patterns. At the VC level, there is a high dependence on ecosystem's rainfall regulation patterns as flowering and maturation of coffee requires stable rainfall patterns.

Soil and sediment retention:

At IP level, dependency on soil and sediment retention is low, primarily related to protection of infrastructure at the industry against erosion. At VC level, there is a high dependence on soil and sediment retention services for the protection of coffee plantations from erosion.

Water purification: At IP level, there is a high dependence of the eco system water purification services for the treatment of coffee processing wastewater containing high concentrations of organic loads. At VC level, there is a high dependence on the ecosystem services to purify agricultural runoff containing pesticides, herbicides and fertilizers.

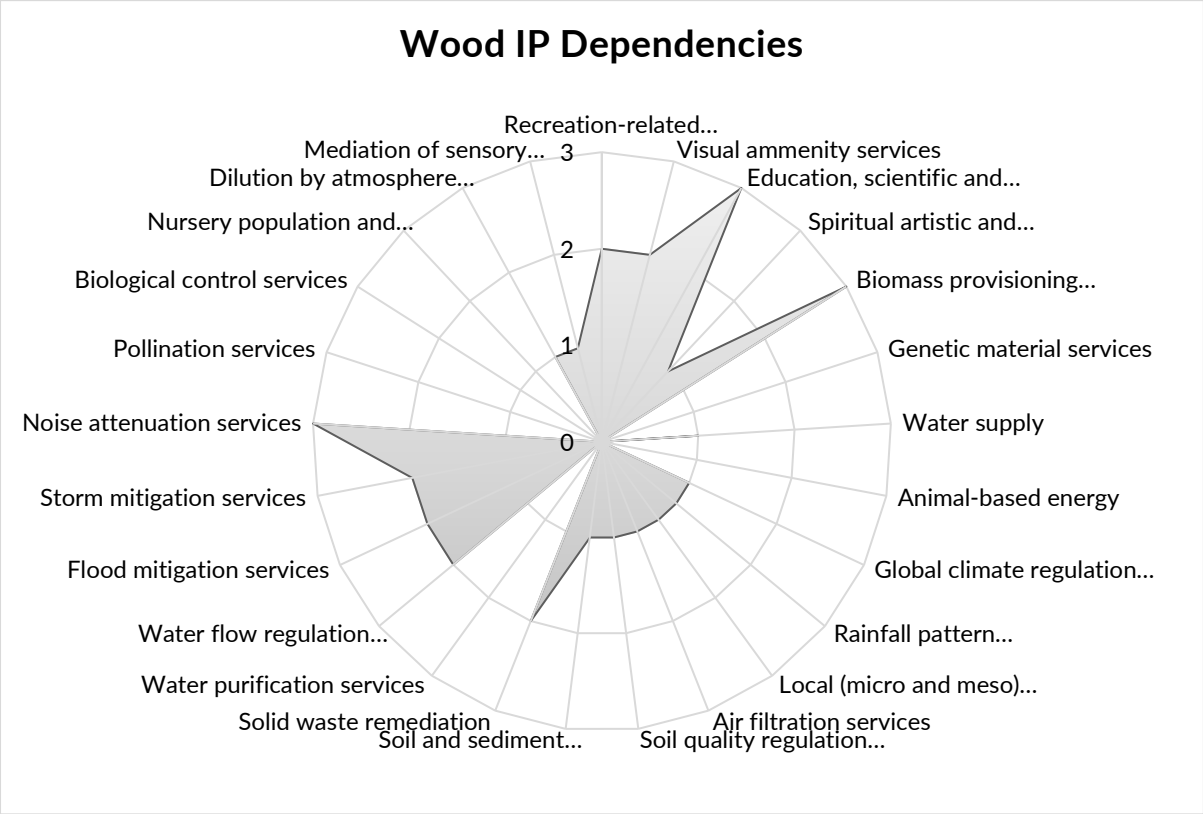
Water flow regulation: The dependency on water flow regulation is significant at both IP and VC level. Growing of non-perennial crops depends on the water flow regulation services provided by ecosystems to ensure sufficient flow of water even during drier seasons (e.g., for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

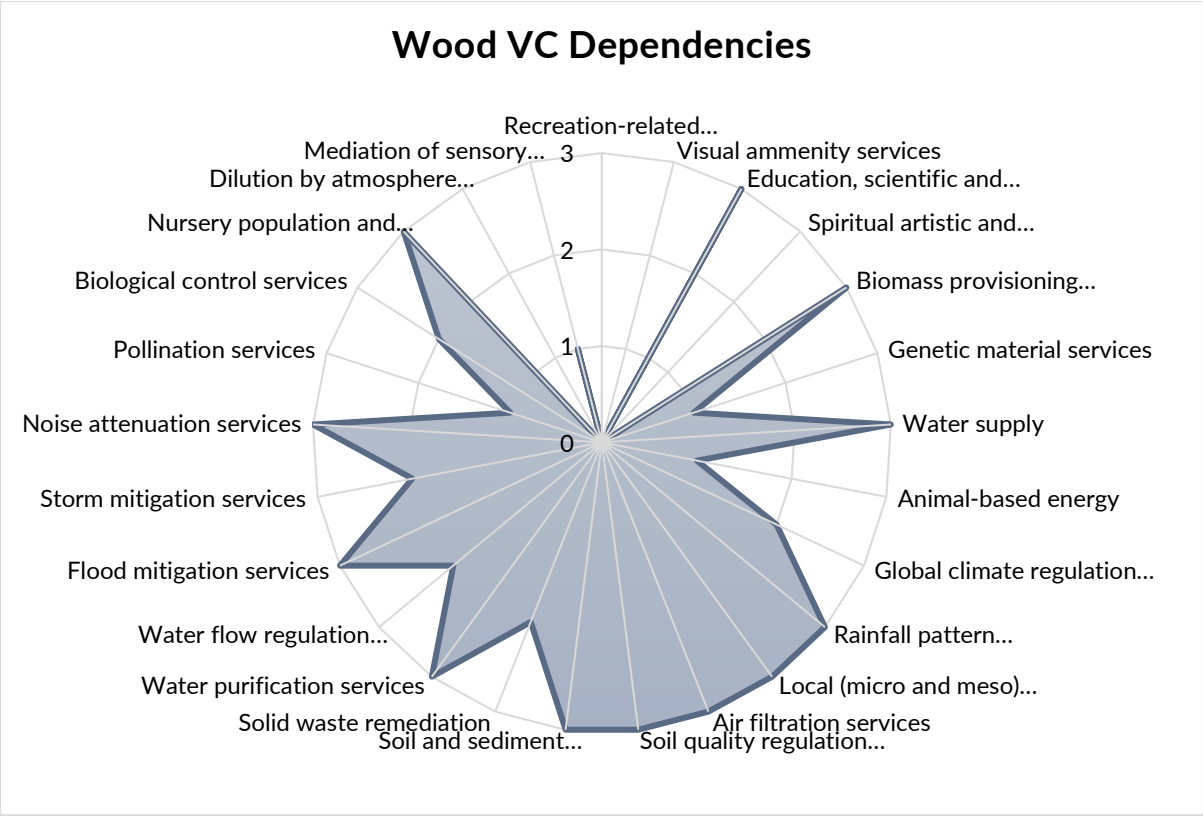
Flood mitigation: The dependency on ecosystem flood mitigation services is moderate at the IP for the protection of the factory infrastructure against flooding. At VC level, flood mitigation is significant (high) for the farming of coffee because floods can damage the coffee plantations and disrupt the whole value chain.

Storm mitigation: The reliance on storm mitigation at the IP is moderate relating to the protection of infrastructure against storms. Across the VC, storm mitigation services are significant to prevent damage of coffee trees and delay of harvest.

Note: *Cocoa, Tea, and Vanilla exhibit similar value chain (VC) dependence due to their nature as perennial crops, except the dependence on pollination services. Coffee and cocoa rely more on insect pollinators (bees and tiny midges), while tea and vanilla depend much less on pollinator services. Tea trees are self-pollinating and vanilla requires hand pollination in Uganda. Their processing methods, such as milling, grinding, and washing, are also comparable, falling under beverage processing. Given these parallels in both VC and Industrial Park (IP) implications, we will extend the IP and VC dependency framework developed for coffee to cocoa, tea, and vanilla.*

Wood Processing IP and VC dependence





Global Climate Regulation: In industrial parks (IPs), wood production generates relatively low emissions, resulting in minimal dependence on global climate regulation services to function as carbon sinks. In contrast, the broader value chain (VC) produces significant emissions, primarily from deforestation activities, leading to moderate dependence on global climate regulation. This is partly mitigated through corporate requirements to utilize planted forests and implement reforestation programs to offset the impacts of land-use change.

Local climate (micro and meso) regulation services: In industrial parks (IPs), wood production relies on mechanized climate control systems to regulate ambient temperatures for manufacturing processes, resulting in low dependence on natural climate regulation. In contrast, tree growth in the value chain (VC) is highly dependent on local climate conditions, making it vulnerable to temperature fluctuations and requiring intact ecosystems for natural climate regulation.

Solid waste remediation: Both industrial parks (IPs) and the broader value chain (VC) exhibit moderate dependence on ecosystems for solid waste decomposition. While significant volumes of sawdust and wood residues are generated, over 50% are either burned for energy recovery or valorized into byproducts (e.g., briquettes, biochar)

Noise attenuation service: Both the value chain (VC) and industrial park (IP) operations generate significant noise pollution, primarily from timber cutting, processing machinery, and finishing activities. As a result, they heavily depend on ecosystem services such as forest buffers and greenbelts for natural noise attenuation.

Air filtration services. At the industrial park (IP) level, wood production generates lower greenhouse gas (GHG) emissions and moderate non-GHG pollutants, resulting in reduced dependence on air filtration services. In contrast, across the broader value chain (VC), significant air pollutant emissions arise from deforestation, land-use changes, and transportation, leading to a much higher reliance on natural and artificial air filtration services.

Biomass provisioning services: At both the IP and VC levels, wood product processing directly relies on biomass of timber. Logging depends on the biomass provisioning service because ecosystems contribute to the growth of trees and other woody biomass in both cultivated (plantation) and uncultivated production contexts that can be harvested.

Genetic material services: IP operations do not require genetic materials. At VC level, some industries use improved clones for uniform wood quality, the direct reliance on diverse gene pools or native forests is limited. Also, forestry activities depend on the provision of genetic for the planting of trees and production such as seeds and spores.

Pollination services: Pollination is not relevant at the IP level. In the VC, both pine and eucalyptus are planted, no animal/insect pollination needed.

Biological control services: No biological control services are needed at the IP level. At the VC level, logging depends on biological pest control to enable the maintenance of wood condition, and to reduce diseases, as pest outbreaks (e.g., termites, eucalyptus snout beetle) are a growing concern in Ugandan plantations.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, successful forestry requires well-functioning nursery systems, often relying on soil health, mycorrhizal fungi, and habitat conditions for seedling survival.

Education, scientific, and research services are rated rated high due to the high-level of skills required in the wood/timber value chain, especially in R&D and plantation management. Also, many other jobs in the value chain will require at least, medium-level skills, e.g. logging, transportation. The processing of wood will require high-level skills with most jobs requiring mid-level skills.

Water supply: Wood processing at the IP level involves relatively low water use since most of the processes are dry. Therefore, the dependence on the ecosystem's water supply services is low. The wood VC in the early stages of tree growth such as tree nurseries, and pulp production, heavily depends on the ecosystems water supply.

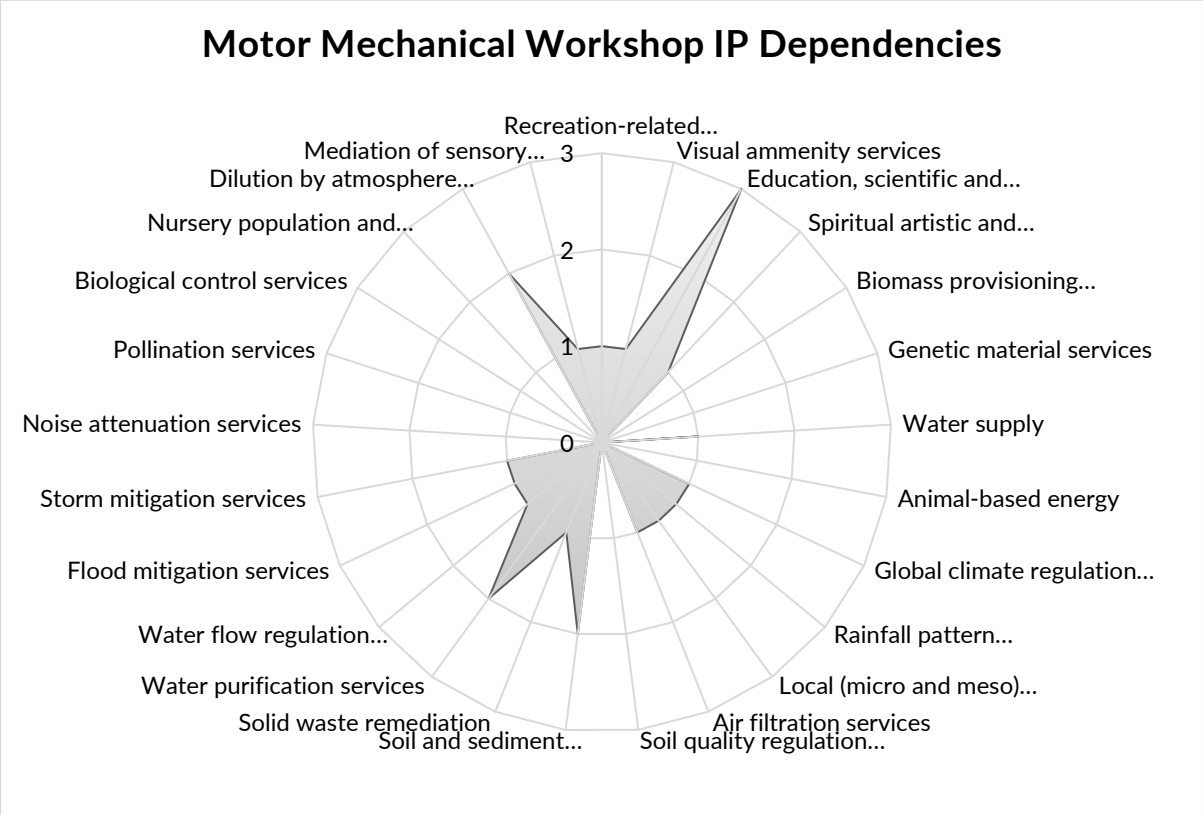
Rainfall pattern regulation: The IP operations are less dependent on rainfall patterns. The VC, specifically the tree growth heavily relies on consistent rainfall patterns.

Soil and sediment retention: At IP level, there is low dependency on soil and sediment retention services since soil exposure is minimal due to paved or built-up environments. The VC is heavily dependent on eco system's sediment retention services because of the high susceptibility of deforested areas to erosion.

Flood mitigation services: There is moderate dependence of IP operations on flood mitigation services to protect the wood processing infrastructure. The VC is highly dependent on natural flood mitigation services provided by forests through reduction of surface runoff.

Storm mitigation services: There is moderate dependence of IP and VC operations on storm mitigation services to protect infrastructure at the wood processing factory.

Motor Vehicle Workshop IP dependence



Local (micro and meso) climate regulation services. At the IP motor vehicle mechanical workshop, there is a moderate dependence on local climate regulation to maintain cooler temperatures. This is achieved through exhaust fans and ventilation systems, which facilitate air exchange with the surrounding atmosphere.

Solid waste remediation. The IP vehicle mechanical workshop generates a large volume of solid waste, predominantly metallic and plastic scraps, which are non-biodegradable. As a result, the workshop has low dependence on ecosystem services for solid waste remediation.

Noise attenuation. Motor vehicle workshop operations generate significant noise pollution, primarily from compressed air systems, electric nut drivers, and drill machines. This results in a moderate dependence on ecosystem services for natural noise attenuation.

Air filtration service: At IP motor vehicle mechanical workshop emits moderate levels of volatile organic compounds (VOCs), necessitating reliance on ecosystem services for air filtration and pollutant remediation.

Soil quality regulation. The operations at the IP motor vehicle mechanical workshop are not dependent on soil quality.

Biomass provisioning services: Not applicable for motor vehicle workshop sector

Genetic material services: Not applicable for motor vehicle workshop sector

Pollination services: Not applicable for motor vehicle workshop sector

Biological control services: Not applicable for motor vehicle workshop sector

Nursery population and habitat maintenance services: Not applicable for motor vehicle workshop sector

Water supply: There is minimal water use at the IP and VC level. This accounts for the low dependence on the ecosystem's water supply services.

Rainfall pattern regulation: IP and VC operations are not affected by rainfall patterns.

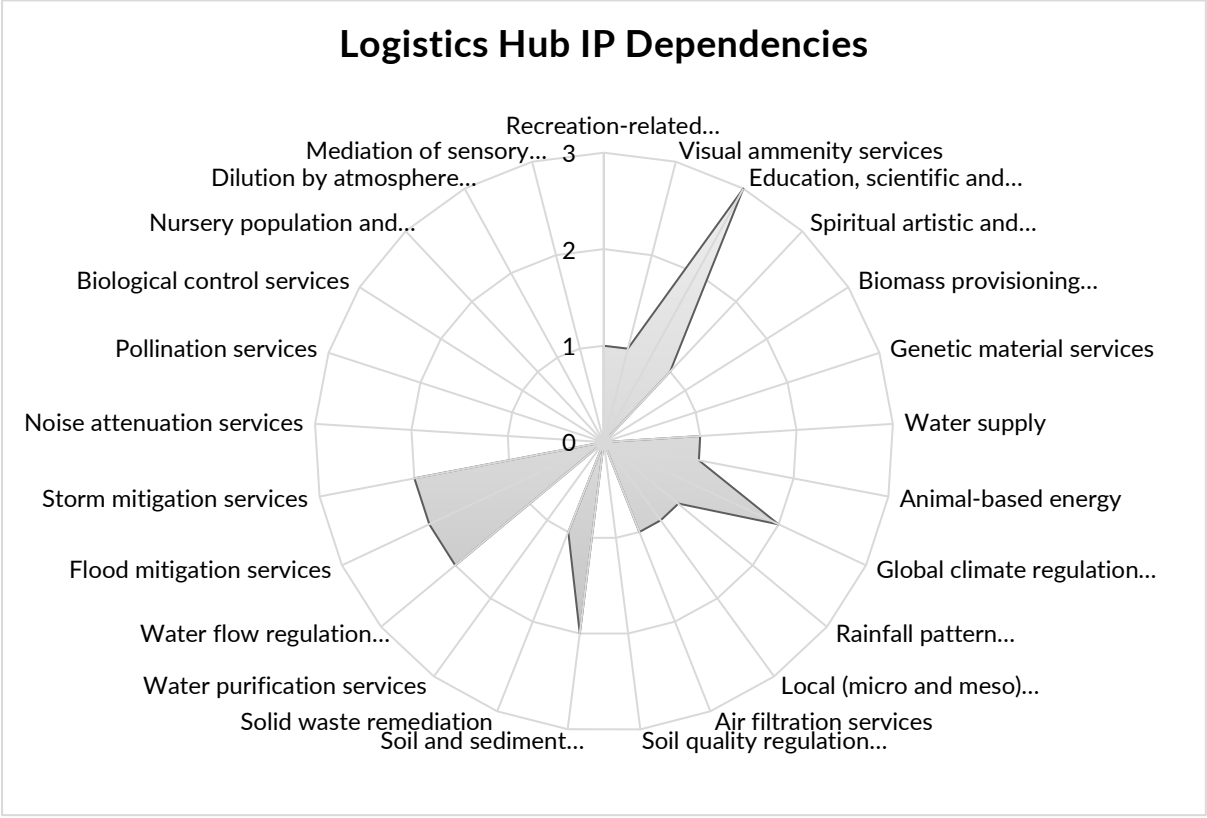
Soil and sediment retention services: There is moderate dependence on soil and sediment retention services at IP and VC level to protect service areas and prevent spread of oily debris and soil contamination.

Water purification services: There is moderate dependence on the ecosystem's water purification services to reduce contaminants in runoff from service areas arising from oil spills or vehicle washing.

Flood mitigation services: Motor mechanical workshops depend on flood mitigation ecosystem services to protect the workshops and other infrastructure from flooding.

The mechanical workshop will require high-level skills relating to mechanical and electrical engineering and refurbishment.

Logistics HUB IP Dependencies



Local (micro and meso) climate regulation services. Warehouses storing finished goods usually rely on air conditioning systems to maintain stable temperatures in storage areas, resulting in low dependence on local climate regulation services.

Solid waste remediation: IP logistics operation generates significant volumes of solid waste, including both biodegradable and non-biodegradable materials such as packaging and damaged goods from storage and transit. This results in moderate dependence on ecosystem services for waste remediation.

Noise attenuation: At IP, moving trucks generate moderate noise pollution, resulting in a partial reliance on ecosystem services for natural noise attenuation.

Air filtration service: At IP logistics operations generate high levels of greenhouse gas (GHG) and non-GHG emissions, primarily from cold chain logistics and fossil fuel combustion. This results in significant dependence on ecosystem services for air filtration and pollutant remediation.

Biomass provisioning services: Not applicable for logistics hub sector

Genetic material services: Not applicable for logistics hub sector

Pollination services: Not applicable for logistics hub sector

Biological control services: Not applicable for logistics hub sector

Nursery population and habitat maintenance services: Not applicable for logistics hub sector

Water supply: There is minimal water use at the IP and VC level. This accounts for the low dependence on the ecosystem's water supply services.

Rainfall pattern regulation: IP and VC operations are not affected by rainfall patterns.

Soil and sediment retention services: There is moderate dependence on soil and sediment retention services at IP and VC level to prevent erosion of docking areas and the spread of oily debris and soil contamination.

Water purification services: There is moderate dependence on the ecosystem's water purification services to reduce contaminants in runoff from service areas arising from oil spills or vehicle washing.

Flood mitigation services: Logistic hubs depend on flood mitigation ecosystem services such as swamps to protect the docking areas of trucks and other infrastructure from flooding.

The management of the warehouses and the integrated inventory & logistics management platform will require high-level skills.

1.5. Pre-identified common infrastructures & services and resource efficient & cleaner production potential measures

(For WATSAN preidentified needs refer to Part IV.)

1.5.1. RECP infrastructures

Opportunity for RECP symbiotic infrastructures:

Lugazi Industrial Park is an established brownfield site, with approximately 50% of its land already allocated to a wearable apparel manufacturer and a pharmaceutical company. The remaining available space presents opportunities for potential processors and manufacturers, including coffee, cocoa, vanilla, ethanol, timber (furniture), as well as warehouses and logistics hubs. The park's location gives it access to major infrastructure, including:

- Reliable power supply through an 11 kV distribution line and a 132 kV transmission line
- Proximity to a 25 MW biomass power plant, ensuring access to clean energy
- Strategic transport connections, including the Jinja-Kampala international highway (45 km from the park) and a major port located just 45 km away
- Future infrastructure developments, including the planned Jinja-Kampala Expressway and Standard Gauge Railway, which will pass within 5 km of the park, significantly improve logistics efficiency and reduce carbon emissions

While the Lugazi area currently faces challenges in piped water access, the central government has outlined plans to extend a water transmission line from the Katosi treatment plant (25 km away), which will further enhance the park's utility infrastructure.

The industrial park is located adjacent to a large sugar factory and surrounded by sugar plantation estates. This proximity presents significant industrial symbiosis opportunities, including:

i. **Reliable Power Supply:** The sugar factory generates approximately 25 MW of electricity, providing access to high-quality power for Lugazi Industrial Park tenants.

ii. **Bagasse-Based Thermal Energy:** Excess bagasse from sugar production could be repurposed to generate thermal energy for industrial processes within the park.

iii. **Bagasse Valorization for Construction Materials** (production of Medium-Density Fiberboard (MDF)):

iv. **Ethanol Production Potential:** The factory's surplus molasses can be utilized as a feedstock for ethanol production, adding value to byproducts and supporting biofuel industries.

v. **Valorization of Sugarcane leaves for Animal Feed Production.** The industrial park's proximity to extensive sugarcane plantations presents a valuable opportunity to process underutilized agricultural byproducts into high-quality animal feed. Specifically, Sugarcane Leaves for Silage Production

Opportunity for logistics infrastructure;

Furthermore, Lugazi Industrial Park's strategic location offers a scalable solution: A shared, eco-friendly motor vehicle workshop with integrated waste oil recycling. A shared motor vehicle repair workshop provides small-scale mechanics and artisans with access to: Standardized, high-quality repair equipment (lifting tools, diagnostic devices, etc.), a centralized waste oil collection system. Eliminates the need for individual workshops to invest in expensive tools or waste management systems.

1.5.2. Social infrastructures

Opportunities for shared social infrastructures have not been fully investigated but the business plan makes provision for residential housing, corporate social responsibility programs in the surrounding areas, and youth training programs. Communal kitchen were also raised by the manager.

2. Tororo Industrial Park Detailed Analysis

2.1. Sectors Pre-identification and Materiality Assessment

2.1.1. Sectors Pre-identification

Located at Uganda's eastern border with Kenya, Tororo District is strategically positioned to serve as a regional hub for cross-border trade and industrial development. With established formal and informal trade networks, proximity to major transport corridors, and the existence of an airstrip, the Tororo Industrial Park (IP) presents a unique opportunity to facilitate value addition, promote import substitution, and expand export readiness for local small and medium enterprises (SMEs). The IP is an open land (greenfield), and no tenants are allocated yet. The selection of these sectors reflects the region's existing economic strengths, growing entrepreneurial base, and its strategic location for cross-border trade. By clustering these value chains within the IP and addressing infrastructure gaps, Tororo can serve as a model for inclusive, export-oriented industrial development in Uganda's Eastern region.

Table 14 summarizes the companies and sectors of interest at the pre-assessment stage. Further investigation into the sectors and potential partnerships or tenants' attraction will be investigated in a second phase.

Company/Org	Sector	Status	Interests	Export Readiness
Elgonia Industries Limited	**Coffee:** Elgonia Coffee processes and exports Arabic and Robusta coffee, both green and roasted beans.	Potential interest in moving to the IP.	Interested in more value addition activities, such as instant coffee, and needs marketing supports	Yes, mostly green beans
Amaro Manufacturers LTD	**Meat:** Amaro produce processed meat products, such as sausages and minced meat.	Potential interest in moving to the IP.	Interested in more space, especially cold storage, affordable power and synergy with other value chain players to expand their business to leather.	Yes, but in small scale now
Shared by Tororo Commercial Officer	**Fruit & Veg (pineapple, Banana, tomato)**	Partners to be identified	Information from commercial officer	Yes, mostly selling as raw

			and other participants	material to Kenya
Sule Manufacturing LTD	**Oil seed (Sunflower Seed):** Sule manufacturer offers a range of high quality packaged refined sunflower oil. Extracted from sunflower seeds, the oil has a very long shelf life. https://sule.ug	Potential interest in moving to the IP.	Interested in marketing supports and scaling up operations	Yes, but in small scale now
Jubilee Spring LTD	**Oil seed (Soy beans):** Junilee manufactured refined soy bean oil and soybean oilcake.	Potential interest in moving to the IP.	Interested in marketing supports and scaling up operations	Yes, but in small scale now
Shared by Tororo Commercial Officer	**Wood**	Partners to be identified	Information from commercial officer and other participants	Unlikely
IME Beauty Skill Center	**Cosmetics:** Provide trainings for make-up and hair making.	Potential interest in moving to the IP.	Offers training and retails now, but would like to scale up and upgrade into formal training certification. Needs access to more products such as hair fiber. Also interested in making some products like shampoo and skin lotion.	No, only training local staffs
Mapecho Detergent & Cosmetics LTD	**Soap:** Manufacture liquid soap.	Potential interest in moving to the IP.	Interested in marketing supports and scaling up operations	Yes, but in small scale now
Shared by Tororo Commercial Officer	**Maize/Grains**	Partners to be identified	Information from commercial officer and other participants	Yes, already trading to Kenya
Rudii International Co. LTD	**Alcoholic beverages:** Certified by the Uganda National Bureau of Standards (UNBS), Rudii	Potential interest in moving to the IP.	Interested in marketing supports and scaling up operations	Yes, but in small scale now

	produces fruit wine, such as pineapple and hibiscus.			

Table 14: Sectors and companies of interest at Tororo IP.

Thus, the following sectors were prioritized based on both existing activity and potential for growth, diversification, and impact on the local economy.

Coffee: Coffee is a key agricultural commodity in the Tororo region, supported by companies like Elgonia Industries Limited and a wide base of smallholder farmers. While current operations are limited to the sale of green and roasted beans, there is growing demand—both locally and regionally—for processed coffee products, especially instant coffee. However, local producers face challenges in ensuring consistent bean quality and accessing value addition equipment. Sector inclusion is aligned with the Government of Uganda's national export development strategy to increase local processing capacity, reduce instant coffee imports, and improve farmers' incomes through higher value exports.

Meat Processing: Tororo plays a growing role in Uganda's meat trade, with neighboring Kenya serving as a major export destination. Enterprises like Amaro Manufacturers LTD have initiated small-scale sausage and minced meat production and have expressed strong interest in scaling up operations within the IP. By offering shared infrastructure, such as cold storage, meat inspection, and processing facilities, the IP can improve product quality, support compliance with export standards, and boost formal cross-border meat trade. This sector holds high potential for structured market access and job creation in value-added livestock processing.

Fruits & Vegetables: The Tororo region is a significant supplier of fresh fruits and vegetables, including tomatoes, bananas, and pineapples, to Kenyan markets. . In addition to fresh fruits and vegetables, processed foods, such as tomato sauce and pineapple juice, are also produced in the region. However, buyers currently face inefficiencies due to scattered sourcing from individual farmers. Centralizing aggregation and processing activities at the IP would enhance supply chain coordination and reduce post-harvest losses. Additionally, improved enforcement of the East African Community (EAC) trade protocols—particularly around the issuance of certificates of origin—could further unlock export potential by eliminating unnecessary tariffs currently faced by Ugandan producers.

Alcoholic Beverages: There is growing entrepreneurial activity in the production of fruit-based wines and molasses-based alcoholic drinks, as demonstrated by SMEs like Rudii International Co. LTD. These enterprises are certified by the Uganda National Bureau of Standards (UNBS) and ready to scale up, but lack brand recognition and marketing platforms. Integrating a shared showroom within the IP to showcase regional products would enhance visibility and marketability, both domestically and internationally. Alcoholic beverage production also offers opportunities to strengthen agricultural-industrial linkages by sourcing local raw materials.

Oil Seed Processing: Participants such as Sule Manufacturing LTD and Jubilee Spring LTD currently produce high-quality vegetable oil from sunflower and soybean, yet remain small-scale due to limited market access. These enterprises would benefit from being co-located within the IP, enabling them to pool logistics, packaging, and distribution services. Establishing an IP model would also facilitate vertical integration with other sectors, such as animal feed or soap production, thereby creating stronger value chains and economic spillovers.

Soap: Mapecho Detergent & Cosmetics LTD, a UNBS-compliant local soap producer, has expressed interest in relocating to the IP. Currently operating from a residential setting, the company competes with lower-quality producers that are not subject to regulatory oversight. Integrating soap manufacturing into the IP would encourage formalization, raise product standards, and unlock synergies

with vegetable oil processors already present in the region. The sector is particularly important for improving hygiene outcomes and supporting women-led enterprises.

Cosmetics: Tororo's cosmetics sector is nascent but promising. Alongside manufacturers, institutions like IME Beauty Skill Center offer training in beauty product use and formulation. Local production of cosmetics—particularly those based on natural and herbal ingredients—has strong potential to reduce dependency on imports and build inclusive business models that support youth and women employment. An integrated model combining production and training facilities within the IP would position the sector for scalable growth and regional competitiveness.

Wood: Woodworking is a traditional industry in Tororo, with local carpenters producing furniture for both domestic and export markets. However, the sector faces sustainability challenges due to premature harvesting of trees and the lack of reforestation efforts. Local cement companies also rely heavily on firewood, further straining forest resources. Introducing sustainable forestry practices, possibly through partnerships with organizations like Busoga Forestry Company Limited, would support responsible resource use and enable green certification for local wood products. Shared machinery and training facilities in the IP would also improve productivity and reduce the financial burden on small-scale carpenters.

The sectors pre-identified present the profiles below for the priority economic areas defined in §5.5

Potential for Import Substitution (Figure 47**)**

Tororo Industrial Park (IP) holds strong potential for import substitution, largely due to its strategic location near the Uganda–Kenya border, which facilitates extensive cross-border trade. Uganda currently relies on imports for a wide range of products that could be locally produced in Tororo, including sausages, instant coffee, alcoholic beverages, and cosmetics. Additional imports such as vegetable oil, laminated wood, liquid soap, and other wood products may also be sourced from neighboring Kenya. With targeted investment in processing and manufacturing facilities, these sectors could be developed within the park to reduce dependence on imports and retain value within Uganda's economy on a first stage, and potentially compete in the regional market on a second stage. Meanwhile, sectors such as fruits and vegetables, maize/maize flour, and coffee beans already benefit from reliable domestic raw material supply chains, providing a solid foundation for local production.

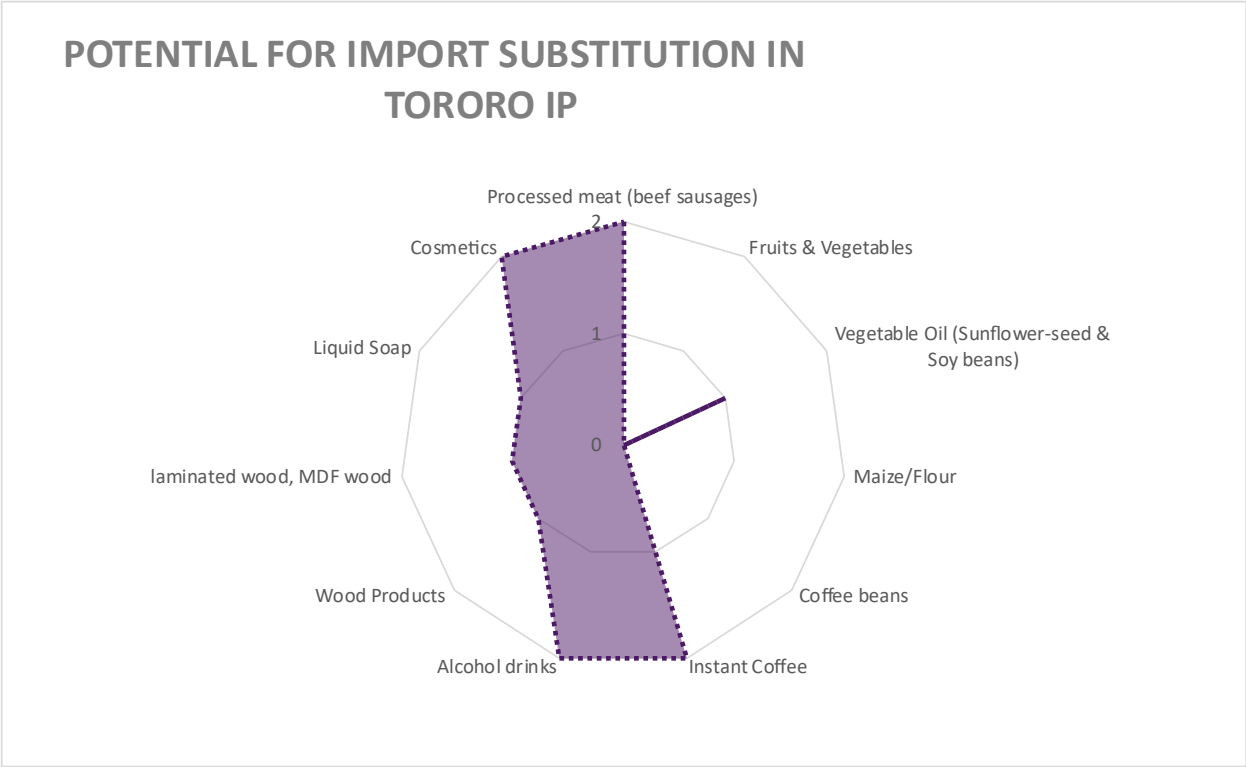


Figure 47: Potential for Import Substitution at Tororo IP.

Food Security Contribution (Figure 48**)**

Several sectors identified for development within the Tororo IP contribute directly to national food security. These include processed meat, fruits and vegetables, and maize/maize flour, all of which play a significant role in household food consumption. Vegetable oil is also considered a key item in the basic food basket, as recognized by institutions such as the World Food Programme (WFP).

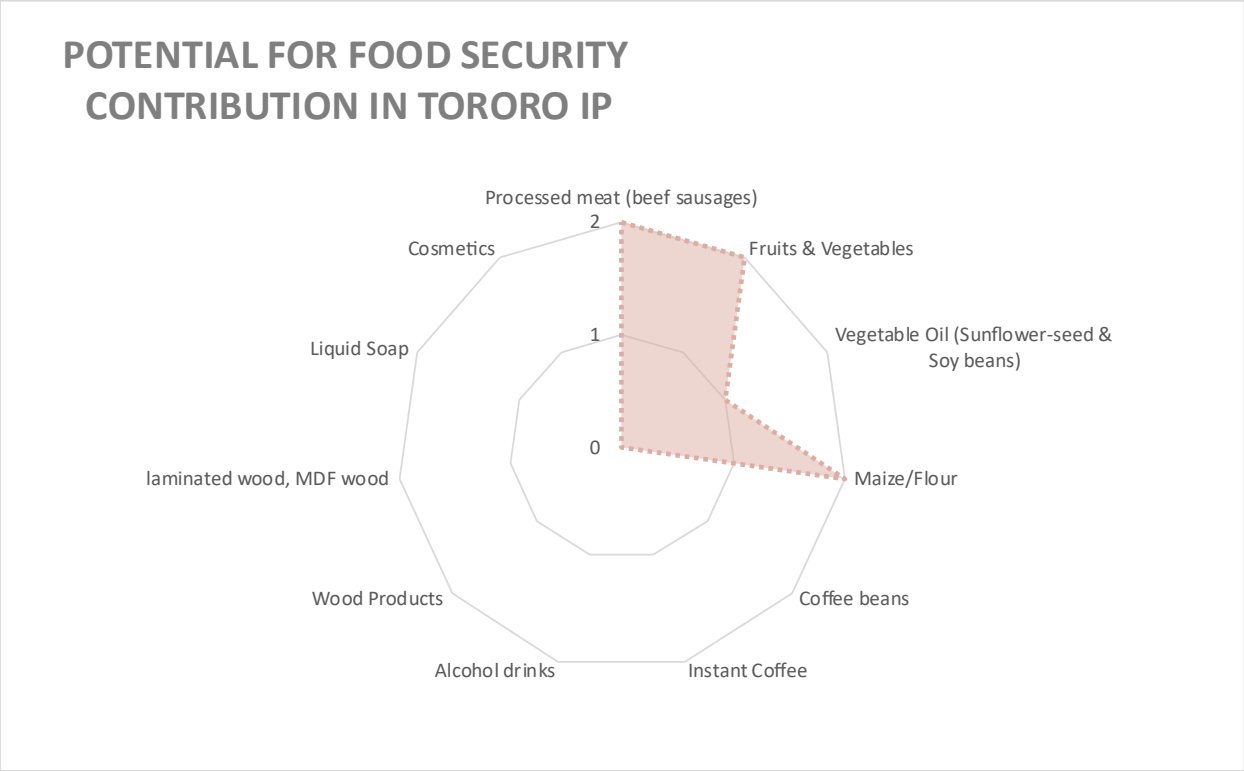


Figure 48: Potential for Food Security Contribution at Tororo IP.

Diversification and Upgrade Readiness (Figure 49**)**

There is substantial potential for product and market diversification in sectors such as processed meat, coffee beans, alcoholic beverages, liquid soap, and cosmetics. However, most enterprises currently operate at a small scale, often from household-level setups, and lack the infrastructure or financial resources needed to scale up. The coffee sector stands out as the only one operating at a relatively mature scale. Strategic interventions—such as providing shared facilities, access to finance, and streamlined logistics—could enable broader diversification across sectors. Tororo's proximity to the Kenyan border offers unique opportunities for scaling production and tapping into regional markets, particularly for raw material trade and light manufacturing exports.

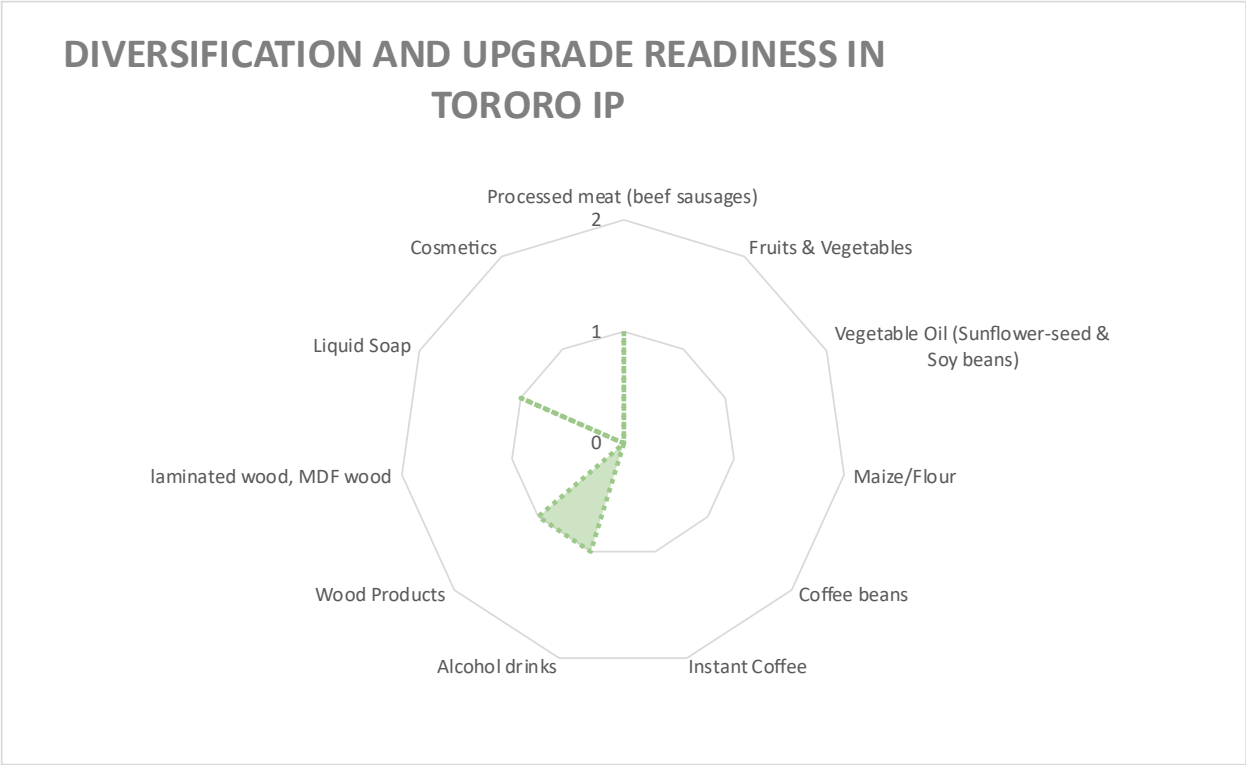


Figure 49: Diversification and upgrade readiness in Tororo IP.

Potential for Global Value Chain Participation (Figure 50**)**

Tororo-based sectors including fruits and vegetables, maize/maize flour, coffee, and wood products already participate in global value chains, although at varying degrees of integration. Instant coffee, despite strong potential, still requires significant investment in modern processing technologies and quality assurance systems to meet international standards. Vegetable oil and alcoholic beverages produced in the region are generally of good quality, but production capacity constrains reduces their competitiveness. Similarly, wood product manufacturers lack adequate equipment, hindering scale and efficiency. A notable logistical challenge raised by firms is the inefficiency in machinery importation: equipment imported into Uganda must first pass through Kampala before reaching Tororo, increasing costs and reducing the advantage of the park's location.

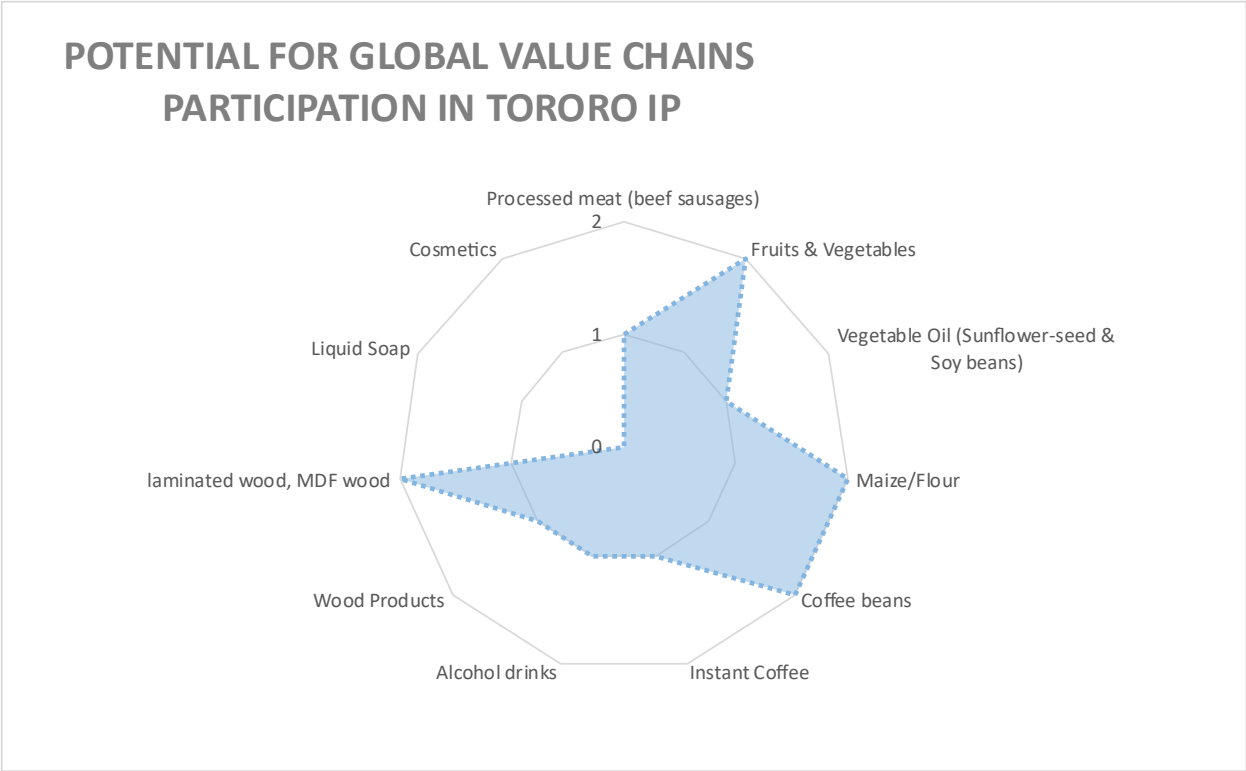


Figure 50: Potential for Global Value Chains participation in Tororo IP.

Export Readiness (Figure 51**)**

Several sectors are considered export-ready, provided there is sufficient demand. These include fruits and vegetables (notably banana, pineapple, and tomato), vegetable oil, maize/maize flour, coffee beans, and laminated wood. Due to its favorable location, Tororo benefits from regional trade dynamics, particularly as Kenyan companies continue to source raw materials from Uganda for further processing. However, sectors such as instant coffee, alcoholic beverages, wood products, liquid soap, and processed meat still require upgrades in infrastructure, compliance with quality standards, and scale expansion to be competitive in export markets. Additionally, some enterprises expressed concern over persistent cross-border trade barriers. Despite the East African Community (EAC) Free Trade Agreement, traders reported continued tariff payments when exporting to Kenya due to a lack of certificates of origin—highlighting the need for administrative support to maximize regional trade benefits.

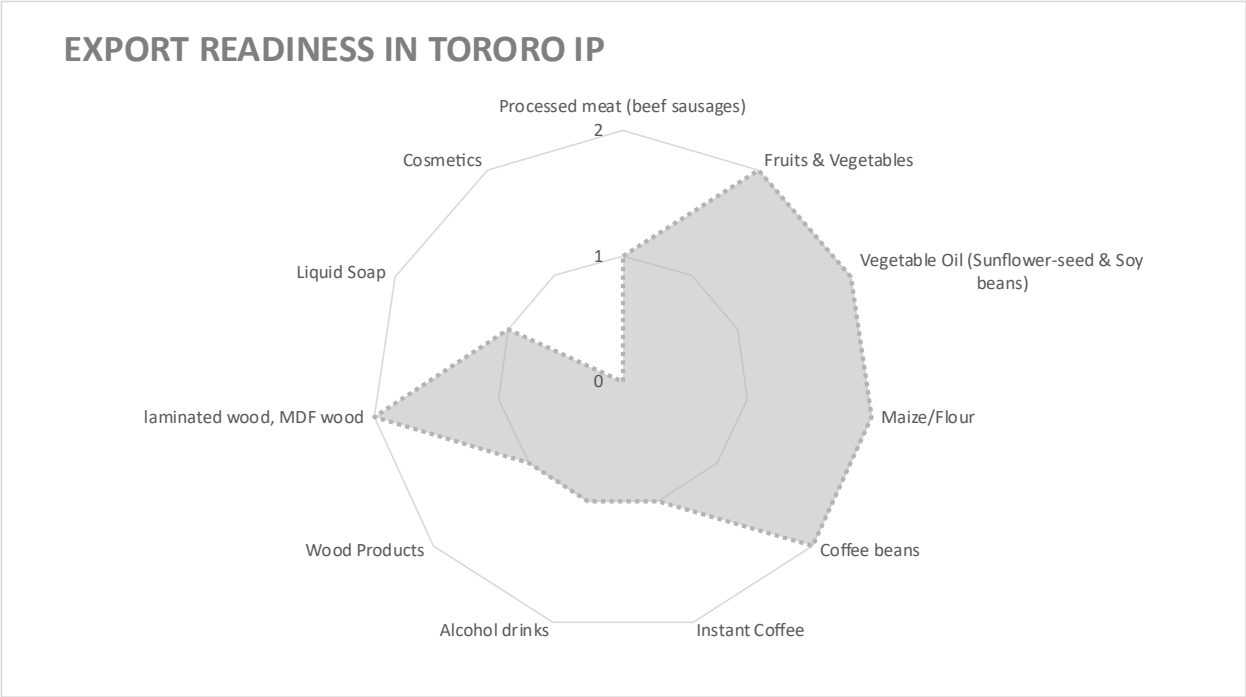


Figure 51: Export readiness in Tororo IP.

Figure 52 shows domestic versus potentially export ready products at Tororo Lugazi IP.

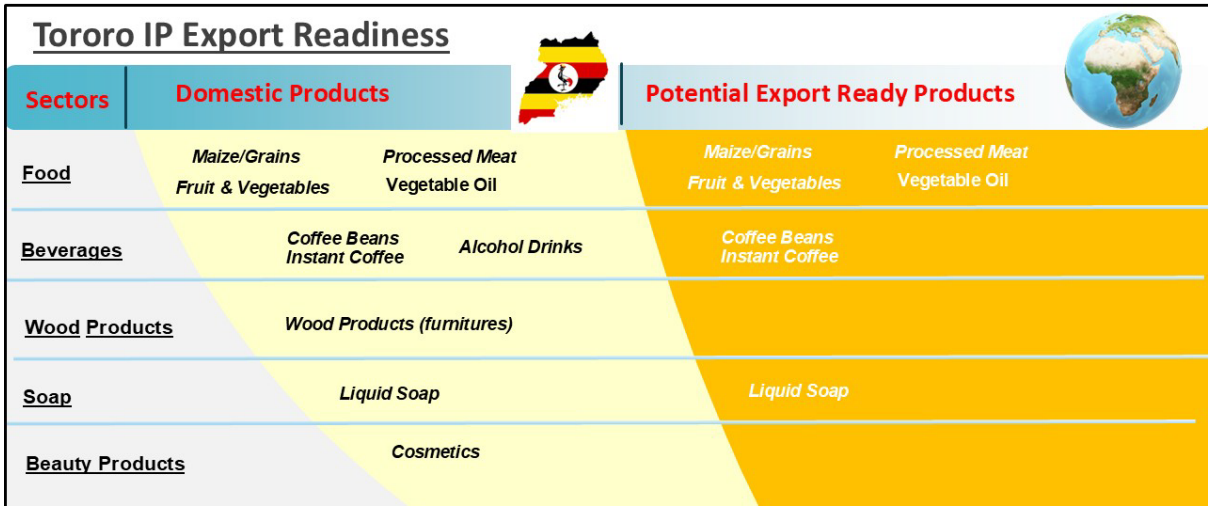


Figure 52: Tororo IP Export Ready vs Domestic products.

2.1.2. Examples of sectors with export potential

Vegetable oil: one of the sectors in Masese cluster and Tororo IP

Uganda's vegetable oil value chain, particularly sunflower-seed oil, is currently oriented toward domestic consumption, but holds significant untapped export potential. With an unrealized potential of $26 million, there are clear opportunities to scale exports to both regional and global markets. Switzerland stands out as the largest buyer, with actual export of $12 million, while nearby countries like Kenya represent important regional markets (Figure 53). Beyond these, substantial growth opportunities exist in Asia, especially India and China, as well as in the Middle East. To position itself competitively in international markets, the sector will need to invest in refining capacity, quality control, packaging, and

compliance with export standards, while also strengthening linkages between market players to meet consistent volume and quality requirements.

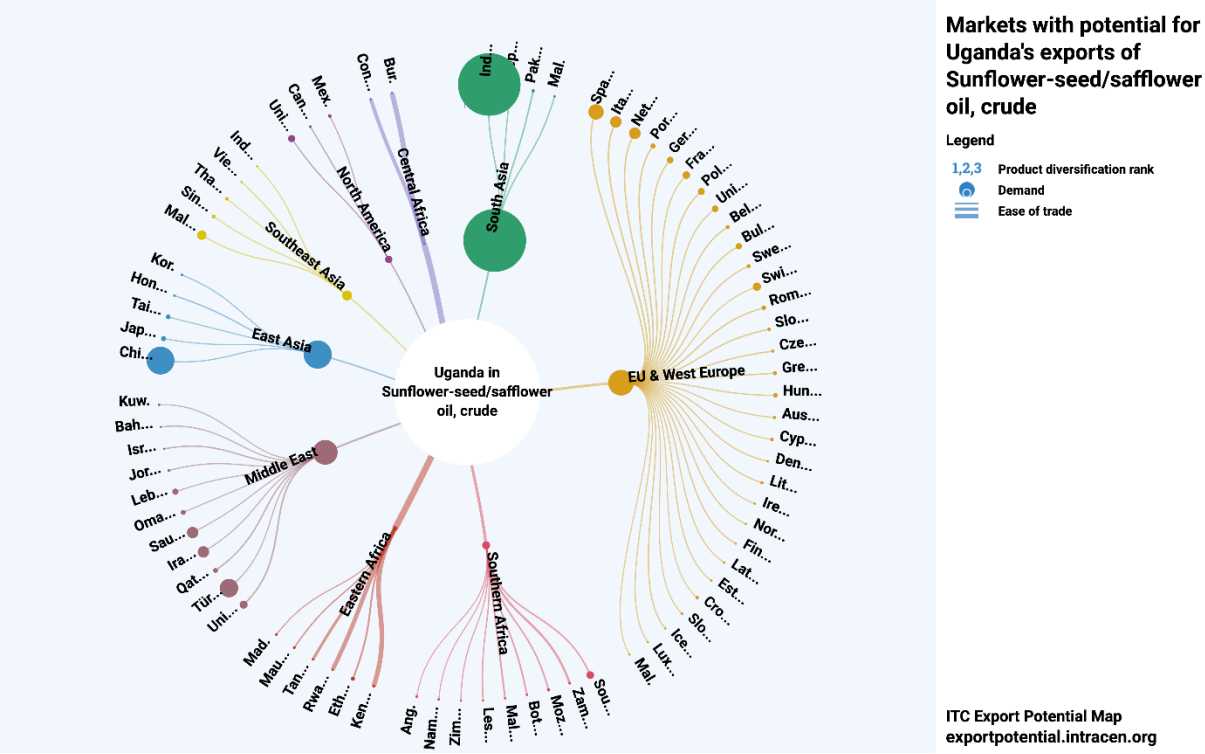


Figure 53: Markets with potential for Uganda's exports of safflower oil.

See also § 14.2.2 for coffee.

2.1.3. Materiality assessment

The 9 sectors/products and processes the materiality assessment focused on were (see Table 13**)**

SECTOR CHECK-LIST	ACTIVITIES
Coffee	From raw coffee beans to green beans
Meat	Beef, pork and chicken into processed products, like sausage and includes by-products (leather, gelatin)
Fruit & Veg (pineapple, Banana, tomato)	Direct fruit trade, or make into sauce or juice
Oil seed	Sunflower seed oil and soybean oil
Wood	Timber to furniture
Cosmetics	Packaging, retail and training center
Soap	Whole processing

Maize/Grains	Direct trade or milling
Alcoholic beverages	Made from fruits (pineapple) or molasses

Table 15: Tororo IP sectors checklist

Note that the processes identification is not final, thus the materiality rating did not limit itself to the strict processes listed but encompassed other likely processes if their impact would be more material, unless there was a clear indication that those could not take place, for example due to technical limitations.

The materiality assessment shows no disqualifying concern. However, the percentage of High materiality impacts at Value Chain Level is far greater than at IP level (53% of all impacts vs 29%). Besides the overall impacts at IP level are not negligible with 48 elements rated high or medium all sectors considered (Figure 54).

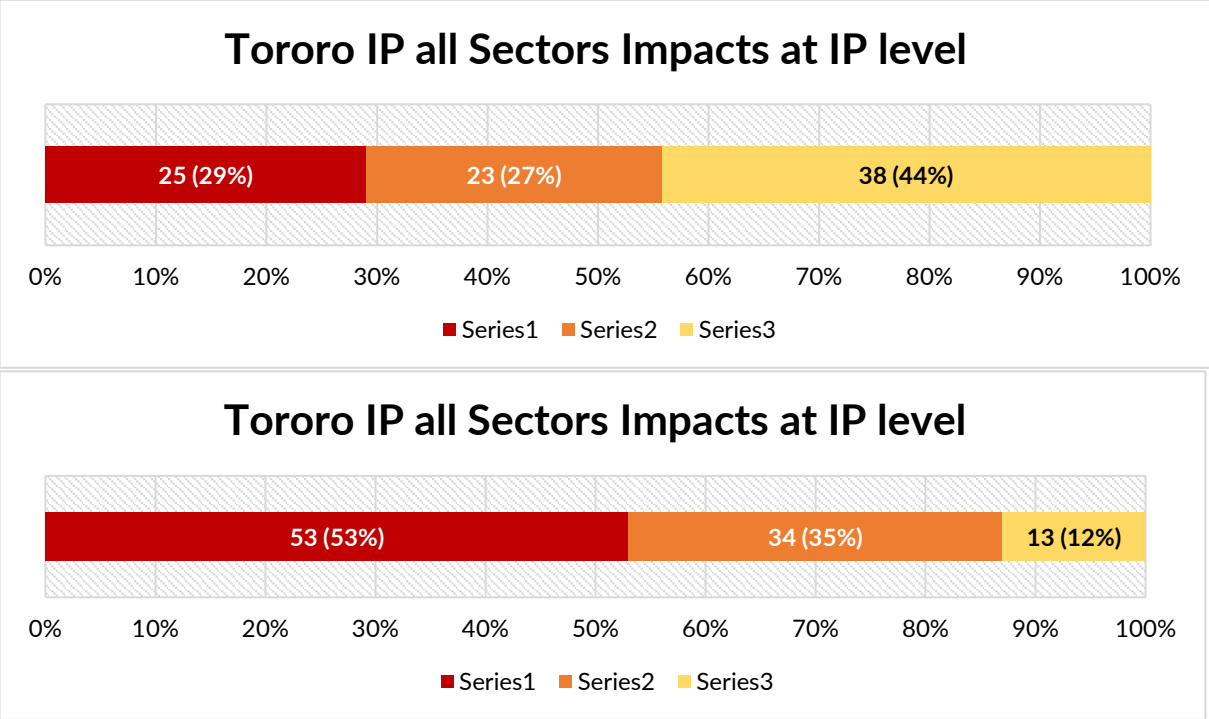


Figure 54:Tororo IP impacts at IP and value chain levels

Overall, the elements most impacted at IP level are the volume of water use, emission of toxic pollutants to water and soil, disturbances, solid waste generation, other biotic resource extraction and the emission of GHG and non GHG air pollutants. As can be expected, the value chain present elements of concern adding introduction of invasive species, area of land use and of freshwater use concerns to the list (Figure 55).

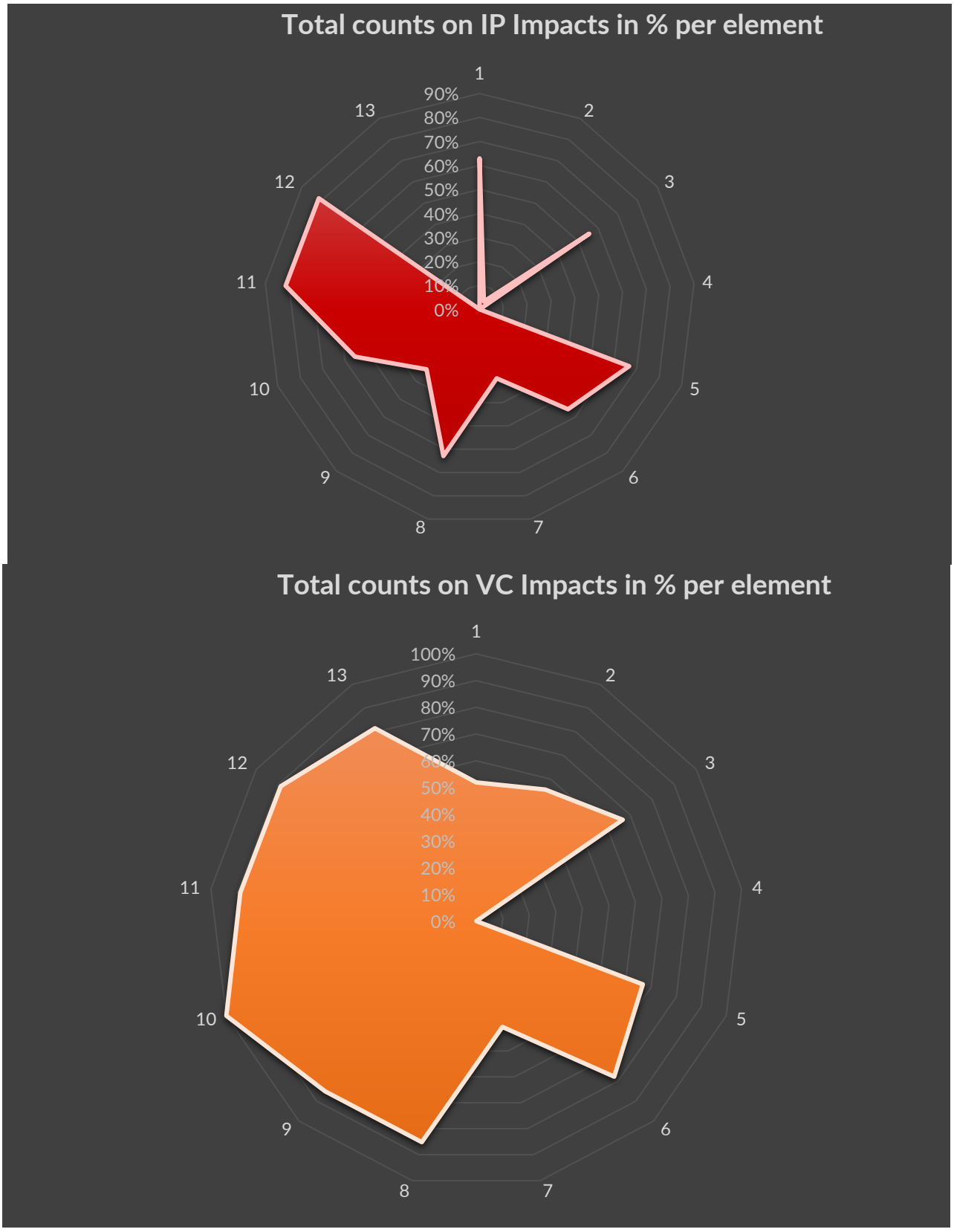


Figure 55:Impacts in % per element at IP and VC levels

In particular, key IP level impacts to be addressed in the watsan sector are:

Volume of water use:

The proposed sectors in the Tororo IP require medium volumes of water use. Currently, Tororo town relies on a piped water supply system fed by surface water source (River Malaba). There is need to assess

the current and projected water requirements for the domestic, institutional, commercial and industrial water uses.

Emission of toxic and nutrient pollutants to water and soil:

The proposed sectors in park can potentially emit high volumes of nutrient pollutants as compared to toxic pollutants that can result in pollution of groundwater and surface water resources. The surface water resource nearest to the park is River Malaba flowing along the south boundary of the park. The river is a tributary to for the Mpologoma river that drains into Lake Kyoga. Hence there would be far reaching implications of pollution of the water sources.

Generation and release of solid waste:

The proposed sectors can cause low generation of solid waste at the industrial park. Currently, the town relies on a solid waste dumping site at Mukujo. However, the site does not follow standard landfilling operation and management principles and practices. A detailed assessment of the solid waste generation and composition for the park and municipality is required.

And key VC level impacts to be addressed in the the watsan sector are:

Volume of water use:

The VCs for the proposed sectors in the Tororo IP require high volumes of water use. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting and other surface water sources (River Malaba) to meet the demand for water for production.

Emission of toxic and nutrient pollutants to water and soil:

The VCs for the proposed sectors in park can potentially emit significant volumes of toxic pollutants as compared to nutrient pollutants. The toxic pollutants accumulate due to the use of pesticides in the agricultural activities. There is a potential danger of pollution of groundwater and surface water resources.

Generation and release of solid waste:

The VCs for the proposed sectors can cause high generation of solid waste. The solid waste is primary from agricultural practices, both crop growing and animal rearing. The are high quantities of biodegradable waste from both practices.

The most prominent dependencies at both IP and VC levels are on watsan ecosystem services (Figure 56).

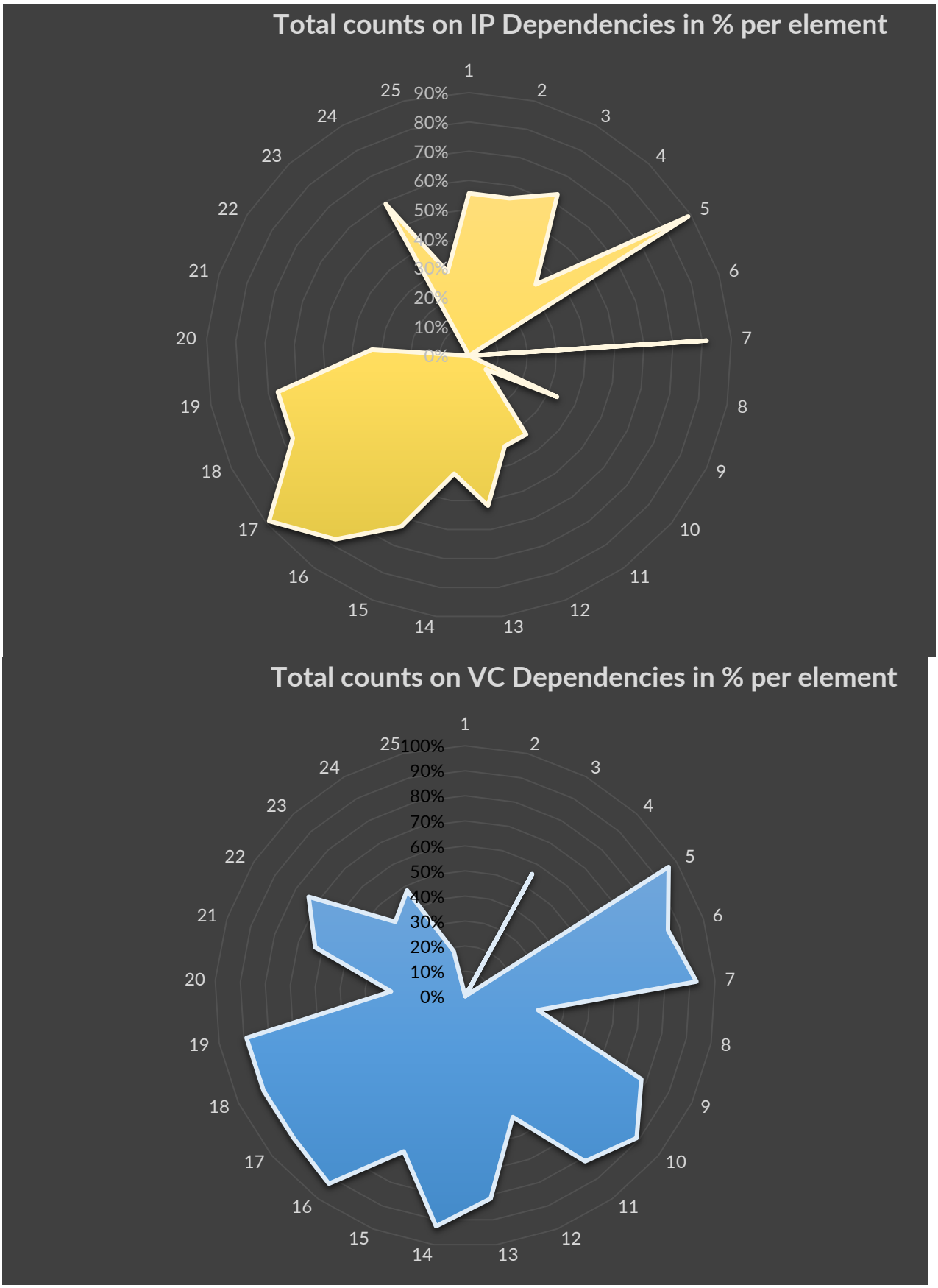


Figure 56: Tororo IP dependencies at IP and VC levels

Key IP level dependencies to be considered in the the watsan sector are:

Water Supply:

The proposed sectors in the park have a high dependency on water supply services. The IP needs should not foreshadow other water uses in the town and surrounding community. A more detailed assessment of the water supply services in comparison to the competing water demand categories is required.

Solid Waste Remediation:

The proposed sectors in the park will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and town, through improved solid waste management practices. This can be further assessed in a detailed assessment of solid waste generation and composition for the IP and town.

Water flow regulation services:

The IP will also heavily rely on the water flow regulation services. The observed land use within the vicinity of the IP is primarily agriculture (subsistence farming) and sparsely populated built up area. The observed land use can support the ability of the ecosystem to provide water flow regulation services. There is need for a detailed land use assessment in proximity to the site.

Storm mitigation services:

The IP will rely on storm mitigation services. The observed land use within the parks is agroforestry that can provide the storm mitigation services. The observed land use in close proximity to the park includes trees and other vegetation that can support storm mitigation services. There is need to further assess the land use within and in close proximity of the site.

Flood mitigation services:

The IP will also rely on flood mitigation services. The site topography is observed to be gently sloping from the northern boundary towards the southern boundary. River Malaba along the southern boundary of the park; as well as the low-lying southern boundary presents a risk of flooding that requires detailed assessment.

Water purification services:

The proposed sectors will require water purification services, however, there is no existing wetland in close the park. The assessment for potential water purification services should be expanded to consider constructed wetlands, depending on the availability of land.

And key VC level dependencies to be considered in the the watsan sector are:

Water Supply:

The VCs of the proposed sectors in the park have a high dependency on water supply services. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting and other surface water sources (streams) to meet the demand for water for production.

Solid Waste Remediation:

The VCs for the proposed sectors in the park will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and town. The areas outside the municipality manage solid waste at household and institutional level. The solid waste is primary from agricultural practices, with high quantities of biodegradable waste.

Water flow regulation services:

The VCs of the proposed sectors will also heavily rely on the water flow regulation services. The observed land use in some areas of the district is agriculture, forestry, vegetation and both sparsely and densely populated built-up areas. There are a few areas where agroforestry is being practiced and this will enhance the services. The land use limits or supports the ecosystem's ability to provide water flow regulation services.

Storm mitigation services:

The VCs will rely on storm mitigation services to support the protection of infrastructure, crop produce and animal rearing. There are some areas within the district where agroforestry is carried out, thereby supporting the services. The services are critical to maintain the VC for the respective production processes.

Flood mitigation services:

The VCs will also rely on flood mitigation services to support the protection of infrastructure and crop produce. The district is actively working to reduce the level of riverbank degradation and this would improve the flood mitigation services.

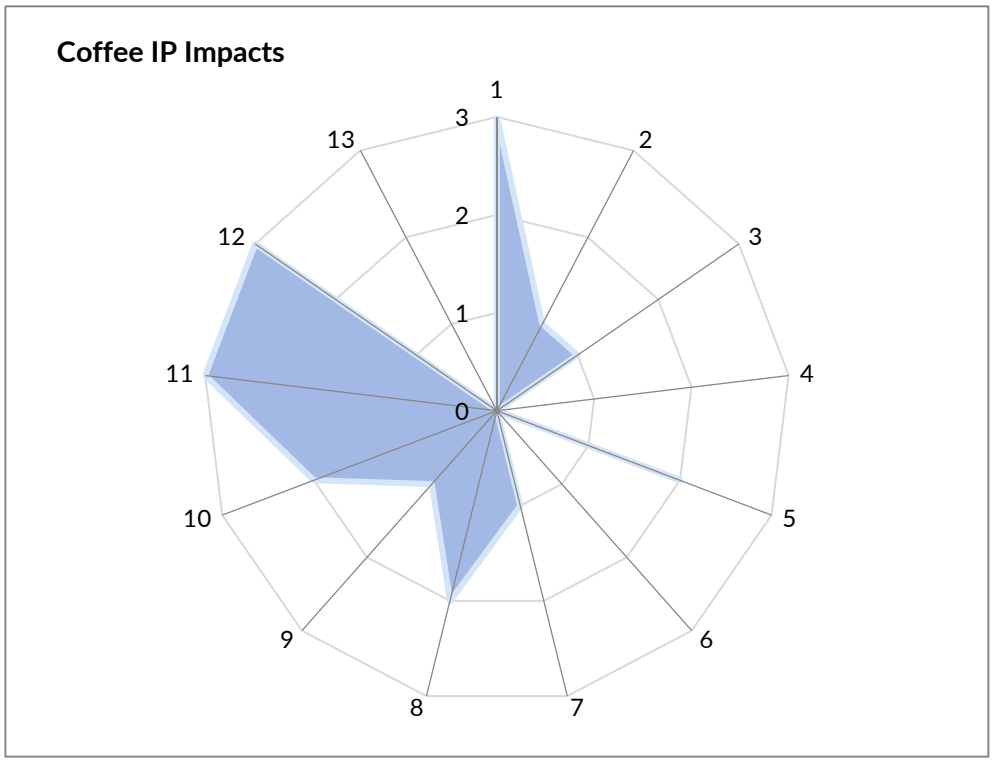
Water purification services:

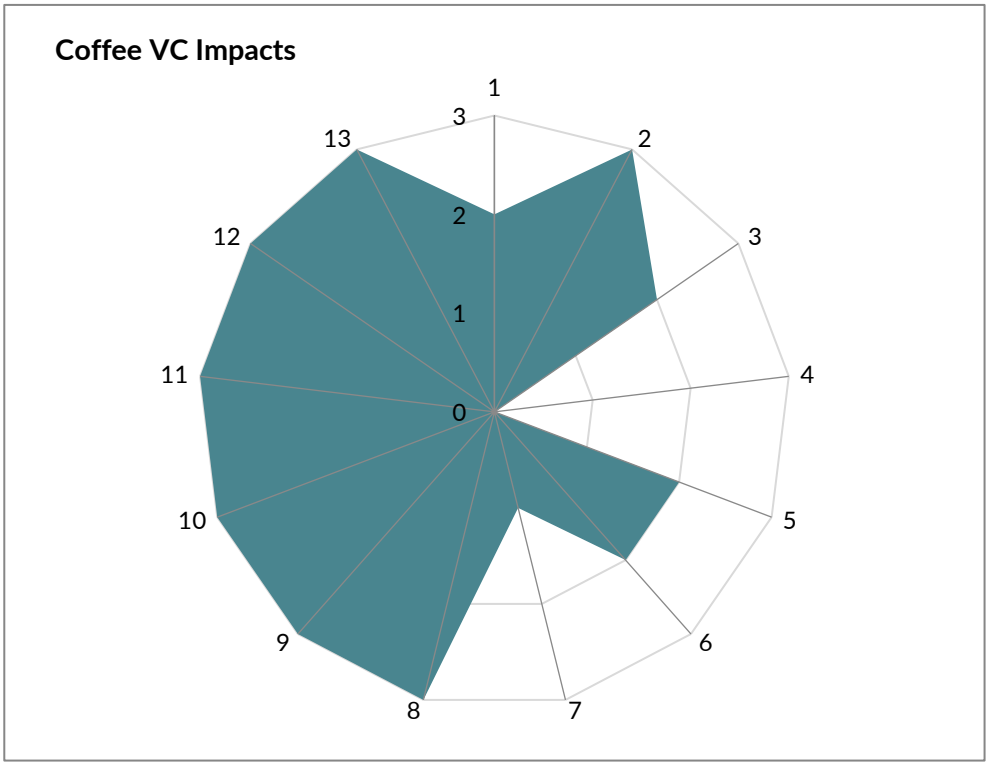
The VCs of the proposed sectors will heavily rely on water purification services. There are a number of wetlands in the district which can provide water purification services along the VC. The district reported ongoing measures of demarcation of wetlands to reduce the level of degradation.

Below is an overview of impacts and dependencies by sector and element.

Tororo IP and VC Impacts by sector and element

Coffee processing IP and VC impacts





The IP and VC impact of coffee processing includes:

Disturbances (noise and light); IP operation of coffee processing is the dominant noise source, while value chain noise is minor except for transport. At the IP coffee processing, noise comes from pulping machines, hullers, dryers, and grinders (noise range 70–90 dB), while at VC, there is minimal noise (occasional farm machinery).

Emission of GHG pollutants to air: The Value chain (farming) dominates GHG emissions (~40–70% of total), mainly from deforestation and fertilizers, while IP operations are significant (~20%) due to drying.

Emission of non-GHG pollutants to air: At IP, non-GHG pollutants (PM/VOCs) are concentrated and hazardous for workers, while at VC, agro chemicals contribute to diffuse but persistent air/soil toxicity. At IP, particulate matter (PM) from hulling/drying and Volatile organic compounds (VOCs) from fermentation (wet process), while at VC, PM is from soil tillage and agrochemical spraying (pesticide drift of toxic VOCs)

Emission of Toxic pollutants to water and land: Value chain pesticide use and releases dioxins from burning agro-chemical containers is the most severe toxic threat (chronic ecosystem damage), while IP wastewater with high BOD, COD, and phenols from fermentation poses acute local risks.

Emission of Nutrient pollutants into water: Value chain fertilizer runoff is the largest nutrient pollution source, while Industrial Pack wastewater is a localized but severe issue. At IP, nutrient-rich wastewater (nitrogen, phosphorus) is produced from wet milling and coffee pulp/husk decomposition.

Generation and release of solid waste: IP operations generate large volume waste, but reusable (pulp for compost/biogas), while the Value chain solid waste includes toxic agro-plastics, but less volume than pulp.

Other biotic resource extraction: At the IP level, coffee-related activities are confined to color-sorting, packaging, and storage, which do not involve any extraction of other biotic resources. However, at the VC level, the cultivation of coffee trees is often intercropped with other plants such as vanilla, vegetables, or shade trees. This system may lead to incidental extraction of non-timber forest products such as mushrooms, berries, nuts, cork, balata, and resins. In some cases, harvesting of these materials

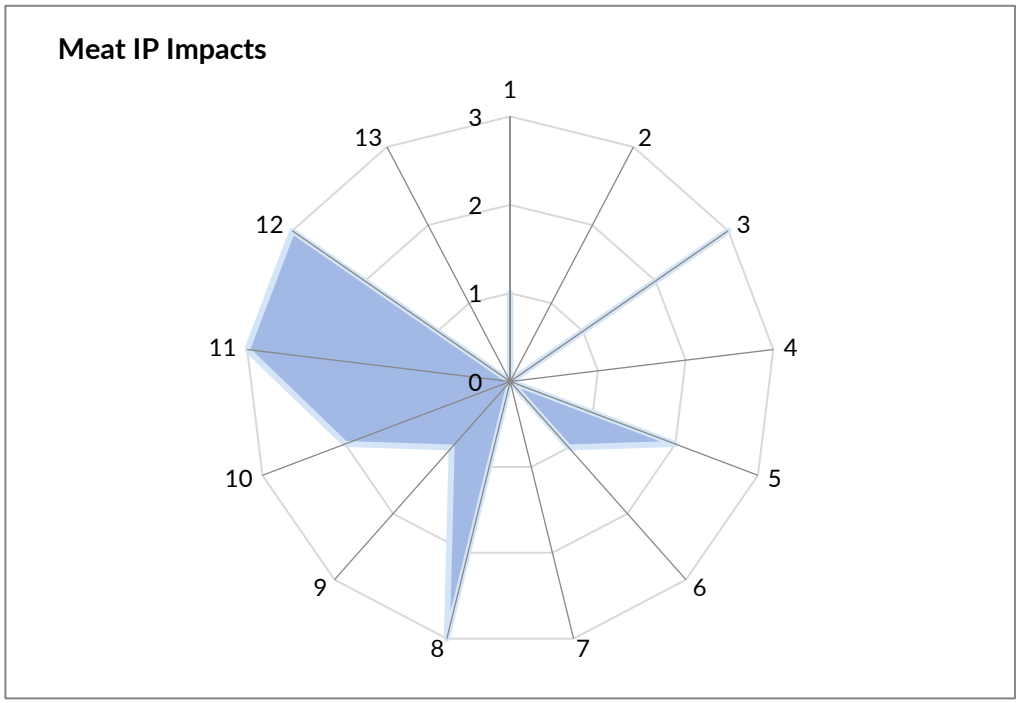
may exceed the regeneration capacity of local species, contributing to biotic stress in forest-edge ecosystems.

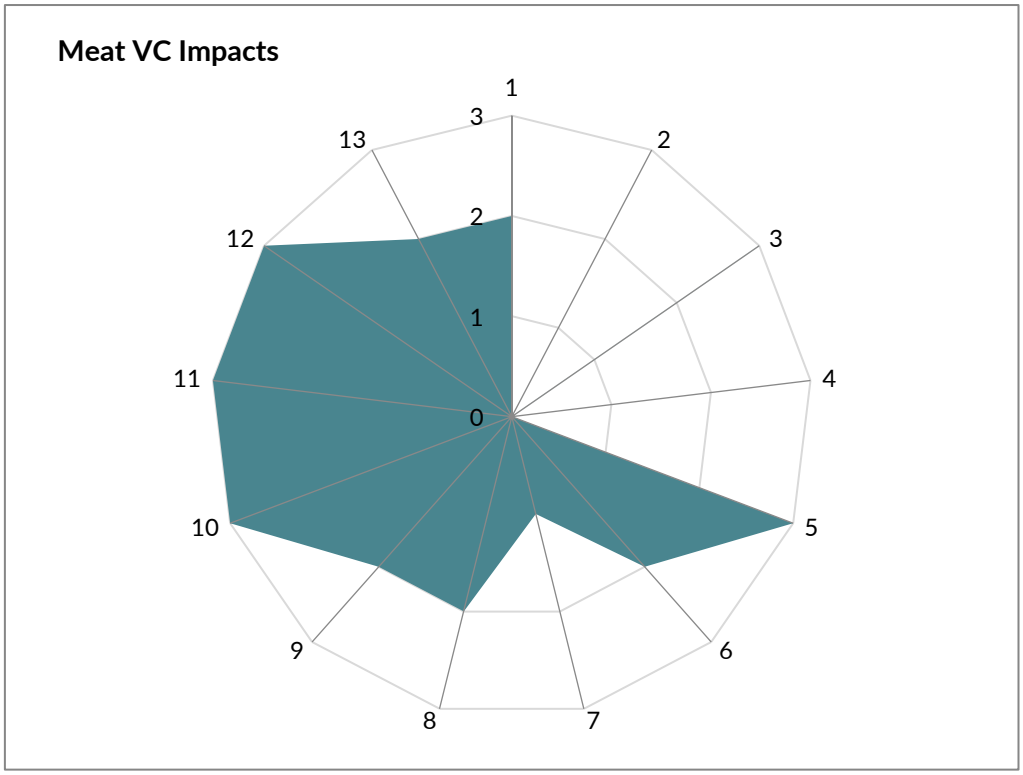
Area of land use: Land use within the IP remains limited due to the post-harvest nature of operations. At the VC level, however, coffee cultivation is land-intensive and predominantly carried out by smallholder farmers, often in hilly or forest-adjacent areas. This contributes to significant land transformation and can increase pressure on ecologically sensitive zones.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, the cultivation and maintenance of coffee plantations can contribute to the spread of invasive species through improper waste management, accidental transport of seeds via farm machinery or workers, and the use of unsustainable agricultural inputs such as herbicides, pesticides, and irrigation. These practices can weaken surrounding ecosystems and facilitate the establishment of invasive species.

Volume of water use: Large volumes of water are required especially during coffee processing for fermentation, pulping, rinsing, and cooling of machinery. This accounts for large volumes of water use at IP level and the value chain. Coffee growing also contributes to the VC water use especially where irrigation is required.

Meat Processing IP and VC impacts





Noise Disturbance: At IP, Significant noise (75-95 dB) from processing equipment (saws, grinders), refrigeration, and compressor units, while at VC, moderate noise from livestock transport and farm equipment, but more intermittent than IP.

Emission of GHG pollutants to air: At IP, High emissions from energy-intensive processing, refrigeration (F-gases), and wastewater treatment (methane). Similarly, at VC, high emissions from enteric fermentation (methane), manure management, and feed production.

Emission Non-GHG Air Pollutants to air: At IP, non-GHG are medium, including Ammonia and VOCs from rendering plants, particulate matter from combustion processes, while at VC **non GHG pollutants are high, and they include d**ust and endotoxins from feedlots, ammonia from manure storage.

Solid Waste Generation and release: At IP, High volumes of processing waste (bones, fat, blood), packaging materials, and sludge (assumed slaughterhouse is part of IP), while at VC, moderate waste from livestock bedding, mortality, and slaughterhouse byproducts.

Emission of nutrient pollutants to water: At IP, high BOD/COD from blood water, nitrogen/phosphorus from processing wastewater, while at VC, severe nutrient runoff from concentrated animal feeding operations (CAFOs) and manure lagoons.

Emission of Toxic Pollutants to Land/Water: At IP, medium risk from cleaning chemicals, disinfectants, and oil and lubricants (from equipment), while at VC, high risk from veterinary pharmaceuticals, hormones, and pesticides accumulating in soils.

Other biotic resource extraction: At the IP level, meat processing operations can introduce microbiological risks if hygiene standards are not strictly followed. Improper handling and storage of meat may lead to contamination by bacteria and parasites. At the VC level, livestock production—primarily cattle and poultry in the Tororo region—requires significant inputs such as pasture grasses, grains, and feed supplements. These draw on various biotic resources, including both cultivated and natural vegetation, which are essential for sustaining animal husbandry systems.

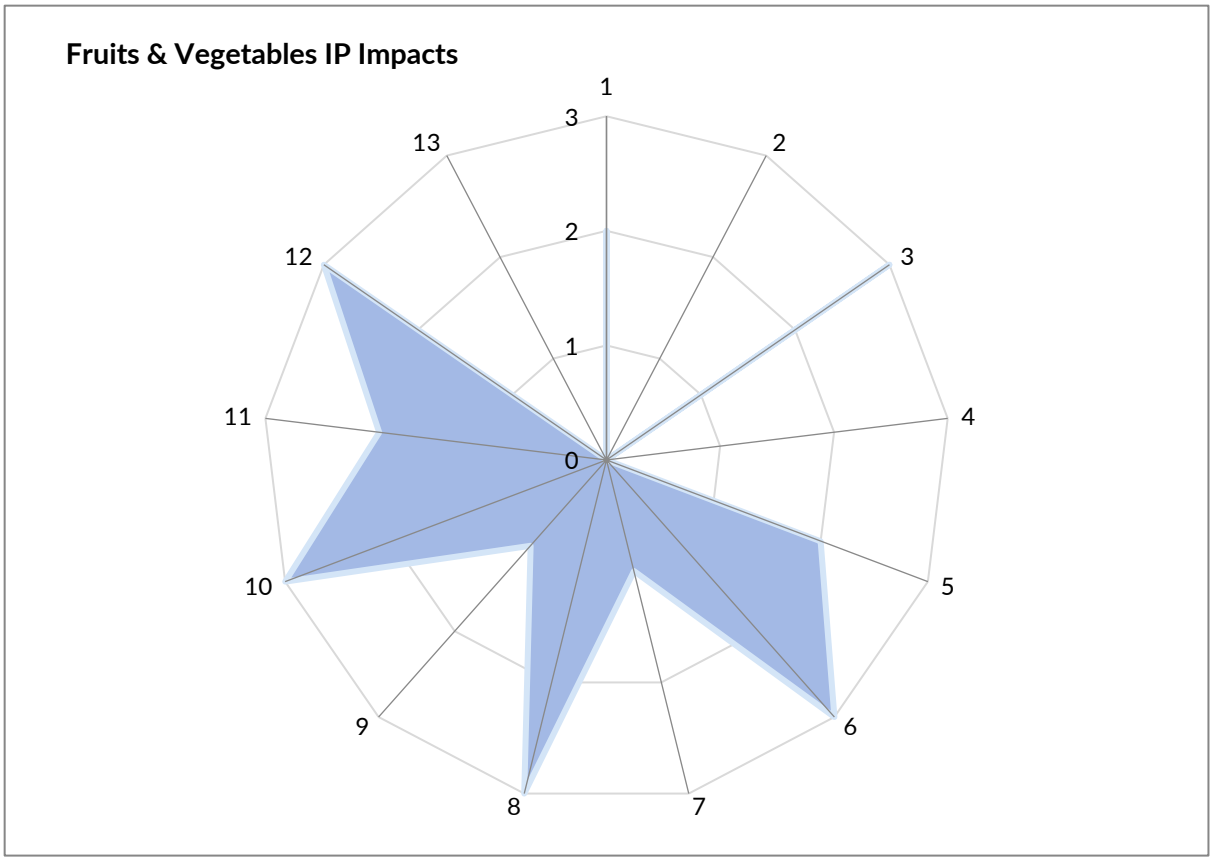
Area of land use: Land use within the IP remains minimal, as operations are focused on only processing, and packaging. At the VC level, land requirements are moderate. Although livestock rearing does not

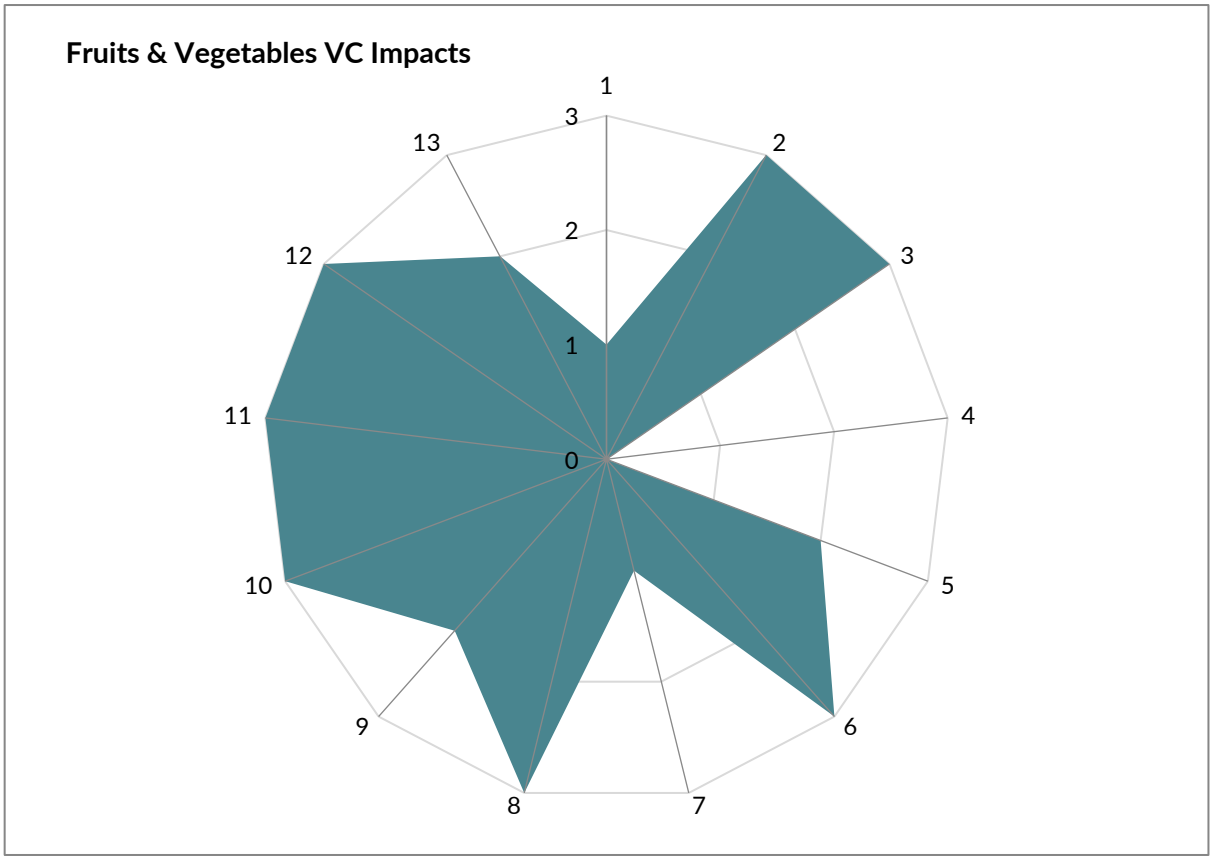
necessitate continuous cropping, it does require pastureland, grazing areas, and infrastructure for feed cultivation and water access—particularly in integrated or free-range systems.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, raising cattle and poultry can spread invasive species through contaminated feed and bedding materials, the use of invasive plant-containing manure as fertilizer, unintentional transport of invasive species by livestock during movement, and the escape of livestock carrying invasive species.

Volume of water use: At IP, large volumes of water are used for washing carcasses, chilling, scalding, cleaning equipment and facilities, and conveying waste. For the VC, a significant amount of water is required for raising livestock for a variety of purposes such as drinking, irrigating pastures and washing animals.

Fruits and Vegetables IP and VC impacts





Noise Disturbance: **At IP**: Moderate noise (65–80 dB) from sorting machines, peelers, blenders, and packaging lines, while at **VC**: Low noise because the fruits are harvested entirely by hand picking, occasionally tractors are used by large farmers in the cultivation phase (once in 6 years)

Emission of GHG air pollutants: At IP, high GHG emissions from cold storage operation (refrigeration leaks (HFCs), and boiler combustion), similarly, at VC, GHG emissions are high (fertilizer application (N_2O), farm machinery (CO_2), and transport emissions).

Emission of Non-GHG Air Pollutants: At IP moderate, including particulate matter (PM) from drying operations and boiler combustion, while at VC, non-GHG pollutants are high, including pesticide drift, dust from soil tillage, and ammonia (NH_3) from fertilizer volatilization.

Solid Waste Generation and Release: At IP and VC, solid waste generation is high. At IP, solid waste includes (peels, seeds, pulp, spoiled produce, packaging waste), while at VC, solid waste includes crop residues, rejected produce, and agrochemical containers.

Nutrient Water Pollution: At IP, moderate nutrients are released, including organic wastewater with high BOD, phosphorus from cleaning agents, while at VC, nutrients are high from fertilizer runoff and soil erosion from farms.

Toxic Pollutants to Land/Water. At IP, toxic pollutants are high in water, including wastewater with low pH and disinfectants like chlorine and chlorine-based compounds, as well as fungicides. Similarly, toxic pollutants at VC are high, including pesticides and plastics.

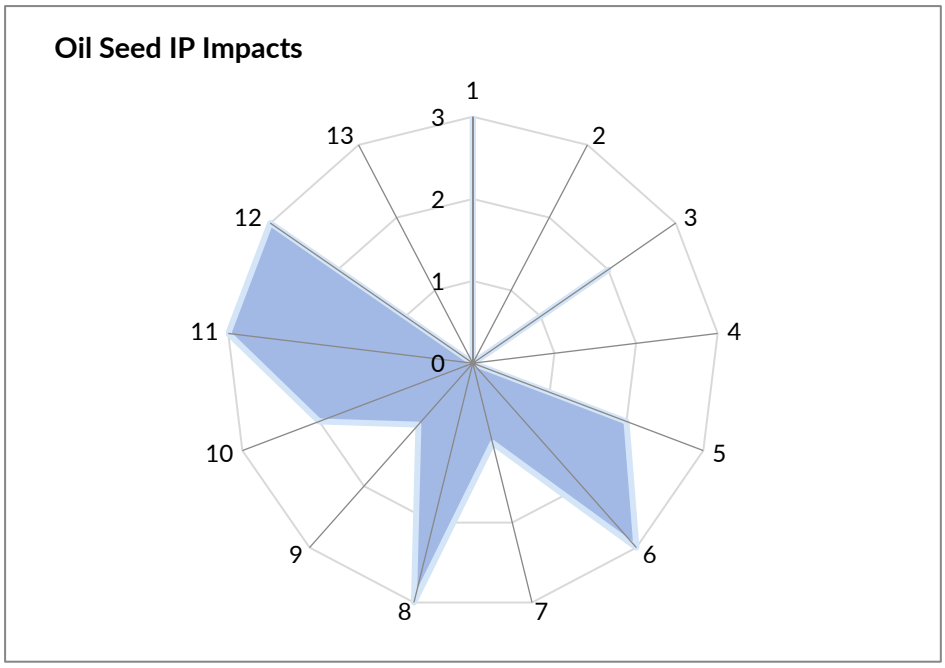
Other biotic resource extraction: Processing of fruits and vegetables at the IP level involves cleaning, grading, cutting, and packaging, often generating organic waste. This waste can be repurposed through microbial processing into valuable by-products such as organic acids (e.g., citric, lactic acid), although such activity remains limited and controlled within the facility. At the VC level, fruits and vegetables are commonly cultivated using mixed cropping systems. These systems may lead to incidental extraction of other biotic resources, particularly in early stages of land preparation and intercropping practices involving wild or semi-domesticated species.

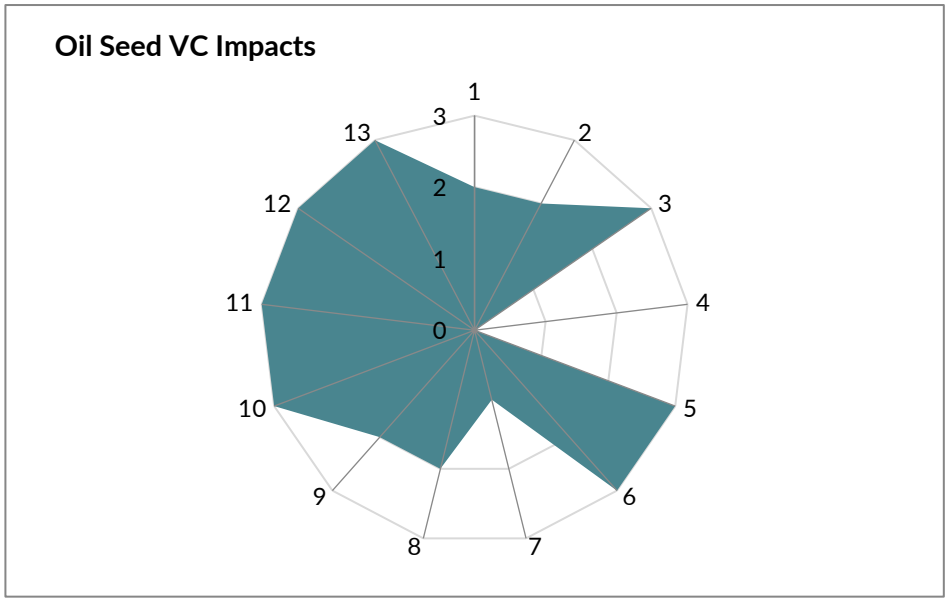
Area of land use: Land use at the IP is minimal due to the post-harvest nature of operations. In contrast, the VC is land-intensive, especially given the prevalence of smallholder farming systems in Tororo. Although individual farms are small, the cumulative footprint of dispersed horticulture plots across the region is significant.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not handled properly, this risk requiring further confirmation, it has not been rated for the time being. Fruit and vegetable farming at the VC level poses a moderate to high risk of invasive species spread. Improper disposal of plant waste, movement of farm equipment, and unsustainable chemical inputs (herbicides, pesticides, and fertilizers) can degrade the ecosystem's ability to contain biological threats. Additionally, development partners and NGOs occasionally promote the cultivation of non-native species such as chia seeds and green chili, which may contribute to ecological imbalances if not managed carefully.

Volume of water use: Large amounts of water are used in fruit and vegetable processing for washing the fruits and vegetables, juice extraction, dilution of concentrates and equipment cleaning. On the VC side, cultivation of vegetables and fruits requires large amounts of water mainly for irrigation also due to potential water losses through the puddling process, surface evaporation, and percolation.

Oilseed processing IP and VC impacts





Disturbance (noise): At the Industrial Park (IP) level, noise levels are consistently high (75-85 dB) due to the continuous operation of mechanical presses, decanters, solvent extractors, packaging lines, and refinery equipment. In contrast, Value Chain (VC) noise is intermittent and moderate, primarily generated by agricultural machinery during oilseed cultivation and transport, though many small-scale farmers still utilize quieter traditional hand tools.

Emission of GHG air pollutants: At the IP, high emissions come from steam generation and refinery energy use. At the VC, high emissions result from N_2O (fertilizers), CO_2 (machinery/transport), and soil carbon loss.

Emission of Non-GHG Pollutants to air. At IP, moderate emissions include VOCs (solvent extraction), PM (husk combustion), and SO_2 (boiler fuels). At VC, emissions are higher, dominated by agricultural dust, pesticide drift, and NH_3 from fertilizers.

Generation and release of Solid Waste: IP generates large solid waste volumes (press cakes, husks, bleaching clays, packaging), while VC produces moderate waste (crop residues, spoiled seeds, agrochemical containers).

Emission of pollutant to Water Pollution: IP wastewater contains moderate BOD/phosphates (degumming), while VC generates high nitrate/phosphate runoff (field fertilization)

Emission of Toxic Pollutants to Land/Water: IP shows moderate chemical risks, including processing solvents and cleaning acids and caustics, while VC faces severe contamination (persistent agrochemicals, metal-laden soils.

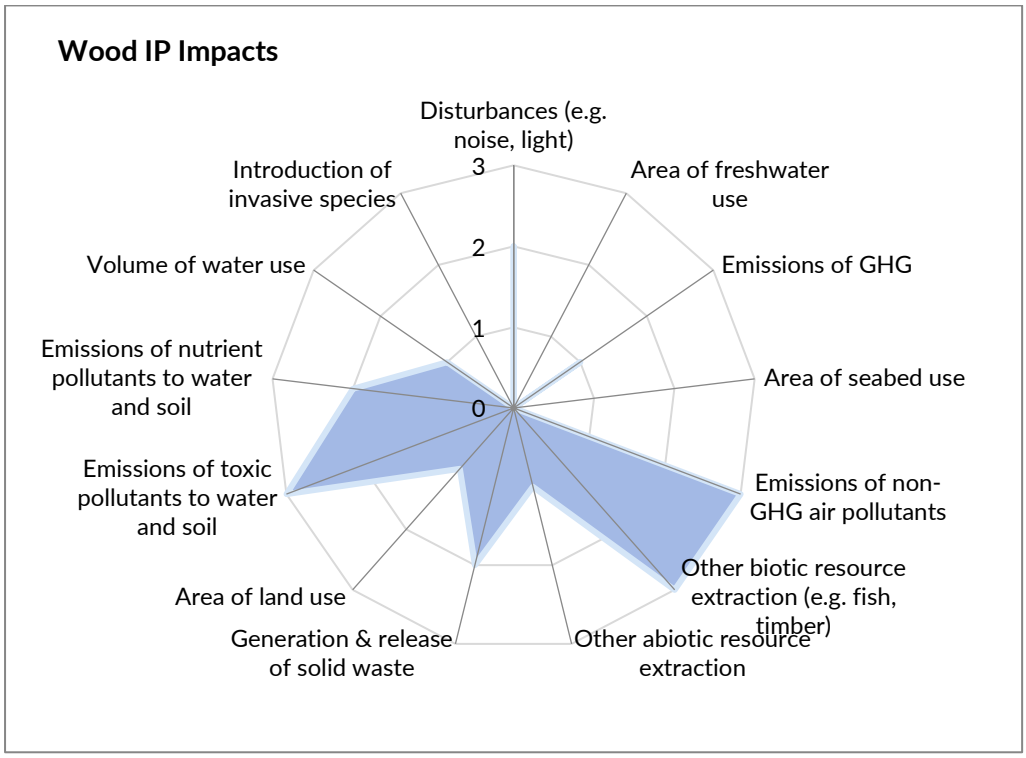
Other biotic resource extraction: At the IP level, oilseed processing—including crushing, filtering, and packaging—does not involve extraction of other biotic resources. However, the by-products of oil extraction, such as oilcake, are typically repurposed as animal feed, which links indirectly to downstream dependencies on animal biomass and ecosystems. At the VC level, the cultivation of sunflower and soybeans—often practiced in rotation or intercropping systems with vegetables—does involve interaction with broader biotic resources, particularly soil organisms and support species in mixed farming environments.

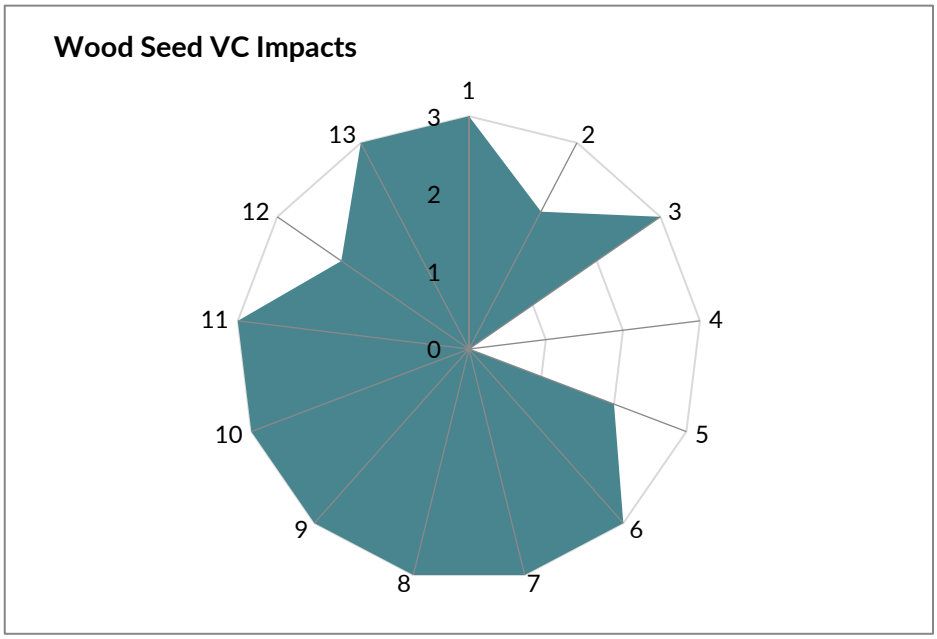
Area of land use: Land use is low due to only processing and storage in the IP. In VC perspective, medium level of land usage are required for plantation of sunflower and soy beans, but the current scale is less than other crops.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, both sunflower and soybean are non-native crops introduced to Uganda. Their cultivation may contribute to the spread of invasive species through improper residue disposal, seed contamination, or mechanical dispersal via farming tools and transportation. Without appropriate crop management and ecological safeguards, these species could affect local biodiversity and soil systems.

Volume of water use: High amounts of water are required during oil seed processing for washing the seeds, conditioning to ease the oil extraction, degumming, scrubbing, and bleaching of the oil, steam generation and cleaning equipment. With the VC side, cultivation of oil seed requires large amounts of water mainly for irrigation also due to potential water losses through the puddling process, surface evaporation, and percolation.

Wood production IP and VC impacts





Noise Disturbance: At IP, high noise from sawmills, planers, sanders, and pneumatic tools. Similarly, at VC, high noise from chainsaws, harvesters, and transport. Noise at VC is intermittent but widespread in forests.

Emission of GHG pollutants to air: At IP, there are moderate emissions from drying kilns, boilers, and fossil-powered machinery, while at VC, there are high GHG emissions from deforestation, carbon loss, transport emissions, and residue burning.

Emission of non-GHG pollutants: At IP, non-GHG pollutants are high, including PM from sawdust, VOCs from finishes/adhesives, formaldehyde from resins, and SO_2 from coal-fired kilns, while at VC non GHG pollutants are medium, including dust from logging roads, wildfire smoke, and terpenes from fresh-cut timber.

Generation and release of solid Waste: At IP, a moderate volume of solid waste is generated, including sawdust, off-cuts, sanding residues, and packaging, while at VC large volume of solid waste is generated, including treetops/branches left in forests, sawdust damaged logs.

Emission of nutrient pollutants. At IP, there is low nutrient pollution due to limited leaching from wood preservatives in treated poles, while at VC, there is moderate nutrient runoff from soil erosion in clear-cut areas.

Emission Toxic Pollutants to Land/Water: At IP, there are highly toxic pollutants, including chromated copper arsenate [CCA] from pole treatment and solvent-based finishes. Similarly, at VC is intermittent use of persistent herbicides to control weeds.

Other biotic resource extraction: At the IP level, wood production activities consist primarily of furniture-making. These activities do not involve the extraction of additional biotic resources. In contrast, at the VC level, timber procurement relies on logging, which entails the extraction of roundwood and firewood. This extraction is often conducted at rates that exceed the regenerative capacity of natural forests, posing significant threats to biodiversity and forest ecosystems.

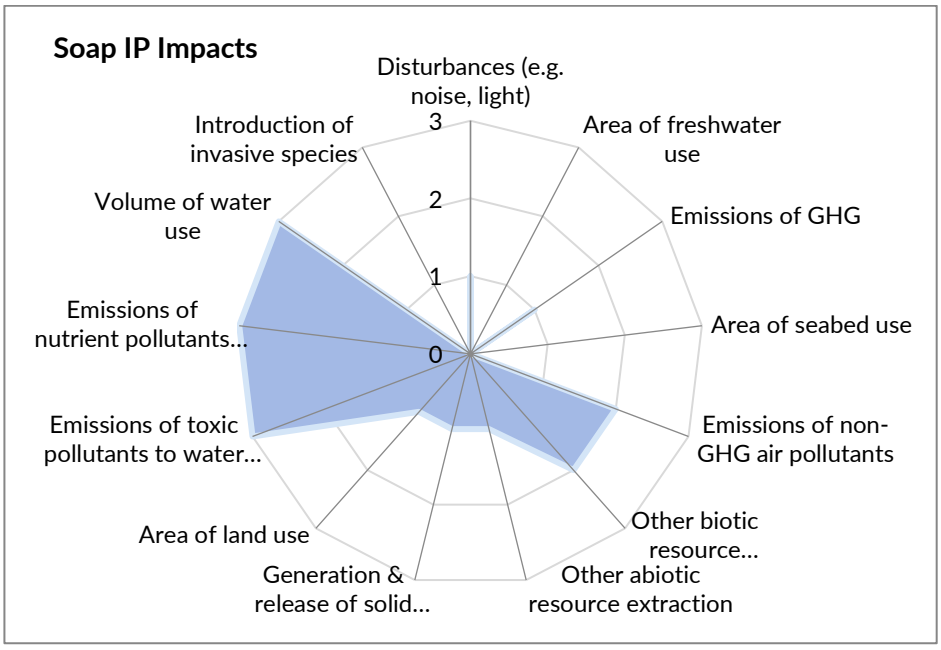
Area of land use: Land use at the IP level remains minimal due to the limited footprint of workshop and carpentry operations. However, at the VC level, the cultivation and harvesting of forest resources require substantial land, especially where commercial forestry plantations are established.

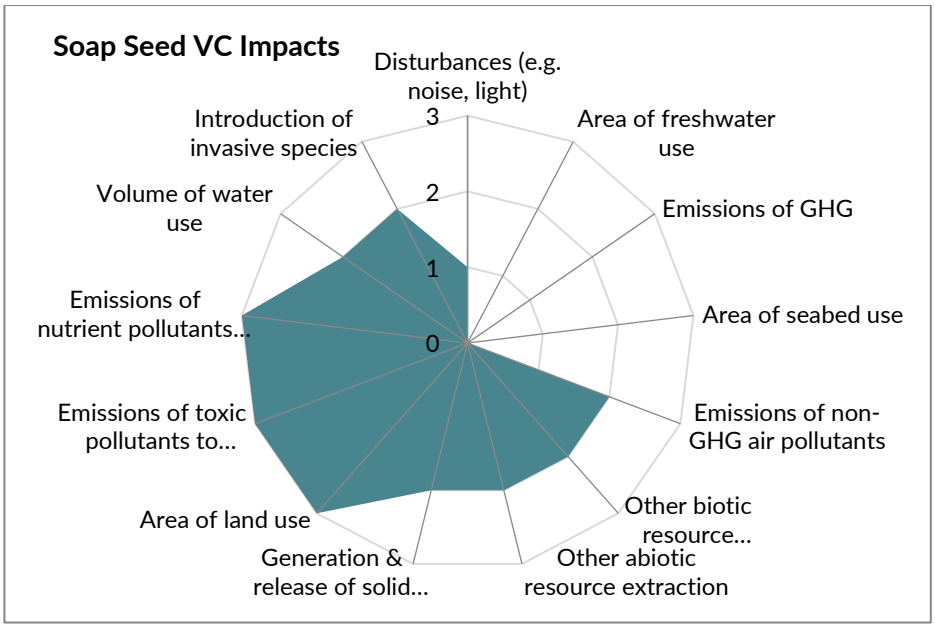
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, commercial forestry often relies on fast-growing, non-native

species such as pine and eucalyptus. Although economically viable, these species are not indigenous to Uganda and, if unmanaged, may outcompete native vegetation, disrupt local ecosystems, and deplete water resources.

Volume of water use: At IP level, medium volumes of water are required since wood processing is mainly a dry process. At VC level, water use is also medium. Logging uses a moderate amount of water for transporting logs, cleaning equipment, and fire suppression. Silviculture and other forestry activities use a significant amount of water for planting trees, irrigating forests, and controlling pests.

Soap Production IP and VC impacts





Noise Disturbance:

- At IP, low noise from mixers, pumps, packaging lines,
- At VC, there is low intermittent noise from farm machinery for oilseed cultivation, and negligible in small-scale (artisanal) farms.

Emission of GHG pollutants into the Air

- **IP**: moderate GHG emission from steam generation and fat saponification energy.
- **VC**: high GHG emissions including CO_2 from oilseed farming, N_2O from fertilizer use, and transport emissions.

Emission of Non-GHG Air Pollutants

- **IP**: moderate emissions including VOCs from essential oils and solvents, PM from powdered additives, and SO_2 (if using sulfur-based acids).
- **VC**: moderate emission including dust from oilseed processing, ammonia (NH_3) from fertilizer application, and pesticide drift.

Generation and release of Solid Waste

- **IP**: moderate solid waste, including glycerin byproducts, packaging waste, and failed batches.
- **VC**: high solid waste generation, including oilseed husks, spoiled crops, and agrochemical containers.

Emission of Nutrient pollutants

- **IP**: Moderate these nutrients include phosphates from detergents, BOD from organic wash water.
- **VC**: High, including fertilizer runoff from oilseed/palm plantations, causing eutrophication.

Toxic Pollutants to Land/Water

- **IP**: Medium including synthetic dyes, preservatives like parabens, and alkali spills.
- **VC**: High including pesticides/herbicides from oilseed farms, heavy metals in contaminated soils.

Other biotic resource extraction: Soap production at the IP level is primarily based on processing of inputs and formulation of end products, with no direct extraction of biotic resources involved, as the vendors here are not involved in the whole oil value chain. However, at the VC level, soap is derived from vegetable oils, typically extracted from crops such as sunflower or soybean. The cultivation of these oilseeds, often intercropped with vegetables, engages broader ecological systems—including soil biota, companion species, and pollinators—thereby constituting indirect interaction with a range of biotic resources.

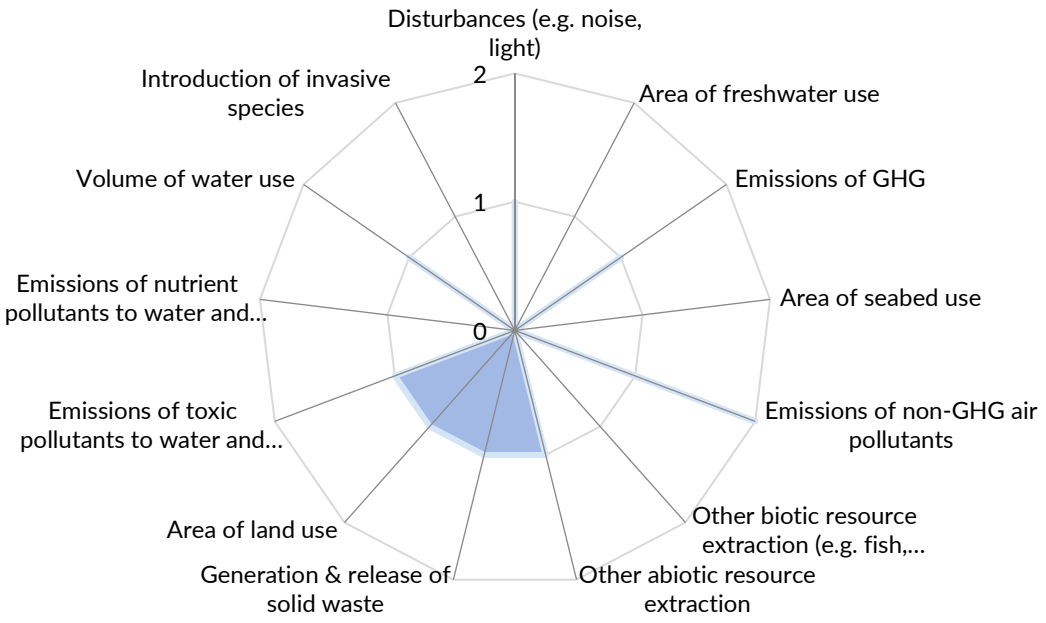
Area of land use: Land use at the IP remains low, as soap production facilities are compact and do not demand significant space. In contrast, the VC requires medium-scale land use for the cultivation of oilseed crops. While current production remains moderate, any planned scale-up would necessitate larger tracts of arable land and potentially influence land-use dynamics in the surrounding areas.

Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur on some of the raw material entering in the soap composition, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, sunflower and soybean—both introduced species in Uganda—can contribute to the spread of invasive plant materials. Inappropriate management practices can further increase the risk of ecological disturbance and affect surrounding agricultural and natural systems.

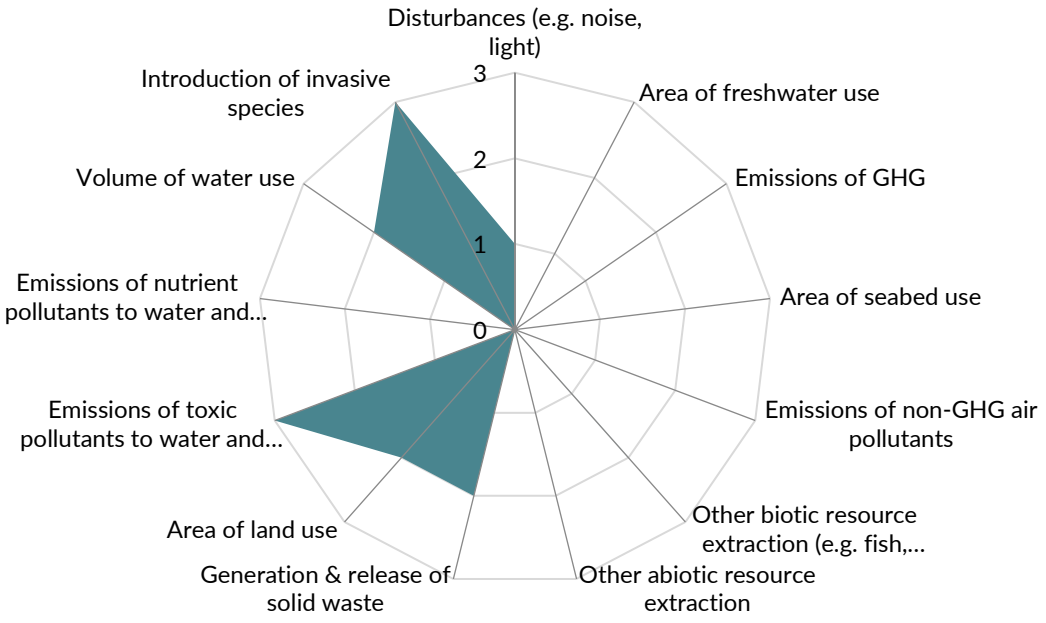
Volume of water use: Volume of water use is rated high at IP level and medium at VC level. The manufacturing process requires large volumes of water for dissolving ingredients (fats, oils, lye, soda ash), saponification, dilution if liquid soap is to be produced, cooling reactors and other equipment, and surface washing. Palm oil cultivation and processing requires significant amounts of water.

Cosmetics IP and VC impacts

Cosmetics IP Impacts



Cosmetics VC Impacts



Disturbance noise:

IP: Noise generated from mixing and filling machinery is typically localized, primarily affecting on-site workers. Due to the contained nature of industrial parks, noise pollution rarely extends to surrounding communities. No sufficient data at VC.

Emission of GHG pollutants:

IP: Cosmetic manufacturing operations within the industrial park primarily utilize hydroelectric power for mixing processes, significantly reducing their greenhouse gas (GHG) emissions compared to fossil fuel-dependent energy sources. No sufficient data at VC.

Emission of non-GHG pollutants:

IP: The cosmetic industry generates substantial volatile organic compound (VOC) emissions from solvents, fragrances, and propellants used in manufacturing. Key pollutants include ethanol, isopropanol, acetone, and butane, thus a high rating for non-GHG pollutants**.** No sufficient data at VC.

Solid waste generation:

IP: The cosmetic industry generates a low volume of solid waste, primarily consisting of packaging materials (containers, labels) and production sludges. No sufficient data at VC.

Emission of toxic pollutants to land or water.

IP: Wastewater effluent from cosmetic manufacturing contains residual solvent chemicals such as acetone, ethyl acetate, toluene, and isopropanol. No sufficient data at VC.

Emission of Nutrient pollutants:

IP: There is limited emission of nutrients from cosmetics operations, and low nutrients come from cleaning operations that may use detergents. Insufficient data at VC.

Other biotic resource extraction: At the IP level, cosmetics-related activities are expected to be limited to packaging, storage, and training, with no involvement in the direct extraction of biotic resources. However, at the VC level, if production relies on locally sourced natural ingredients—such as shea butter—there may be notable implications. The harvesting of Vitellaria paradoxa (shea trees) and associated non-timber forest products (e.g., mushrooms, berries, cork, and resins) can lead to over-extraction, especially if collection exceeds the natural regeneration capacity of the ecosystems involved.

Area of land use: Land use within the IP is minimal, supporting packaging and training facilities. Conversely, at the VC level, cultivation and harvesting of shea trees and other herbal inputs require land allocation. Although often managed in semi-wild agroforestry systems, expansion of such sourcing could place additional pressure on land resources.

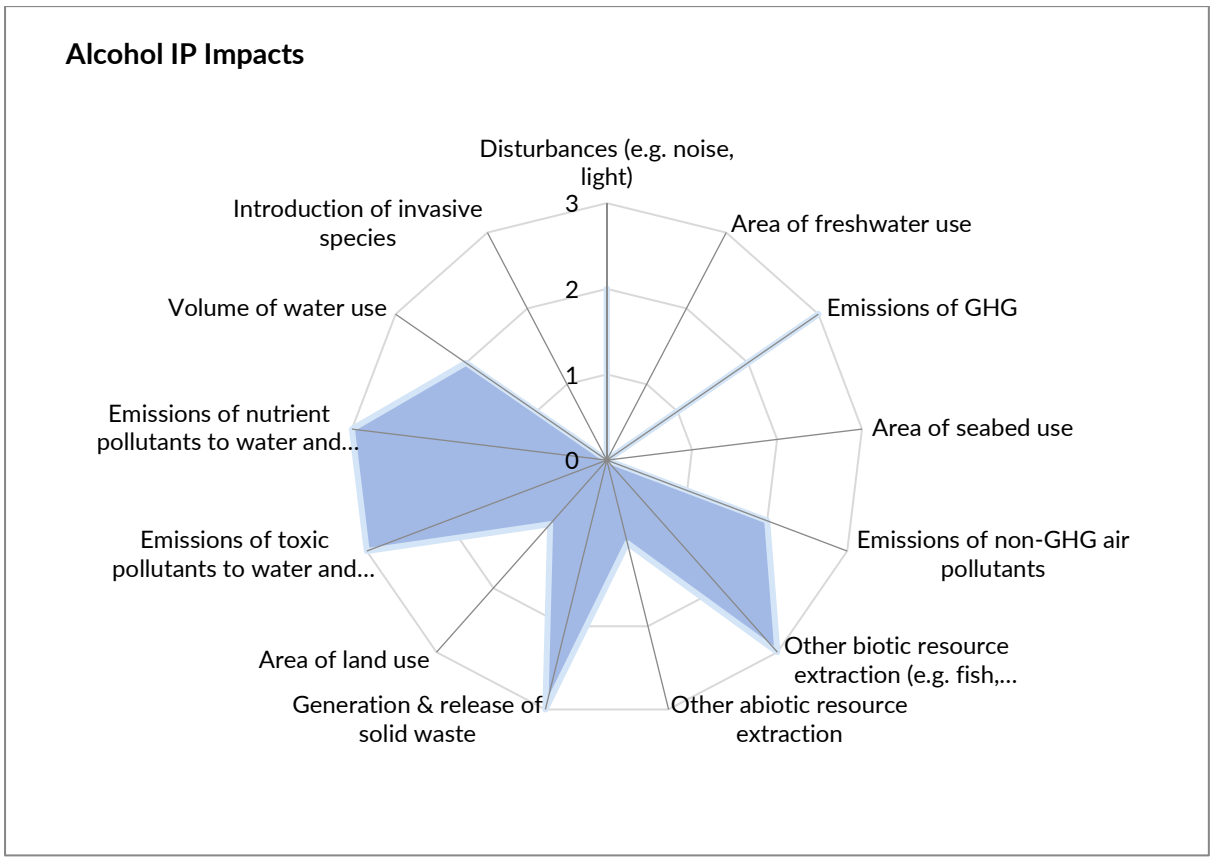
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur on raw materials entering into the cosmetics composition, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, the expansion of perennial crops such as shea or other herbs can contribute to the spread of invasive species. Risks arise through improper waste disposal, contamination via agricultural machinery, and ecosystem disturbances associated with unsustainable input use (e.g., pesticides, herbicides, and irrigation), all of which may compromise native biodiversity and ecological stability.

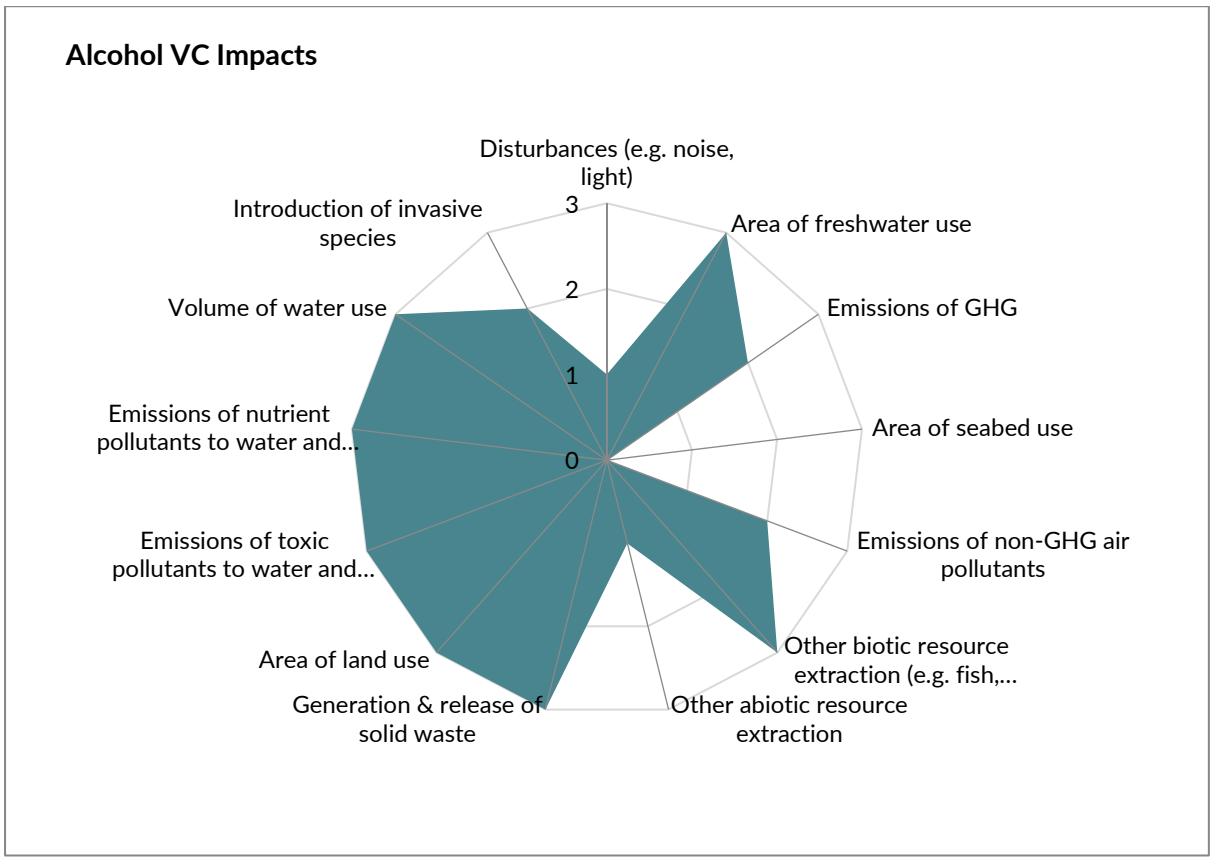
Volume of water use:

IP: Low. During production of the cosmetics, water is required for mixing and emulsification of the cosmetics and for cooling reactors.

VC: Medium, manufacturing processes require large volumes of water for cooling reactors and other equipment, processing raw materials, and surface washing. The cultivation of plant based raw materials such as flowers, shea trees, coconuts, aloe vera requires significant amounts of water.

Alcohol IP and VC impacts





Noise Disturbance

- **IP**: High noise from boilers, fermenters, distillation columns, and bottling lines.
- **VC**: moderate noise from harvesting machinery, transport.

Emission of GHG pollutants to air

- **IP**: moderate emission, including CO_2 from fermentation
- **VC**: high including N_2O from crop fertilization, CH_4 from residue decomposition, transport CO_2.

Emission of non-GHG pollutants to air

- **IP**: moderate Ethanol vapors, SO_2 (boilers), PM (from grain milling/bagasse combustion).
- **VC**: moderate PM (field burning), NH_3 (fertilizers), VOCs (rotting crop residues).

Generation and release of Solid Waste

- **IP**: High (spent yeast, distillation sludge, packaging).
- **VC**: Moderate (crop stalks, spoiled harvests, agrochemical containers).

Emission of pollutants Nutrient to Water

- **IP**: high (organic matter, phosphorus from cleaning agents).
- **VC**: High (nitrate/phosphate runoff from fertilized fields).

Emission of toxic pollutants to Land/Water

- **IP**: high (high-BOD vinasse, disinfectants).
- **VC**: High (pesticides, herbicides, vinasse).

Other biotic resource extraction: At the IP level, alcohol production typically involves fermentation of fruits or molasses using microorganisms under controlled conditions. While this process itself does not entail extraction of additional biotic resources, it does rely on organic raw materials and microbial activity. At the VC level, the sourcing of fruits, sugarcane, and other fermentable crops involves mixed farming systems, which may indirectly affect surrounding biotic resources through habitat alteration and intercropping.

Area of land use: Land use associated with alcohol production within the IP is low, as most producers operate at small or medium scales. In contrast, the VC relies on fruit and sugarcane cultivation, which requires medium levels of land use. Smallholder farms dominate this space, but cumulative impacts across the region can be considerable.

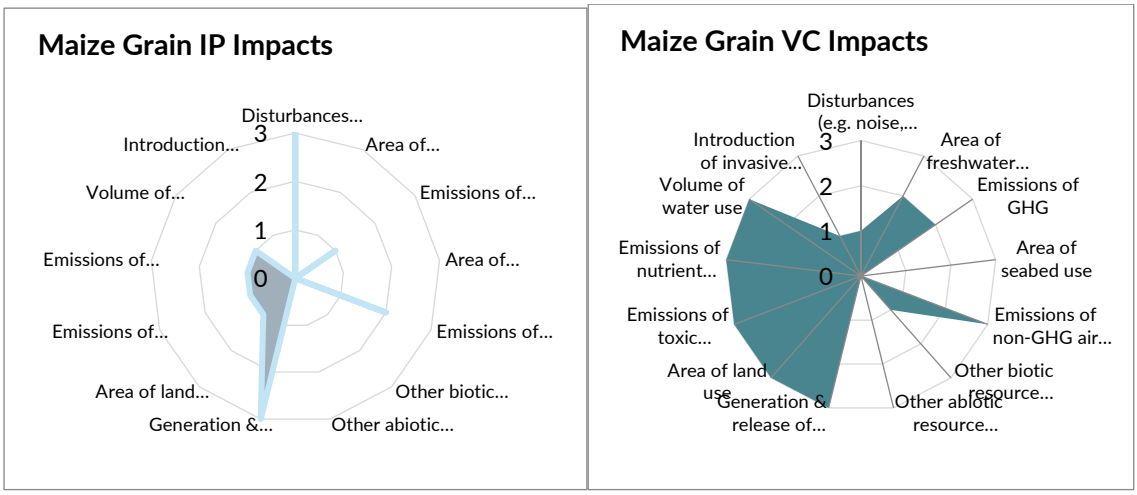
Introduction of invasive species: There is anticipated risk at the IP level that pest or microbial contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. At the VC level, however, cultivation of sugarcane and fruit crops poses moderate ecological risks. Improper agricultural practices—such as excessive irrigation, unregulated chemical input use, and the spread of contaminated seeds or plant materials—can lead to the introduction and spread of invasive species. These disruptions may reduce ecosystem resilience, degrade natural habitat functions, and require intervention to restore ecological balance.

Volume of water use

- IP: Medium. Moderate amounts of water required in washing of feedstock, dilution and cleaning of equipment. Barrel washing and tank cleaning account for much of the water use.

- VC: High A significant amount of water is required during cultivation of pineapples or maize particularly for irrigation.

Maize/Grain IP and VC impacts



The major IP and VC impacts of maize milling operations include.

Disturbance (noise and light): At the IP (Industrial Production) level, maize grain processing generates significant noise pollution (70-90 dB) from processing equipment like dehullers, grinders, and rollers, supplemented by additional noise from conveyors, blowers, and packaging machinery. In contrast, VC (Value Chain) disturbances are minimal, primarily consisting of agricultural machinery noise (tractors, harvesters) during upstream operations, which is substantially quieter than milling activities.

Emission of GHG pollutants to air: At the IP (Industrial Production) level, GHG emissions remain low due to the predominant use of sun drying for maize and grid electricity with low emission factors. At the VC (Value Chain) level, emissions are moderate, resulting primarily from limited tractor fuel combustion and suboptimal manure management practices.

Emission of non-GHG pollutants to air: Air pollutants, including dust and particulate matter (PM_{10}, $PM_{2.5}$) impact both IP and VC levels. At IP, concentrations reach severe levels in enclosed processing facilities. At VC, emissions become diffuse yet remain significant due to widespread synthetic agrochemical application.

Generation and release of solid waste: Maize grain processing generates substantial solid waste volumes across both Industrial Production (IP) and Value Chain (VC) stages. At the IP level, processing yields byproducts include husks, cobs, bran, germ, and broken kernels. At the VC level, agricultural operations produce crop residues such as stalks and leaves remaining in fields post-harvest.

Other biotic resource extraction: Within the IP, maize activities are limited to milling, packaging, and storage, which do not involve any direct extraction of other biotic resources. At the VC level, however, maize cultivation can interact with other biotic elements. Mixed cropping systems and integrated farming practices—such as raising poultry near fields—result in the incidental use or interaction with additional biotic resources.

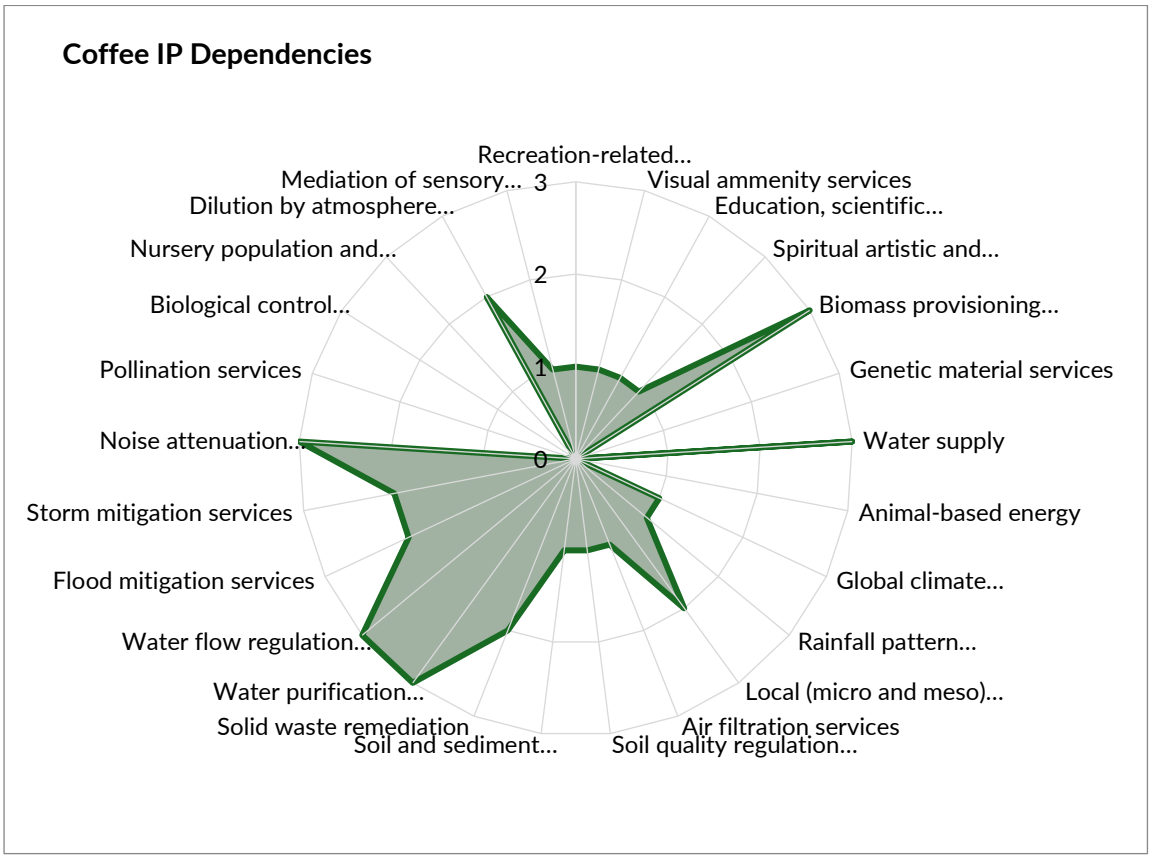
Area of land use: Land use within the IP is limited, as processing operations require relatively little space. At the VC level, however, maize production relies heavily on land, particularly through Uganda's network of smallholder farmers. This contributes to significant agricultural land use on a national scale.

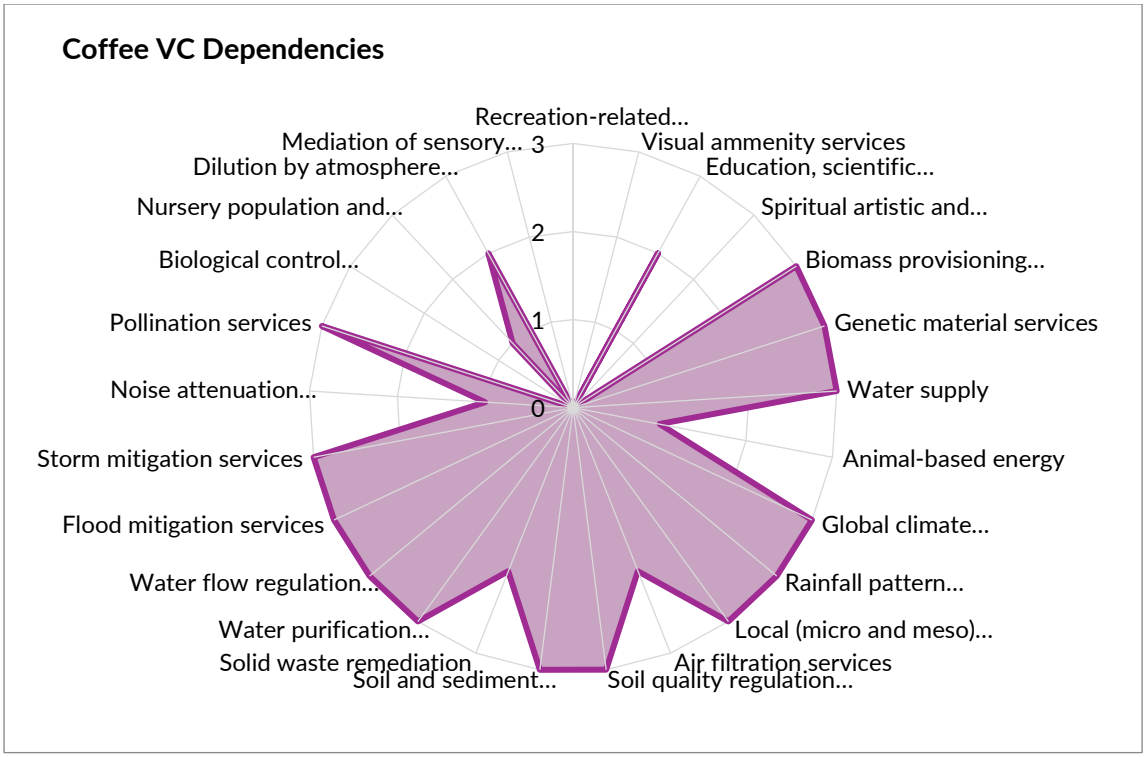
Introduction of invasive species: There is anticipated risk at the IP level that pest contamination could occur, if not stored or packed properly, this risk requiring further confirmation, it has not been rated for the time being. However, at the VC level, the spread of invasive species can occur through several pathways: improper waste disposal, the transfer of seeds via machinery and clothing, and unsustainable agricultural practices such as overuse of herbicides, pesticides, and irrigation. These factors can degrade surrounding ecosystems and reduce their ability to resist invasive species encroachment.

Volume of water use: At IP level, low volume of water is required for industrial processes such as milling. At the VC level, a significant amount of water is required during the cultivation of maize due to potential water losses through the puddling process, surface evaporation, and percolation. Irrigation of crops leads to a substantial water footprint which contributes to water stress, especially in areas where water resources are already limited.

Tororo IP and VC Dependencies by sector and element

Coffee Processing IP and VC dependence





Animal-based energy. Neither the industrial processing (IP) nor the smallholder farm (VC) stages of coffee production utilize animal labor. At VC, coffee is usually intercropped with other perennial crops limiting use of animal labor like oxen.

Local (micro and meso) climate regulation services: The industrial processing (IP) facilities utilize mechanical systems (exhaust fans and rotor vanes) to regulate production temperatures. In contrast, smallholder coffee cultivation (VC) relies primarily on local climate conditions to maintain optimal ambient temperatures for flowering and fruit development.

Solid waste remediation: In industrial processing (IP) of coffee, significant volumes of coffee husk are generated. While a portion is utilized for heat generation, this results in moderate ecosystem dependence for residual decomposition. Conversely, smallholder production (VC) generates lower volumes of solid waste, leading to intermediate reliance on ecosystems for waste decomposition

Noise attenuation. In industrial processing (IP) of coffee, hauling machinery generates significant noise pollution, creating substantial dependence on surrounding ecosystems for natural noise attenuation. In contrast, smallholder coffee production (VC) operates with minimal noise output, requiring negligible ecosystem support for sound regulation

Air filtration service. Industrial processing (IP) of coffee generates minimal greenhouse gas (GHG) and non-GHG emissions, resulting in low ecosystem dependence for air filtration. In contrast, smallholder production (VC) releases moderate levels of non-GHG pollutants, requiring intermediate reliance on ecosystem air purification services

Soil quality regulation. Industrial processing (IP) of coffee is unaffected by soil conditions, whereas coffee cultivation requires fertile, high-quality soil to achieve optimal yields.

The pre-processing activities will require medium-level skills with mostly low-level skill jobs. R&D within the coffee value chain require high-level skills while farm management requires high and medium-level skills with mostly low-level skilled jobs.

Biomass provisioning services: At both the IP and VC levels, coffee processing directly relies on biomass of coffee beans from the plant, and local harvest affects the production directly. Growing sugar cane also depends on the ecosystem to produce biomass materials, that are captured and harvested in

uncultivated production contexts. The activity also depends on the ecosystem contributions to the growth of organic material, as well as waste, and compost.

Genetic material services: While IP operations do not require genetic materials, the VC relies on diverse wild gene pools to manage disease, especially Arabica. Also, growing perennial crops depends on the provision of genetic materials, for example to enable scientists and breeders to cross modern crops with their wild relatives to reintroduce desirable genetic traits such as disease resistance or drought tolerance.

Pollination services: Pollination is not relevant at the IP level. In the VC, coffee (especially Arabica) depends on insect pollinators (bees).

Biological control services: No biological control services are needed at the IP level. At the VC level, the high caffeine content acts as a natural pest repellent, making the coffee crop more resilient, but pesticides are still required for coffee leaf rust.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, growing perennial crops is dependent on the maintenance of natural gene pools for valuable traits.

Water supply: At IP level, reliance of the coffee processing industry on eco system's water supply is moderate for uses such as fermentation, pulping, cooling and cleaning of machinery. At the VC, the dependence on the eco system's water supply services is high as coffee farming heavily relies on rainfall and irrigation in some areas

Rainfall pattern regulation: The industrial processing of coffee is not directly affected by rainfall patterns. At the VC level, there is a high dependence on ecosystem's rainfall regulation patterns as flowering and maturation of coffee requires stable rainfall patterns.

Soil and sediment retention: At IP level, dependency on soil and sediment retention is low, primarily related to protection of infrastructure at the industry against erosion. At VC level, there is a high dependence on soil and sediment retention services for the protection of coffee plantations from erosion.

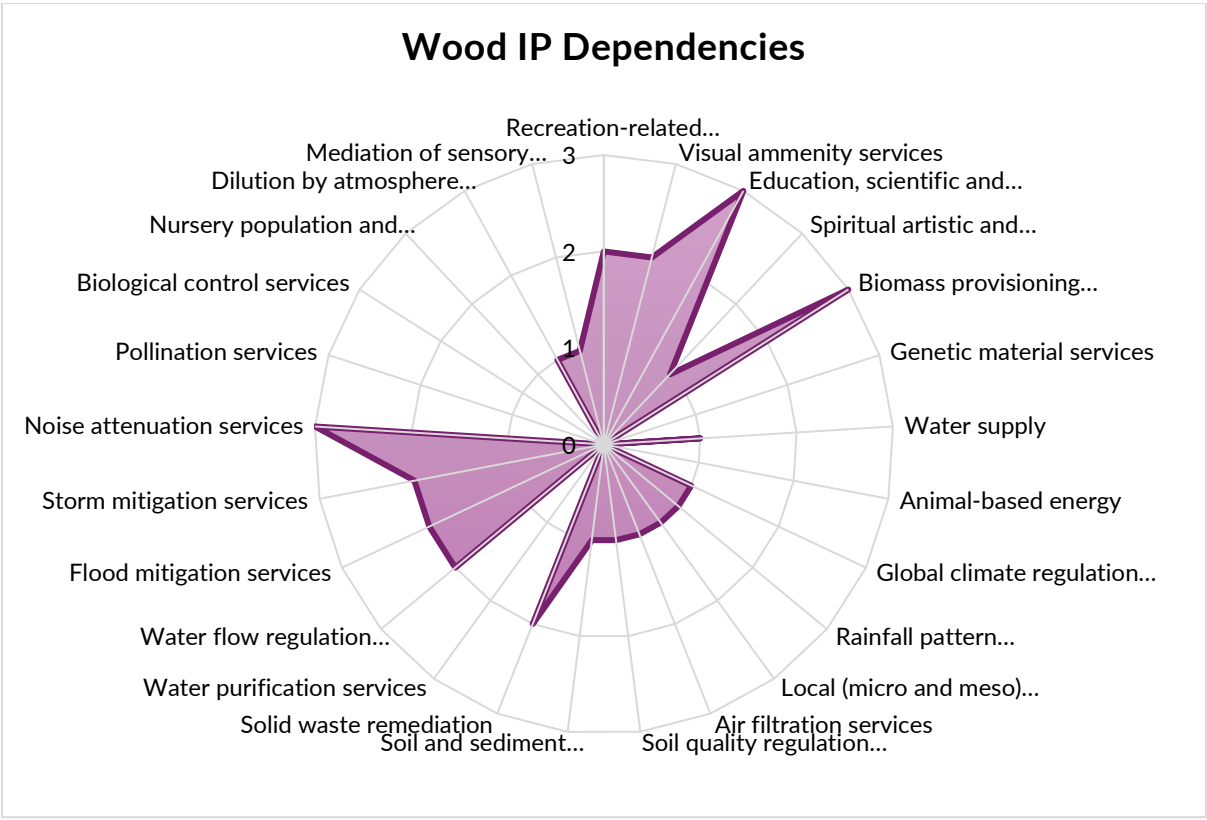
Water purification: At IP level, there is a high dependence of the eco system water purification services for the treatment of coffee processing wastewater containing high concentrations of organic loads. At VC level, there is a high dependence on the ecosystem services to purify agricultural runoff containing pesticides, herbicides and fertilizers.

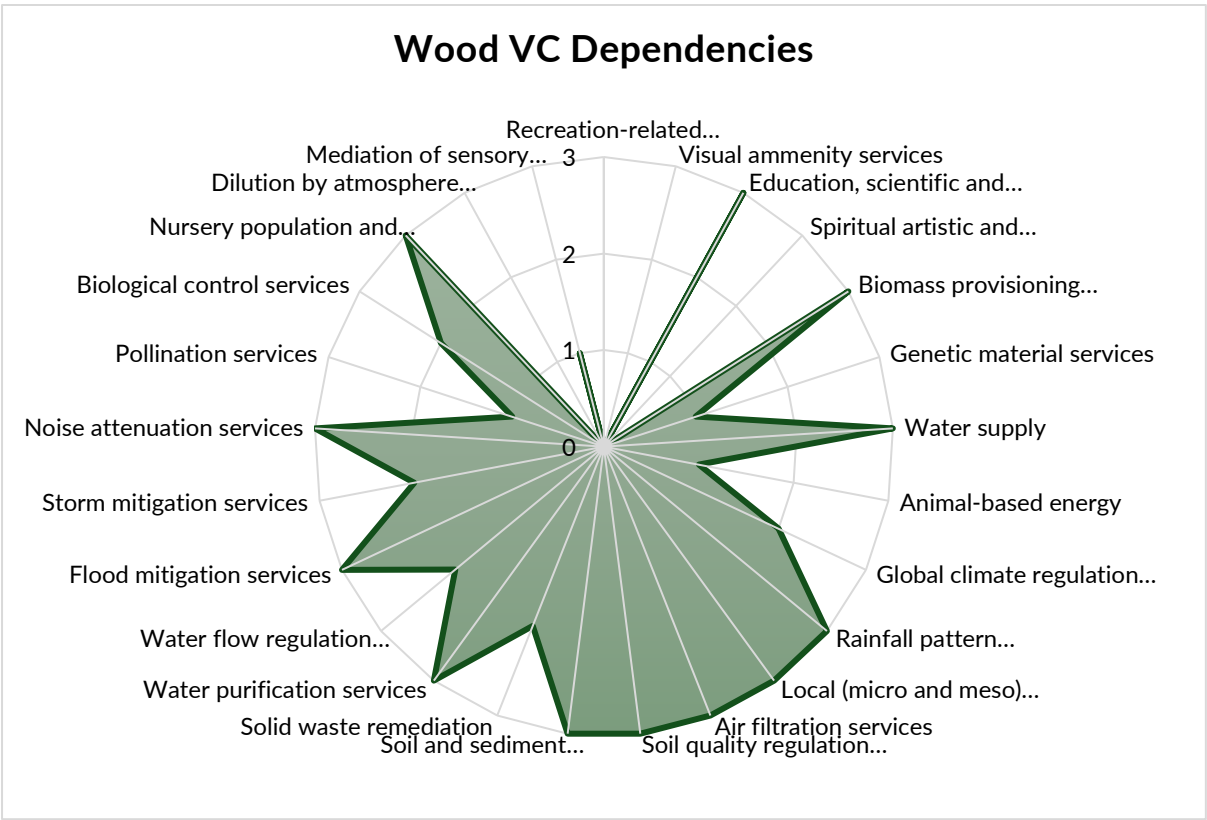
Water flow regulation: The dependency on water flow regulation is significant at both IP and VC level. Growing of non-perennial crops depends on the water flow regulation services provided by ecosystems to ensure sufficient flow of water even during drier seasons (e.g., for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation: The dependency on ecosystem flood mitigation services is moderate at the IP for the protection of the factory infrastructure against flooding. At VC level, flood mitigation is significant (high) for the farming of coffee because floods can damage the coffee plantations and disrupt the whole value chain.

Storm mitigation: The reliance on storm mitigation at the IP is moderate relating to the protection of infrastructure against storms. Across the VC, storm mitigation services are significant to prevent damage of coffee trees and delay of harvest.

Wood IP and VC dependences





Global Climate Regulation: In industrial parks (IPs), wood production generates relatively low emissions, resulting in minimal dependence on global climate regulation services to function as carbon sinks. In contrast, the broader value chain (VC) produces significant emissions, primarily from deforestation activities, leading to moderate dependence on global climate regulation. This is partly mitigated through

corporate requirements to utilize planted forests and implement reforestation programs to offset the impacts of land-use change.

Local climate (micro and meso) regulation services: In industrial parks (IPs), wood production relies on mechanized climate control systems to regulate ambient temperatures for manufacturing processes, resulting in low dependence on natural climate regulation. In contrast, tree growth in the value chain (VC) is highly dependent on local climate conditions, making it vulnerable to temperature fluctuations and requiring intact ecosystems for natural climate regulation.

Solid waste remediation: Both industrial parks (IPs) and the broader value chain (VC) exhibit moderate dependence on ecosystems for solid waste decomposition. While significant volumes of sawdust and wood residues are generated, over 50% are either burned for energy recovery or valorized into byproducts (e.g., briquettes, biochar)

Noise attenuation service: Both the value chain (VC) and industrial park (IP) operations generate significant noise pollution, primarily from timber cutting, processing machinery, and finishing activities. As a result, they heavily depend on ecosystem services such as forest buffers and greenbelts for natural noise attenuation.

Air filtration services. At the industrial park (IP) level, wood production generates lower greenhouse gas (GHG) emissions and moderate non-GHG pollutants, resulting in reduced dependence on air filtration services. In contrast, across the broader value chain (VC), significant air pollutant emissions arise from deforestation, land-use changes, and transportation, leading to a much higher reliance on natural and artificial air filtration services.

Biomass provisioning services: At both the IP and VC levels, wood product processing directly relies on biomass of timber. Logging depends on the biomass provisioning service because ecosystems contribute to the growth of trees and other woody biomass in both cultivated (plantation) and uncultivated production contexts that can be harvested.

Genetic material services: IP operations do not require genetic materials. At VC level, some companies use improved clones for uniform wood quality, the direct reliance on diverse gene pools or native forests is limited. Also, forestry activities depend on the provision of genetic for the planting of trees and production such as seeds and spores.

Pollination services: Pollination is not relevant at IP level. In the VC, both pine and eucalyptus are planted, no animal/insect pollination needed.

Biological control services: No biological control services are needed at the IP level. At the VC level, logging depends on biological pest control to enable the maintenance of wood condition, and to reduce diseases, as pest outbreaks (e.g., termites, eucalyptus snout beetle) are a growing concern in Ugandan plantations.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, successful forestry requires well-functioning nursery systems, often relying on soil health, mycorrhizal fungi, and habitat conditions for seedling survival.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. R&D within the wood value chain require high-level skills while forest management requires high and medium-level skills with mostly low-level skilled jobs.

Water supply: Wood processing at the IP level involves relatively low water use since most of the processes are dry. Therefore, the dependence on the ecosystem's water supply services is low. The wood VC in the early stages of tree growth such as tree nurseries, and pulp production, heavily depends on the ecosystems water supply.

Rainfall pattern regulation: The IP operations are less dependent on rainfall patterns. The VC, specifically the tree growth heavily relies on consistent rainfall patterns.

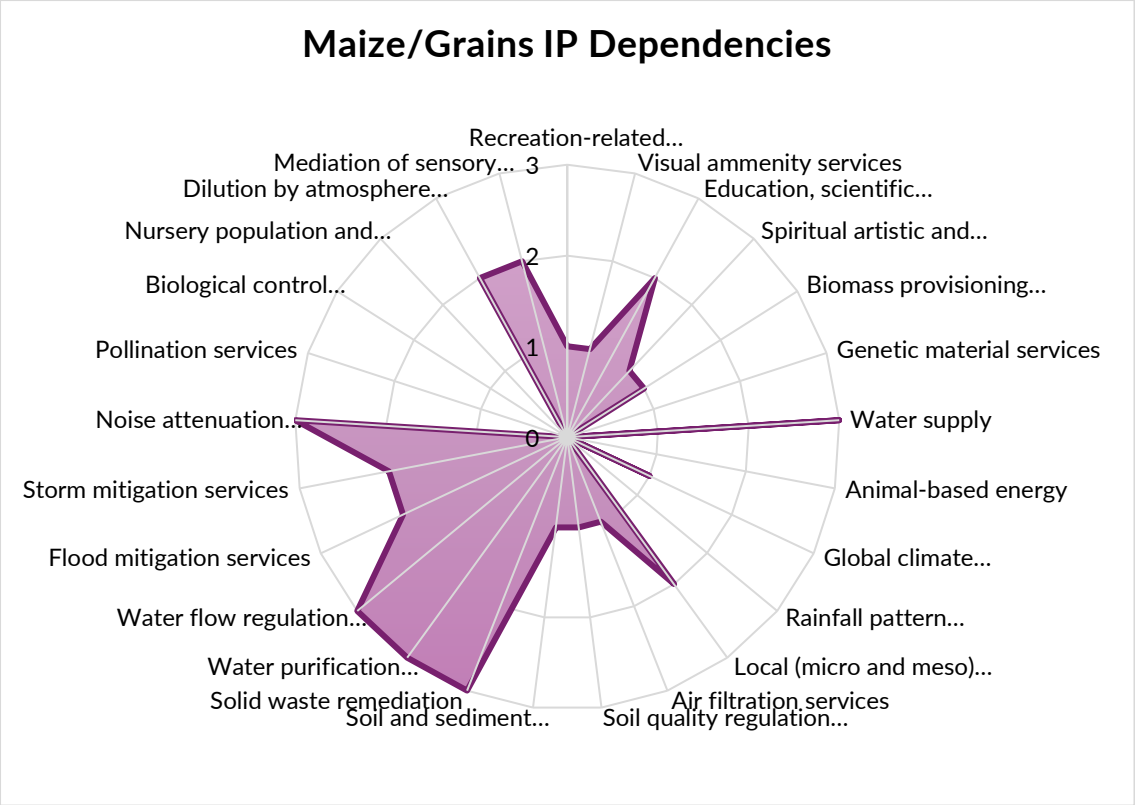
Soil and sediment retention: At IP level, there is low dependency on soil and sediment retention services since soil exposure is minimal due to paved or built-up environments. The VC is heavily dependent on

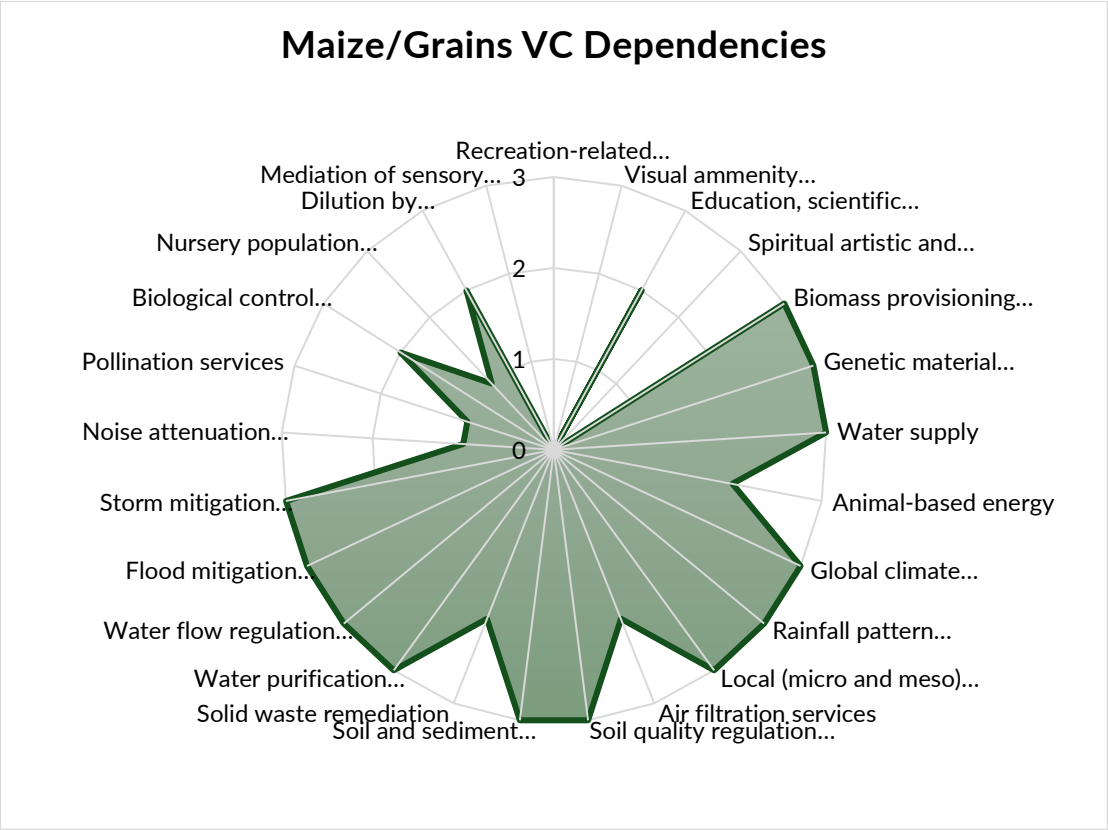
eco system's sediment retention services because of the high susceptibility of deforested areas to erosion.

Flood mitigation services: There is moderate dependence of IP operations on flood mitigation services to protect the wood processing infrastructure. The VC is highly dependent on natural flood mitigation services provided by forests through reduction of surface runoff.

Storm mitigation services: There is moderate dependence of IP and VC operations on storm mitigation services to protect infrastructure at the wood processing factory.

Maize Gain Processing IP and VC dependence





Animal-based Energy; At IP, animal labor is not used. However, at VC, animals such as oxen and donkeys are commonly employed for cultivation and transporting grain from the fields

Local (micro and meso) climate regulation services: At IP, maize processing has a moderate dependence on climate regulation services, as warehouses storing maize grain use rotor vanes to extract atmospheric air for temperature control. In contrast, at VC, maize crops are highly reliant on local climate regulation services to maintain suitable ambient temperatures

Solid waste remediation: At IP, maize processing generates a large volume of solid waste, but most of it is valorized as animal feed, resulting in low dependence on ecosystems for waste remediation. In contrast, at VC, solid waste such as cobs and stalks relies moderately on natural ecosystems for decomposition.

Noise attenuation: At IP, maize processing generates significant noise pollution, resulting in high dependence on ecosystems for noise attenuation. In contrast, VC operations are relatively quiet, with minimal reliance on ecosystems for noise regulation

Mediation of Sensory Impacts. At IP, maize processing produces moderate light emissions from warehouse security floodlights, resulting in a medium dependence on ecosystems to mediate sensory impacts. In contrast, VC operations generate negligible light pollution.

Soil quality regulation: At IP, operations do not depend on healthy soil quality, whereas VC maize cultivation is highly dependent on maintaining fertile and productive soils.

Biomass provisioning services: At both the IP and VC levels, maize processing directly relies on biomass in the form of maize grain. Additionally, maize cultivation depends on natural systems to support the growth of organic material and benefits from nutrient cycling processes, including the use of compost and organic waste.

Genetic material services: While IP operations do not require genetic materials, the VC depends significantly on access to genetic resources. These are essential for breeding programs that enhance

crop resilience by introducing disease resistance, drought tolerance, and other valuable traits through genetic crosses with wild relatives.

Pollination services: Pollination is not relevant at the IP level. In the VC, maize is primarily wind-pollinated, resulting in minimal dependence on pollinators.

Biological control services: No biological control services are needed at the IP level. At the VC level, however, effective biological control is essential to manage common maize pests, which can significantly impact yields and crop quality.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, maize is commonly grown in simplified, intensive agricultural systems, which often provide limited ecosystem support functions and reduce the overall contribution to habitat maintenance.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. R&D within the maize/grain value chain require high-level skills while farm management requires high and medium-level skills with mostly low-level skilled jobs.

Water supply: At IP level, reliance on eco system's water supply is moderate as less water is used in industrial processes. At VC level, the reliance is high due to the high-water requirements in the cultivation of maize.

Rainfall pattern regulation: The rainfall pattern regulation by ecosystems to ensure water provision is rated high at VC level. The cultivation of maize is highly dependent on rainfall pattern regulation by ecosystems to ensure sufficient levels of rainfall for productive cultivation.

Soil and sediment retention: At IP level, dependency on soil and sediment retention is low, primarily for protection of infrastructure at the industry against erosion. At VC level, there is a high dependence on soil and sediment retention services for the protection of maize farmlands from erosion.

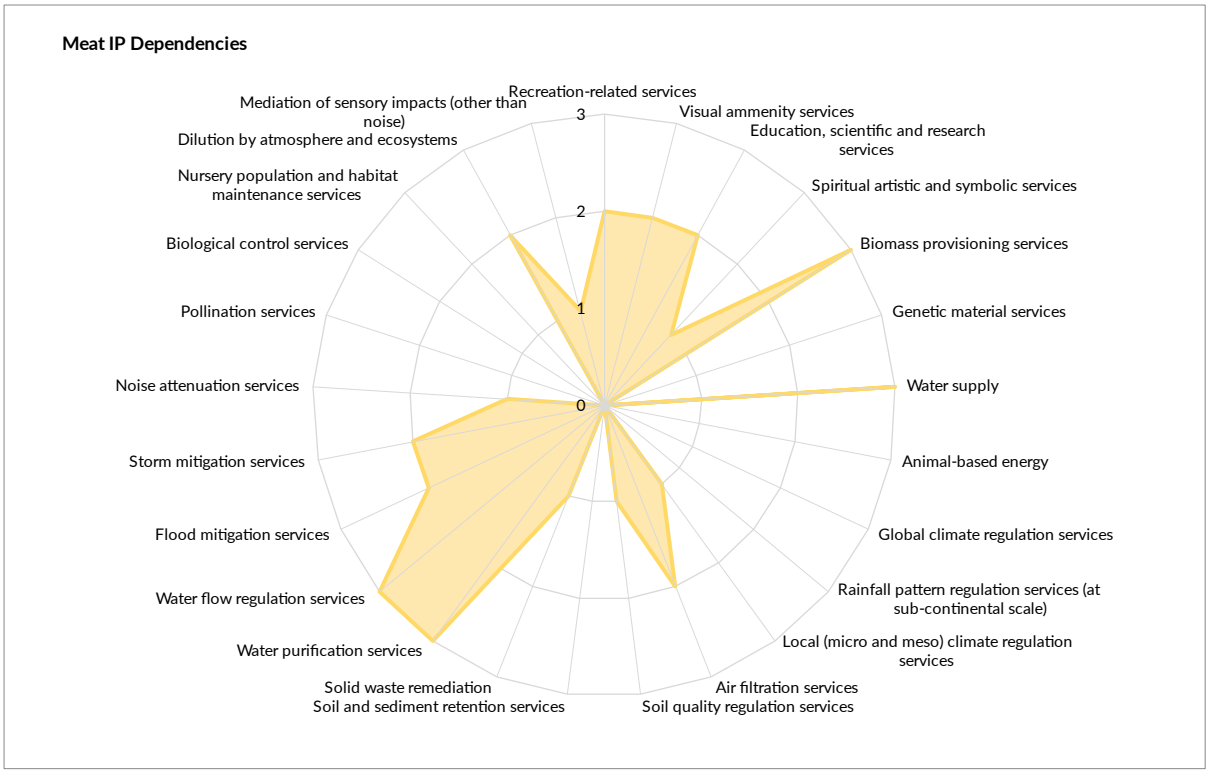
Water purification: At IP level, there is a high dependence of the eco system water purification services for the treatment of maize processing wastewater containing high concentrations of organic loads. At VC level, there is a high dependence on the ecosystem services to purify agricultural runoff containing pesticides, herbicides and fertilizers.

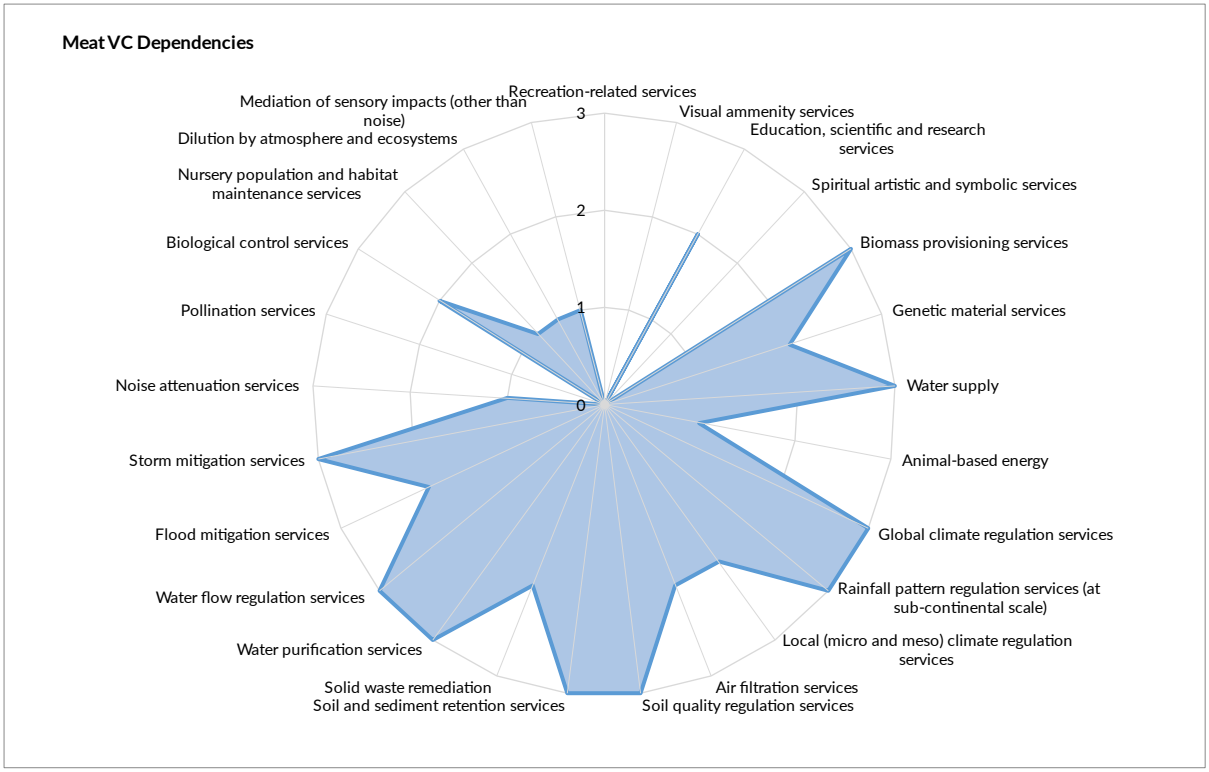
Water flow regulation: The dependency on water flow regulation is significant at both IP and VC level. Growing of non-perennial crops depends on the water flow regulation services provided by ecosystems to ensure sufficient flow of water even during drier seasons (e.g., for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation: The dependency on ecosystem flood mitigation services is moderate at the IP for the protection of infrastructure against flooding. At VC level, flood mitigation is significant to the farming and storage of maize grains.

Storm mitigation: Storm mitigation at the IP is moderate relating to the protection of infrastructure against storms. Across the VC, storm mitigation is significant to prevent crop damage and loss.

Meat Process IP and VC dependence





Noise Attenuation Services:

IP; Moderate noise from cutting machines and refrigeration system, thus low dependence on noise attenuation service.

VC: intermittent low noise from transportation and farm animals, the low dependence.

Solis waste remediation:

IP; High volume of solid waste including hides, horns and bones; however, currently in Uganda, hides are taken by tannery, and bones and horns by other recycling companies thus low dependence.

VC: there moderated solid waste generated at the farm, include leftover feed, animal dung that moderately depend on ecosystem for decomposition.

Soil regulation services:

IP: meet processing operations are not affected by soil quality and health, thus low rating

VC: Producing feed and pasture for animals requires quality healthy soil, thus high dependence on soil regulation services

Air filtration services:

Meet processing operation both at IP and VC generates odor and pm emission from feeds, rendering, heating, and wastewater, thus medium dependence on the ecosystem for air filtration services.

Local Climate regulation services:

IP: Meet processing operation depends on machines and appliances to provide ambient temperatures for storage and handling meet thus low dependence on local climate regulation services.

VC: animal keep affects heat and moderately depends on local climate regulation services for ambient temperatures.

Biomass provisioning services: At both the IP and VC levels, meat processing is heavily dependent on biomass provisioning services. The sector relies on the supply of cattle and poultry, which in turn depend on ecosystem-based biomass—such as pasture grasses, crop residues, and plant-based feed—for growth and health. Bedding materials and forage crops further reflect the system's reliance on plant biomass.

Genetic material services: While IP-level operations do not involve direct use of genetic material services, the broader VC depends on the availability of diverse gene pools to support livestock breeding. Genetic resources are critical for developing traits such as disease resistance, feed conversion efficiency, and adaptability to local conditions, which are central to sustainable animal production systems.

Pollination services: Pollination is not relevant at both IP and VC level in this sector.

Biological control services: Biological control services are not utilized within the IP, but are of medium importance in the VC. Cattle farming is dependent on biological control, to control pests which irritate or impact the health of livestock. Pastural and feedstock crops fed to cattle are also dependent on any disease control naturally afforded.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. In VC, low level of nursery population service is needed, as maintenance of natural gene pool is important to maintain desirable genetic traits and variation in cattle.

The management and processing activities will require high & medium-level skills with some low-level skill jobs. R&D within the meat value chain require high-level skills while farm management, including veterinary services, requires high and medium-level skills with mostly low-level skilled jobs.

Water supply

IP: High. Meat processing has a high-water demand which is heavily supplied by fresh water supplies from the ecosystem such as rivers and wetlands.

VC: High, raising of cattle and poultry depends on water supply services provided by ecosystems to ensure sufficient quantity and quality of water for drinking, washing animals and cleaning yards and parlours.

Rainfall pattern regulation services (at sub-continental scale)

VC: High, cultivation of grasslands which is a major source of food especially for cattle is largely dependent on rainfall pattern regulation by ecosystems.

Solid waste remediation

IP: Medium, the solid waste generated from meat processing is highly organic. This waste is treated through ecosystem services such as natural decomposition by microorganisms, animal feeds for example for dogs and animals which may find the meat waste at the landfill, reuse as manure (for cow dung) in farmlands

VC: Medium, animal rearing relies on solid waste remediation by ecosystems (e.g., micro-organisms, algae, plants and animals) to treat large quantities of manure, other solid wastes, and wastewater, mitigating their harmful effects.

Water purification services

IP: High. Meat processing wastewater is highly organic with high levels of BOD, COD and nutrients. Therefore, at IP level, there is heavy reliance on ecosystem services such as natural wetlands and rivers for post treatment polishing of the effluent.

VC: High, Livestock agriculture needs maintenance or improvement of the quality of the water accessible to the animals as well as to break down or remove any pollutants emitted in the agricultural process.

Flood mitigation services

IP: Medium, Moderate reliance on ecosystems such as trees, vegetation buffer zones to protect infrastructure at the factory against flood damage and contamination

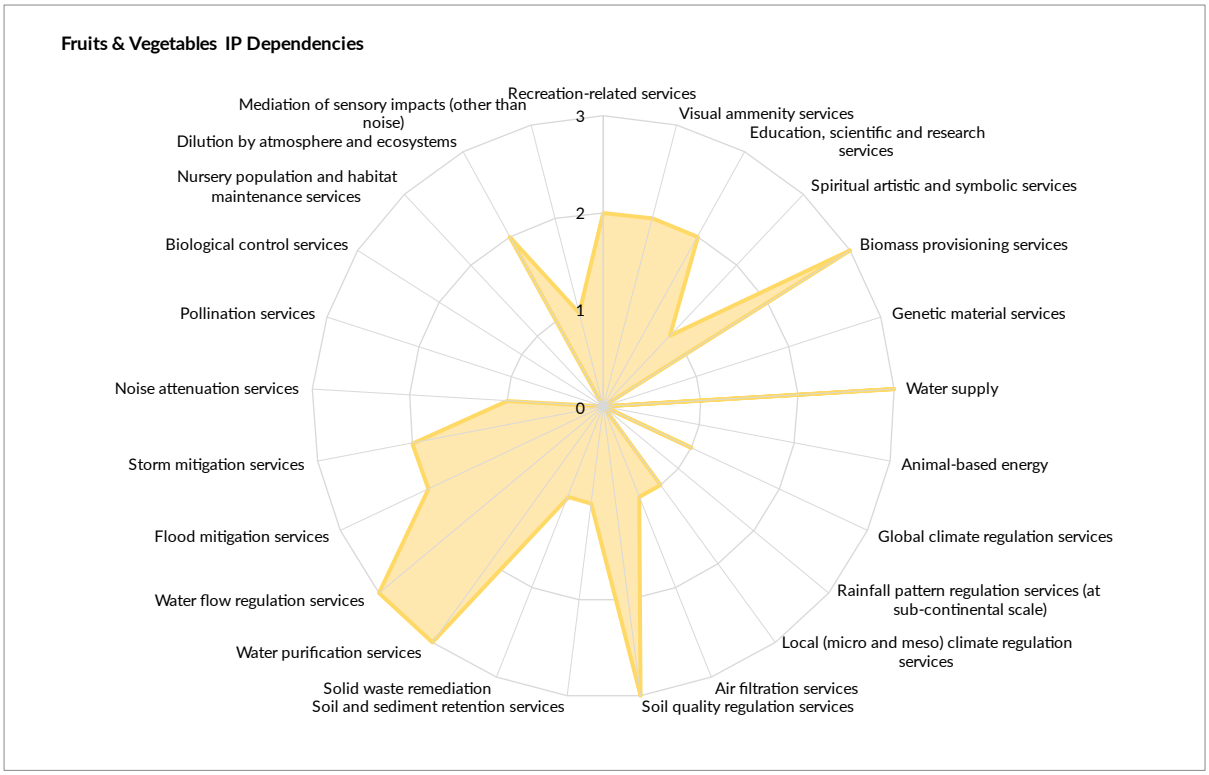
VC: Medium, Cattle and poultry farming is dependent on flood mitigation ecosystem services to protect animals, buildings and infrastructure from flooding.

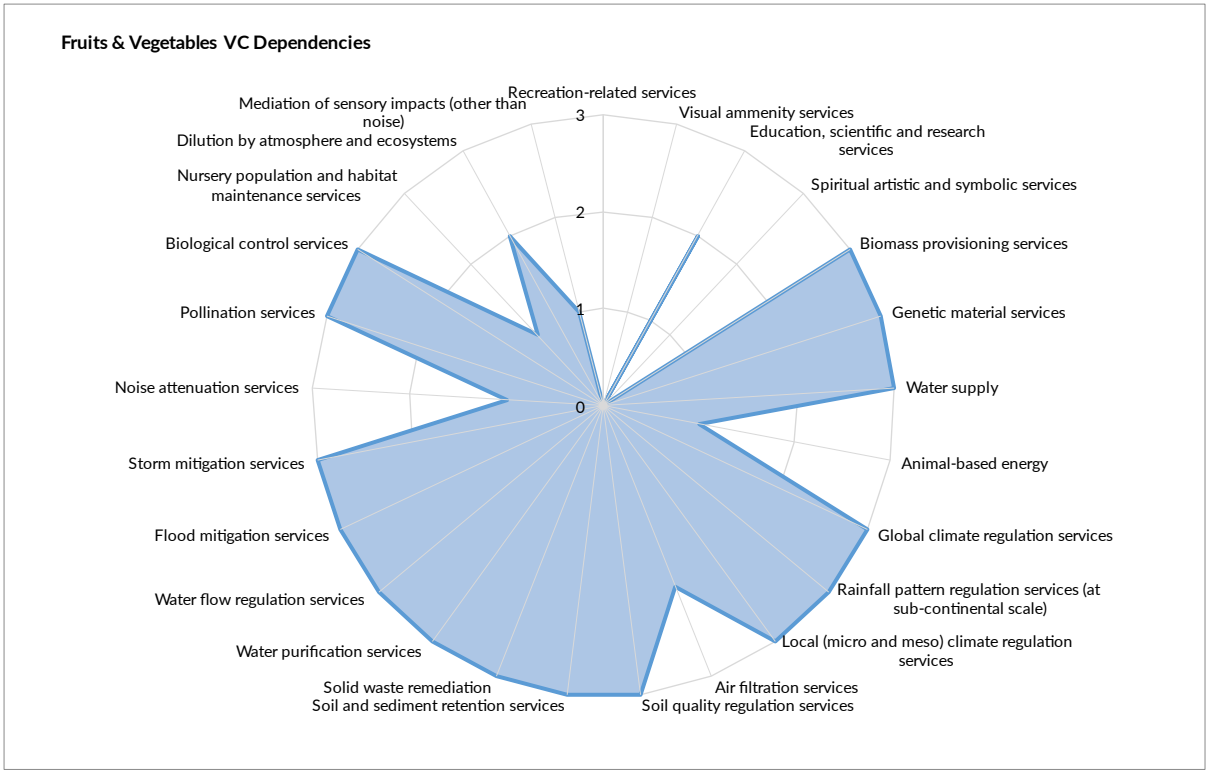
Storm mitigation services

IP: Medium, Moderate reliance on ecosystem services such as nearby vegetation buffers, forests, rivers around the factory to protect the infrastructure at the factory against heavy storms.

VC: High, Livestock production is dependent on storm mitigation ecosystem services to protect animals, buildings, and infrastructure from the impacts of wind or other storms.

Fruits and Vegetables IP and VC dependence





Noise Attenuation Services:

IP: Moderate noise from washing machines and refrigeration system, thus low dependence on noise attenuation service.

VC: intermittent low noise from transportation and farm animals, the low dependence.

Solid waste remediation:

IP: low volume of solid waste, low-grade fruits often sold on the local market, and packing waste, thus low dependence.

VC: high volume solid waste generated at the farm, including damaged fruits during harvest and transportation, thus high dependence on the ecosystem for decomposition.

Soil regulation services:

IP: fruits processing operations are not affected by soil quality and health, thus a low rating

VC: Growing of requires quality healthy soil, thus high dependence on soil regulation services

Air filtration services:

IP wastewater from fruit and vegetable processing produces less odor compared to other processes like meat, thus medium dependence on the ecosystem for air filtration services.

VC: Farm operation generates GHG and non-GHG pollutants to the air that moderately require air filtration services.

Local Climate regulation services:

IP: Fruits and vegetable processing operation depends on machines and appliances to provide ambient temperatures for storage and handling meet thus low dependence on local climate regulation services.

VC: Fruits and vegetables growing are affected by temperature and highly depend on local climate regulation services for ambient temperatures.

Biomass provisioning services: At both the IP and VC levels, fruit and vegetable processing relies directly on biomass provisioning services. Production depends on the capacity of ecosystems to generate quality produce. Additionally, ecosystem contributions such as compost, organic matter, and microbial activity in soils are essential for nutrient cycling and biomass productivity.

Genetic material services: Genetic material services are not required at the IP level. In contrast, the VC is highly dependent on genetic diversity to ensure crop improvement and resilience. Breeding programs frequently rely on wild relatives of domesticated plants to introduce traits like drought tolerance, pest resistance, and improved shelf life.

Pollination services: Pollination is not relevant at the IP level. In the VC, the rating is high, because most fruits and vegetables depend on pollination by birds, bats and insects to produce fruits.

Biological control services: Biological control services are not used within IP operations, but are essential in the VC. Insectivorous birds, beneficial insects, and small mammals play a critical role in regulating pest populations, reducing the need for synthetic pesticides, and contributing to healthy crop development.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, a low degree of dependence exists due to the importance of preserving natural habitats and gene pools for future crop development and to maintain ecological functions that support non-perennial crop productivity.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. R&D within the fruits and vegetables value chain require high-level skills while farm management requires high and medium-level skills with mostly low-level skilled jobs.

Water supply

IP: Fruits and vegetable processing highly depends on ecosystem services such as rivers, groundwater aquifers for supply of water required for the processing

VC: High, growing of vegetables and fruits requires sufficient quantity and quality of water to grow the crops and for general on-farm use (such as cleaning, sanitation, crop spraying).

Rainfall pattern regulation services (at sub-continental scale)

VC: High, growing of vegetables and fruits relies on sufficient levels of rainfall for productive cultivation.

Soil and sediment retention services

VC: High, erosion control provided by ecosystems reduces the loss of soil and runoff of fertilizers from the cultivation sites.

Solid waste remediation

IP: There is low reliance on the ecosystem services for remediation of solid waste for example reuse as animal feeds and composting for manure

VC: Medium, ecosystems (e.g. micro-organisms, algae, plants and animals) help to break down soil contaminants as well as waste and leachates from the production.

Water purification services

IP: High dependence on the ecosystem services such as nearby natural wetlands and rivers to treat the highly organic fruit and vegetable processing effluent

VC: High, required for ensuring the quality and availability of water for the cultivation and reducing the agricultural production's impact on water quality.

Water flow regulation services

IP: High reliance on ecosystem services such as rivers to provide water required for the industrial processes

VC: High, help to ensure sufficient flow of water even during drier seasons (e.g. for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation services

IP: Moderate reliance on ecosystems such as trees, vegetation buffer zones to protect infrastructure at the factory against flood damage and contamination

VC: High, dependent on flood mitigation ecosystem services to protect crops, buildings, and infrastructure from flooding.

Storm mitigation services

IP: Moderate reliance on ecosystem services such as nearby vegetation buffers, forests, rivers around the factory to protect the infrastructure at the factory against heavy storms.

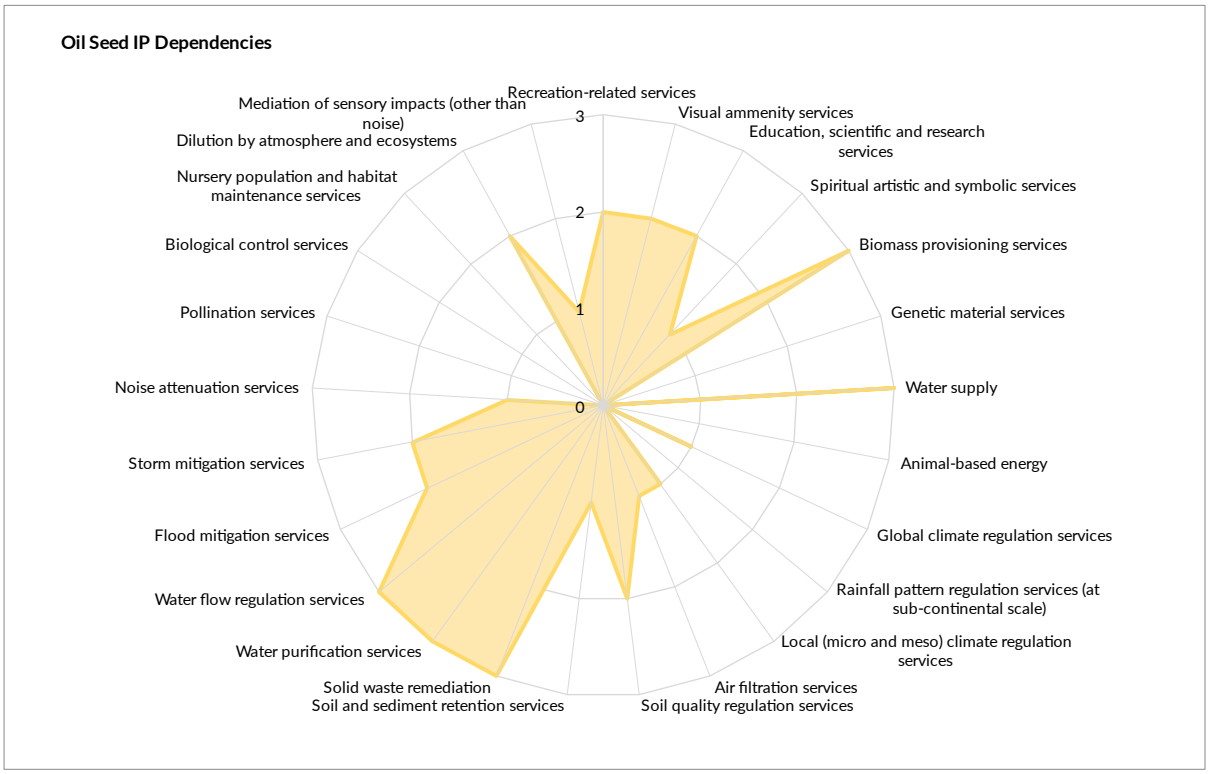
VC: High, dependent on storm mitigation ecosystem services to protect crops, buildings, and infrastructure from storms.

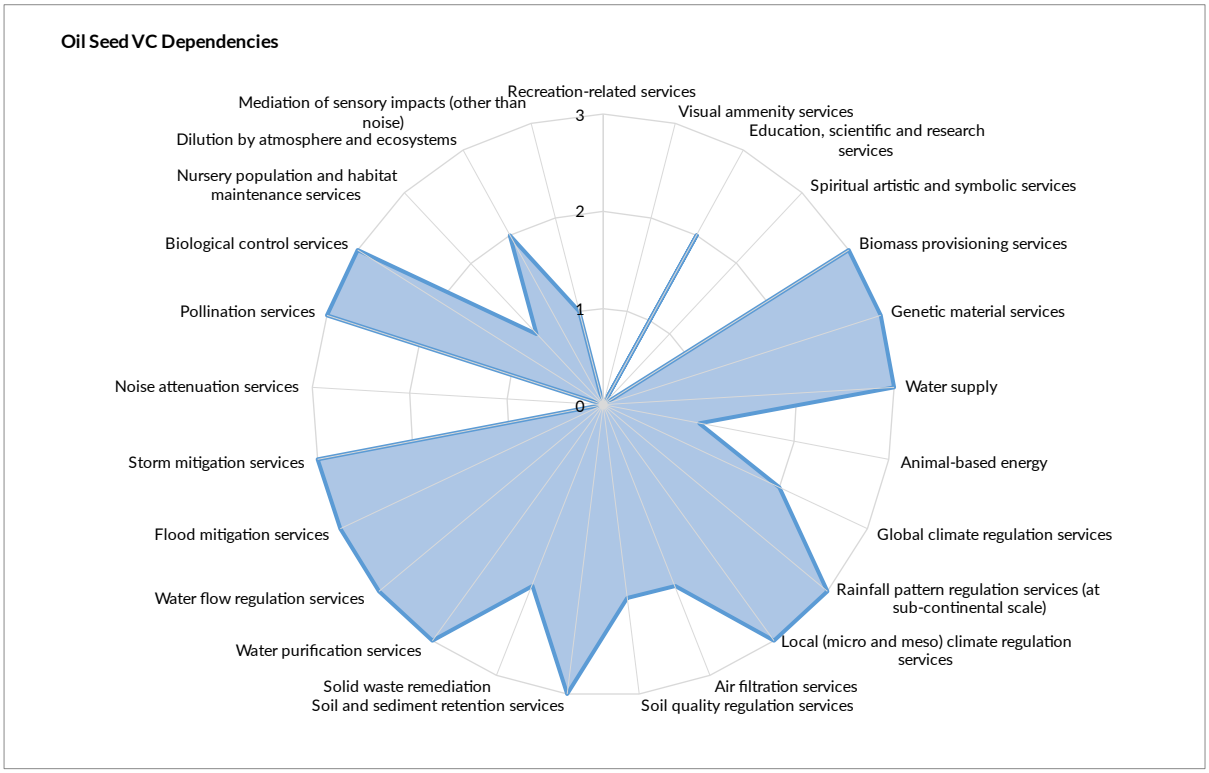
Dilution by atmosphere and ecosystems

IP: Heavy reliance on natural wetlands and rivers for dilution of the highly organic effluent

VC: Medium, growing of vegetables and fruits depends on atmosphere and the ecosystems to maintain air and water quality.

Oil seed IP and VC dependences





Animal-based services:

IP: oil milling and refining operation run entirely on machine and human labour. There is no use of animals

VC: Small and medium-scale seed oil farms use animals for cultivation and transportation, thus low dependence on animal labour.

Local (micro and meso) climate regulation:

IP: temperature control in seed oil production largely depends on the use of machines like rotor vanes, exhaust fans, thus low dependence on local climate regulation service for ambient temperatures.

VC: The growing of oil seeds like peanuts, sesame, and sunflowers is affected by temperatures, thus high dependence.

Air filtration services

IP: seed oil mills and refinery produce moderate pollutants, including air dust and PM air pollutants, that depend on air filtration services

VC: farm operation of oil seed production significant pollutants air, including pesticide drifts, dust, PM, monoxides of carbon monoxide that moderately require air filtration services.

Soil quality regulatory services:

IP: seed oil mills and refinery are not affected by quality soils

VC: growing of seed oil high depend on quality and health soils.

Solid waste remediation:

IP: Oil seed mill generates large volume of waste including husks and press cake thus high dependence on eco-system for remediation.

VC: moderate qualities of solid waste is generated including agro-residues that moderate depend on eco-system for decomposition.

Biomass provisioning services: At both the IP and VC levels, oil seed processing directly relies directly on biomass of sunflower and soybeans in Tororo. Also, growing them depends on the ecosystem to produce biomass materials, that are captured and harvested in uncultivated production contexts. The activity also depends on the ecosystem contributions to the growth of organic material, as well as waste, and compost.

Genetic material services: Genetic material services are not relevant to IP operations. However, at the VC level, crop improvement programs rely on access to wild and semi-domesticated gene pools to address agronomic challenges. Traits such as pest resistance, drought tolerance, and yield enhancement depend on ongoing genetic research and material exchange.

Pollination services: Pollination services are not required for IP-level activities but are of high relevance at the VC level. Sunflowers are pollinator-dependent and benefit from bee populations to achieve optimal seed production. While soybeans are largely self-pollinating, pollinator activity can enhance yields and their flowers offer forage for pollinating insects, contributing to broader ecosystem health.

Biological control services: Biological control services are not necessary at the IP level. At the VC level, natural pest regulation provided by birds, insects, and microbial antagonists is essential for protecting oilseed crops from threats such as aphids and caterpillars. These services help maintain yields and reduce chemical input reliance.

Nursery population and habitat maintenance services: No dependency on nursery populations or habitat maintenance exists at the IP level. In contrast, VC-level operations depend to some extent on maintaining diverse gene pools and supporting habitats to ensure seed viability, access to future crop traits, and resilience under changing environmental conditions.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. R&D within the oil seed value chain require high-level skills while farm management requires high and medium-level skills with mostly low-level skilled jobs.

Water supply

IP: High dependence on ecosystems such as rivers, wetlands and groundwater aquifers as fresh water sources

VC: High, growing of oil seed plants requires sufficient quantity and quality of water to grow the crops and for general on-farm use (such as cleaning, sanitation, crop spraying).

Rainfall pattern regulation services (at sub-continental scale)

IP: Negligible dependence

VC: High, growing of oil seed plants relies on sufficient levels of rainfall for productive cultivation.

Soil and sediment retention services

IP: Low dependence relating to protection of infrastructure against erosion

VC: High, erosion control provided by ecosystems reduces the loss of soil and runoff of fertilizers from the cultivation sites.

Water flow regulation services

IP: High reliance on wetlands for consistent water supply for industrial processes

VC: High, help to ensure sufficient flow of water even during drier seasons (e.g., for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation services

IP: Moderate reliance on ecosystems such as trees, vegetation buffer zones to protect infrastructure at the factory against flood damage and contamination

VC: High, dependent on flood mitigation ecosystem services to protect crops, buildings, and infrastructure from flooding.

Storm mitigation services

IP: Moderate reliance on ecosystem services such as nearby vegetation buffers, forests, rivers around the factory to protect the infrastructure at the factory against heavy storms.

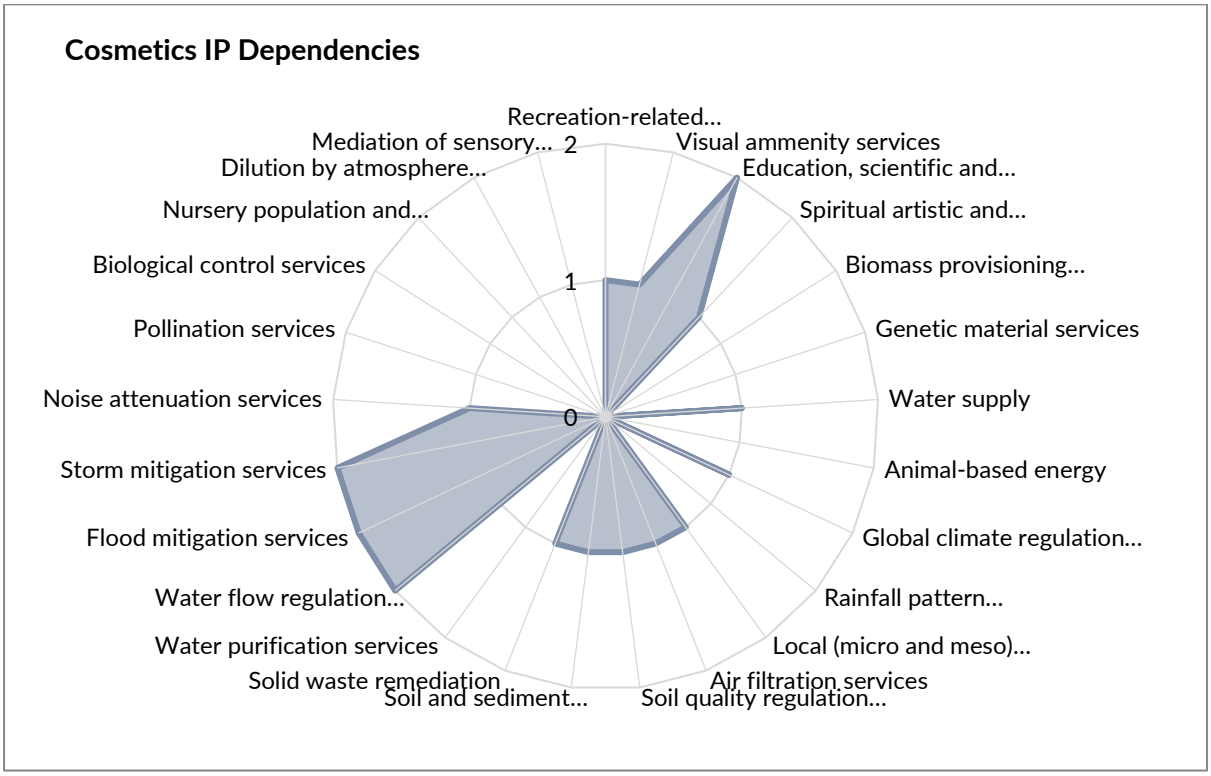
VC: High, dependent on storm mitigation ecosystem services to protect crops, buildings, and infrastructure from storms.

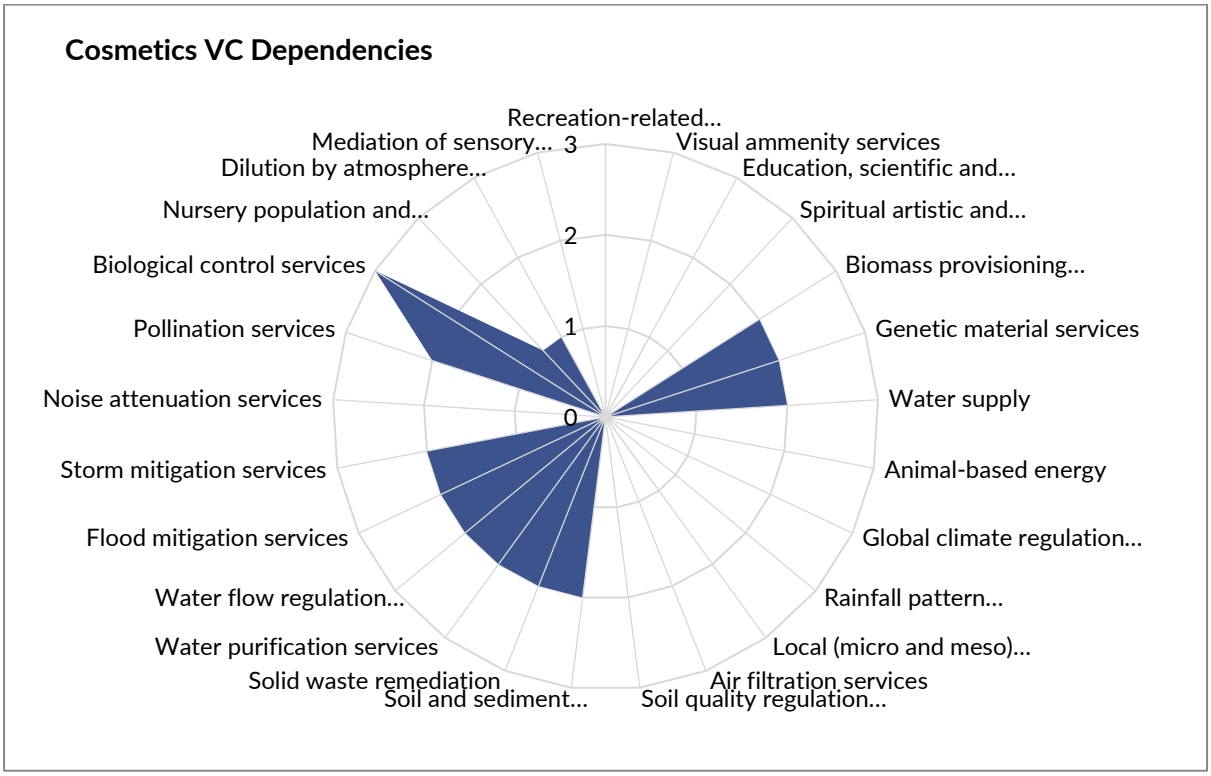
Dilution by atmosphere and ecosystems

IP: Moderate reliance on atmosphere for dilution of gas pollutants and wetlands for dilution of wastewater

VC: Medium, growing of oil seed plants depends on the atmosphere and ecosystems to dilute water pollutants generated.

Cosmetics





Solid waste remediation:

IP: There is a generation of non-biodegradable waste (plastic microbeads, chemical sludge), which High dependence on industrial waste treatment (incineration, landfills), thus low dependence on of ecosystem. No data on VC of cosmetics.

Local (micro and meso) climate regulation:

IP: Cosmetic manufacturing operations demonstrate minimal dependence on local climate regulation, as temperature control is primarily maintained through mechanical systems in production facilities.

VC: No data available on climate regulation dependence for cosmetic value chain operations.

Soil quality regulation

IP: Cosmetic manufacturing operations are unaffected by soil quality, resulting in minimal dependence on soil-related ecosystem services.

VC: No data available regarding value chain dependence on soil quality for cosmetic production.

Noise attenuation:

IP: Cosmetic processing operations primarily utilize mixing and filling equipment that generates minimal noise pollution, resulting in negligible dependence on ecosystem noise attenuation services.

VC: No data available regarding noise generation or ecosystem dependence in cosmetic value chain

Air quality filtration services:

IP: The cosmetics industry generates moderate levels of non-GHG emissions (including VOCs), resulting in limited dependence on air quality filtration services.

VC: No data available regarding emission levels or air filtration dependence in cosmetic value chain

Biomass provisioning services: At the IP level, cosmetics activities are limited to packaging, storage, and training, and therefore do not involve any biomass provisioning. However, at the VC level, if production incorporates locally sourced ingredients such as shea butter or aromatic herbs, direct biomass provisioning becomes relevant. Harvesting of plant-based materials for use in cosmetics relies on healthy ecosystems for sustained yields.

Genetic material services: No genetic material services are required at the IP level. At the VC level, however, the use of shea nuts and other botanicals depends on genetic diversity to maintain crop resilience and quality. Preserving local gene pools is essential for continued access to desirable traits in natural product ingredients.

Pollination services: Pollination services are not relevant within the IP. In the VC, however, pollination is critical—particularly for shea trees (Vitellaria), which rely on bees and other pollinators for fruit production.

Biological control services: Biological control services are not needed at the IP level but are important in the VC. Cultivation of Vitellaria and other herbs benefits from ecosystem-based pest management services provided by birds, insects, and other organisms, which reduce reliance on synthetic pesticides and protect the long-term viability of natural ingredients.

Nursery population and habitat maintenance services: Nursery populations and habitat maintenance services are not applicable at the IP level. At the VC level, however, long-term cultivation of perennial plants such as shea trees depends on the maintenance of healthy ecosystems and gene pools, which provide the foundation for seedling survival, plant regeneration, and continued trait diversity.

The management, processing, and marketing activities will require mostly high & medium-level skills with some low-level skill jobs. The packaging and retail value chain will require mostly low-level skills with business management requiring medium-level skills.

Water supply:

Dependence on ecosystem water supply services such as rivers and wetlands is low at IP and moderate at VC. At VC, significant amounts of water are required as a primary ingredient, and in cooling systems of cosmetics production. The cultivation of plant raw materials such as aloe vera, coconuts, and flowers requires moderate amounts of water.

Soil and sediment retention:
At IP, dependence is low since factories are usually paved with minimal erosion risk. At VC, there is moderate dependence on soil and sediment retention services to prevent erosion of farmlands of plant based raw materials such as shea trees, flowers, aloe vera and herbs.

Solid waste remediation:
IP: Low dependence on ecosystem services since the solid waste from cosmetics production is mainly comprised of packaging materials which are non-biodegradable.
VC: Medium dependence on ecosystem services for remediation of organic sold waste generated from the cultivation and supply of plant based raw materials.

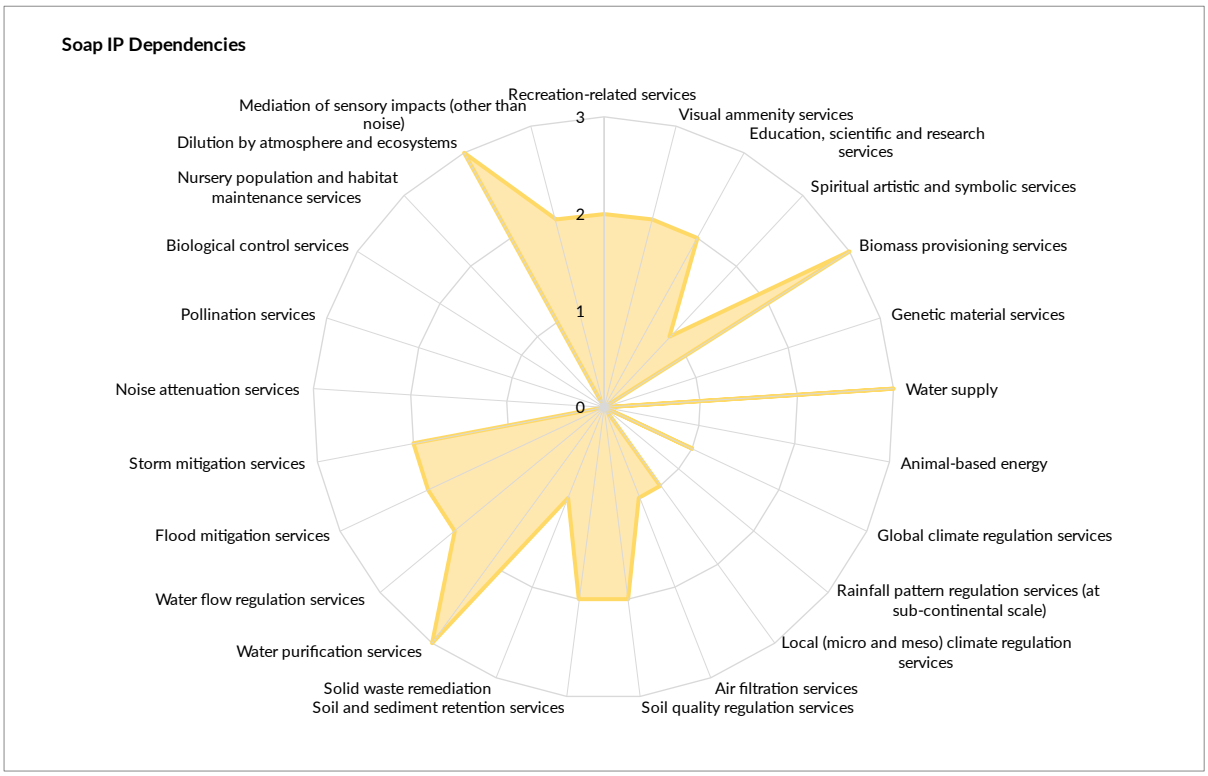
Water purification services:
Wastewater from cosmetics production is highly toxic with high levels of BOD, COD, dyes and surfactants. Therefore, the industry relies on ecosystem services such as natural wetlands and rivers to dilute the wastewater.

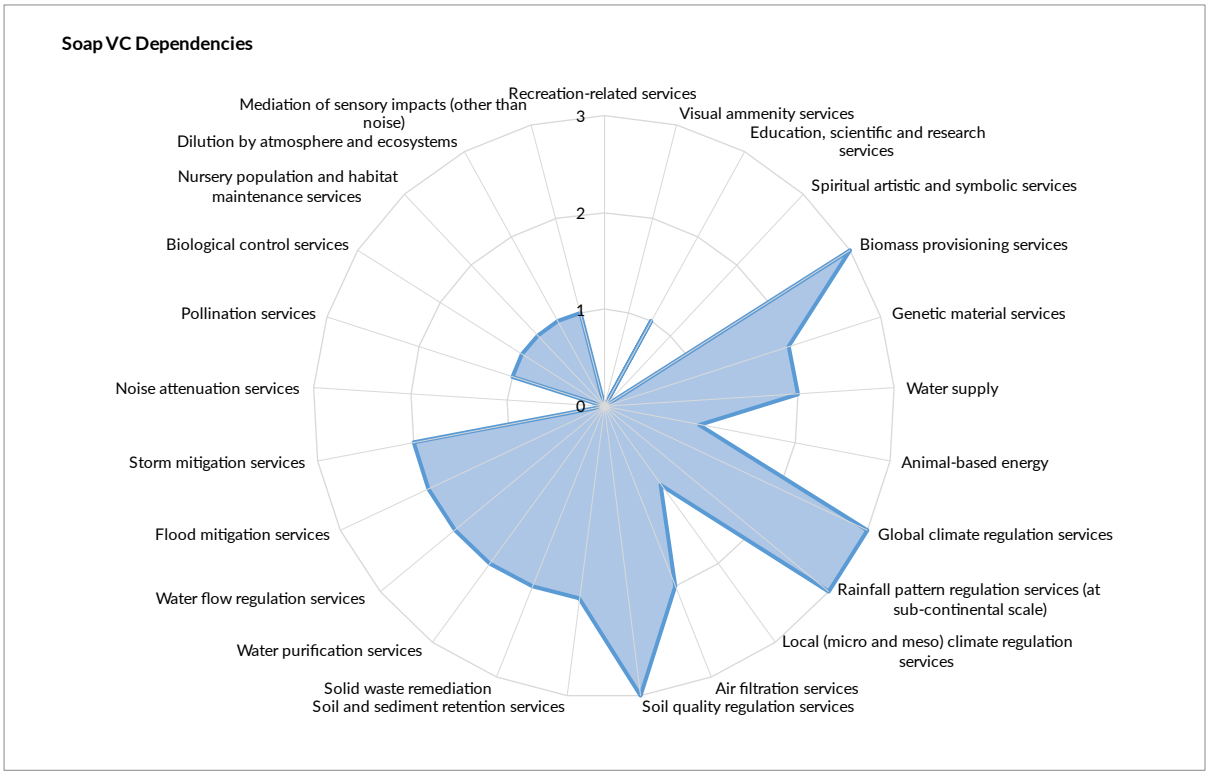
Flood mitigation services:
There is moderate reliance on the ecosystem's flood mitigation services both at IP and VC for the protection of farmlands of plant based raw materials, manufacturing sites and other infrastructure against flood damage.

Storm mitigation services:
There is moderate reliance on the ecosystem's storm mitigation services both at IP and VC for the protection of farmlands of plant based raw materials, manufacturing sites and other infrastructure from the impacts of wind, sand and other storms.

Dilution by atmosphere and ecosystems:
Medium dependence at both IP and VC level for the dilution of gaseous toxic emissions and toxic pollutants by the atmosphere and natural ecosystems such as wetlands and rivers.

Soap IP and VC dependence





Animal-based service:

IP: Soap processing is entirely dependent on the use of machinery and human labour

VC: Small-scale farmers in seed oil-producing areas, especially the northern and eastern parts of the country, use oxen for land preparation, and thus have low dependence

Global climate regulation service:

IP: The Soap production process is not directly affected by climate change, like heavy rainfall or prolonged droughts.

VC: Oilseed productivity is immediately affected by climate change, especially prolonged drought, thus high dependence on global climate regulations

Local (micro and meso) regulations:

IP: Soap production is not directly affected by climatic conditions, temperature, humidity, and rainfall, because it relies on mechanical control to obtain ambient temperatures.

VC: Seed oil crop highly relies on ambient temperatures, humidity for better productivity, thus high dependence on local climate regulation services.

Air quality regulation services;

Both at IP and VC there is moderate emission including VOC from essential oil, colour pigments, oder from soap processing and dust, PM, pesticide drifts and monoxides of carbon and nitrogen from farm operations.

Solid waste remediation:

IP: Soap production generates minimum solid waste (soap off cut) and is often recycled with the process, thus low dependence on the ecosystem for decomposition.

VC: The moderate solid waste generated at the farm and seed oil processing thus medium dependence on the ecosystem for solid waste decomposition.

Biomass provisioning services: Soap production at both the IP and VC levels depends directly on biomass provisioning, primarily with vegetable oils derived from oilseeds such as sunflower and soybean. These raw materials are the basis for soap production and rely on ecosystem services for crop growth, nutrient cycling, and soil health.

Genetic material services: IP operations do not require genetic materials. At the VC level, while oilseed crops benefit from breeding for improved yield and resilience, soap producers do not directly engage in genetic R&D. However, the sector indirectly benefits from ongoing crop improvement efforts that enhance the reliability of oilseed supply.

Pollination services: Pollination services are not applicable at the IP level. Within the VC, the relevance is moderate—sunflower cultivation is pollinator-dependent, whereas soybean is mostly self-pollinated. While animal fats (also used in soap) are not reliant on pollination, the broader VC partially depends on insect-pollinated crops for sourcing vegetable oil.

Biological control services: No biological control services are needed at the IP level. In the VC, however, the health and productivity of oilseed crops are supported by natural pest regulation from beneficial organisms, which limit the need for chemical interventions and contribute to sustainable farming.

Nursery population and habitat maintenance services: Nursery population and habitat maintenance services are not applicable to IP activities. At the VC level, successful cultivation of oilseed crops may depend on the availability of healthy soil ecosystems and habitat conditions that support seed development and genetic diversity.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. The soap processing value chain will require mostly low-level skills with business management requiring medium-level skills.

Water supply

IP: Medium dependence on rivers and groundwater aquifers to supply the water required for industrial processes

VC: Medium, Manufacturing activities require sufficient quantity and quality of water, for activities including cooling and cracking chemicals.

Soil and sediment retention services

IP: Moderate reliance for protection of the buildings and other infrastructure at the factory

VC: Medium, necessary to provide a stable substrate, erosion control, and landslide mitigation for infrastructure.

Solid waste remediation

IP: Low reliance on ecosystem services such as microorganisms for decomposition of organic soap waste

VC: Medium, ecosystems help to remove pollutants to break down substances from the manufacture of chemicals in waste-water streams.

Water purification services

IP: High reliance on rivers and natural wetlands for post treatment effluent polishing

VC: Medium, facilitate the upholding of the chemical composition of water necessary for the detoxification of potential effluents, and other critical stages throughout the production process.

Water flow regulation services

IP: High dependence on wetlands, forests to support the consistent water requirements even n dry seasons

VC: Medium, chemical product manufacture requires a steady water flow which is vital for cooling and cracking chemicals.

Flood mitigation services

IP: Moderate reliance on ecosystems such as trees, vegetation buffer zones to protect infrastructure at the factory against flood damage and contamination

VC: High, dependent on flood mitigation ecosystem services to protect crops, buildings, and infrastructure from flooding.

Storm mitigation services

IP: Moderate reliance on ecosystem services such as nearby vegetation buffers, forests, rivers around the factory to protect the infrastructure at the factory against heavy storms.

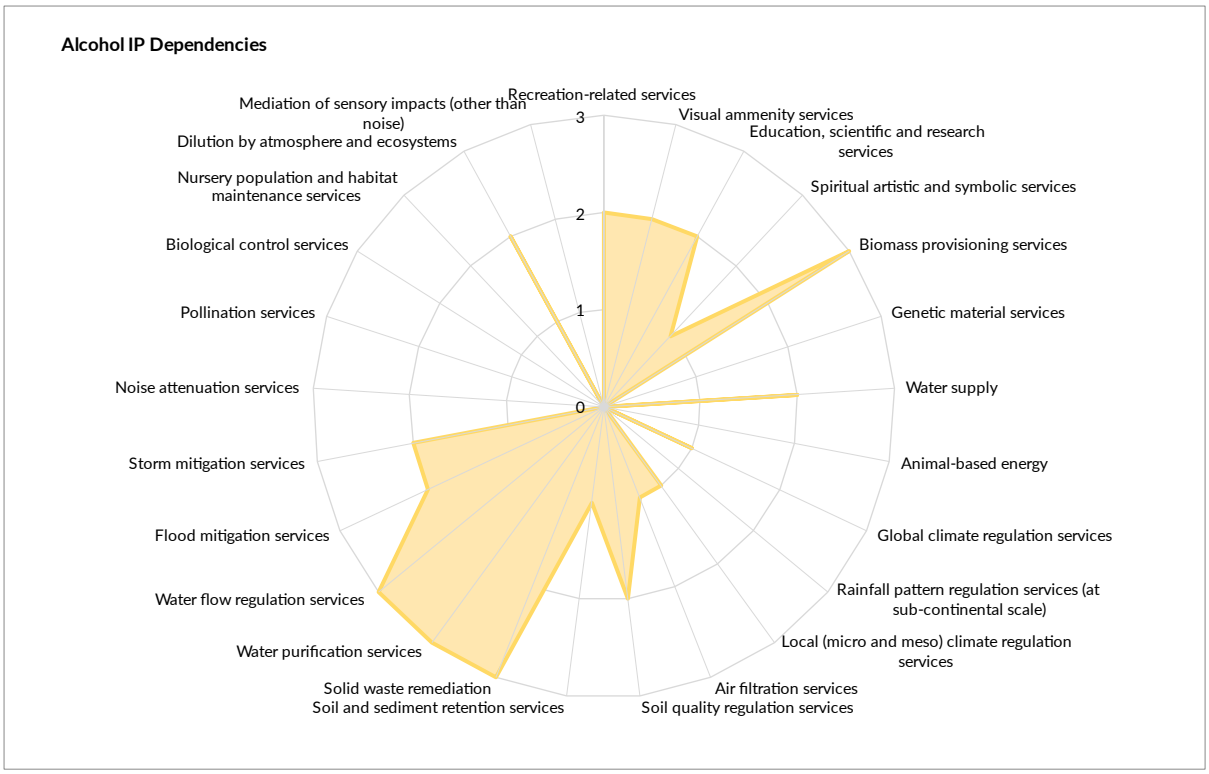
VC: Medium, storm mitigation ecosystem services to protect infrastructure from storms.

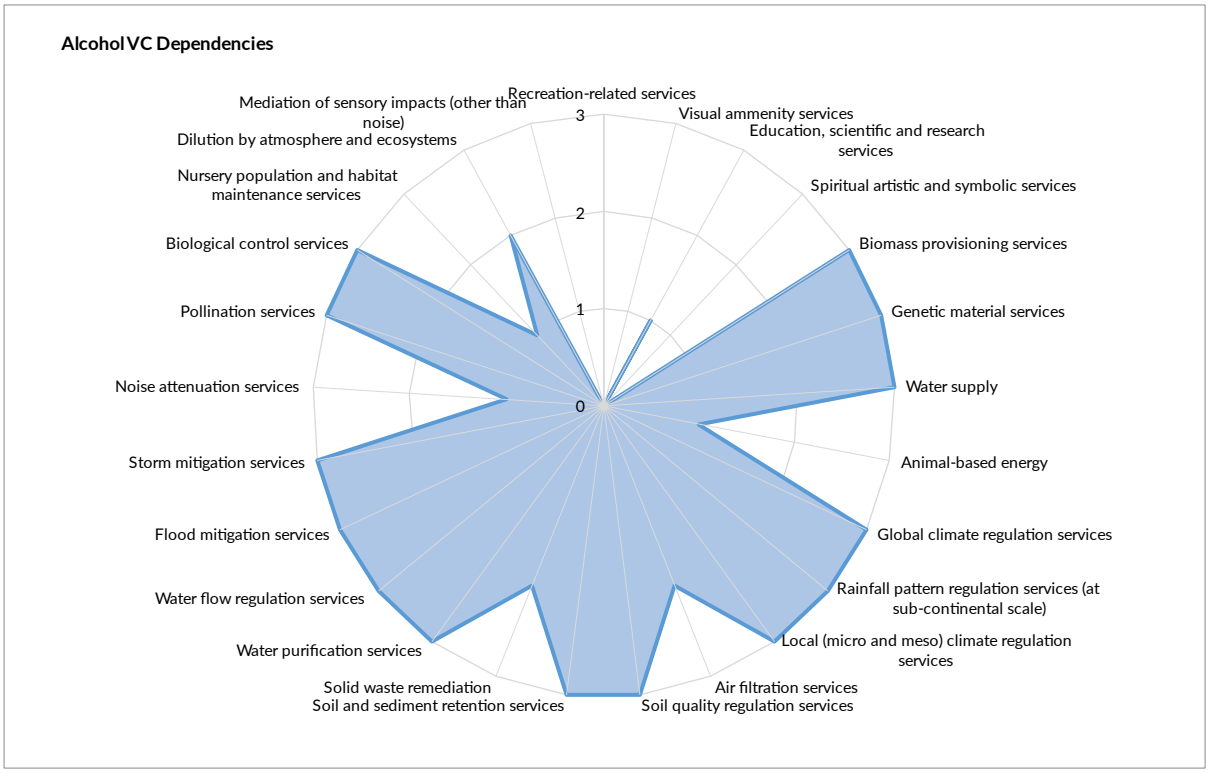
Dilution by atmosphere and ecosystems

IP: Moderate reliance on natural wetlands and rivers for dilution of the highly organic effluent

VC: Low, the local atmosphere and ecosystems aid in diluting localized pollution and chimney emissions from the manufacturing process.

Alcohol IP and VC dependencies





Global Climate Regulation:

At IP, the is less dependence on global climate regulation because climate change has a long-term impact on the IP operation, thus low dependence.

At VC: the growing of crops, including grains, fruits, and bananas used in production affected by climate change, like prolonged drought or heavy rainfall fall thus high dependence.

Local (micro and meso) climate regulation:

IP: Operating conditions within alcohol production facilities are usually done using machines that have low dependence on local climate regulation.

VC: Growing input crops for alcohol production highly depend on local climate regulation for ambient temperature for growing.

Air filtration service:

Both IP and VC Alcohol production generate moderate GHG and non-GHG air pollutants, thus moderate dependence on air filtration service.

Soil quality regulations services:

IP operations are not directly affected by soil quality, while growing inputs in alcohol production are highly affected by the quality and health of soils.

Noise attenuation service:

IP: Wine fermentation operates silently, demonstrating negligible dependence on noise attenuation services. Whiskey and ethanol production generate moderate noise levels, resulting in intermediate ecosystem dependence for noise regulation.

VC: Small-scale farming operations are virtually noiseless, while medium and large-scale farms produce intermittent, moderate noise levels - collectively showing limited dependence on noise attenuation services.

Solid waste remediation:

IP: The production process generates substantial solid waste (primarily spent grain, vinasse, and yeast), creating significant reliance on ecosystem decomposition services.

VC: Agricultural operations produce moderate quantities of agro-residual waste, resulting in intermediate dependence on natural decomposition processes.

Biomass provisioning services: At both IP and VC levels, alcohol production depends directly on biomass sources like fruits and molasses from sugar cane. Also, growing fruits and sugar cane depends on the ecosystem to produce biomass materials, that are captured and harvested in uncultivated production contexts. The activity also depends on the ecosystem contributions to the growth of organic material, as well as waste, and compost.

Genetic material services: Genetic material services are not required within the IP. At the VC level, most fruits and sugarcane used in Uganda are native species. However, genetic diversity is important to improve yield, resilience, and quality. Access to improved germplasm through breeding programs could enhance industry performance in the long term.

Pollination services: Pollination services are not relevant to IP-level operations. At the VC level, however, pollination is critical for fruit crops, many of which rely on birds, bats, and insects for fertilization. These pollinators play a vital role in ensuring crop productivity and quality.

Biological control services: No biological control services are needed at the IP level. In the VC, alcohol production is indirectly reliant on the biological control of pests in fruit orchards and sugarcane fields. Natural predators help reduce the incidence of pests such as aphids and fruit borers, contributing to crop health and minimizing chemical pesticide use.

Nursery population and habitat maintenance services: There is no reliance on habitat or nursery services at the IP level. At the VC level, sustainable fruit production depends on maintaining diverse gene pools and healthy habitat conditions, which are necessary for breeding programs and ecosystem resilience.

The management, processing, and marketing activities will require high & medium-level skills with some low-level skill jobs. R&D within the alcohol value chain requires medium-level skills while fruit farm management requires medium-level skills with mostly low-level skilled jobs.

Water supply

IP: Moderate reliance on rivers and wetlands for fresh water supplies for production proceeses

VC: High, growing of fruits requires sufficient quantity and quality of water to grow the crops and for general on-farm use (such as cleaning, sanitation, crop spraying).

Rainfall pattern regulation services (at sub-continental scale)

IP: Limited or no reliance on rainfall patterns

VC: High, growing of fruits relies on sufficient levels of rainfall for productive cultivation.

Soil and sediment retention services

IP: Low dependence on natural soil and sediment retention for protection of infrastructure at the factory against erosion

VC: High, erosion control provided by ecosystems reduces the loss of soil and runoff of fertilizers from the cultivation sites.

Solid waste remediation

IP: High reliance on local ecosystem services for solid waste remediation e.g pineapple peels can be reused to make juice, decomposition of the highly organic solid waste by microorganisms

VC: Medium, ecosystems (e.g. micro-organisms, algae, plants and animals) help to break down soil contaminants as well as waste and leachates from the production.

Water purification services

IP: High reliance on wetlands and rivers to treat the highly organic effluent

VC: High, required for ensuring the quality and availability of water for the cultivation and reducing the agricultural production's impact on water quality.

Water flow regulation services

IP: High reliance on nearby wetlands for consistent water supply

VC: High, help to ensure sufficient flow of water even during drier seasons (e.g. for irrigation, cleaning and sanitation) and to mitigate peak flows that could flood the cultivation sites or associated infrastructure.

Flood mitigation services

IP: Moderate reliance on ecosystems such as trees, vegetation buffer zones to protect infrastructure at the factory against flood damage

VC: High, dependent on flood mitigation ecosystem services to protect crops, buildings, and infrastructure from flooding.

Storm mitigation services

IP: Moderate reliance on ecosystem services such as nearby vegetation buffers, forests, rivers around the factory to protect the infrastructure at the factory against heavy storms.

VC: High, dependent on storm mitigation ecosystem services to protect crops, buildings, and infrastructure from storms.

Dilution by atmosphere and ecosystems

IP: Moderate reliance on natural wetlands and rivers for dilution of the highly organic effluent

VC: Medium, growing of fruits depends on atmosphere and the ecosystems to maintain air and water quality.

2.2. Pre-identified Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

(For WATSAN preidentified needs refer to Part IV.)

2.2.1. RECP infrastructures

Opportunity for RECP symbiotic infrastructures:

Tororo Industrial Park is a privately owned 100-acre greenfield industrial park strategically located in Tororo's industrial zone near the Maraba border crossing between Uganda and Kenya. The site has direct access to three-phase 33kV power lines and proximity to a potable water treatment plant. The park has access to the Jinja-Tororo Highway and sits just 5 km from Tororo Railway Station, enabling efficient multimodal transportation. The property's eastern boundary adjoins the Maraba River, presenting potential opportunities for water-adjacent operations. Access utilities, transport links, and expansion capacity make this park an ideal location for manufacturing and logistics operations serving both Ugandan and Kenyan markets.

Opportunities for Industrial Symbiosis and Infrastructure Development in Tororo Industrial Park

i. **Transition from Wood Biomass to Agro-Residue Briquettes**

Meeting with a potential industrial park tenant revealed that cement factories in Tororo heavily rely on wood biomass, contributing to deforestation and rising fuel costs. The stakeholder highlighted the abundance of agro-residues like coffee husks, rice husks, and sunflower hulls that can be densified and used as an alternative fuel. The Industrial Park can invest in a biomass briquette production line to convert agro-waste into high-energy briquettes. This will potentially supply other industries, including cement factories, reduce deforestation and carbon emissions, and Lower fuel costs for tenants; additional income for farmers selling residues. The industrial park should partner with agricultural cooperatives to secure residue supply and pilot a briquette plant with a cement factory as anchor clients.

ii. **Reducing Post-Harvest Losses through Agro-Processing**

The stakeholders meeting revealed that farmers of tomatoes, green peppers, and chilies face significant losses due to grading rejections, up to 30% of produce is deemed "low-grade" and unsold, and short shelf life leads to spoilage. To overcome this challenge, it's proposed to anchor a tomato/chili processing line to produce: Tomato sauce/ketchup, Chili paste/sauce, and Sun-dried tomatoes (for export markets). This will stabilize farmer income by adding value to "low-grade" produce and utilizing surplus that would otherwise be waste.

iii. **Power Stabilization for Reliable Operations**

Tororo's power grid suffers from surges and instability, disrupting small- and medium-scale processors. To minimize equipment damage and production downtime of the tenant industries and attract power-

sensitive industries (e.g., cold storage, precision manufacturing), the industrial park would need to install a centralized power stabilization station in the industrial park with Voltage regulators and surge protectors for critical machinery.

iv. SME Agro-Processing Zone with Shared Wastewater Treatment

In addition to its role as a logistics hub, the industrial park will dedicate specific zones for small and medium-sized enterprises (SMEs) specializing in agro-processing. These designated areas will support the establishment of cottage industries focusing on key value-added sectors, including Meat processing, Coffee processing, Tomato and chili sauce production, and Rice milling and processing. These agro-processing activities produce wastewater containing significant organic matter. To manage this wastewater efficiently while controlling costs, we recommend establishing a shared treatment facility. This centralized solution would enable compliant, sustainable wastewater management while offering potential for byproduct recovery, benefiting all participating enterprises.

Opportunity for logistics symbiotic infrastructures:

i. Logistics Hub and Warehouse Optimization

The industrial park's management plans to incorporate comprehensive warehousing and logistics facilities, including an Inland Clearance Depot (ICD) to streamline customs processing. To optimize operations, we recommend implementing an integrated logistics management system that will: Transport Coordination to digitally track and schedule all truck movements, and Inventory Management to provide centralized visibility of all goods in transit and storage. This technology-driven approach will cut logistics costs by 25-30% for park tenants, reduce average cargo dwell time by 40%, enhance customs clearance efficiency at the ICD, and provide data analytics for continuous improvement.

2.2.2. Social infrastructures

Opportunities for shared social infrastructures have been identified such as amenities for truck drivers and similar measures aimed to reduce negative impacts due to people's movements.

3. Jinja Industrial Business Park Detailed Analysis

3.1. Sectors Pre-identification and Materiality Assessment

3.1.1. Sectors Pre-identification

The Jinja IBP is a designated investment area managed by the Uganda Investment Authority (UIA), with existing lease agreements in place through 2027. According to the park manager, potential tenants cite funding challenges and mismatches between their interests and those of potential financiers. The land is waterlogged, which increases the construction costs and difficulties to get an updated ESIA. Sector selection for the park is based on the confirmed tenant list (see F Schedule of Leases).

Key sectors include:

- Motor vehicle assembly and manufacturing
- Wood processing and furniture production
- Maize milling and grain handling
- Dairy processing, including milk powder production
- Steel and metal fabrication
- Fertilizer production
- Footwear manufacturing

Given that tenants are already committed and in place, the park does not currently require sector selection or recruitment efforts. However, despite the signed leases, operational progress has been limited. To date, only Kiira Motors has commenced operations, while all other tenants have yet to begin construction and none of them could be met during the preassessment mission. As an example, the National Water set up a 9 cubic meter water line in KMC for the park. However, with no other tenants, this line is underutilized. The local government believes the heavy presence and involvement of the army in Jina industrial park could be deterring potential tenants. Future plans could involve re-engaging potential investors, reviewing infrastructure development strategies, and exploring new sectors opportunities aligned with regional economic priorities and environmental feasibility at the term of the lease agreement in 2027.

Table 15 summarizes the companies and sectors of interest at pre-assessment stage. Further investigation into the sectors and potential partnerships or tenants' attraction could not be investigated given the lack of direct communication with the interested stakeholders.

Company/Org	Sector	Status	Interests	Export Readiness

Kiira Motors Corporation	**Motor Vehicle:** KMC produces electric buses. The Corporation's Core Business is to Develop, Make and Sell Sustainable Mobility Solutions https://kiiramotors.com	Operating	Assembling and production sites are up and running. Extra space is allocated and fenced for parking.	In progress, as the current focus is domestic demands
Nile Plywood	**Wood:** The company produces plywood, block boards, flush doors, particle boards and creosate and CCA treated electricity transmission polls.	Signed Lease Contract	Signed contract but haven't started the construction	Unknown
Mega Holdings Ltd	**Maize:** Deals maize export	Signed Lease Contract	Signed contract but haven't started the construction	Likely as the main business is export.
Beta Koreb Ltd	**Milk, Milk powder:** One of the Large-Scale Processors register with Dairy Development Authority (DDA)	Signed Lease Contract	Signed contract but haven't started the construction	Unknown
Bweya Kajjansi Limited	**Wheat Flour:** Supply Flour, Baking Powder, Yeast, Bean Paste, Floss Sugar, Dough	Signed Lease Contract	Signed contract but haven't started the construction	Unknown
Modern Steel Works Ltd	**Steel:** The Modern Group runs businesses across diverse sectors, including Sugar, Distilleries, Tiles, Aluminum Profiles, Organic Fertilizer, Gas, Power, and Luxury Beverages. In Jinja, the factory will focus on Steel products. https://www.themoderngroup.co/index	Signed Lease Contract	Signed contract but haven't started the construction	Unknown
ADT Africa Ltd	**Grains, Animal Feed:** ADT Africa runs businesses in milling, handling and logistics. Seems it's expanding to processing grains and animal feed.	Signed Lease Contract	Signed contract but haven't started the construction	Unknown

Agro Tech Chemicals Limited	**Fertilizer:** Supply of agriculture chemical to farmers and selling the wholesale	Signed Lease Contract	Signed contract but haven't started the construction	Unknown
NEC-Watu Automobile (U) Ltd	**Motor Vehicle:** NEC-WATU, a joint venture between NEC and a Chinese Company – WATU, produces vehicle filters and air cleaner	Signed Lease Contract	Signed contract but haven't started the construction	Likely
Shengda Industries Limited	**Footwear:** Established in 1995 in the province of Fujian, China, specializes in the manufacturing of athletic and leisure shoes, hikers and safety shoes for local and international markets.	Signed Lease Contract	Signed contract but haven't started the construction	Likely
Mohammed Enterprise Uganda Ltd (METL)	**Soft drinks:** Mohammed Enterprise Tanzania Ltd (METL), its A-One began producing and distributing three water brands, Masafi, Maisha, and Just Chill, and one non-carbonated flavored beverage, Pride. https://metl.net/what-we-do/manufacturing/drinks-beverages/	Signed Lease Contract	Signed contract but haven't started the construction	Unknown

Table 16: Sectors and companies of interest at Jinja IBP.

3.1.2. Examples of sectors with export potential

Milk: one of the sectors in Jinja IBP

Uganda's dairy sector has strong export potential, with an estimated market opportunity of $102 million, of which $53 million remains unrealized. The value chain is currently dominated by the export of fresh milk, primarily to regional markets. Kenya is by far the largest importer, with current purchases valued at $49 million, and a potential to grow up to $81 million, making Eastern Africa the most active trading zone (Figure 58). However, there are untapped opportunities in the European Union, East Asia, Southeast Asia, and the United Arab Emirates, where exports are currently negligible but demand is rising. Expanding into these markets would likely require product diversification, particularly into milk powder, which is more viable for long-distance trade. Strengthening cold chain logistics, ensuring quality and safety certification, and upgrading processing capacity will be key to unlocking higher-value exports and reducing dependency on regional markets.

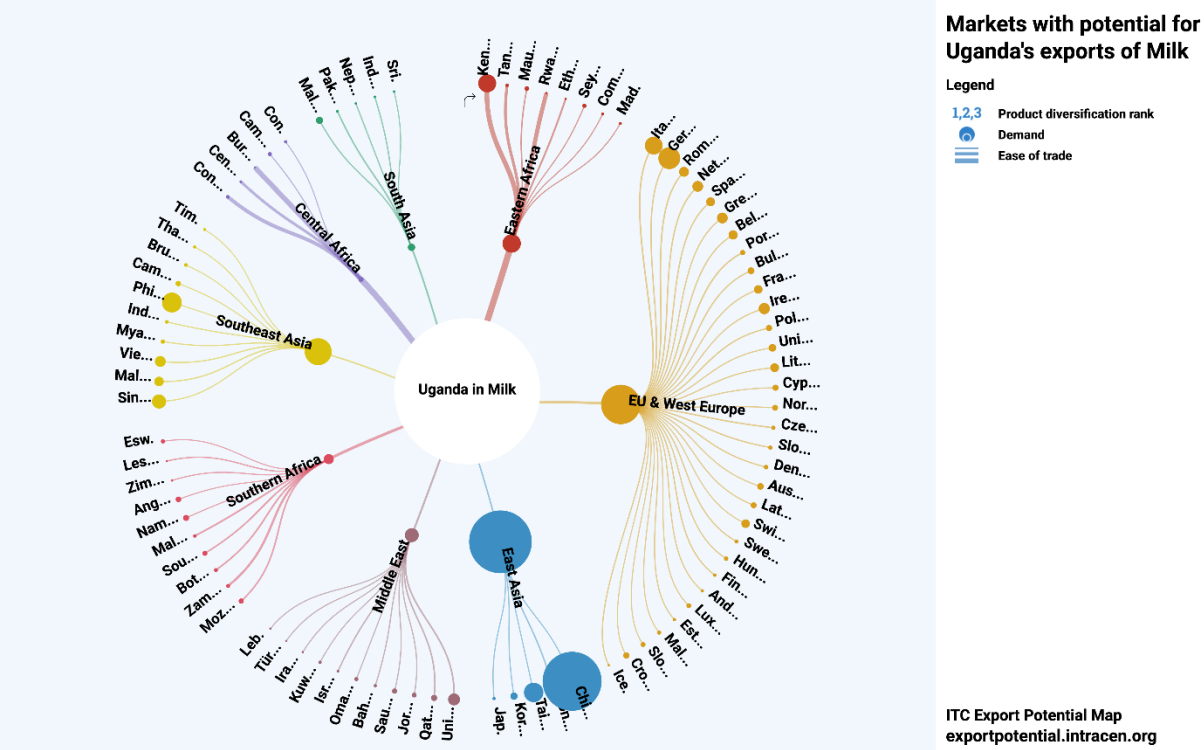


Figure 58:Markets with potential for Uganda's exports of Milk.

3.1.3. Materiality assessment

The 9 sectors/products and processes the materiality assessment focused on were (see Table 11**):**

SECTOR CHECK-LIST	ACTIVITIES
Motor	Electric buses production, vehicles filters and air cleaner
Wood	Processing furnitures, plywood, fireboards
Maize	Processing, packaging for export
Milk	processing
Milk powder	processing
Steel	Processing steel products
Chemicals, fertilizers	processing
Footwear	manufacturing
Soft drinks	Processing water brands and carbonated drinks

Table 17: Jinja IBP sectors checklist

Note that the processes identification is merely based on the schedule of lease and general sectoral knowledge given the fact that schedule tenants could not be met.

The materiality assessment shows no disqualifying concern. The results may artificially be lower due to the lack of data on Kira Motors and because some of the VC impacts may be exported abroad. As for all parks, the percentage of High materiality impacts at Value Chain Level is far greater than at IP level (X% of all impacts vs X%). Besides the overall impacts at IP level are not negligible with X elements rated high or medium all sectors considered (Figure 59 and Figure 60).

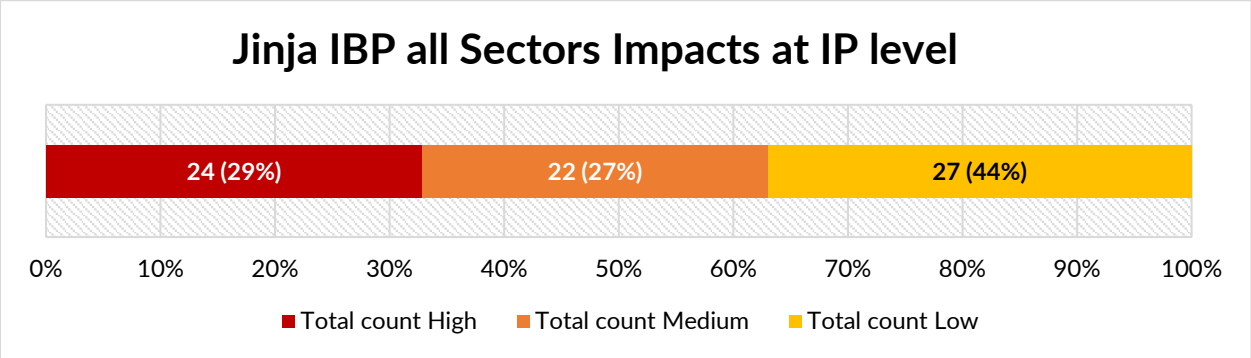


Figure 59: Jinja IBP impacts at IP level

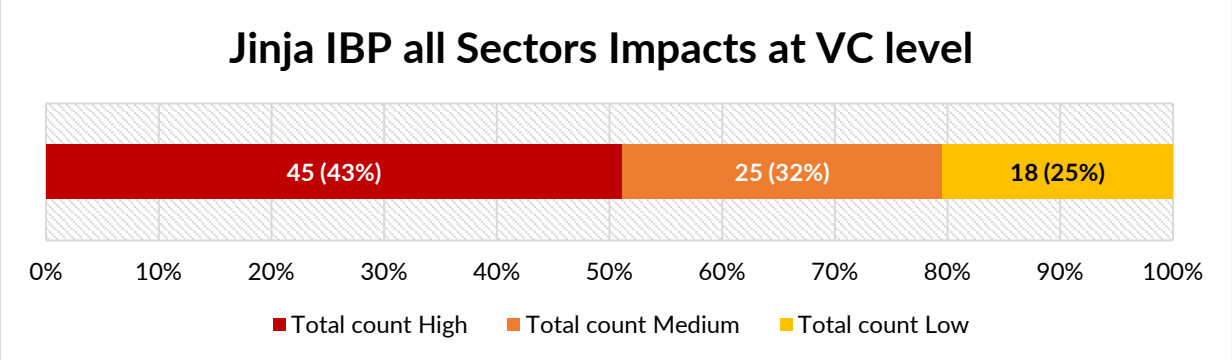


Figure 60: Jinja IBP impacts at value chain levels

Overall, the elements most impacted at IP level are the volume of water use, emission of nutrients and toxic pollutants to water and soil, disturbances, solid waste generation and the emission of GHG and non GHG air pollutants. As can be expected, the value chain presents elements of concern adding area of land use and of freshwater use concerns to the list (Figure 63 and Figure 64).

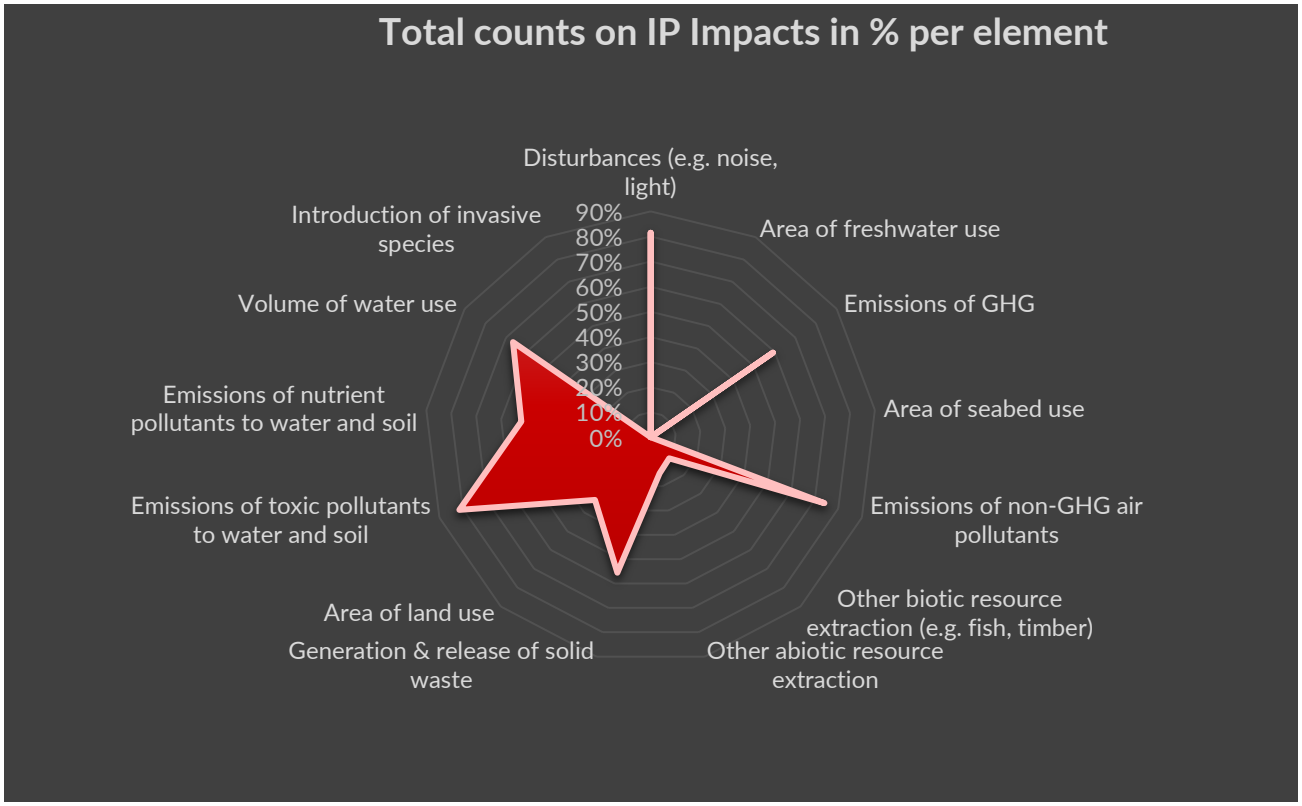


Figure 61: Jinja IBP impacts at IP level

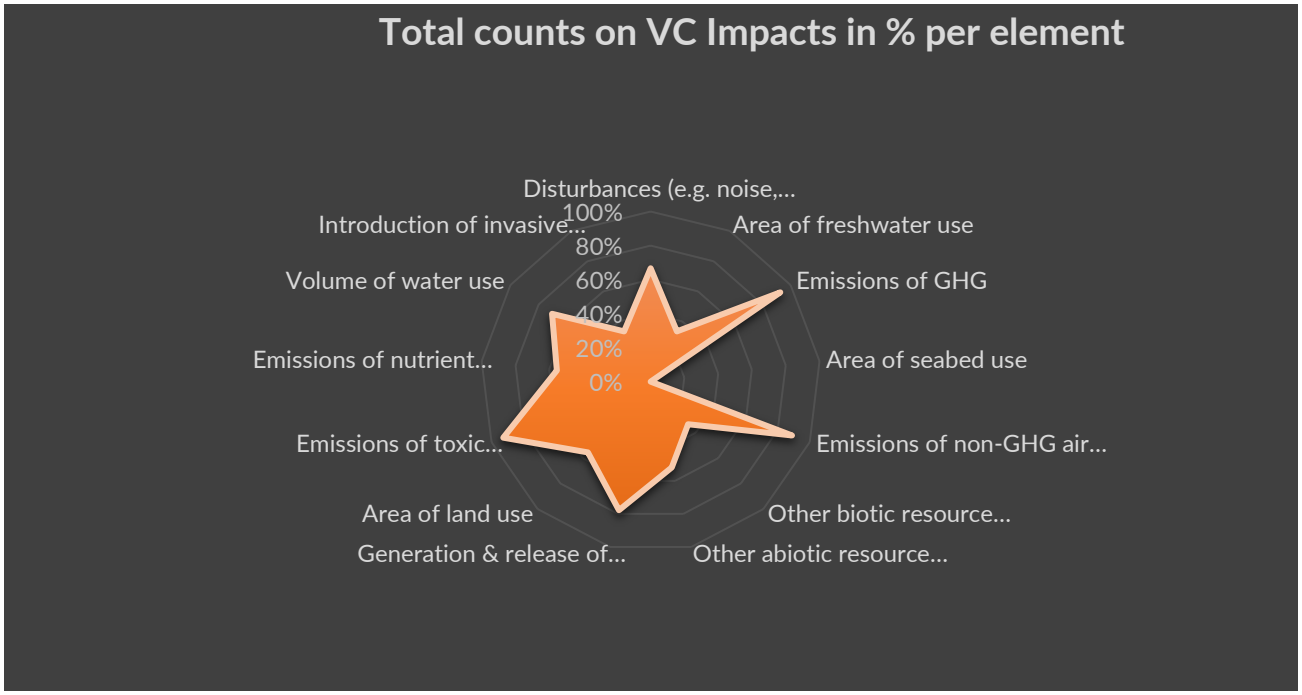


Figure 62:Jinja IBP impacts at VC level

In particular, key IP level impacts to be addressed in the the watsan sector are:

Volume of water use:
The proposed sectors in the Jinja IBP require significant volumes of water for their manufacturing processes. Currently, Jinja town relies on surface water from a Water Treatment Plant which abstracts raw water from Lake Victoria. The piped water supply system has been extended to the location of the IP and currently supplies Kiira Motors Corporation. There is need for a detailed assessment of the current and projected water requirements for the domestic, institutional, commercial and industrial water uses.

Emission of toxic and nutrient pollutants to water and soil:
The proposed sectors in Jinja IBP can potentially emit significant volumes of toxic pollutants compared to nutrient pollutants. This can result in pollution of groundwater and surface water resources. The nearest surface water source is a stream along the western boundary of the park. The stream flows into a tributary of River Nile. Hence, there would be far-reaching implications of pollution of the water source.

Generation and release of solid waste:
The proposed sectors can cause low generation of solid waste at the industrial park. Currently, Jinja City relies on a solid waste dumping site at Masese. However, the dumping site is distant from Jinja IBP. A detailed assessment of the solid waste generation and composition for the park and the surrounding community is required to guide provisions to meet the IP's requirements and ensure urban symbiosis.

And key VC level impacts to be addressed in the the watsan sector are:

Volume of water use:

The VCs for the proposed sectors require low to medium volumes of water. Currently, the communities in the district rely on piped water supply systems, motorised production wells, irrigation, rainwater harvesting and other surface water sources (rivers, streams and Lake Victoria) to meet the demand for water for production.

Emission of toxic and nutrient pollutants to water and soil:

The VCs for the proposed sectors in the IBP can potentially emit significant volumes of toxic pollutants as compared to nutrient pollutants. Most of the toxic pollutants accumulate due to the use of pesticides in agricultural activities. There is a potential danger of pollution of groundwater and surface water resources through the runoff from farmlands.

Generation and release of solid waste:

The VCs for the proposed sectors can cause a high generation of solid waste. The solid waste is primarily from agricultural practices, with high quantities of biodegradable waste.

The most prominent dependencies at both IP and VC levels are on watsan ecosystem services (Figure 63 and Figure 64).

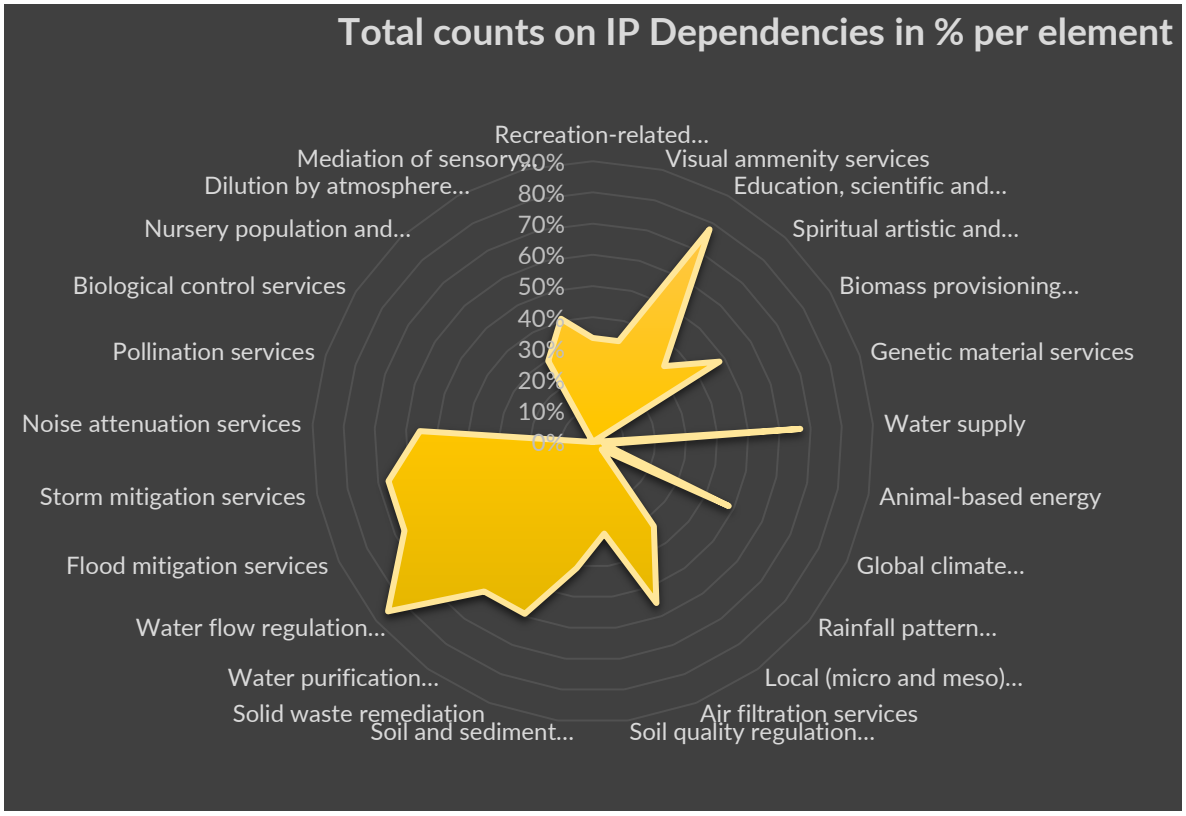


Figure 63: Jinja IBP dependencies at IP level

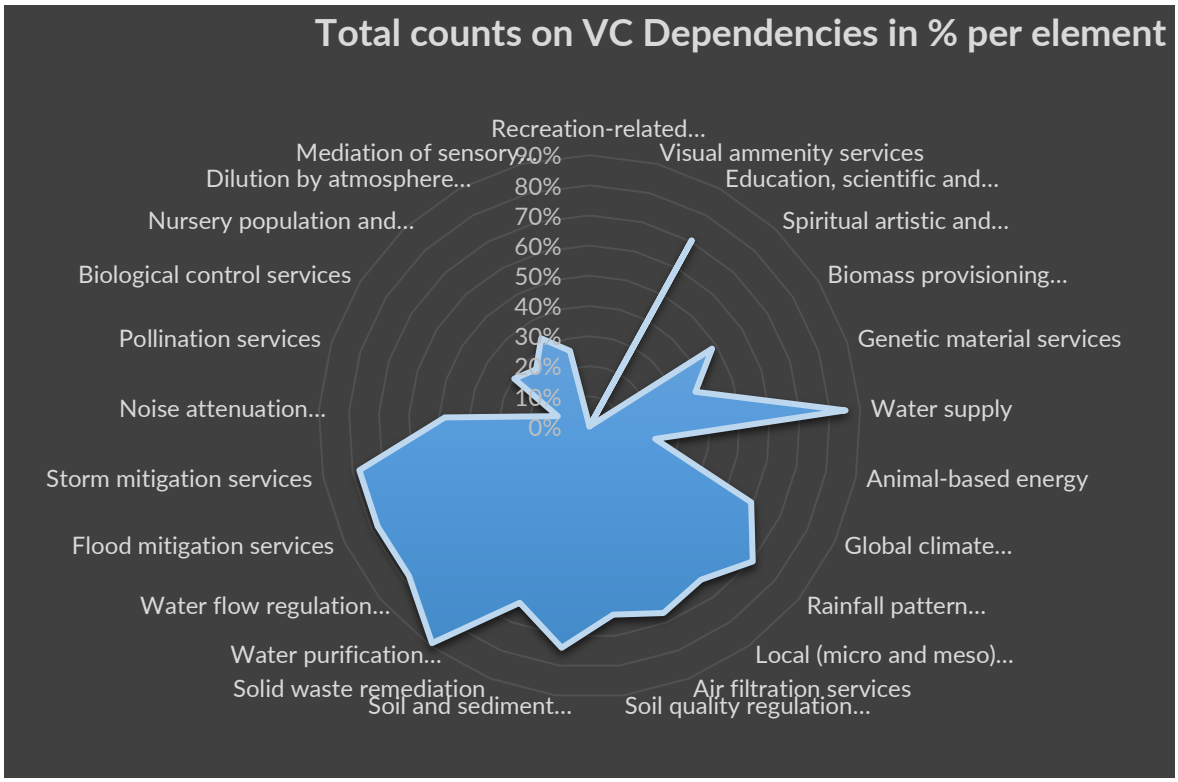


Figure 64:Jinja IBP dependencies at VC level

Key IP level dependencies to be considered in the the watsan sector are:

Water Supply:
The proposed sectors in the Jinja IBP significantly depend on the local ecosystem water supply services. The IBP needs should not foreshadow other water uses in the city and communities relying on the piped water supply system. There are also planned improvements underway to increase the production capacity of the water treatment plant and plans to increase the volume of supply to the IBP in anticipation of establishment of industries. The proposed increase in supply can potentially ensure adequate, safe water access for domestic, institutional, commercial and industrial water users. However, a more detailed assessment is required.

Solid Waste Remediation:
The proposed sectors in the IBP show a low to medium generation of solid waste, however, the IBP will also rely on the solid waste remediation services. The existing solid waste dumping site is distant and hence there is need to establish a new solid waste management site with emphasis on opportunities for urban symbiosis and solid waste valorisation.

Water flow regulation services:
The IP will heavily rely on the water flow regulation services, such as vegetated and forested areas observed in the park's vicinity, to regulate water flows and mitigate the effects of flooding. The IP is bordered by a forest reserve in the north. The vast sugarcane plantations from the western boundary do not present opportunities for water flow regulation services. There is a need for a detailed land use assessment in proximity to the site and its impact on the water flow regulation services.

Storm mitigation services:
The IP is located in an area where the observed land use varies from forested areas, farmland and sparsely built-up areas. The observed land use can provide storm mitigation services through the forest reserve. There is a need to further assess the land use in close proximity to the site.

Flood mitigation services:
The IP will significantly rely on flood mitigation services provided by a combination of a robust drainage system, vegetated areas and forests to reduce the effects of floods. The park is located in an area that is reportedly waterlogged during heavy rains, hence there is a need for the stormwater management systems that are supported by the opportunities identified in the observed land use.

And key VC level dependencies to be considered in the the watsan sector are:

Water Supply:

The VCs of the proposed sectors in the Jinja IBP heavily depend on the local ecosystem water supply services. Currently, the communities in the district rely on piped water supply systems, motorized

production wells, irrigation, rainwater harvesting, and other surface water sources (rivers, streams and Lake Victoria) to meet the demand for water for production.

Solid Waste Remediation:
The VCs for the proposed sectors in Jinja IBP will rely on the local solid waste remediation services. There is no existing solid waste management facility near the IBP. The surrounding areas manage solid waste at the household and institutional level. The solid waste is primarily from agricultural practices, with high quantities of biodegradable waste.

Water flow regulation services:
The VCs of the proposed sectors heavily depend on the local water flow regulation services. The observed land use in some areas of the district is agriculture, forestry, vegetation and built-up areas in the towns. The land use limits or supports the ability of the ecosystem to provide water flow regulation services.

Storm mitigation services:
The VCs will significantly depend on storm mitigation services to support the protection of infrastructure and crop production. There are some areas within the district where forestry and agroforestry are carried out, such as near the IBP, thereby supporting the services. The services are critical to maintaining the VC for the respective production processes.

Flood mitigation services:
The VCs will rely on flood mitigation services to support the protection of infrastructure and crop production. These services include vegetated areas, forests, and the urban drainage network. The land use activities impact the flood mitigation services.

Water purification services:
The VCs of the proposed sectors will heavily depend on the local ecosystem's water purification services to dilute the heavily polluted industrial and agricultural runoff. There are a number of wetlands in the district which can provide water purification services along the VC.

As Jinja IBP was not selected in 10 **Sites preassessment tool results**, details and graphs on impacts and dependencies by element are not featured in this report but available upon request, again, as tenants could not be met, those are indicative for the sectors involved based on the schedule of lease.

3.2. Pre-identified Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

(For WATSAN preidentified needs refer to Part IV.)

3.2.1. RECP infrastructures

The Jinja Industrial and Business Park is located about 11 km from Jinja Town, offering access to industrial-grade power infrastructure with planned future connectivity to the Standard Gauge Railway network. Currently, the park hosts Kiira Motors Corporation as its sole operational tenant,

manufacturing electric buses, with all available land fully allocated. The site faces significant challenges due to its wetland location near a water stream, resulting in frequent flooding that disrupts operations, while its eastern boundary adjoins a protected National Forest Authority Reserve that limits expansion possibilities. A critical infrastructure gap exists in the water supply, as the park lacks piped water services. During our assessment mission, we were unable to engage directly with park tenants, which prevented the identification of operational challenges and potential industrial symbiosis opportunities that could optimize resource sharing and waste utilization among future enterprises.

3.2.2. Social infrastructures

This aspect could not be investigated.

4. Masese/Jinja SMEs Cluster Detailed Analysis

4.1. Sectors Pre-identification and Materiality Assessment

4.1.1. Sectors Pre-identification

The Masese Cluster, located within Jinja City, is a well-established industrial zone with a concentration of medium to large-scale enterprises. During stakeholder consultations, key players such as Nile Agro Industries, Agroways Grain Processing, Nyanza Perch Fish Processing, AGI Steel Company, and Busoga Forestry Company participated in the engagement meetings. See also F Schedule of Leases for a list of exporting companies based in Masese/Jinja.

The sectors represented in the cluster reflect the region's diversified agro-industrial and manufacturing base, including:

- Palm oil and vegetable oil processing
- Soap and detergent manufacturing
- Grain and starch-based industries (maize, cassava, and cereals)
- Steel production
- Fish processing
- Coffee, vanilla, and cocoa
- Fruits and vegetables
- Timber and wood-based products

While most enterprises in Masese operate at scale and do not currently require targeted infrastructure upgrades or expansion support, common challenges were identified. These include:

- Poor road infrastructure and high transport costs impacting logistics efficiency
- Waste management systems that are insufficient to handle industrial by-products and effluents

These issues require coordinated long-term urban and industrial planning, particularly in improving public infrastructure and environmental services, to sustain the cluster's growth and competitiveness.

Table 16 summarizes the companies and sectors of interest at preassessment stage. Further investigation into the sectors and exhaustive list of companies could be investigated provided there is funding for a longer-term project.

Company/Org	Sector	Status	Interests	Export Readiness
Nile Agro Industries, MMP Group	**Vegetable Oil, Palm Oil, Soap:** Nile Agro is under MMP group, focuses on manufacuring vegetable oil, laundry soap and baking flour. The MMP group engagned in various sectors, such as battery, plastic, metal, pater, etc. http://nileagro.co.ug	Operating	Interested in improving road condition and synergies with value chain players	Yes
AgroWays (U) Limited	**Maize/Grains/Cassava:** AgroWay is a designated grain provider to Nile Breweries, so 90% of their business is to supply to the breweries. Theie main operaion is grain storage and distribution, and sometimes process grains into flour and starch. To solve the Aflatoxin issues, they are organzing a testing lab that will open to others later. They also support the program of Uganda Warehousing and Receipting, but doesn't really work due to price fluctuation. https://www.agroways.ug	Operating	Needs support with tools for digitizing warehouse management and price tracking	Yes, but now most of its grain goes to Nile Breweries
Nyanza Perch Limited	**Fish:** Nyanza Perch Limited does fish processing and exports. The company has acquired the processing facilities of Gomba Fishing Industries Ltd. The facility has a freezing capacity of 25 tons a day. The storage capacity for both fresh chilled and frozen products is 350 tons. The facility has an approved HACCP system, and currently working on ISO	Operating	Face challenges in power supply and transportation (road condition)	Yes. Exporting to EU (especially France) & UAE now

	certification. https://www.nyanzaperch.com			
Abyssinia Group Industries (AGI Steel Company)	**Steel:** AGI is one of the largest steel producers in East Africa using mineral resources from its own mining operations and imported billets. https://abyssiniagroup.com	Operating	Face challenges in power supply solid waste handling and transportation (road condition)	Mostly supports domestic market
Busoga Forestry Company	**Wood:** BFC, established in 1996 a Norwegian firm together with Africa Impact Invest Platform as the biggest shareholder, is part of Green Resources Group. It supplies sawn timber, Utility poles, & Wooden pallets to the local & regional markets. They also have plantations in Tanzania and Zambia.	Operating	Wish to advocate for sustainable procurement of wood product. The company also faces challenges of being substituted by concrete poles. Additionally, taxation regime, ESIA certificate and export bans further complicate their business.	Yes. Exporting to EU
MMP Group	**Coffee:** Export green beans to the US	Operating	Interested in value addition activities	Yes. Exporting to the US
Shared by Jinja Commercial Officer	**Vanilla**		Interested in value addition activities	Potential
Shared by Jinja Commercial Officer	**Cocoa**		Interested in value addition activities	Potential

Shared by Jinja Commercial Officer	**Fruit & Vegetables**		Interested in value addition activities	Requires support.

Table 18:Sectors and companies of interest at Masese/Jinja SMEs cluster

Thus, the following sectors were prioritized based on both existing activity and potential for growth, diversification, and impact on the local economy.

Vegetable oil and Soap: Vegetable oil and soap production is a well-established industrial activity in Masese, represented by companies such as Nile Agro Industries. The company operates an integrated value chain where oilseeds are processed into refined cooking oil, with by-products including oilcake used for animal feed and unrefined oil inputs for soap manufacturing. This vertical integration enhances resource efficiency across the value chain. Despite operational maturity, the sector faces environmental management challenges. Industrial waste volumes are increasing, and Nile Agro emphasized the need for an upgraded landfill in Jinja and support for a nearby hazardous waste management facility. Additionally, the company expressed strong interest in the Standard Gauge Railway (SGR) project, citing its potential to lower transportation costs and enhance competitiveness.

Grain and starch-based industries (maize, wheat and cassava): Masese hosts several grain-based processing facilities. AgroWays, a designated supplier to Nile Breweries, is engaged in maize and grain storage, distribution, and conversion into flour and starch. This subsector supports both food security and agro-industrial value addition. However, the industry faces two key challenges: (i) aflatoxin contamination, which affects quality and export potential, and (ii) price volatility, which undermines supply chain stability. In response, AgroWays has invested in a quality assurance laboratory that may also be accessible to other processors. The sector has collectively identified the need for a real-time price monitoring system, which could provide greater market transparency and benefit smallholder suppliers and industrial buyers alike.

Steel production: Steel manufacturing is a major industrial activity in Masese, represented by firms such as AGI Steel. These operations contribute to infrastructure development and regional industrialization. However, producers face critical operational constraints, most notably unreliable electricity supply, which causes equipment failures and production downtime. Additionally, the sector lacks avenues for by-product utilization. For example, AGI Steel generates charcoal residues with approximately 18% carbon content but lacks viable linkages for onward processing or reuse. Addressing power reliability and fostering circular economy solutions for steel by-products are key areas for industrial upgrading.

Fish processing: Proximity to Lake Victoria and the Nile River has made Jinja a hub for Uganda's fish export industry. Companies like Nyanza Perch Limited are engaged in fish processing and export to high-value markets, including the EU and UAE. These exports are typically air-freighted, and the company operates with limited waste through full-product utilization and contracted waste collection services. Nevertheless, challenges persist. Power instability increases costs due to frequent reliance on diesel generators. Moreover, logistics inefficiencies, particularly in cross-border cold-chain transport to Kenya, jeopardize export quality. Export containers are rented from Kenya, yet they are scarce, and refrigeration equipment sometimes fails. The company has highlighted the need for digital logistics systems to improve tracking, order management, and cold-chain reliability.

Coffee, vanilla, and cocoa: Coffee, vanilla, and cocoa are traded primarily in raw form by companies in Masese. For instance, MMP exports green coffee beans to the United States but lacks facilities and technic to engage in value addition. These commodities are Uganda's top cash crops and offer significant potential for increased earnings through domestic processing into higher-value products, such as instant coffee, cocoa powder, or vanilla extracts.

Timber and wood-based products: Sustainable forestry and wood processing are represented by firms like Busoga Forestry Company, part of Green Resources Group. The company leases land from the National Forestry Authority (NFA) and manages commercial plantations in Uganda, Tanzania, and Zambia. Their operations supply utility poles, sawn timber, and wooden pallets to local and regional markets. Despite being certified for sustainable forest management, the company faces policy and perception challenges. Their products are not distinguished from those of unregulated producers, leading to market disadvantages. Export bans and the lack of government recognition of their certifications further compound operational difficulties. The company is advocating for public procurement policies that prioritize sustainability criteria over lowest-price bidding. Additionally, there are market linkage opportunities, as stakeholders in Tororo have expressed demand for certified sustainable wood, which could be met through connections with Busoga Forestry.

The sectors preidentified present the profiles below for the priority economic areas defined in §5.5

Potential for Import Substitution (Figure 65)

As an established industrial area, Masese exhibits modest but targeted potential for import substitution. While many of its industries currently serve the domestic market at scale, there is room for strategic substitution of imported goods through value addition. Sectors such as coffee and fruits and vegetables present opportunities to develop instant coffee, tomato paste, juices, and other processed food products that can replace imports. Additionally, palm oil, vegetable oil, wood products, soap, and basic metals, which are currently supplied by both domestic and international producers, have potential to capture greater market share through quality enhancement, product variety expansion, and competitive pricing.

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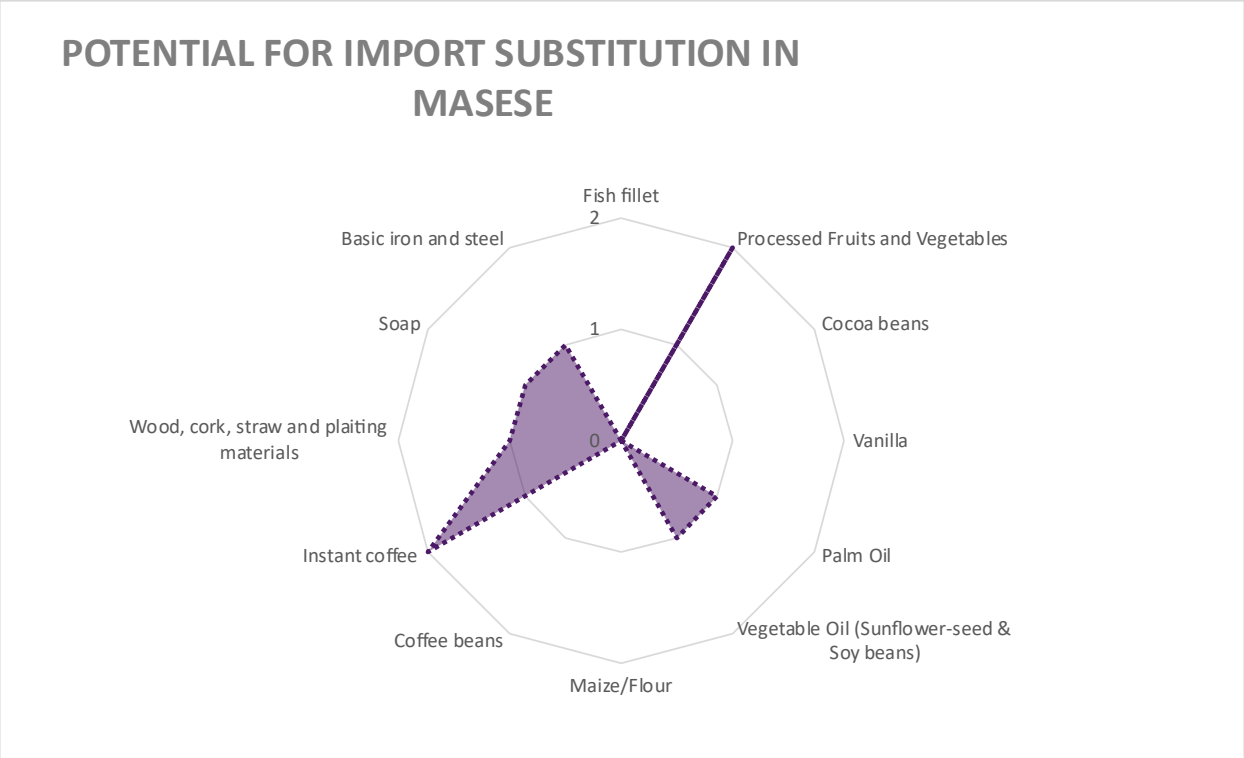


Figure 65: Potential for Import Substitution

Food Security Contribution (Figure 66)

Several sectors within the Masese cluster contribute directly to Uganda's national food security objectives. In particular, fish and maize/maize flour are staple products with high consumption across households. Furthermore, cooking oil and processed fruits and vegetables—notably vegetable pastes and sauces—are recognized components of the basic food basket by development partners such as the World Food Programme (WFP). Strengthening production and processing capabilities in these sectors would enhance food access and affordability across the country.

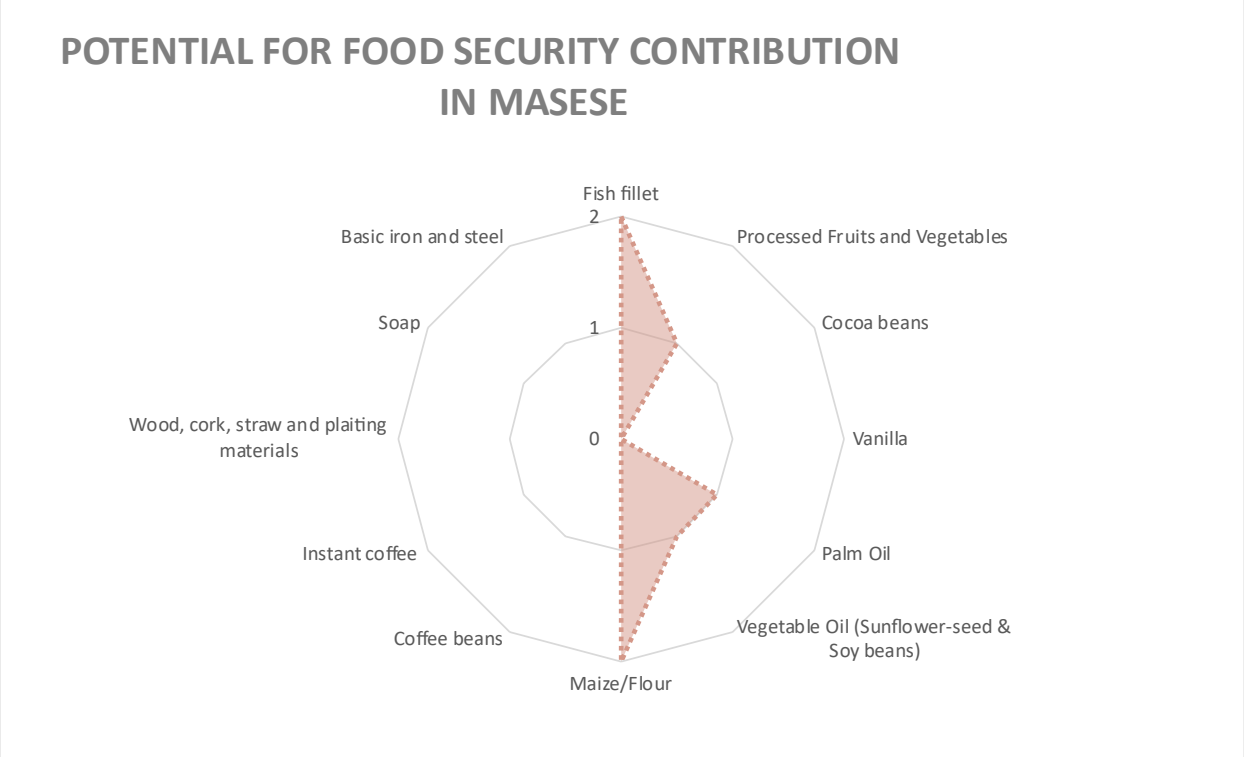


Figure 66: Potential for food security contribution

Diversification and Upgrade Readiness (Figure 67)

The Masese cluster demonstrates a strong foundation for product and market diversification across key sectors. Industries involved in fish fillet processing, cocoa and coffee, vegetable oil, and processed fruits and vegetables show particular promise. While most firms in Masese operate at scale, their diversification capacity varies depending on capital availability, technical expertise, and access to infrastructure. Firms such as MMP Group have expressed readiness to invest in new product lines—such as instant coffee—pending the provision of targeted technical and facility support. Based on stakeholder consultations, sectors such as processed fruits and vegetables, vegetable oil, coffee, and soap are considered highly ready for diversification and upgrading. Moreover, most sectors in the cluster have demonstrated potential to adapt and expand into higher-value markets.

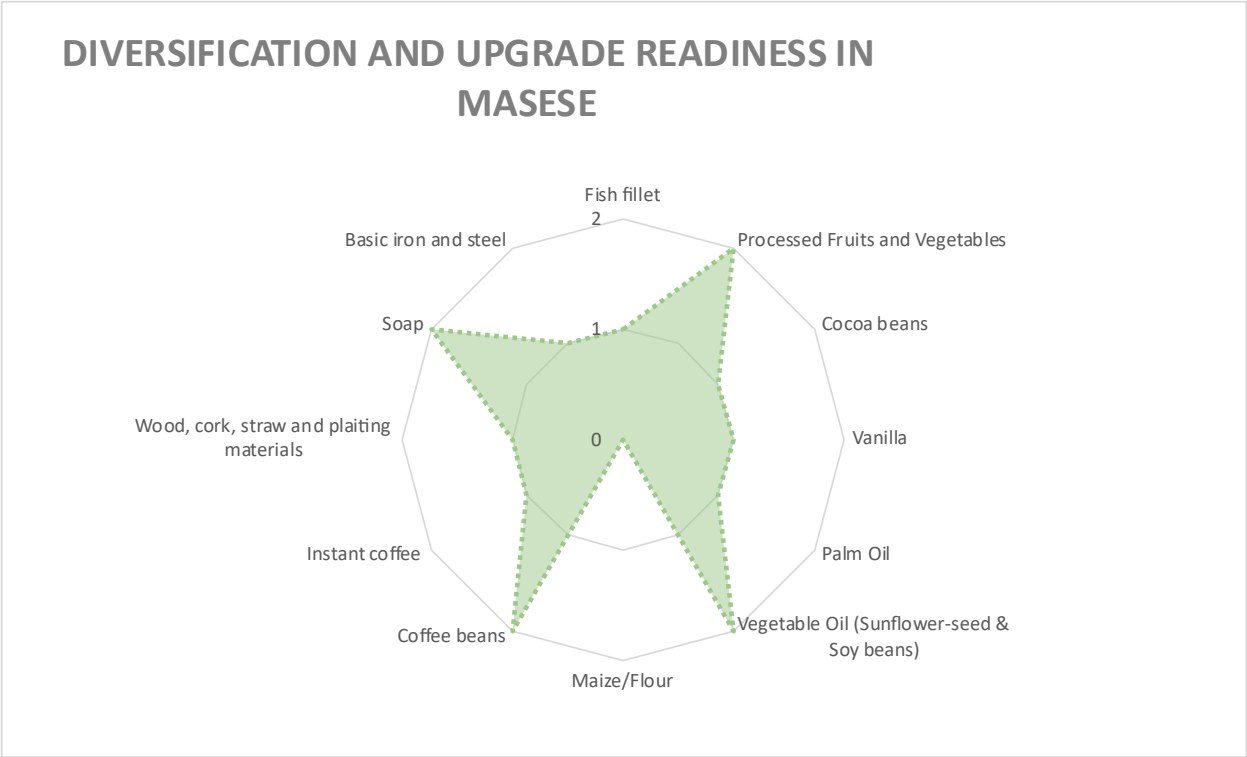


Figure 67: Diversification and upgrade readiness

Potential for Global Value Chain Participation (Figure 68**)**

A number of Masese-based sectors are already integrated into global value chains, leveraging Uganda's export potential. These include fish processing, cocoa, vanilla, maize/flour, coffee, and certified wood products. Firms in these sectors export regularly to Europe, North America, the Middle East, and East Africa. Other sectors, including palm oil, vegetable oil, soap, and basic metal production, remain focused primarily on domestic markets due to the high level of international competition and their reliance on imported raw materials. Nonetheless, these sectors retain potential for gradual integration into regional value chains through investment in quality upgrades and compliance with export standards.

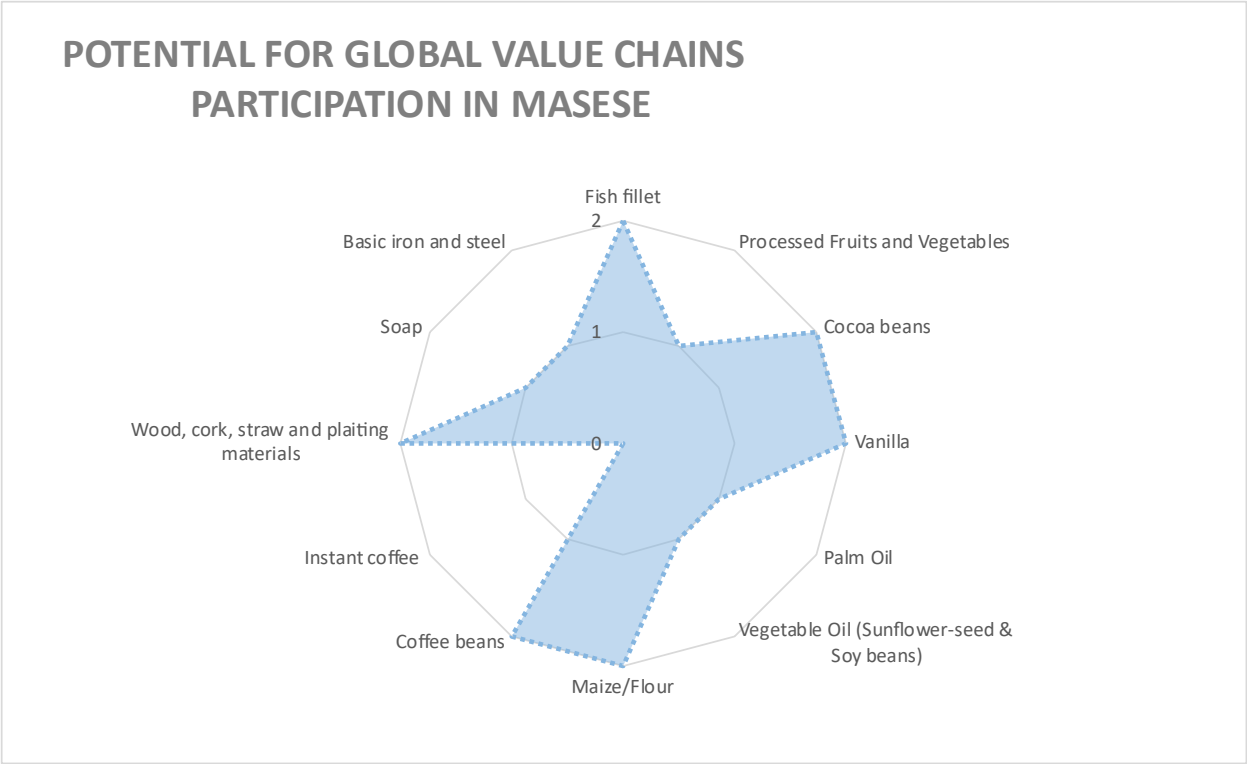


Figure 68: Potential for global value chains participation

Export Readiness (Figure 69**)**

Unlike emerging (greenfield) industrial parks such as Lugazi and Tororo, Masese hosts mature enterprises with established operations and infrastructures. Most sectors in the cluster are export-ready, with quality certification, production capacity, and logistics systems in place. Exceptions include processed fruits and vegetables and instant coffee, which have not yet reached sufficient industrial scale for consistent export. Nevertheless, with moderate investment in value addition facilities, packaging technologies, and export marketing, these sectors can transition into high-value exports. Overall, Masese offers a robust base for expanding Uganda's industrial exports, particularly through targeted support for product development and market linkages.

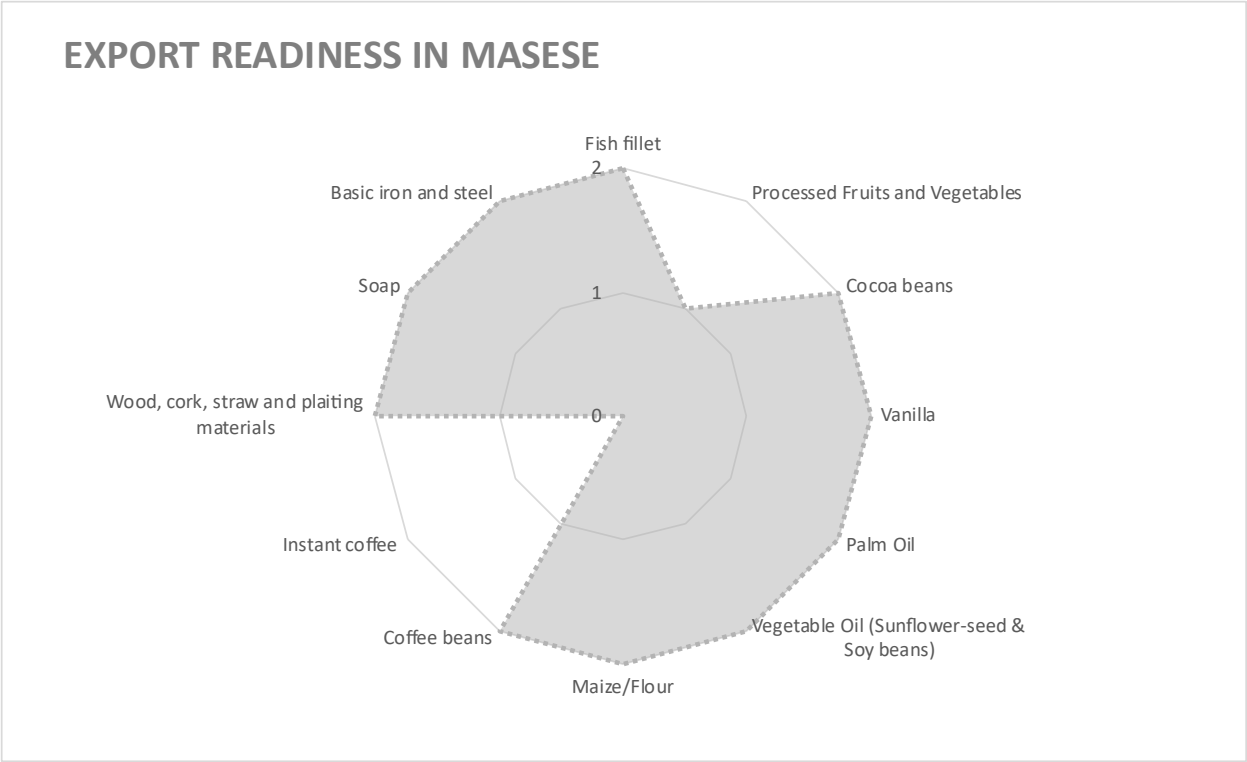


Figure 69: Export readiness

4.1.2. Examples of sectors with export potential

Fish: one of the sectors in Masese cluster

Uganda's fish value chain—particularly in frozen fish fillets and cured fish—offers strong export potential across multiple global markets. For frozen fish fillets, the total export potential is $34 million, with $23 million still unrealized. The United States is currently the largest market for frozen fish fillets, while growing demand from the Middle East—notably Israel, UAE, and Saudi Arabia—is driving further expansion (Figure 65). Uganda also trades with several Western European countries, and exports to this region could double to $21 million, particularly in markets like Spain, Italy and Germany. Additional opportunities exist in East Africa and East Asia.

On the other hand, cured fish is already a major success story, with Hong Kong importing $52 million, making it the largest buyer (Figure 66). Despite relatively low volumes at present, Europe presents an estimated $29 million in untapped potential—especially in Portugal and Italy, where cured fish is culturally significant. Other growth markets include Central Africa (especially the DRC), North America, and the Middle East. To realize these opportunities, Uganda's fish sector will need to strengthen environmental protection to secure long-term fish supplies and cold chain logistics to ensure sanitary and phytosanitary compliance.

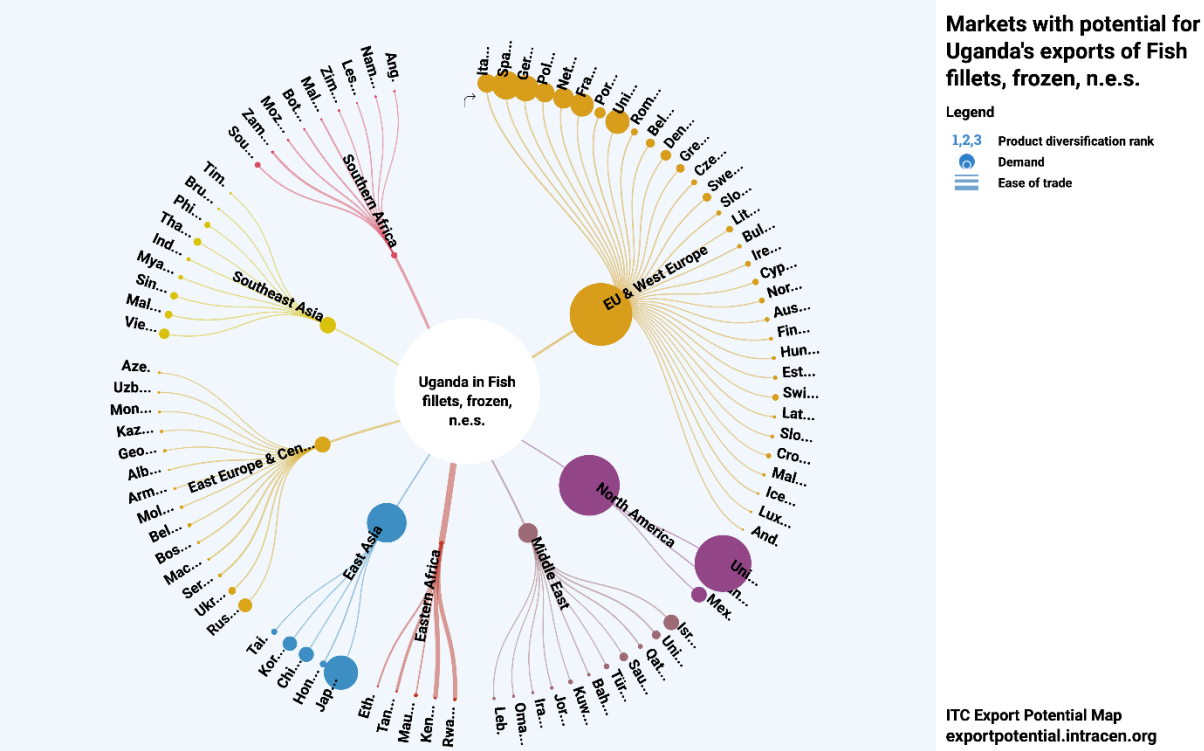


Figure 70: Markets with potential for Uganda's exports of frozen fish fillets.

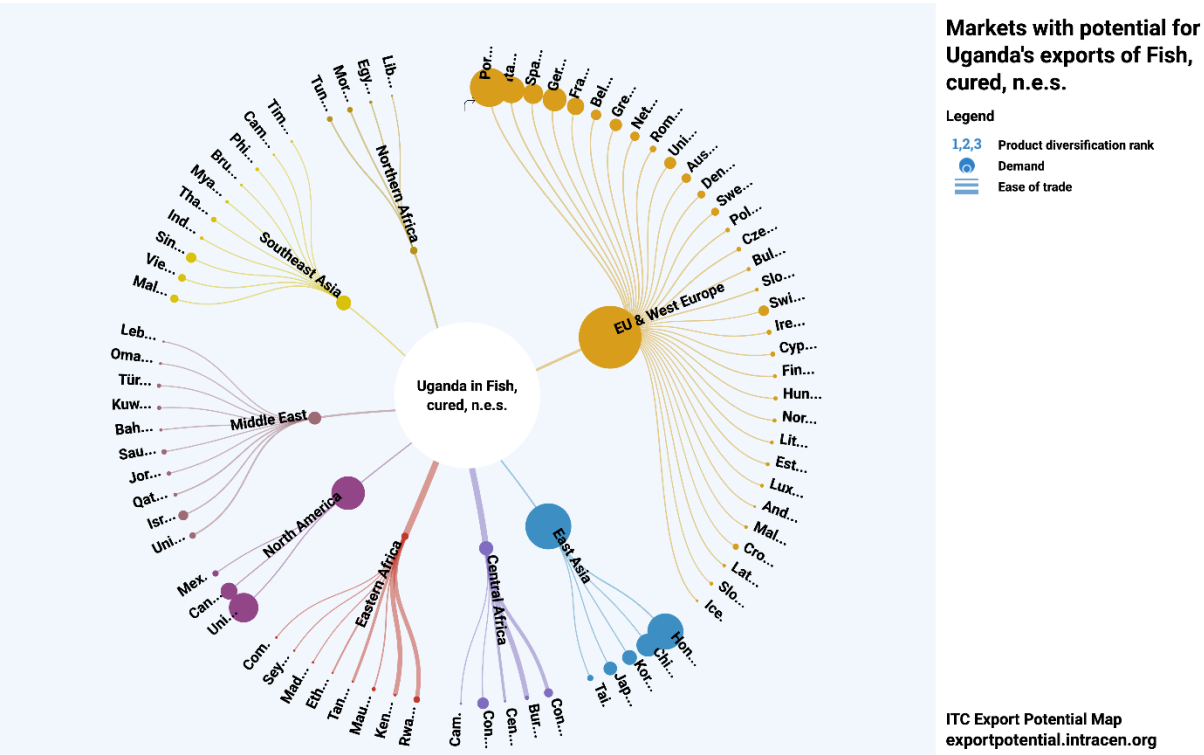


Figure 71: Markets with potential for Uganda's exports of cured fish.

See also § 14.2.2 for Coffee, Cocoa, Vanilla and §15.1.2 for Vegetable Oil.

4.1.3. Materiality assessment

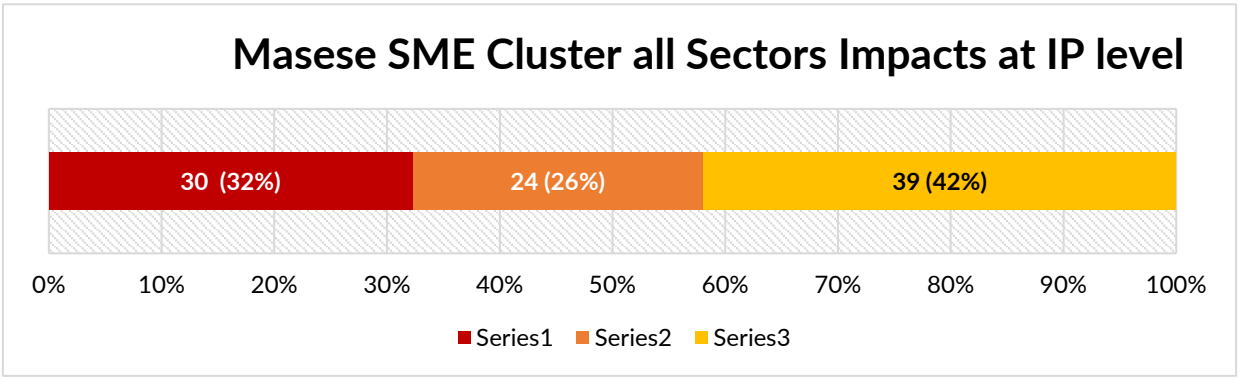
The 11 sectors/products and processes the materiality assessment focused on were (see Table 15**):**

SECTOR CHECK-LIST	ACTIVITIES
Palm Oil	Whole palm oil processing
Vege oil	Whole vegetable oil processing
Soap	Whole soap processing, by-product of oil
Maize/Grains/Cassava	Milling into flour
Steel	Finishing process
Fish	From fresh fish to fillet, both fresh & frozen
Coffee	From raw coffee beans to green beans
Vanilla	Whole vanilla processing
Cocoa	Cocoa processing
Fruit & vegetables	Dried fruit or juice
Wood/Timber	Wood processing to timber and boards

Table 19: Masese SMEs Cluster sectors checklist

Note that the processes identification is not final, thus the materiality rating did not limit itself to the strict processes listed but encompassed other likely processes if their impact would be more material, unless there was a clear indication that those could not take place, for example due to technical limitations. The tourism sector has not been confirmed yet; thus, we did not do its materiality rating.

The materiality assessment shows no disqualifying concern, though this is the park with the highest number of high materiality impacts. Also, the percentage of High materiality impacts at Value Chain Level is far greater than at IP level (56% of all impacts vs 32%). Besides the overall impacts at IP level are not negligible with 54 elements rated high or medium all sectors considered (Figure 67).



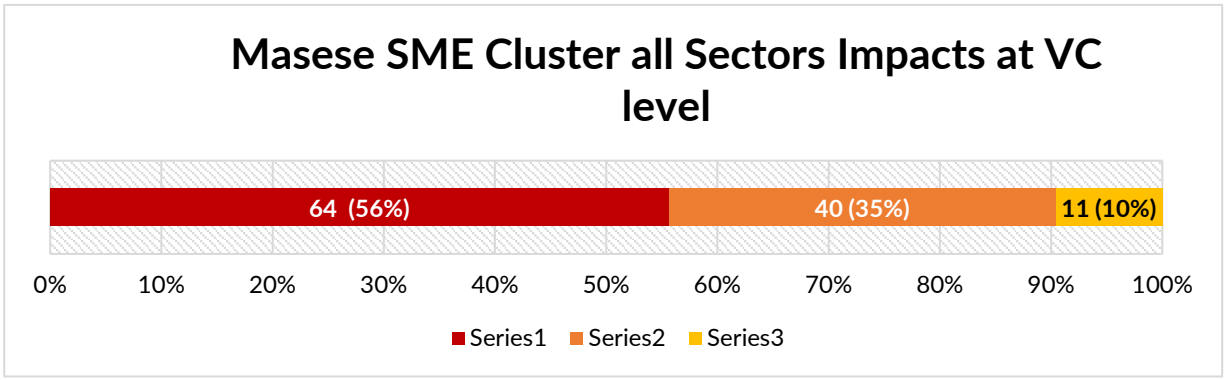


Figure 72: Masese SMEs Cluster impacts at IP and VC levels.

Overall, the elements most impacted at IP level are the volume of water use, emission of nutrients and toxic pollutants to water and soil, disturbances, solid waste generation and the emission of GHG and non GHG air pollutants. As can be expected, the value chain presents elements of concern adding area of land use and of freshwater use concerns to the list (Figure 68 and Figure 69).

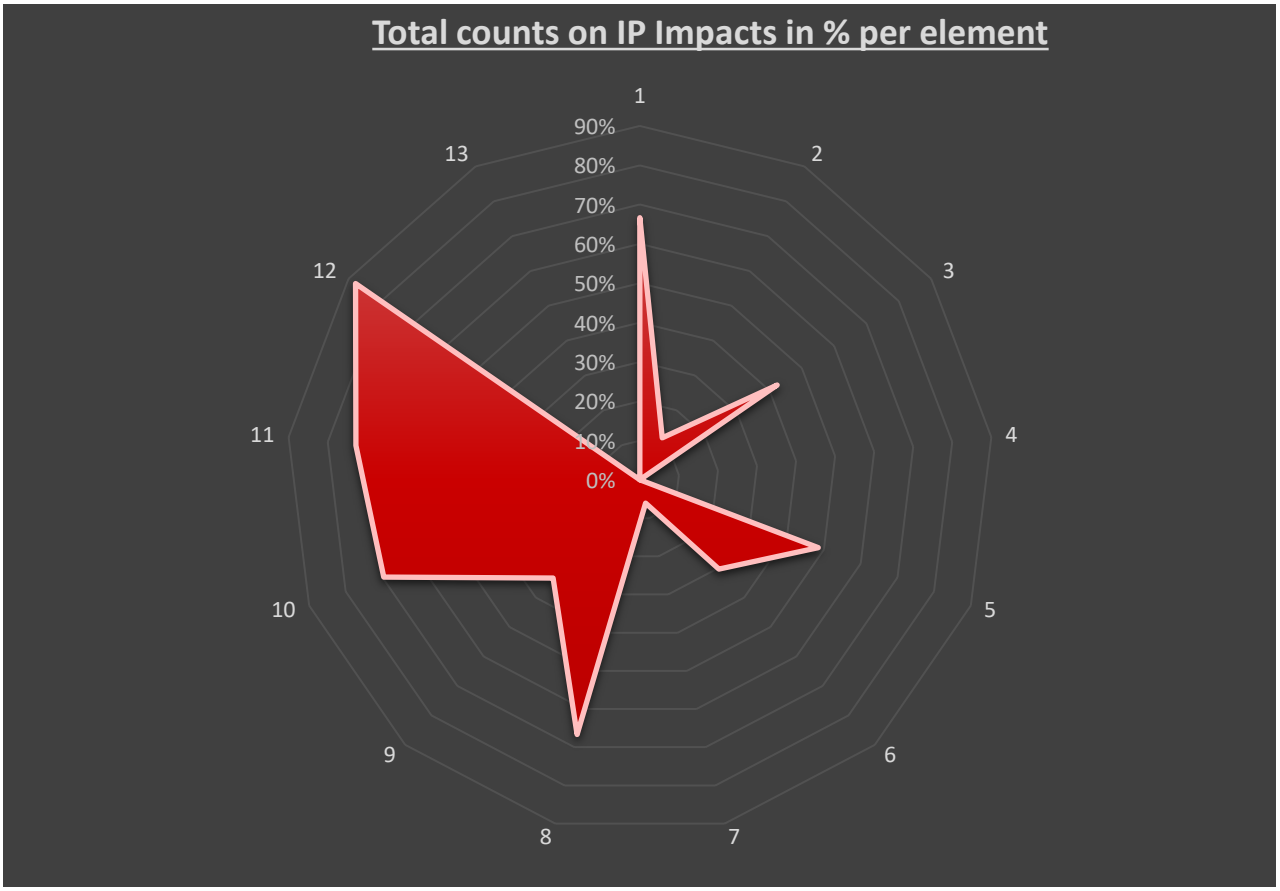


Figure 73:Masese SME Cluster impacts at IP level

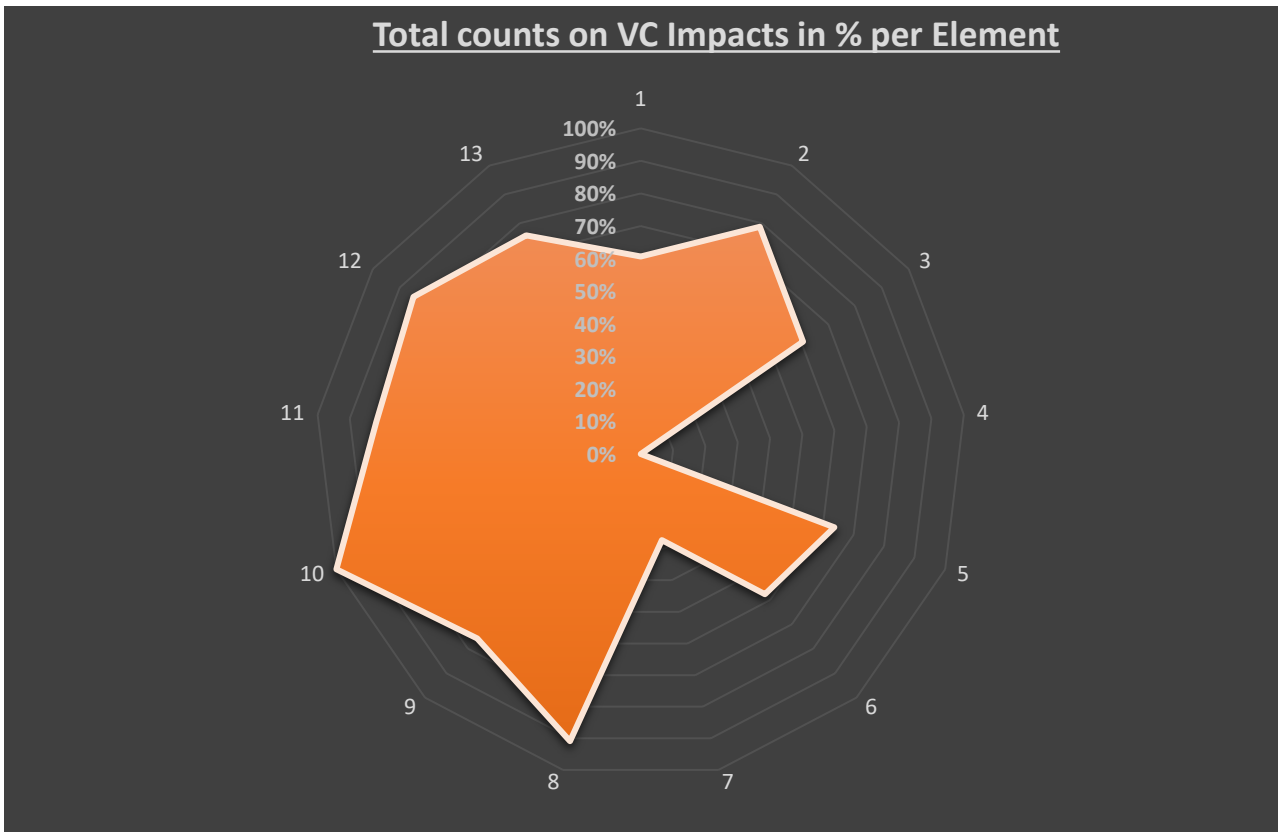


Figure 74: Impacts in % per element at VC levels

In particular, key IP level impacts to be addressed in the the watsan sector are:

Volume of water use:
The proposed sectors in the SME Cluster require high volumes of water use. Currently, Jinja town relies on surface water from a Water Treatment Plant which abstracts raw water from Lake Victoria. There is need to assess the current and projected water requirements for the domestic, institutional, commercial and industrial water uses.

Emission of toxic and nutrient pollutants to water and soil:
The proposed sectors in SME Cluster can potentially emit high volumes of nutrient and toxic pollutants that can result in pollution of groundwater and surface water resources. The surface water resource nearest to the park is Lake Victoria, located to the east of the SME Cluster. Hence there would be far reaching implications of pollution of the water sources.

Generation and release of solid waste:
The proposed sectors can cause significant generation of solid waste at the industrial park. Currently, the municipality relies on a solid waste dumping site at Masese. However, the site does not follow standard landfilling operation and management principles and practices. There are ongoing initiatives by Jinja city to implement recycling of waste to compost. A detailed assessment of the solid waste generation and composition for the park and municipality is required.

And key VC level impacts to be addressed in the the watsan sector are:

Volume of water use:
The VCs for the proposed sectors in the SME Cluster require high volumes of water use. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting and other surface water sources (rivers, streams and Lake Victoria) to meet the demand for water for production.

Emission of toxic and nutrient pollutants to water and soil:
The VCs for the proposed sectors in SME Cluster can potentially emit significant volumes of toxic pollutants as compared to nutrient pollutants. The toxic pollutants accumulate due to the use of pesticides in the agricultural activities. There is a potential danger of pollution of groundwater and surface water resources.

Generation and release of solid waste:
The VCs for the proposed sectors can cause high generation of solid waste. The solid waste is primary from agricultural practices, with high quantities of biodegradable waste.

The most prominent dependencies at both IP and VC levels are on watsan ecosystem services (Figure 70 and Figure 71)

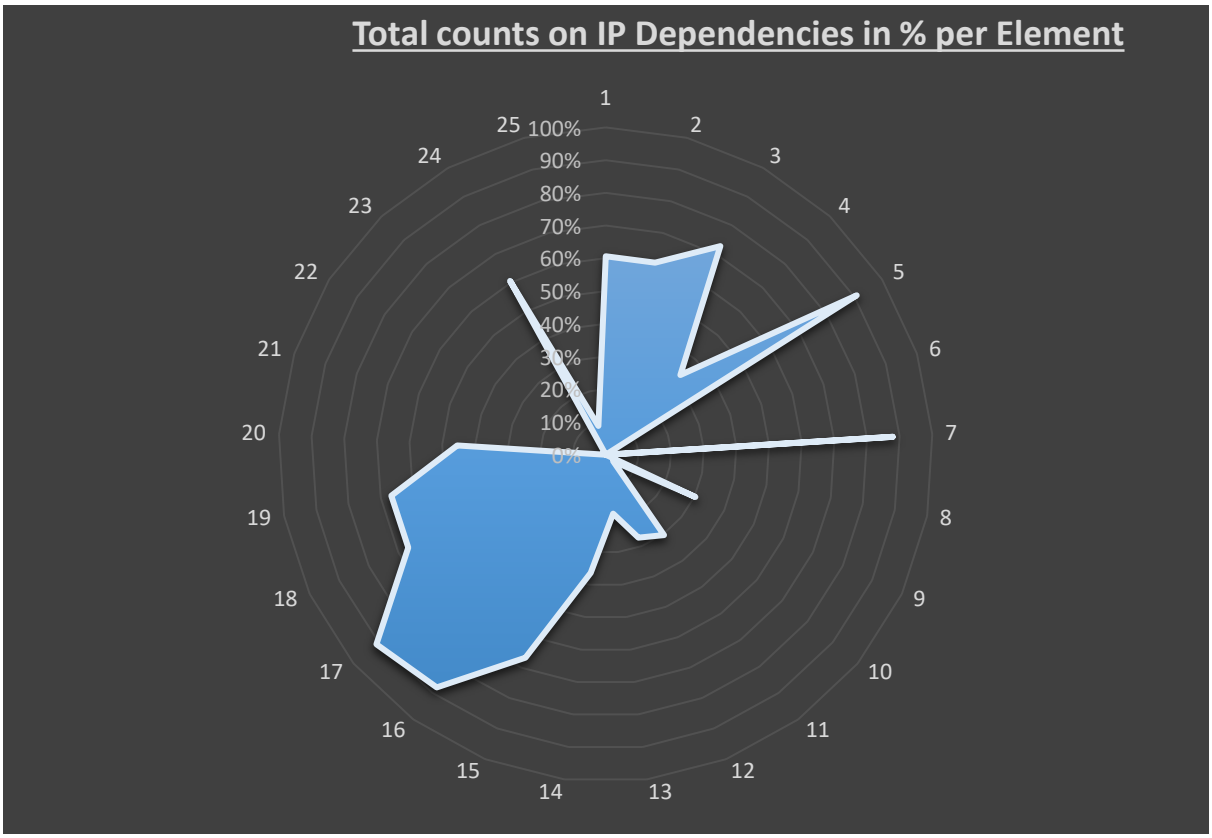


Figure 76:Dependencies in % per element at IP level

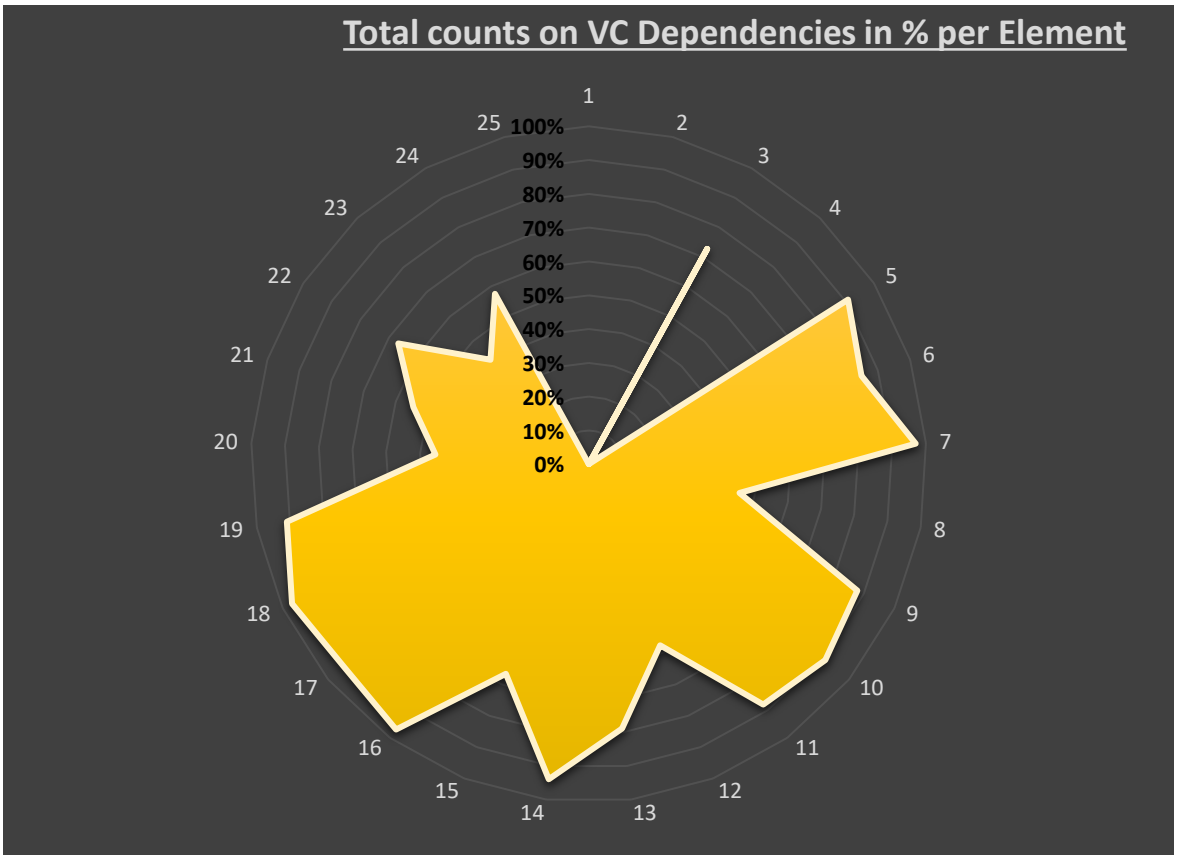


Figure 75:Dependencies in % per element at VC level

Key IP level dependencies to be considered in the the watsan sector are:

Water Supply:

The proposed sectors in the park have a high dependency on water supply services. The IP needs should not foreshadow other water uses in the city and communities relying on the piped water supply system. There are planned improvements underway to increase the production capacity of the water treatment plant. The proposed increase in supply can potentially ensure adequate safe water access for domestic, institutional, commercial and industrial water users. However, a more detailed assessment is required.

Solid Waste Remediation:

The proposed sectors in the park will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and city, through improved solid waste management practices. There is also potential for valorization of solid waste generated at the IP. This can be further assessed in a detailed assessment of solid waste generation and composition for the IP and city.

Water flow regulation services:

The IP will also heavily rely on the water flow regulation services. The observed land use within the vicinity of the IP is primarily built-up areas. The observed land use limits the ability of the ecosystem to provide water flow regulation services. There is need for a detailed land use assessment in proximity to the site and its impact on the water flow regulation services.

Storm mitigation services:
The IP will rely on storm mitigation services, however, the observed land use in close proximity to the park (built-up areas) cannot provide storm mitigation services. There is need to further assess the land use in close proximity of the site.

Flood mitigation services:

The IP will also rely on flood mitigation services. The site is located in a built-up area, where flood mitigation services will be supported by robust urban storm water management practices. A drainage masterplan for the SME Cluster, incorporating the storm water management structures for the access roads is required.

Water purification services:

The proposed sectors will require water purification services. There is a wetland along the eastern boundary of the SME Cluster. This would provide the water purification services.

And key VC level dependencies to be considered in the the watsan sector are:

Water Supply:

The VCs of the proposed sectors in the SME Cluster have a high dependency on water supply services. Currently, the communities in the district rely on piped water supply systems, motorized production wells, irrigation, rainwater harvesting, and other surface water sources (rivers, streams and Lake Victoria) to meet the demand for water for production.

Solid Waste Remediation:

The VCs for the proposed sectors in the SME Cluster will also rely on the solid waste remediation services. The existing solid waste dumping site can potentially serve the industrial park and city. The areas outside the city manage solid waste at household and institutional level. The solid waste is primary from agricultural practices, with high quantities of biodegradable waste.

Water flow regulation services:

The VCs of the proposed sectors will also heavily rely on the water flow regulation services. The observed land use in some areas of the district is agriculture, forestry, vegetation and built-up areas in the towns. The land use limits or supports the ability of the ecosystem to provide water flow regulation services.

Storm mitigation services:

The VCs will rely on storm mitigation services to support the protection of infrastructure and crop produce. There are some areas within the district where forestry and agroforestry is carried out, thereby supporting the services. The services are critical to maintain the VC for the respective production processes.

Flood mitigation services:

The VCs will also rely on flood mitigation services to support the protection of infrastructure and crop produce. The land use activities impact the flood mitigation services.

Water purification services:

The VCs of the proposed sectors will require water purification services. There are a number of wetlands in the district which can provide water purification services along the VC. There is also an existing wetland along the shores of Lake Victoria.

As Masese SMEs cluster was not selected in 10 **Sites preassessment tool results**, details and graphs on impacts and dependencies by element are not featured in this report but available upon request.

4.2. Pre-identified Common Infrastructures & Services and Resource Efficient & Cleaner Production measures

(For WATSAN preidentified needs refer to Part IV.)

4.2.1. RECP infrastructures

Opportunity for RECP symbiotic infrastructures:

The Masese Industrial Cluster is a well-established brownfield site in Jinja City's South Division, with over 80% of its land already occupied by operational industrial tenants. The cluster has a railway line that runs through the property, connecting it to Masese Port on Lake Victoria. The government's planned upgrade to a standard-gauge railway (SGR) presents a significant opportunity for tenant industries to decarbonize their supply chains. Discussions with Busoga Forests Company indicate that utilizing the upgraded rail link could reduce their transportation costs by over 60% while substantially cutting emissions currently generated by road freight. The cluster also benefits from direct access to major

highways, including the Jinja-Kampala and Jinja-Tororo-Busia routes, ensuring seamless road connectivity. Additionally, the site is supported by a reliable three-phase industrial-grade power supply.

Industrial symbiosis opportunity for Masese Industrial Cluster

i. Transforming Fish Waste into food-grade gelatine

The Masese Fish Factory currently utilizes only about 50% of its processed fish, with the remaining half being sold as waste to local artisanal animal feed processors. However, poor waste management practices have led to persistent odor issues affecting nearby communities. This challenge presents a strategic opportunity to convert fish waste into higher-value products like food-grade gelatin, which commands premium prices in the pharmaceutical and food industries. The gelatin production process would simultaneously address the odor problem through proper waste containment while still providing crushed bones and skins as byproducts for animal feed processors, maintaining existing revenue streams.

ii. Densifying unburnt coal-charcoal residue for heating in steam boilers

The AGI Iron and Steel Factory faces a growing challenge in managing unburnt coal-charcoal residue, which accumulates in large quantities and requires significant storage space. This residue can be repurposed for lower-grade heating applications, such as low-pressure steam boilers. This presents an industrial symbiosis opportunity to densify the material for more efficient use in steam generation, benefiting agro-processors, institutional stoves, and domestic cooking. Additionally, the factory produces slag, a molten waste byproduct composed of silica (SiO_2), alumina (Al_2O_3), and other impurities, which holds potential for reuse in cement production, further reducing waste and supporting circular economy practices.

iii. Power Stabilization for Reliable Operations

Power instability remains a critical issue for tenants within the Masese Industrial Cluster, where frequent surges lead to equipment failures and operational disruptions. For instance, the Masese Fish Factory reported significant losses due to cold room and ice-making machine failures, resulting in spoiled inventory and costly repairs involving imported spare parts. Many factories resort to diesel generators as a backup, increasing both production costs and greenhouse gas emissions. A shared power substation equipped with voltage stabilizers could mitigate these challenges, ensure reliable electricity and reduce dependence on fossil fuels.

iv. In Vessel composting for urban industrial symbiosis

Jinja City Council has invested in 15-ton waste-separating machines to segregate organic matter from plastics, enabling composting. However, under natural conditions, organic waste decomposition can take weeks or months, leading to accumulation at dump sites near the Masese Industrial Cluster. To address this, investing in In-Vessel Composting technology, which employs automation, controlled aeration, and real-time monitoring, can drastically reduce composting time, improve compost quality, and prevent anaerobic conditions that generate foul odors and harmful emissions.

Opportunity for logistics infrastructure:

i. Shared maintenance workshop.

Another pressing concern is motor failure, which forces factories to transport damaged units to Kampala or even Kenya for repairs, causing prolonged downtime and high maintenance expenses. Establishing a shared maintenance workshop with a dedicated motor winding section within the cluster would minimize delays and lower operational costs.

ii. Port infrastructure

There is also an opportunity for revamping the port infrastructure, especially under the assumption that the railway from Masese to Jinja is going to be revamped. This infrastructure would also provide symbiosis with Jinja city (including Jinja IP) and surrounding districts like Buikwe (where Lugazi IP is being constructed). The port could be combined with an eco-tourism and wetland rejuvenation initiative to clean the water.

4.2.2. Social infrastructures

This aspect could not be investigated.

5. Conclusion: Site Selection

The preassessment concludes on the **selection of Lugazi IP and Tororo IP** as summarized in Table 16 and detailed in 10 (**Sites preassessment tool results**). **The materiality assessments didn't point out to an exclusion of any sites,** though of course mitigation measures would be needed in each of them. In-depth field missions for the elaboration of master planning and recommendations as well as green benefits valuation using GGGI eCBA tool are planned for the next phase of the project.

Site	Final selection Y/N	Next steps recommendations
LUGAZI Industrial Park	Yes.	The park offers a reproductible model for decentralized parks with mix export-domestic focus promoting innovation, SMEs and gender/social inclusion. Support could be phased for longer term development with various models for service allocation and would make an excellent case for eCBA.
Masese/Jinja Cluster	Maybe but recommended for project with a longer time-frame	The park would present one of the first documented model for supporting a cluster to form an Industrial Park with a prior and post park formation simulated in an eCBA exercise. However, the complexity of the project requires a longer time-frame and funding. Complementary or co- funding is required.
JINJA Industrial Business Park	No unless included in a wider project (port)	Symbiosis with Masese SMEs cluster could potentially be envisioned in relation to a shared port services and provided ecosystems preservation measures are put in place.
TORORO Industrial Park	Yes	High prospect as a logistics hub and for urban symbiosis services. Potential to act as an SME h. Border location of significant importance.

Table 20: Site selection results

6. ANNEXES

A. Terms of Reference of the Mission Consultants

Green Freezones Expert Individual Consultant

Objective: Developing the capacity of The Uganda Free Zones Authority (UFZA) to set up Export Free Zones that are designed to meet global green trade standards

General Information

Project: **UG066 Developing the Capacity of Uganda Freezones Authority to set up Freezones that meet Global Green Trade Standards**

Duty Station: Uganda

Contract Duration: 08 April 2025 - 30 June 2025

Project background

Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries in order to contribute to growth, employment, and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that emphasizes product certification, sanitary and phytosanitary standards and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and The Global Green Growth Institute will partner to deliver the project.

This project will support Uganda's exporting enterprises to increase profitability, income and employment by promoting green, sustainable and resilient industrial infrastructure that is well adapted to handling different climate crises.

Objectives of the assignment

The overall goal is to design the infrastructure to allow the freezone and its contextual city to thrive, as an economic system that is climate proofed. The consultant will supervise a team of sectoral experts and act as the primary green industrial parks expert and quality controller to deliver the project deliverables.

Deliverables and Payment schedule

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

The consultant will be the primary expert for green industrial parks expert and quality controller to deliver the activities outlined below.

SPECIFIC ACTIVITIES

Planning Phase

1. Project start-up, inception meeting online, partners mobilization
2. Document/data collection and background analysis
3. Development of methodology by sector, including methodological design, interview and survey tools

4. Identification of information gaps and limitations
5. Collecting data and analyzing quantitative and qualitative information
6. Online interviews
7. Manage the site selection exercise

Field Work Stage

1. Field missions tools/methodology preparation
2. Field surveys/data collection for all locations

Project Deliverables

1. Workplan and methodological tools for the 2 sites
2. Site selection report
3. Field work preparation

Consultant's Specific Deliverables

1. Team leadership and work supervision
2. Workplan and methodological tools for the 2 sites based on sectoral methodological tools inputs
3. Site selection report
4. Field work preparation

Timetable and reporting arrangements

The outputs shall be delivered in a phased manner, as stated below.

Deliverables	Input-timeline	Payment
1. Planning: Workplan and methodological tools by sector and secondary data collection and site pre-identification presentation, and draft site selection report.	30 May 2025	40%
2. Planning: Stakeholder Engagement & Communication plan	15 May 2025	20%
3. Field Work: Field missions preparation and supervision.	6 June 25	40%

Notes: The input-timelines are indicative only. Deadlines will be agreed as part of the inception report.

Reporting arrangements

The consultant shall report to the Project Lead, Greening Uganda's Freezones.

The consultant's progress will be monitored primarily through periodic review meetings, as jointly agreed, and specified in the inception report. The consultant is also expected to produce, upon GGGI's request, a formal progress report that includes: an overview of the assignment; a narrative description of project activities; progress on deliverables to date; and actual achievements made against the timeline set.

A soft copy of the draft report shall be sent to the Country Representative. A soft and one hard copy of the final report shall also be submitted. The final report will be accompanied by all other material used for the assignment such as notes of meetings including stakeholders' contacts, graphics and so on.

Expertise required

Academic qualifications

University degree in engineering and management, or a related engineering discipline with verifiable direct experience in green industrial estate design and improvement.

Professional experience:

1. Minimum of 10 years of relevant professional experience in sustainability program management, evaluation and feasibility assessments
2. Minimum 6 years of industrial ecology, circular economy, Eco-Industrial Parks and/or innovative PPP approaches.
3. Proven multi-stakeholder engagement and communication skills is highly desirable.
4. Fluency in English, verbal and written is required.
5. Excellent report writing skills.

Administrative information

Selection method is GGGI Consultant Roster

Economist/Financial Modelling Expert

Objective: Developing the capacity of The Uganda Free Zones Authority (UFZA) to set up Export Free Zones that are designed to meet global green trade standards

Contract	
Project	Greening Uganda's Freezones
Expertise	
Category	Economist/Financial Modelling Expert
Location	
Duty station	TBD, with support from Kampala
Contract length	
Start date	February 20th 2025
End date	September 30th 2025
Part-time/ full-time	Part time
Contract value	
Days estimated	100
Outputs/Deliverables estimated	This is based on approved outputs and their percentages in the timetable below.

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.

Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries inorder to contribute to growth, employment and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that

emphasize product certification, sanitary and phytosanitary standards and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and The Global Green Growth Institute will partner to deliver the "Greening Uganda's Freezones" Project.

Immediate context
To support Uganda's exporting enterprises, increase profitability, income and employment by promoting green, sustainable and resilient industrial infrastructure that is well adapted to handling different climate crises.

Goal
The overall goal is to design the infrastructure to allow the freezone and its contextual city to thrive, as an economic system that is climate proofed.

Objective
Develop green climate proofed masterplans including symbiotic infrastructure plans and infrastructure project concept notes and teasers for 2 freezone 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 freezone and the wider city in a green way. This extends to planning and engagement with not only those responsible for the development of the freezone but also, the surrounding municipality and local businesses.

The consultant will be the focal point for the financial and economic deliverables under the supervision of the team leader.

Specific activities
INCEPTION PHASE
1. Stakeholder identification and analysis per site
2. Document/data collection and background analysis
3. Development of Financial modelling and eCBA methodology incl. methodological design, interview and survey tools
4. Identification of Financial and eCBA information gaps and limitations
5. Collecting data and analysing quantitative and qualitative information
6. Online interviews

FIELDWORK PREPARATION:
7. Together with GGGI inhouse experts, refinement and customization of initial financial and eCBA information per site.
8. Concept note data collection for site specific infrastructure as per annex 1
9. Field surveys/Data Collection Kampala and other additional locations

FIELD MISSION DATA ANALYSIS AND SECTORAL REPORT DEVELOPMENT
10. Field Missions data analysis
11. Field Missions financial and eCBA reports drafts
12. Field Missions infrastructure and financial model for self-sustainability drafts
13. Complementary data collection/missions (ex-technical experts)
14. Revised sectoral reports and concept notes

Project Deliverables

1. Workplan and methodological tools for the 2 sites
2. Draft master plan and infrastructure plans
3. eCBA and financial plan for infrastructure per site
4. Project concept notes

5. Final report.

Specific Deliverables

6. Methodological tools for the 2 sites
7. Anchor Industry and supporting industries analysis, parks business models with profitability calculations and financials.
8. Financial modelling of the masterplan and infrastructure plans for self-sustainability and management models proposals.
9. eCBA on sectoral models and financial plan for infrastructure per site **indicating contribution to GGGI Strategic Outcomes**
10. Project concept notes
11. Final report.

Timetable and reporting arrangements

The outputs shall be delivered in a phased manner as indicated below.

Deliverables	Input-timeline	Payment
1. 1. Inception Phase: Methodological financial analysis tools for the 2 sites	28 February 2025	10%
2. Field Phase: Field missions preparation, delivery and data analysis. Draft anchor Industry and supporting industries analysis, parks business models with profitability calculations and financials. Draft and infrastructure plans, Draft Financial models of the masterplan and infrastructure plans for self-sustainability and management models proposals.	28 March 2025	30%
3. eCBA on select sectoral models and financial plan for infrastructure per site **indicating contribution to GGGI Strategic outcomes** and project concept notes	30 April 2025	30%
4. Final financial models and selected eCBA modelling and narrative report	16 May 2025	15%
5. Report revisions.	16 June 2025	10%
6. Retention for final report editing.	24 June 2025	5%

Notes: The input-timelines are indicative only. Deadlines will be agreed as part of the inception report.

Reporting arrangements

The consultant shall be supervised by the team leader who reports to the Project Manager who they shall work with on a day-to-day basis.

The consultant's work progress will be monitored primarily through periodic review meetings, as jointly agreed, and specified in the inception phase. The consultant is also expected to produce, upon GGGI's request, a formal progress report that includes: an overview of the assignment; a narrative description of project activities; progress on deliverables to date; and actual achievements made against the timeline set.

A soft copy of the draft report shall be sent to Project Manager. A soft and one hard copy of the final report shall also be submitted. The final report will be accompanied by all other material used for the assignment such as notes of meetings including stakeholders' contacts and so on.

Qualifications/experience/expertise

Academic qualifications

University degree in finance, accounting, or a related discipline with verifiable direct experience in water and sewerage system design.

Professional experience:

6. Minimum of 10 years of relevant professional experience in financial analysis, business development and investment modelling.
7. Experience in stakeholder engagement to achieve an approvable design solution.
8. Experience in the development of innovative PPPs in relation to water and waste management.
9. Proven multi-stakeholder engagement and communication skills is highly desirable.
10. Fluency in English, verbal and written is required.
11. Excellent report writing skills.
12. Recognition as an expert in the field of investment.

Mode of procurement
Local procurement.

Water and Sanitation Expert

Objective: Developing the capacity of The Uganda Free Zones Authority (UFZA) to set up Export Free Zones that are designed to meet global green trade standards

Contract	
Project	Greening Uganda's Freezones
Expertise	
Category	Water and Sanitation Expert
Location	
Duty station	TBD , with support from Kampala
Contract length	
Start date	
End date	
Part-time/ full-time	
Contract value	
Days estimated	
Outputs/Deliverables estimated	This is based on approved outputs and their percentages in the timetable below.
Total fees	

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.

Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries inorder to contribute to growth, employment and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that emphasize product certification, sanitary and phytosanitary standards and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and The Global Green Growth Institute will partner to deliver the "Greening Uganda's Freezones" Project.

Immediate context
To support Uganda's exporting enterprises, increase profitability, income and employment by promoting green, sustainable and resilient industrial infrastructure that is well adapted to handling different climate crises.

Goal
The overall goal is to design the infrastructure to allow the freezone and its contextual city to thrive, as an economic system that is climate proofed.

Objective

Develop green climate proofed masterplans including symbiotic infrastructure plans and infrastructure project concept notes and teasers for 2 freezone 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 freezone and the wider city in a green way. This extends to planning and engagement with not only those responsible for the development of the freezone but also, the surrounding municipality and local businesses.

The consultant, under the supervision of the team leader will be the primary expert for all water and sanitation deliverables.

Specific activities
PLANNING PHASE
15. Stakeholder identification and analysis per site
16. Document/data collection and background analysis
17. Development of watsan methodology incl. methodological design, interview and survey tools
18. Identification of watsan information gaps and limitations
19. Collecting data and analysing quantitative and qualitative information
20. Online interviews

FIELD WORK STAGE:
21. Gap analysis of watsan infrastructure per site
22. Concept note data collection for site specific watsan infrastructure
23. Field surveys/Data Collection Kampala and other additional locations

FIELD MISSION DATA ANALYSIS AND SECTORAL REPORT DEVELOPMENT
24. Field Missions data analysis
25. Field Missions watsan reports draft
26. Field Missions Infrastructures Concept Notes drafts
27. Complementary data collection/missions (ex technical experts)
28. Revised sectoral reports and concept notes

FINAL DATA SYSTHESIS AND REPORT
29. Mission draft final report
30. Mission draft concept notes
31. Field Mission revised draft concept notes and mission report
32. Support in project closure event

Project Deliverables

1. Workplan and methodological tools for the 2 sites
2. Draft master plan and infrastructure plans
3. eCBA and Financial plan for infrastructure per site
4. Project concept notes

5. Final report.

Specific Deliverables

12. Using **RECP approach plus traditional watsan methods**, refine Watsan methodological tools for the 2 sites
13. Storm water, Water consumption, Solid waste, wastewater and solid waste management plans for each site **specifying contributions to GGGI strategic outcomes and greening rationale**.
14. Infrastructure lay out plan for water and sanitation facilities and environmental assessment needs.
15. Project concept notes for water and sanitation infrastructures **including detailed costing and contribution to GGGI strategic outcomes**

Timetable and reporting arrangements

The outputs shall be delivered in a phased manner as indicated below.

Deliverables	Input-timeline	Payment
4. Planning: Watsan methodological tools for the 2 sites		
5. Field Work: Field missions preparation and supervision.		
6. Field data analysis: Field missions preparation, delivery and data analysis. Draft Storm water, water consumption, Solid waste, wastewater and solid waste management plans for each site. Draft Infrastructure lay out plan for water and sanitation facilities.		
7. Draft project concept notes for water and sanitation infrastructures, environmental assessment needs **including detailed costing, greening rationale and contribution to GGGI strategic outcomes.**		
8. Final report Concept Notes		
9. Retention for final report editing.		

Notes: The input-timelines are indicative only. Deadlines will be agreed as part of the inception report.

Reporting arrangements

The consultant shall be supervised by the team leader who reports to the Project Manager who they shall work with on a day-to-day basis.

The consultant's work progress will be monitored primarily through periodic review meetings, as jointly agreed, and specified in the inception phase. The consultant is also expected to produce, upon GGGI's request, a formal progress report that includes: an overview of the assignment; a narrative description of project activities; progress on deliverables to date; and actual achievements made against the timeline set.

A soft copy of the draft report shall be sent to Project Manager. A soft and one hard copy of the final report shall also be submitted. The final report will be accompanied by all other material used for the assignment such as notes of meetings including stakeholders' contacts and so on.

Qualifications/experience/expertise

Academic qualifications
University degree in engineering and management, or a related engineering discipline with verifiable direct experience in green industrial estate design and improvement.

Professional experience:

13. Minimum of 10 years of relevant professional experience in sustainability program management, evaluation and feasibility assessments
14. Minimum 6 years of industrial ecology, circular economy, Eco-Industrial Parks and/or innovative PPP approaches.
15. Proven multi-stakeholder engagement and communication skills is highly desirable.
16. Fluency in English, verbal and written is required.
17. Excellent report writing skills.

Mode of procurement
From GGGI Roster.

RECP Expert

Objective: Developing the capacity of The Uganda Free Zones Authority (UFZA) to set up Export Free Zones that are designed to meet global green trade standards

Contract	
Project	Greening Uganda's Freezones
Expertise	
Category	RECP Expert
Location	
Duty station	TBD, with support from Kampala
Contract length	
Start date	
End date	
Part-time/ full-time	
Contract value	
Days estimated	
Outputs/Deliverables estimated	This is based on approved outputs and their percentages in the timetable below.
Total fees	

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.

Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries inorder to contribute to growth, employment and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that emphasize product certification, sanitary and phytosanitary standards and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and The Global Green Growth Institute will partner to deliver the "Greening Uganda's Freezones" Project.

Immediate context

To support Uganda's exporting enterprises increase profitability, income and employment by promoting green, sustainable and resilient industrial infrastructure that is well adapted to handling different climate crises.

Goal
The overall goal is to design the infrastructure to allow the freezone and its contextual city to thrive, as an economic system that is climate proofed.

Objective

Develop green climate proofed masterplans including symbiotic infrastructure plans and infrastructure project concept notes and teasers for 2 freezone 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 freezone and the wider city in a green way. This extends to planning and engagement with not only those responsible for the development of the freezone but also, the surrounding municipality and local businesses.

The consultant will act as the primary expert for resource efficiency and cleaner production deliverables as outlined below.

Specific activities
PLANNING PHASE
33. Stakeholder identification and analysis per site
34. Document/data collection and background analysis
35. Development RECP methodology incl. methodological design, interview and survey tools
36. Identification of RECP information gaps and limitations
37. Collecting data and analysing quantitative and qualitative information
38. Online interviews

FIELD WORK STAGE:
39. Refinement of initial material and energy flow per site
40. Concept note data collection for site specific infrastructure
41. Field surveys/Data Collection Kampala and other additional locations
42. Harmonize data collection procedure with Water and Sanitation and Value Chain Analyst

FIELD MISSION DATA ANALYSIS AND SECTORAL REPORT DEVELOPMENT
43. Field Missions data analysis
44. Field Missions RECP reports drafts
45. Together with Watsan and value chain analyst, consolidate information gaps in approach.
46. Field Missions infrastructure Concept Notes drafts
47. Complementary data collection/missions (ex technical experts)
48. Revised sectoral reports and concept notes

FINAL DATA SYSTHESIS AND REPORT
49. Mission draft final report
50. Mission draft concept notes
51. Field Mission revised draft concept notes and mission report
52. Support in project closure event

Project Deliverables

1. Workplan and methodological tools for the 2 sites
2. Draft master plan and infrastructure plans
3. eCBA and Financial plan for infrastructure per site
4. Project concept notes

5. Final report.

Specific Deliverables

1. RECP and methodological tools for the 2 sites
2. Material and Energy flow plan
3. Symbiotic infrastructure layout plan
4. Project concept notes including costing and **highlighting greening rationale and contribution of each infrastructure to GGGI strategic outcomes**
5. Final report.

Timetable and reporting arrangements

The outputs shall be delivered in a phased manner as indicated below.

Deliverables	Input-timeline	Payment
10. Planning: RECP methodological tools for the 2 sites and secondary data collection.		
11. Field Work: Field missions preparation and supervision.		
12. Field data analysis: Field missions preparation, delivery and data analysis. Draft Material and Energy flow plan. Draft Symbiotic infrastructure layout plan,		
13. Draft infrastructures concept notes including costing and **highlighting greening rationale and contribution of each infrastructure to GGGI strategic outcomes**		
14. Final report and draft Concept Notes		
15. Retention for final report editing.		

Notes: The input-timelines are indicative only. Deadlines will be agreed as part of the inception report.

Reporting arrangements

The consultant shall be supervised by the team leader who reports to the Project Manager who they shall work with on a day-to-day basis.

The consultant's work progress will be monitored primarily through periodic review meetings, as jointly agreed, and specified in the inception phase. The consultant is also expected to produce, upon GGGI's request, a formal progress report that includes: an overview of the assignment; a narrative description of project activities; progress on deliverables to date; and actual achievements made against the timeline set.

A soft copy of the draft report shall be sent to Project Manager. A soft and one hard copy of the final report shall also be submitted. The final report will be accompanied by all other material used for the assignment such as notes of meetings including stakeholders' contacts and so on.

Qualifications/experience/expertise

Academic qualifications
University degree in engineering and management, or a related engineering discipline with verifiable direct experience in green industrial estate design and improvement.
Professional experience:
18. Minimum of 10 years of relevant professional experience in sustainability program management, evaluation and feasibility assessments

19. Minimum 6 years of industrial ecology, circular economy, Eco-Industrial Parks and/or innovative PPP approaches. 20. Proven multi-stakeholder engagement and communication skills is highly desirable. 21. Fluency in English, verbal and written is required. 22. Excellent report writing skills.
Mode of procurement From GGGI Roster.

Value Chain Analyst

Objective: Developing the capacity of The Uganda Free Zones Authority (UFZA) to set up Export Free Zones that are designed to meet global green trade standards

Contract	
Project	Greening Uganda's Freezones
Expertise	
Category	Value Chain Analyst
Location	
Duty station	TBD, with support from Kampala
Contract length	
Start date	
End date	
Part-time/ full-time	Part time
Contract value	
Days estimated	
Outputs/Deliverables estimated	This is based on approved outputs and their percentages in the timetable below.
Total fees	

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Trademark Africa has partnered with the Danish Embassy for the development policy "The World We Share". This policy recognizes the importance of facilitating better access to the European Market and regional market integration for developing countries inorder to contribute to growth, employment and poverty alleviation. The policy also hopes to address the climate crisis by making trade infrastructure more climate proof. Finally, this policy also hopes to support Uganda's National Development Plan III (and now IV) that emphasize product certification, sanitary and phytosanitary standards and trade. To deliver this climate resilient industrial infrastructure, Trademark Africa and The Global Green Growth Institute will partner to deliver the "Greening Uganda's Freezones" Project.

Immediate context
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Objective

Develop green climate proofed masterplans including symbiotic infrastructure plans and infrastructure project concept notes and teasers for 2 freezone 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 freezone and the wider city in a green way. This extends to planning and engagement with not only those responsible for the development of the freezone but also, the surrounding municipality and local businesses.

The consultant, under the supervision of the team leader, will be the primary expert for all value chain analysis deliverables.

Specific activities
INCEPTION PHASE
53. Stakeholder identification and analysis
54. Document/data collection and background analysis
55. Development of Value chain Analysis methodology, interview and survey tools
56. Identification of Value Chain information gaps and limitations
57. Collecting data and analyzing quantitative and qualitative information
58. Online interviews
59. Support site selection exercise

FIELDWORK PREPARATION:
1. Refinement of initial value chain information per site
2. Concept note data collection for site specific value chain analysis
3. Field surveys/Data Collection Kampala and other additional locations

FIELD MISSION DATA ANALYSIS AND SECTORAL REPORT DEVELOPMENT
1. Field missions data analysis
2. Field missions value chain analysis reports drafts
3. Field missions value chain Concept Notes drafts
4. Complementary data collection/missions (ex-technical experts)
5. Revised sectoral reports and concept notes

Project Deliverables

6. Workplan and methodological tools for the 2 sites.
7. Draft master plan and infrastructure plans.
8. eCBA and financial plan for infrastructure per site.
9. Project concept notes.
10. Final report.

Specific Deliverables

1. Methodological value chain analysis tools for the 2 sites.
2. Anchor industry and supporting sectors per site/and value chains analysis identifying opportunities for greening along the value chain.

3. Summary demand side and supply side analysis of value chain products.
4. Support RECP team in developing a symbiotic infrastructure layout plan to support product valorization per site.
5. Market analysis (macro and meso) and market positioning for identified sectors at each site.
6. Support the economist and financial team in the development of viable financial models.
7. Project concept notes highlighting contribution to GGGI strategic outcomes.

Timetable and reporting arrangements

The outputs shall be delivered in a phased manner as indicated below.

Deliverables	Input-timeline	Payment
16. Inception Phase: Methodological tools for the 2 sites. 17. Field Work Phase: Field missions' preparation, delivery and data analysis. Anchor industry and supporting sectors per site/and value chains analysis **identifying opportunities for greening along the value chain.** 18. Summary demand side and supply side analysis of value chain products. 19. Market analysis (macro and meso) and market positioning for identified sectors at each site		
20. Support in developing a symbiotic infrastructure layout plan to support product valorisation per site. 21. Project concept notes **highlighting contribution to GGGI strategic outcomes**.		
5 Final Sectoral report.		
6 Report revisions.		
7 Retention for final report editing.		

Notes: The input-timelines are indicative only. Deadlines will be agreed as part of the inception report.

Reporting arrangements

The consultant shall be supervised by the team leader who reports to the Project Manager who they shall work with on a day-to-day basis.

The consultant's work progress will be monitored primarily through periodic review meetings, as jointly agreed, and specified in the inception phase. The consultant is also expected to produce, upon GGGI's request, a formal progress report that includes: an overview of the assignment; a narrative description of project activities; progress on deliverables to date; and actual achievements made against the timeline set.

A soft copy of the draft report shall be sent to Project Manager. A soft and one hard copy of the final report shall also be submitted. The final report will be accompanied by all other material used for the assignment such as notes of meetings including stakeholders' contacts and so on.

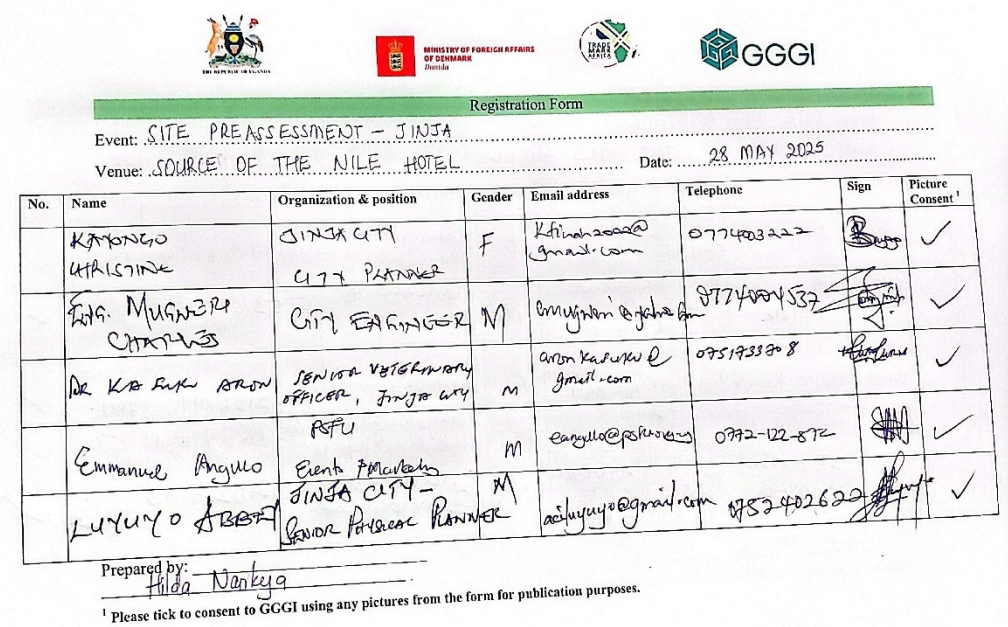
Qualifications/experience/expertise

Professional experience:

23. Minimum of 10 years of relevant professional experience in agricultural value chain analysis and agri business.
24. Experience in sustainability and climate action to deliver approvable design solutions.
25. Strong experience in financial analysis and modelling will be a distinct advantage.
26. Proven multi-stakeholder engagement and communication skills are highly desirable.

27. Fluency in English, verbal and written, is required. 28. Recognition as an expert in innovative approaches to product valorization.
Mode of procurement Competitive process

B. Mission attendees



Registration Form

Event: SITE PREASSESSMENT – JINJA

Venue: SOURCE OF THE NILE HOTEL Date: 28 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	KATONGO CHRISTINE	JINJA CITY CITY PLANNER	F	Kfiinah2000@gmail.com	0774003222		✓
	ENG. MUGWERA CHARLES	CITY ENGINEER	M	[illegible]	0774004537		✓
	DR KABUKU ARON	SENIOR VETERINARY OFFICER, JINJA CITY	M	aron.kabuku@gmail.com	0751933308		✓
	Emmanuel Angullo	RSFU Event Marketing	M	eangullo@rsfu.org	0772-122-872		✓
	LUYUYO ABBEY	JINJA CITY – SENIOR PHYSICAL PLANNER	M	aciluyuyo@gmail.com	0752402622		✓

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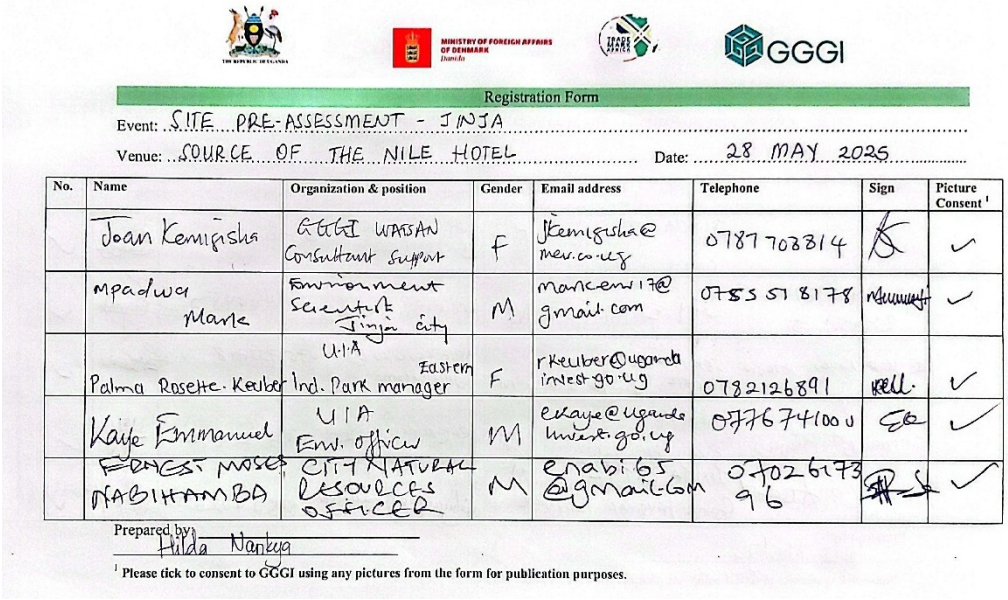

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Joan Kemigisha	GGGI WAASAN Consultant Support	F	jkemigisha@mev.co.ug	0787708314		✓
	Mpadwa Mark	Environment Scientist Jinja city	M	marcenw17@gmail.com	0755518178		✓
	Palma Rosette Keiber	UIA Eastern Ind. Park manager	F	rkeiber@ugandainvest.go.ug	0782126891		✓
	Kaye Emmanuel	UIA Env. officer	M	ekaye@ugandainvest.go.ug	0776741000		✓
	ERNEST MOSES NABIHAMBA	CITY NATURAL RESOURCES OFFICER	M	enabi65@gmail.com	0702617396		✓

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Hilda Nankya	GGGI - Urban Devt Associate	F	hilda.nankya@gggi.org	0773955907		✓
	Edson Twinomujuni	RECP & INDUSTRIAL SYMBIOSIS CONSULTANT	M	googomujuni@gmail.com	0787026363		✓
	LUSAWA ANASTASIE	city clerk jinja natural resource	F	llunyanto@gmail.com	0742184796		
	Vivuya shekinah	city clerk Jinja Natural resource	F	vivuyashekinah1@gmail.com	~~0762016088~~ 0763452068		✓
	Natacha Badibanga	city clerk Jinja Natural resource	F	badibangahata@gmail.com	0702007694		

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1	Turyasiima Titus	MOFPED-CFU Individual Consultant	M	turyasiimat@gmail.com	0788815603		✓
	Rowland Nkalubwa	PACEIA	M	[illegible]@paceif.org	0704299995		✓
	Kasasa Samuel Ayagenda	USSIA	M	samuel.[illegible]@ussia.or.ug	0701238855		✓
	Willbrod Okware	Agroways(U) Ltd Assistant Inventory Mgr	M	Procurement@agroways.ug	0757525707		✓
	Tina Huang	GGGI VCA	F	tininghuang1990@gmail.com	[illegible]		✓

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MINISTRY OF FOREIGN AFFAIRS OF DENMARK

GGGI

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Okello John	Nyanza Beach Ltd	M	Johnchristian.ouello@gmail.com	0752537751		✓
	Olga Ojok	N.F.A	M	Ojok.olco@yahoo.com	0772585359		✓
	TUMULINDE BRIAN	city council	M	tumulindeblaise@gmail.com	0741634271		✓
	CHOLI GULOBA JOHN	JINJA CITY & TOWN CLERK	M	Choli.john@gmail.com	0772444477		✓
	Silas Bahizi	GGGI Fin. & Econ Consultant	M	silas.bahizi@gmail.com	0773224910		✓

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	Mrityunjay Kumar Thakur	Abyssinia group Industries Production Mngr	Male	sms.jinja@abyssiniagroup.com	0745537644		✓
2	Nampeesha charles	Jinja City	male	nampeesha@gmail	0704770382		✓
3	Peter Nameere	Jinja City	Male	Nameere947@gmail.com	0701871463		✓
4	BABIRYE-K-NOOR	NILE AGRO INDUSTRIES LTD	F	Kalmaknoor@gmail.com	0700456684		
5	Eng Byanhanga Leo	MTC Ag Act	M	dbyanhanga@gmail.com	0772555784		

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Venue: JINJA CITY COUNCIL Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	Joan Kenigisha	Sani Gatt Consultant Support WATSAN	F	jkenigisha@...	0787 708814	[signature]	✓
2	Edson Twinomujuni	RECP Consultant	M	googomujuni@gmail.com	0787026363	[signature]	✓
3	Silas Bahizi	Finance & Econ	M	silasbahizi@gmail.com	0773824910	[signature]	✓
4	Mpadwa Mark	Environment Scientist, Jinja city	M	mancewi17@gmail.com	0755518178	[signature]	✓
5	Emmanuel Angullo	PSFU Events & Marketing	M	eangullo@psfu.org...	0772228 7?	[signature]	✓

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Venue: JINJA CITY COUNCIL Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
6	Wassua Samuel Agagenda	USSIA C Policy & Research officer	M	samuel.wassua@ussia.or.ug	0701238855 0777884620	[signature]	✓

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	KAYE Emmanuel	UIA	M	ekaye@ugandainvest.go.ug	0776749000	[signature]	✓
2.	Roland Nkalubwa	PACEID	M	roland.nkalubwa@paceid.org	0704299995	[signature]	✓
3.	Henry Amanya	GGGI - Water and Sanitation	M	hamanya@mwe.go.ug	0702775869	[signature]	✓
4.	Hilda Nankya	GGGI - Urban Devt. Associate	F	hilda.nankya@gggi.org	0773955907	[signature]	✓
5.	Eng. Olaro Oscar	N.P.A	M	Senior Planner oscar.olaro@npa.go.ug	0772915359	[signature]	✓

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Tina Nwang	GGGI VCA	F	tning99@gmail.com	0764893493		✓
	TITUS TURYASIIMA	MOFPED	M	turyasiimab@gmail.com	0788815603		✓
	~~LUYUYO ABBEY~~	~~JINJA CITY~~	M	~~getluyuyo@gmail.com~~	~~0752402622~~		~~✓~~

Prepared by: Hilda Nantya

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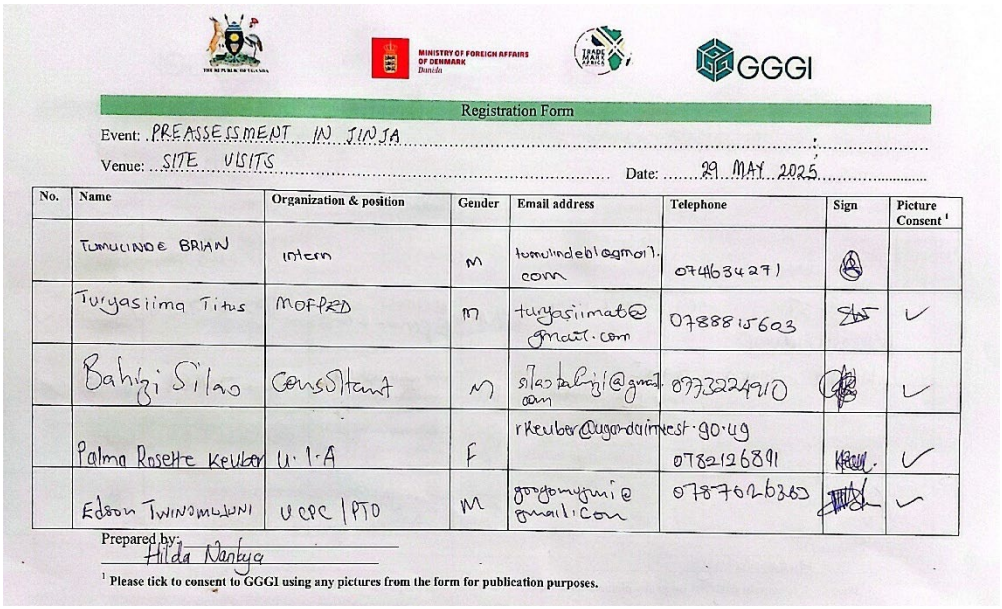

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Venue: SITE VISITS Date: 29 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	TUMULINDE BRIAN	intern	M	tumulindebl@gmail.com	0744634291		
	Turyasiima Titus	MOFPED	M	turyasiimab@gmail.com	0788815603		✓
	Bahigi Silas	Consultant	M	silasbahigi@gmail.com	0773224910		✓
	Palma Rosette Keuber	U·I·A	F	rkeuber@ugandainvest.go.ug	0782126891		✓
	Edson Twinomujuni	UCPC | PTO	M	gogonyuni@gmail.com	0787626365		✓

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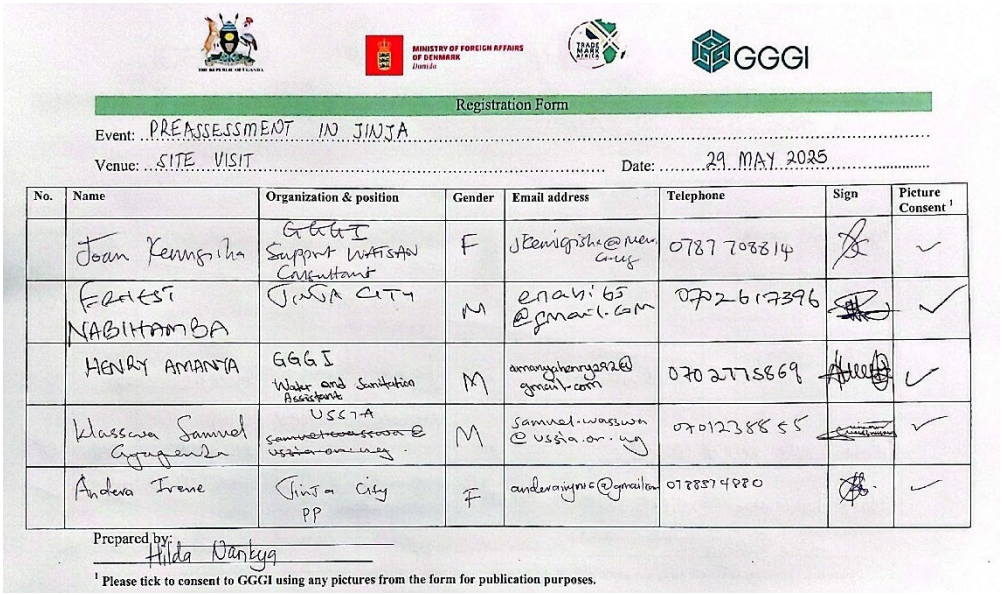

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Venue: SITE VISIT Date: 29 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Joan Kemigisha	GGGI Support WATSAN Consultant	F	JKemigisha@mev.co.ug	0787 708814		✓
	ERNEST NABIHAMBA	JINJA CITY	M	ernabi65@gmail.com	0772617396		✓
	HENRY AMANYA	GGGI Water and Sanitation Assistant	M	amanyahenry92@gmail.com	0702775869		✓
	Klasswa Samuel Gyagenda	USSIA	M	samuel.wasswa@ussia.or.ug	0701238855		✓
	Andera Irene	Jinja City PP	F	anderairene@gmail.com	0788574880		✓

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Venue: SITE VISITS Date: 29 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Mpadwa Mark	Jinja city council	M	mancemi17@gmail.com	0755518178	[signature]	✓
	Regina Mwenyango	GGGI	F	regina.mwenyango@gggi.org	0783008488	[signature]	✓
	Tina Huang	GGGI	F	[illegible]@gmail.com	[illegible]	[signature]	✓
	Kaye Emmanuel	UIA	M	ekaye@ugandainvest.go.ug	0776741000	[signature]	—
	Imran Nakweya	Busoga Forestry	M	imran.nakweya@greenresources.no	0706200220	[signature]	

Prepared by: Hilda Nankya

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No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	SARAH MUKEBEZI	BUSOGA FORESTRY COMPANY LIMITED	Female	sarah.mukebezi@greenresources.no	0702335623	[signature]	Y
	WINNIE BULYABA	Busoga Forestry Co. LTD	FEMALE	winnie.bulyaba@greenresources.no	0703215857	[signature]	Yes
	LUSANA ANASTASIE	jinja city concil	F	lumyanta@gmail.com	0742184796	[signature]	J
	Natacha Bodibanga	Jinja city Council	F	badibanganata@gmail.com	0702007694	[signature]	Y
	Kasoki Vivuya Shekinah	Jinja city council	F	vivuyashekinah1@gmail.com	0763452068	[signature]	✓

Prepared by: Hilda Nankya

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Registration Form

Event: PREASSESSMENT IN JINJA

Venue: SITE VISITS Date: 29 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	Emmanuel Angulo	PSFU Events & Marketing	M	eangulo@psfuug.org	0772-122872	[signature]	✓
2.	Hilda Nankya	GGGI Urban Devt Associate	F	hilda.nankya@gggi.org	0773955907	[signature]	✓
3	Babirye Kalmaki noor	Legal Nile Agro Industries Ltd	F	kalmakinoor@gmail.com	0700456564	[signature]	✓
4	BAGANZI FRANCIS	NILE AGRO INDS. LIMITED	M	francis.baganzi@mmpcorp.africa	0772853788	[signature]	✓

Prepared by: Hilda Nankya

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Registration Form

Event: SITE PRE ASSESSMENT - TORORO

Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	OLOWO TOKOYADA	AGRINET UGANDA ACCOUNTANT	M	ablecolowo7@gmail.com	0775-416644	[signature]	
2.	NANGULU MOSES	SUN MANUFACTURE LIMITED	M	nangulumoses@gmail.com	0772633333	[signature]	
3	OKONGO MICHAEL	Jubilee Spring Ltd	M	Jubileespring@gmail.com	0772664761	[signature]	
4	Karizha R Peter	Rudii International Co Limited	M	ssotororo@gmail.com	0782371007	[signature]	✓
5.	Onyango Jerome	Tororo District Local govt.	M	jeromeokpala@gmail.com	0772619787	[signature]	✓

Prepared by: Hilda Nankya

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Registration Form

Event: PREASSESSMENT MISSION - TORORO

Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
6	ANGUTI SILAS	TORORO DLG DISTRICT FOREST OFFICER	M	angutisilas@gmail.com	0772644744	[signature]	✓
7	Opio Julius	Commercial officer Tororo Dist LG	M	opiojulius1966@gmail.com	0782149361	[signature]	✓
8	Onyango Agnes	Ime beauty Skills Center Director	F	kationyango@gmail.com	0774578054	[signature]	✓
9.	REGINA MWENYANGO	GGGI	F	regina.mwenyango@gggi.org	0783008488	[signature]	✓
10	Ayafwono Rose Otieno	TORORO DLG (Asst forest officer)	M	[illegible] .com	0702825812	[signature]	✓

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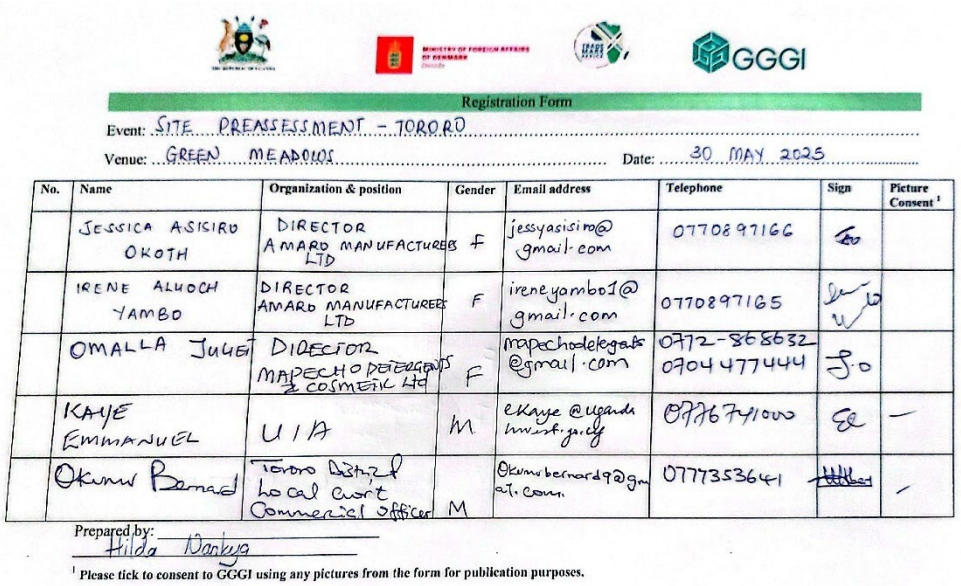

Registration Form

Event: SITE PREASSESSMENT - TORORO

Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	JESSICA ASISIRO OKOTH	DIRECTOR AMARO MANUFACTURERS LTD	F	jessyasisiro@gmail.com	0770897166		
	IRENE ALUOCH YAMBO	DIRECTOR AMARO MANUFACTURERS LTD	F	ireneyambo1@gmail.com	0770897165		
	OMALLA JULIET	DIRECTOR MAPECHO DETERGENTS & COSMETIC LTD	F	mapechodetergents@gmail.com	0772-868632 0704477444		
	KAJE EMMANUEL	UIA	M	ekaye@ugandainvest.go.ug	0776741000		—
	Okumu Bernard	Tororo District Local Court Commercial officer	M	Okumubernard9@gmail.com	077735364		—

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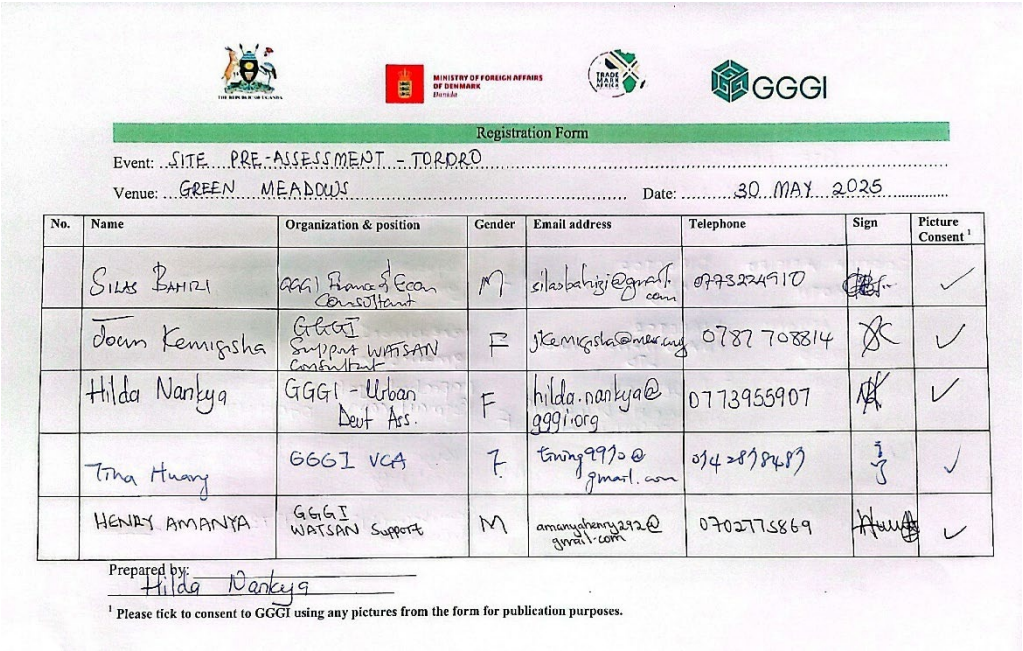

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Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	SILAS BAHIRI	GGGI Finance & Econ Consultant	M	silasbahiri@gmail.com	0773224910		✓
	Doris Kemigisha	GGGI Support WATSAN Consultant	F	jkemigisha@mercy.org	0787 708814		✓
	Hilda Nankya	GGGI - Urban Dev't Ass.	F	hilda.nankya@gggi.org	0773955907		✓
	Tina Nwany	GGGI VCA	F	tinng9910@gmail.com	0142818487		✓
	HENRY AMANYA	GGGI WATSAN Support	M	amanyahenry292@gmail.com	0702775869		✓

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Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
6	Edson Twinomujuni	UCPC / RECP and Industrial Symbiosis Expert	M	googomujuni@gmail.com	0787026636		✓
7	Emmanuel Ngulo	PSFU engulo@psfu.org.ug	M	engulo@psfu.org.ug	0772-122872		✓
8	Kasswa Samuel Ayazenze	USSIA ~~samuel.wasswa@~~ us Policy & Research	M	samuel.wasswa@ussia.or.ug	0701238855		✓
9	Eng. Byaruhanga	MTIC Ag ACT	M	dbyaruhanga@gmail.com	0772885784		
10	Eng. Kidega John	Hima Cement – Tororo	M	john.kidega@himacement.com	0773872396		

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Venue: GREEN MEADOWS Date: 30 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1	BUKAWA W KASSIM	ELGONIA IND. PLOT 36 TORORO	M	elgoniaindustries ltd@gmail.com	0700920320 0394001171		
2	Othieno Jackson	For ACO	M	othienojackson@gmail.com	0788276989		
3	Nakule Jairus	Nat-Jai Commercial Agencies	M	natjaicommercialagencies@gmail.com	0701614345		
4	ABBO PATRICIA	ELGONIA IND. PLOT 36, TORORO	F	patriciaabbo206@gmail.com	0700130932		
5.	Turyasiima Titus	MoPPED – IC	M	turyasiimat@gmail.com	0788815603		

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GGGI

Registration Form

Event: SITE PRE ASSESSMENT - LUGAZI

Venue: STONE CASTLE INN Date: 26 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	HENRY AMANYA	Water and Sanitation Assistant	M	hamanya@meir.co.ug	0702715869		✓
	Wasswa Samuel Gyagenda	Policy & Research officer USSIA.	M	samuel.wasswa@ussia.or.ug	0701238855 0777884620		✓
	Rowland Nkalubwa	Presidential Advisory Committee on exports & Industrial development	M	rowland.nkalubwa@pacril.org	0704299995		✓
	Emmanuel Angulo	PSTU Events & Marketing	M	eangulo@pstu.org.ug	0782-122872		✓
	Turyasiima Titus	MOFPED-CFU	M	turyasiimate gmail.com	0788815608		✓

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Venue: STONE CASTLE INN Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	KAYE EMMANUEL	UGANDA INVESTMENT AUTHORITY	M	EKaye@ugandainvest.go.ug	0776774000		✓
	Edson Twinomujuni C	UCIC / TPO	M	googomujuni@gmail.com	0787026363		✓
	Silao Bahizi	GGGI	M	silaobahizi@gmail.com	0773224910		✓
	Tina Huay	GGGI VCA	F	tinuy991@gmail.com	0742898487		✓

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Venue: STONE CASTLE INN Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Kato Lutaaya Julius	Lugazi Industrial Park	M	lugaziindustrialpark2@gmail.com lutaya@gmail.com	0782215350 0393102591		✓
	Eng. Byaruhanga	MTIC Agaci	M	dbyaruhanga@gmail.com	0772851754		✓
	Birabwa Simon Kabisa	Business Community	M	kabisagonzales@gmail.com	0783027791		✓
	Joan Kemigisha	Citizen WATSAN expert support	F	jkemigisha@mercy	0787708814		✓

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Venue: STONE CASTLE INN Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
1.	Hilda Nankya	GGGI - Urban Devt Associate	F	hilda.nankya@gggi.org	0773955907		✓
2.	Nkwanga Musoke Robert	Lugazi M.C Principle Commercial officer	M	nmusoke@gmail.com	0775256774 0752699829		✓
3	Mwebe Joyce	Lugazi Municipal Senior Physical Planner	F	Mwebejoyce@ymail.com	0782747522 0702122595		✓
4.	Katerewu Julius	Chocolate Milano [illegible]	M	j.katerewu2014@gmail.com	0783426968 0701426968		✓
5.	Namisango Tatush Kibombo	Lugazi MC Labour officer	F.	namitatum@gmail.com	0777-044208 0758-555433		✓

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Event: SITE PREASSESSMENT - LUGAZI

Venue: STONE CASTLE INN Date: 27 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	LUZZE Tom	Chairperson Small Scale Industries	M	Lugazi	0704646663		
	REGINA MWANYANGO	GGGI - INDUSTRIAL DEVELOPMENT OFFICER	F	regina.mwanyango@gggi.org	0783008488		✓
	Eng. Olaro Ojok	NPA SB	M	olaro.olaro@npa.go.ug	0772985359		✓
	Mutebi Masitulah	Lugazi MC SCAO	F	massirjawad@gmail.com	0773408614		✓
	Lwanga Charles	Lugazi M.C. MEO	M.	clwanga2020@gmail.com	0774-281442		✓

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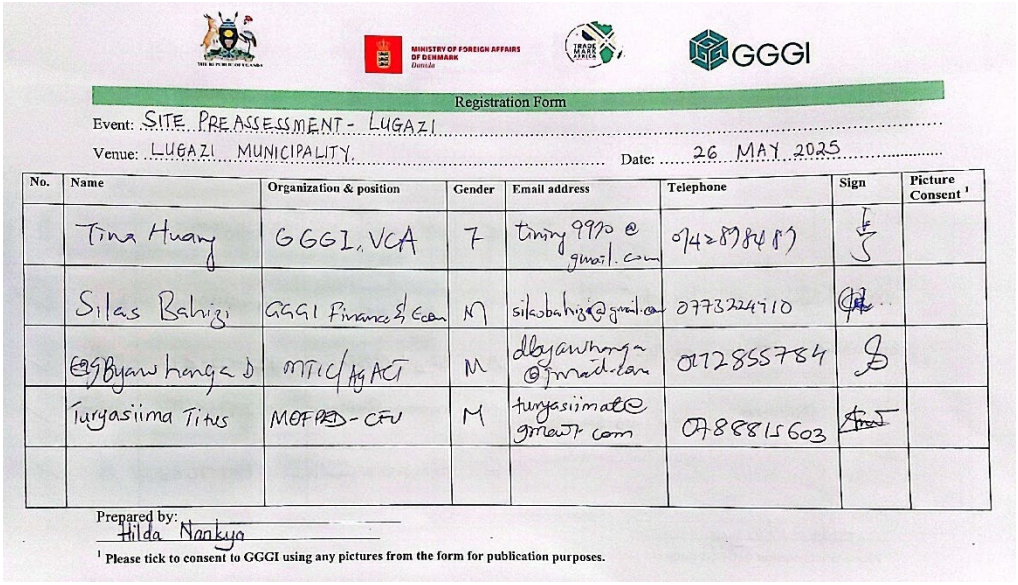
Kato Lutaaya Julius | LUGAZI INDUSTRIAL PARK | M | lugaziindustrialpark1@gmail.com | 0787219357 0393102501 | ✓

Byaruhanga [illegible] | MTIC BAC | M | [illegible]@gmail.com | [illegible] | ✓



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Event: SITE PREASSESSMENT - LUGAZI

Venue: LUGAZI MUNICIPALITY Date: 26 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Tina Huang	GGGI, VCA	F	tinny9990@gmail.com	0742878487		
	Silas Bahizi	GGGI Finance & Econ	M	silasbahizi@gmail.com	0773224710		
	Egbyanhonga D	MTIC/AfACT	M	dbyanhonga@mwtic.com	0772855784		
	Turyasiima Titus	MOFPED-CFU	M	turyasiimatit@gmail.com	0788815603		

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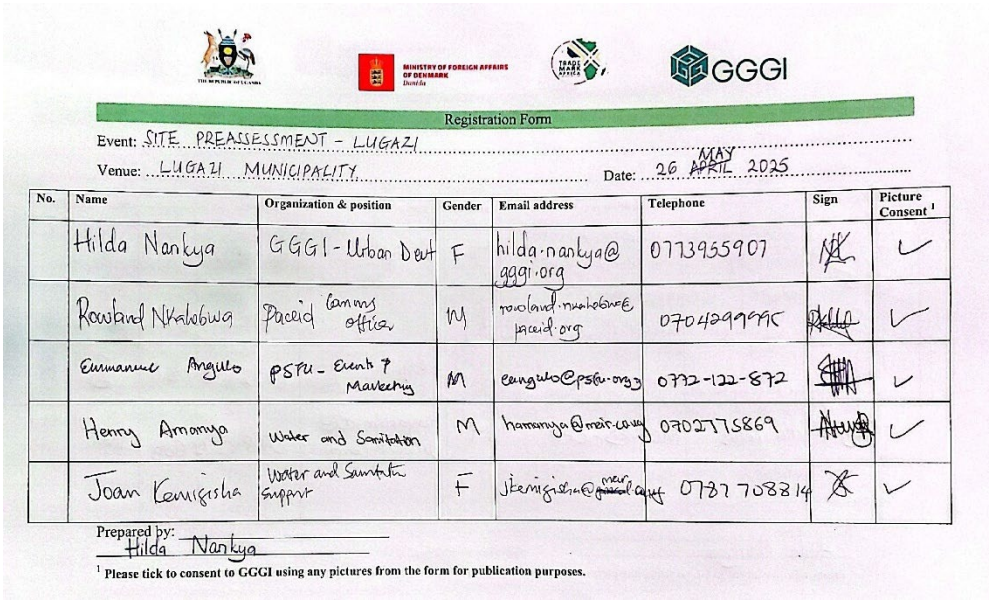

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Venue: LUGAZI MUNICIPALITY Date: 26 APRIL/MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent [1]
	Hilda Nankya	GGGI - Urban Dept	F	hilda.nankya@gggi.org	0773955907		✓
	Rowland Nkalubwa	Pacelo Comms officer	M	rowland.nkalubwa@pacelo.org	0704299995		✓
	Emmanuel Angulo	PSFU - Events & Marketing	M	eangulo@psfu.org	0772-122-872		✓
	Henry Amanya	Water and Sanitation	M	hamanya@mwe.go.ug	0702775869		✓
	Joan Kemigisha	Water and Sanitation Support	F	jkemigisha@mwe.go.ug	0787708814		✓

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Venue: LUGAZI MUNICIPALITY Date: 26 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent[1]
	Nkwanga Musoke Robert	Principal Commercial Officer Lugazi M/C	M	rmusoke@gmail.com	0752699829 0771525674	[signature]	✓
	Musasizi Dorah	SHRO - ForTC	F	musasizidora@gmail.com	0782716285	[signature]	✓
	REGINA MWENYANGO	GLOBAL GREEN GROWTH INSTITUTE	F	regina.mwenyango@gggi.org	0783008488	[signature]	✓
	KAYE EMMANUEL	UGANDA INVESTMENT AUTHORITY ...	M	ekaye@ugandainvest.go.ug	0776741000	[signature]	✓

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Venue: LUGAZI MUNICIPALITY Date: 26 MAY 2025

No.	Name	Organization & position	Gender	Email address	Telephone	Sign	Picture Consent[1]
1	Wassswa Samuel Ayeyemera	Uganda Small Scale Industries Association (Policy)	M	samuel.wasswa@ussia.or.ug	0701238855 0777884620	[signature]	✓
2	Edson Twinomujuni	Uganda Cleaner Production Centre	M	googomujuni@gmail.com	0787702636 0790744086	[signature]	✓
3.	Olaro Oscar	N.P.A Senior Planner,	M	oscar.olaro@npa.go.ug	0772985359	[signature]	✓
4	Kamya Daniel	Lugazi M/C Municipal Engineer	M	Kamyadaniel@gmail.com	0704313255 0777128115	[signature]	✓
5	Luwanga Charles	Lugazi M.C M.ED.	M.	cluwanga@gmail.com	0774-281442	[signature]	✓

Prepared by: Hilda Nankya

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C. National Oversight Committee (NOC) workshop

TradeMark Africa presents the status of selected projects they are funding through their UCP 57th NOC worksop to which GGGI was invited.

Attendance List

UCP 57th NATIONAL OVERSIGHT COMMITTEE MEETING HELD AT SHERATON KAMPALA HOTEL ON 5th JUNE 2025

Names	Designation/ Organisation	Contact – Tel	Signature
REGINA MWONYANGO	SENIOR INDUSTRIAL DEVT. OFFICER: GGGI	0783008488	Regina
SIMON K. KAGWIMURE	PRINCIPAL LOGISTICS OFFICER – MOWT	0702860257	[illegible]
Stephen Asiime	PSFU - COO	0772451542	[illegible]
MALATE SARAH	PRIO/EA – MEACA	0782438396 0782488396	[illegible]
HILDA NANKYA	URBAN DEVELOPMENT ASSOCIATE / GGGI	0773955907	[illegible]
Mwesigwa Ali	PSFU	0702577850	[illegible]
Benedict Musengele	TMA	+254780 320229	[illegible]
Pablo Martinez	GGGI Country Representative	0760031848	[illegible]
EDITH N MWANJE	PS / MEACA	0787015101	[illegible]
ANNA NAMBOOZE	CA / TMA	0788242118	[illegible]
Anna Nakanyi	MFPED / PSDU	0782212257	[illegible]
Bwira Andrew	URC	0773640237	[illegible]
Ndoleriire Geoffrey	NRC	0772605921	[illegible]
JAMES MACINEZI	URA	0772162159	[illegible]
Andrew Byamukanga	Netherlands Embassy	0782161541	[illegible]
Indy Dircksen	netherlands embassy		Indy
Praxeda Ndagire	TradeMark Africa	0761965662	[illegible]
Faith Mbabazi	TradeMark Africa	0774313695	[illegible]
MARTIN KABOINE	TMA	0771489611	[illegible]
KAFEERO HERBERT	SEATINI – UG	0783656535	[illegible]
GERSOM ABAASA	MINISTRY OF FOREIGN AFFAIRS (UG)	0785846971	[illegible]
Dr. Edith Namutebi N	"	0772528250	[illegible]
MONICA MIHIGO	EAC SECRETARIAT	0713388873	[illegible]
Brenda Nalwanga	TradeMark Africa	0783994076	[illegible]
Names	Designation/ Organisation	Contact – Tel	Signature
Ssekamwa Daniel	Min of Trade	0702474211	[illegible]
Patricia B. Ejalu	UNBS	0752978787	[illegible]

Table 21: NOC attendance list

D. Extract from ITC export potential maps

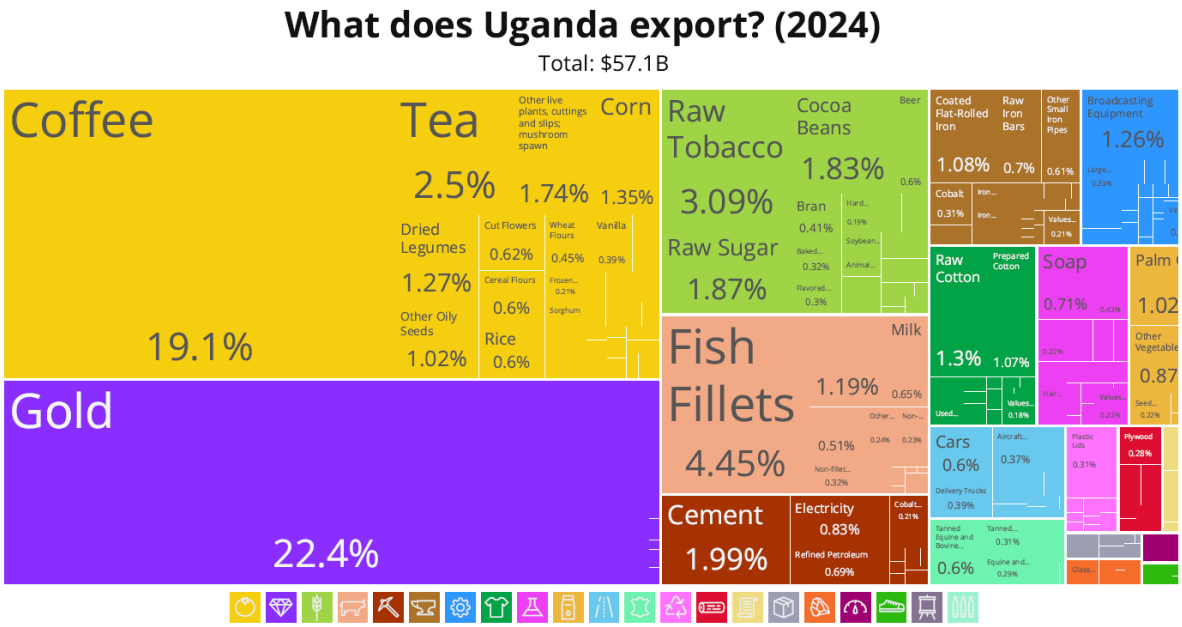

Figure 77: Uganda 2024 exports from ITC export potential

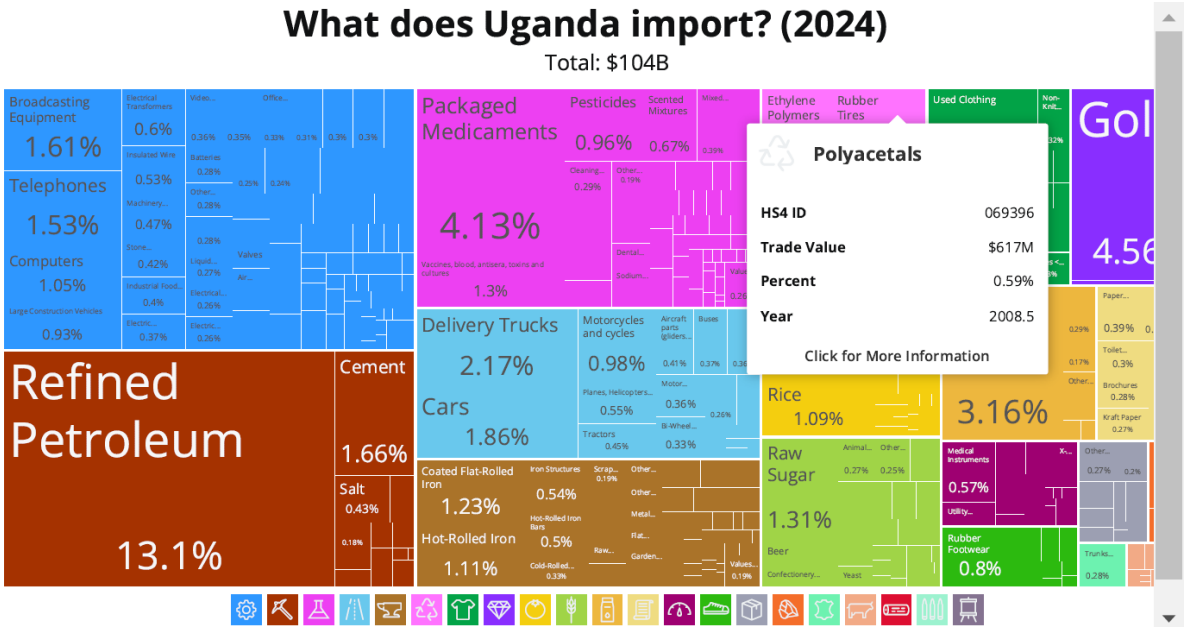

Figure 78: Uganda 2024 imports from ITC export potential

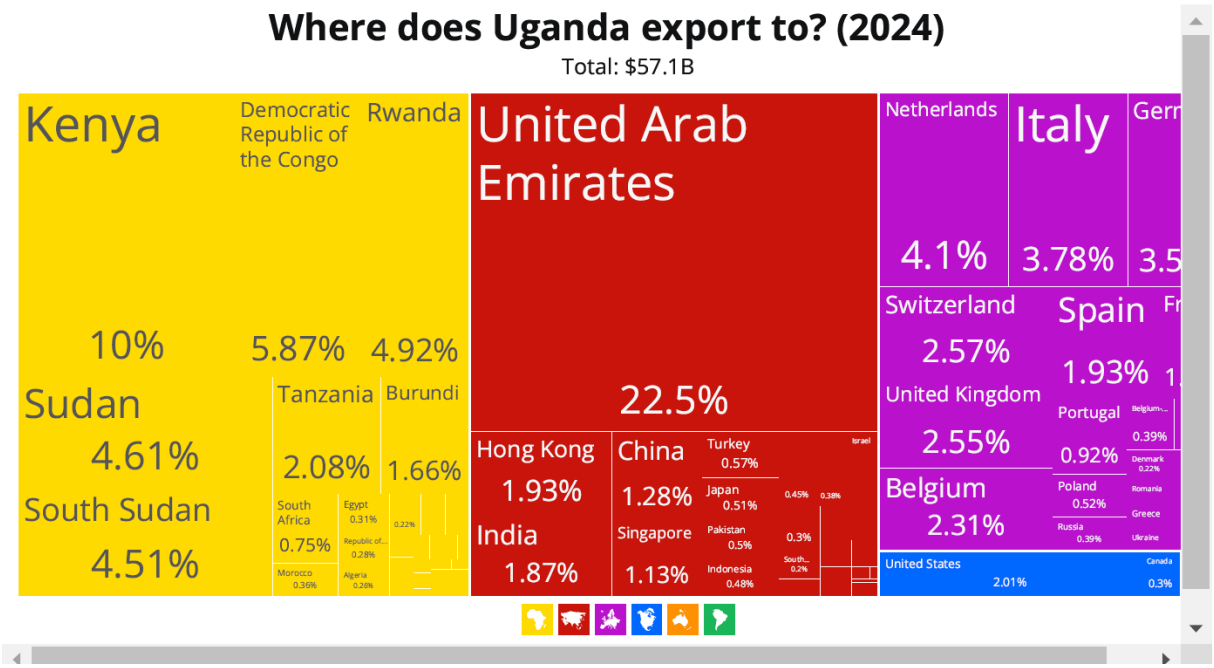

Figure 79: Destination countries of 2024 Uganda exports from ITC export potential

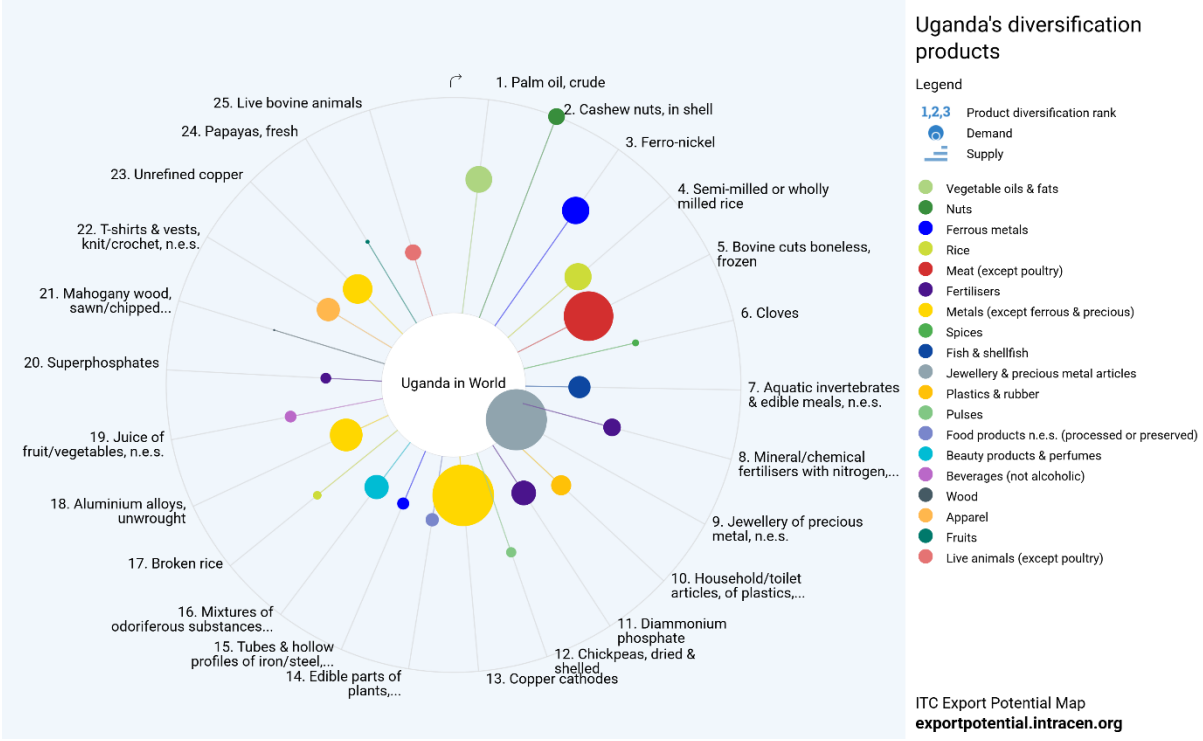

Image 19: Uganda diversification products

E. ITC Upgrading Ugandan Exports: Opportunities for Value-added Diversification

	Value chain	Average input availability	Opportunities to expand existing exports	Opportunities for new exports
Processed food & animal feed	Animal feed	strong	Preparations of a kind used in animal feeding	
	Cereal-based products	medium	Bread, pastries	Pasta, tapioca
	Vegetable oils	very strong	Soybean oil, sunflower seed oil and fractions	Edible mixtures of fats, oil & fractions
	Protein concentrates and food preparations	medium	Protein concentrates and other food preparations	
	Processed fruits and nuts	medium	Fruits and fruit peels preserved in sugar (e.g. pineapples, mangoes, bananas); prepared groundnuts	Fruit jams or pastes; prepared peaches, fruits, citrus fruits; prepared nuts of other types (e.g. cashew and shea nuts)
	Dried fruits	weak		Dried grapes, prunes, pears, peaches and tropical fruits
	Processed vegetables and legumes	medium		Prepared tomatoes, asparagus, and other vegetables; prepared beans
	Sauces and soups	medium	Preparations for sauces	Soups and broths
	Confectionery	medium	Sugar confectionery not containing cocoa	Chewing gum
	Fish products	weak		Prepared sardines ("Mukene")
	Coffee and tea products	strong		Coffee and tea extracts and preparations
Beverages	Alcoholic beverages	medium	Beer, spirits, ethyl alcohol	Rum and other sugarcane-based spirits
	Non-alcoholic	medium	Non-alcoholic beverages (excl. water, fruit or vegetable juices and milk)	
	Fruit juices	medium		Single citrus, orange, apple, and pineapple juice, mixtures of juices

Note: N.e.s. stands for 'not elsewhere specified'. These results highlight products with the most potential to start being exported or, among those already exported, those with the highest potential for export growth. This may not include all products currently being exported.

Source: Authors' calculations based on ITC Export Potential Map (2023).

Table 22:Selected processed products in new and existing agriculture-based exports

	Value chain	Average input availability	Opportunities to expand existing exports	Opportunities for new exports
Chemicals	Beauty and personal care products	strong	Beauty, make-up and skincare preparations, preparations for use on the hair	
	Pesticides	weak	Insecticides, rodenticides, fungicides, herbicides, etc.	
Leather products and footwear	Leather & furskin articles	medium	Leather handbags	
	Footwear	medium		Footwear with different combinations of leather, rubber, plastic, and non-traditional materials
Textiles (fabrics)	Fabrics made of synthetic fibres	weak	Cordage & cables of textile materials	
	Fabrics made of natural fibres	medium		Textile fabrics and tapestries of natural fibres
Apparel and textile products	Textile products made of cotton	medium	Textile products made of cotton	Textile products made of cotton
	Textile products made of textile materials	medium	Home furnishings of textile materials	Textile garments and camping goods, tents, awnings, and sleeping bags
	Textile products made of synthetic fibres	week		Floor coverings, tarpaulins, apparel with plastics
	Textile products made of wool/fine animal hair	medium		Woven carpets, floor coverings, blankets and travel rugs from animal fibres or fine animal hair
Wood, paper, rubber, plastics	Wood products	medium	Wood pallets, basketwork, wickerwork	Ornaments of wood, mats, matting and screens, basketwork, wickerwork, plaiting materials,
	Plastic household articles	weak	Plastic tableware and kitchenware, plastic household and toilet articles, plastic furniture	
Mineral and metal products	Jewellery	medium	Imitation jewellery	Articles of precious or semi-precious stones
	Stone products	medium	Insulating materials made of stones	Tiles and setts of stones, grinding balls and articles for mills
	Tubes, pipes and fittings of metals	weak	Tubes/pipes of iron/steel	Oil/gas pipes, tubes/pipes of iron/steel
	Household articles of metal products	weak		Household articles of iron or steel, of aluminium, of base metal
	Hand-operated tools and mechanical tools	weak		Spades and shovels, mattocks, picks, hoes and rakes
	Wires	weak		Barbed wire of iron or steel, wires of base metal
Machinery and electronic equipment	Refrigerators, freezing equipment	weak		Refrigerators, freezing equipment
	Household appliances	weak		Laundry-type washing machines
	Electricity generators, transformers and capacitors	weak		Manganese dioxide cells and batteries
	Construction and extraction machinery	weak		Boring or sinking machines for mineral extraction
Manufactured products n.e.s	Ceramic articles	weak	Ceramic tiles and mosaics	Ceramic ornaments
	Cargo containers	medium	Containers, incl. containers for the transport of fluids	
	Wigs and false hairs, of synthetics or human hair	weak		False beards, eyebrows and eyelashes, of synthetic textile materials

Note: N.e.s. stands for 'not elsewhere specified'.

Source: Authors' calculations based on ITC Export Potential Map (2023).

Table 23:Opportunities for processed products in new and existing manufacturing exports

F. Schedule of Leases

SCHEDULE OF LEASES FOR LAND AT JINJA INDUSTRIAL PARK												
No	**Name of Developer**	**Sector**	**Business Activity**	**Acreage**	**Development Status**	**Contact Person**	**Country**	**Phone Contact**	**Email**	**Employment**	**Level of Investment (USD)**	**Additional Notes**
	Operational											
1	Kiira Motors Limited	Assembling	Vehicle manufacturing plant	100	Operational	Paul Musasizi	Uganda	0393-517888	info@kiiramotors.com p.musasizi@km.com	500	91 195 224	Investor granted full-term lease on 14th March 2025
	Pre-start											
2	Nile Plywood	Manufacturing	Manufacturing of plywoods, block boards and furniture	12	Pre-start Stage		India	0434-121946 0752-740101 (Farida)	nileply@source.co.ug			
3	Mega Holdings Ltd	Agro processing	Agro processing	4	Pre-start Stage (re-instated)	Makode Chris	Uganda	0782-339421 0718-555417	megaholdings82@gmail.com makodechris@yahoo.co.uk			
4	Beta Koreb Ltd	Agro processing	Agro processing (Milk processing)	3	Pre-start Stage	Sarah Busulwa	Uganda	0755-956456 0777-519473 0756-092084	betakoreb1234@gmail.com	1 066	74 514 829	
5	Bweya Kajjansi Limited	Agro processing	Development of a wheat processing facility	3	Pre-start Stage	Mworozi James	Uganda	0392-895576 0772-369512 0759-368826 0783-185140	jamwoma2000@yahoo.com	63	2 974 947	
6	Modern Steel Works Ltd	Manufacturing	Manufacturing steel and plastics products	4	Pre-start Stage	Mpiirwa Brian	Uganda	0774-818215 0706-294191	mpiirwa@gmail.com	250	1 000 000	
7	ADT Africa Ltd	Agro processing	Animal feeds factory	4	Pre-start Stage	Elizabeth Avenwe	British Virgin Islands & Australia	0782-660926	ben@adtafrica.com	41	1 026 000	
8	Agro Tech Chemicals Limited	Agro processing	Agro chemicals facility	3	Pre-start Stage	Gerald Mayanja	Uganda	0787-575327	agtechemicals@gmail.com	521	19 420 000	
9	NEC-Watu Automobile (U) Ltd	Manufacturing	Manufacturing and assembling of automobiles, spare parts and to explore projects of mutual commercial interest	10	Newly allocated	Lt. Gen. James Mugira	Uganda		nec@nec.go.ug necug2000@gmail.com			
10	Shengda Industries Limited	Manufacturing	Shoe and ceramic factory	5	Newly allocated							
11	Mohammed Enterprise Uganda Ltd (METL)	Beverages	Carbonated soft drink processing plant	5	Newly allocated	Mr. Ashique Mohammad	India	0741-923060	ashique@metlgroup.co.tz	185	38 078 000	

List of exporting companies in Jinja city showing 79% are based in Masese:

SN	FACTORY	TYPE OF INDUSTRY	LOCATION
1.	Bidco Uganda LTD	Food processing	Masese
2.	Giant Aluminum	Steel industry	Masese
3.	Sunbelt	Textile	Masese
4.	AGI steel	Steel industry	Masese
5.	MMI steel	Steel industry	Walukuba-Masese
6.	Madivan steel Division	Steel industry	Masese
7.	Nile Agro Industry	Food processing	Walukuba -Masese
8.	TASCO Industry LTD	Food processing	Masese
9.	Agro ways	Food processing	Magwa
10.	AgroBen	Food processing	Masese
11.	Nyanza perch LTD	Food processing	Old boma
12.	Alpha woollens	Textile	Masese
13.	pulp and paper mills LTD	paper industry	Kimaka
14.	Masese Fish Packers	Food processing	Masese

PART IV: WATER AND SANITATION

Prepared by Eng. Dr. Seith Mugume

Field visits to the industrial parks and stakeholder engagements

Part IV 1. Lugazi Industrial Park

Stakeholder engagement with Lugazi Municipal Council officials

The site pre-assessment team had an engagement with Lugazi Municipal Council officials, including the town clerk, the district engineer, the district environment officer and the district commercial officer on Monday, 26th May 2025. The meeting was held at the municipal council headquarters. The purpose of the meeting was to discuss the municipal council's involvement and interest in the development of Lugazi Industrial Park, as well as the current situation of significant infrastructure such as water supply, sanitation, transport and energy, within the municipal council.

The team introduced EIP project and its objectives to the district officials. The municipal council is highly in support of the development of the Lugazi industrial park because of the highly anticipated benefits from the park, such as increased local revenue (in terms of property taxes, local services tax, and environmental taxes) and increased employment opportunities for the local community. The municipal council is already supporting the park to develop tarmacked access roads under the Urban Support for Municipal Infrastructure Development (USMID) project. It was also reported that the site for the Lugazi industrial park is near the Standard Gauge Railway. The site is also located in close proximity (less than 100 meters) from 132kV power line. The information regarding the current situation of water and sanitation infrastructure in the park and Lugazi as a whole is presented in Table 19.

Image 20:Meeting with Lugazi Municipal Council Officials

Table 24:Information on water and sanitation infrastructure of Lugazi

Water Supply	• Lugazi town relies on a ground water based piped water supply system managed by National Water and Sewerage Corporation (NWSC). It is reported that the supply is not reliable • There are plans to supply Lugazi town using potable water from the completed 160,000 m^3/d Katosi Water Treatment Plant in Mukono District, which abstracts raw water from Lake Victoria • There are existing plans to augment bulk water supply to Lugazi town by connecting the existing system to the Buikwe water system that is currently under construction. However, Lugazi is much further from the targeted small towns. • NWSC is in charge of supplying water to the industries, and a portion of land in the park was gazetted for the installation of reservoir tanks to supply water to the park (100x100ft plot).
Wastewater management	• Lugazi has no centralised wastewater treatment plant • Lugazi Sugar Works operates an industrial effluent treatment plant within the factory premises • Households dispose of their faecal sludge from septic tanks and lined pit latrines by employing cesspool tanks, which take the sludge to treatment plants in Jinja. • Ministry of Water and Environment (MWE) had planned to set up a faecal sludge treatment plant in Lugazi, but the municipal council was unable to secure land for the plant, so it will instead be established in Buikwe Town Council. • Some of the industries in Lugazi, such as SCOUL, Tembo Steels and Hoopoe Tannery, have their own effluent treatment plants
Solid waste management	• Solid waste is disposed of at a dumping site in Kawolo. • Scavengers collect plastics at the dumping site for sale to plastic recycling companies • The solid waste dumping site is supposed to accommodate the abattoir in the future. The municipal council has allocated 5 acres for solid waste dumping within the site (measuring 19 acres). Currently, about 2 acres out of the allocated 5 acres have been utilised for solid waste dumping.
Stormwater management	• There is a stream that flows from the south western boundary to the north western boundary of the park. • The assumed drainage outfall for the park is located along the north western boundary of the park, hence necessitating the need for a drainage masterplan.

Other environmental concerns	• A portion of a wetland was filled to provide land for the industrial park. The area where earth filling was done is along the western and south western boundary of the park, currently allocated to Softcare. • There is no designated site for waste management at the park. It is anticipated that each industry will manage its own waste • There are reports of contaminated springs due to poor effluent disposal from existing industries in Lugazi • The principal engineer reported that the panels meant for lighting the municipal council street lights are constantly covered by soot from SCOUL, and in turn, fail to function. Hence there are concerns about air pollution in the areas surrounding SCOUL. • There are reports of corrosion of the roofing sheets of schools due to the soot from SCOUL.

Stakeholder engagement with the business community of Lugazi

The site pre-assessment team held a stakeholder engagement workshop with the representatives of the business community of Lugazi on Tuesday 27th May 2025. The stakeholders present were the chairperson of the Lugazi business community, the chairperson of the sugarcane out growers in Greater Mukono, the chairperson of carpenters and welders in Lugazi and municipal council officials (environment officer, commercial officer, physical planner, and the community development officer). The stakeholders were briefed about the project and the opportunities and benefits it presents to the business community of Lugazi.

The carpenters obtain timber from natural forests in Lugazi, and they are involved in reforestation initiatives with eucalyptus trees in the municipal council. The main tree species they use are mvule and mahogany. The cuttings from their activities are bought by farmers who use them on the floors of chicken houses and on farms as manure. Women are involved in the carpentry business, especially in vanishing and smoothing. The main challenge faced by the carpenters is the lack of machinery for certain processes, such as curving. In that regard, they have to transport their timber to be processed in Kampala, which is very costly.

The sugarcane out growers grow sugarcane on a smaller scale and then sell to SCOUL. They are in an association with elected leaders and bylaws governing their operations. They are highly interested in being part of the Lugazi Industrial Park. They are particularly interested in the production of biofuels and furniture from sugarcane bagasse, which they said is produced in excess by SCOUL.

Image 21: Meeting with the business community of Lugazi.

The potential sectors identified for Lugazi Industrial Park, through stakeholder engagements and the economic activities within Lugazi Municipal council, include: sanitary wear manufacturing, coffee processing, vanilla processing, tea processing, maize grain processing, logistics hub, mechanical workshop, and pharmaceutical storage.

Part IV 2. Jinja

Stakeholder engagement with the Natural Resources office of Jinja City

The team had an engagement with the environment officer from the Natural Resources Office of Jinja City on Tuesday, 27th May 2025. He informed the team that the city is highly interested in the EIP project to foster its greening initiatives. There are two industrial parks in Jinja, namely, the Masese (Small and Medium-sized Enterprise) SME Park and the Jinja Industrial Park. The main industries in the Masese industrial area include food processing, textiles, steel processing, Aluminium processing and wood processing. Jinja Industrial Park is only occupied by Kiira Motors Corporation at the moment. The main challenges that the industries are facing, especially in the Masese industrial area, are poor road infrastructure and unreliable power supply. The status of water and sanitation infrastructure in Jinja City, as reported by the environment officer, is presented in **Table 2-1**.

Table 2-1: Water and sanitation infrastructure of Jinja City

Water supply	• The city and the industries are supplied from a piped water supply system managed by NWSC. The system relies on abstraction from Lake Victoria and a water treatment plant in Masese with an existing capacity of 35,000 m^3/d • The treated water is transmitted to the Jinja Rubaga reservoir for distribution • Some industries also directly abstract water from Lake Victoria. • Some industries have drilled production wells, and they are completely relying on groundwater supply. These industries must have abstraction permits from the Ministry of Water and Environment
Wastewater	• 98% of Jinja South Division is connected to the sewer network (approximately 84 km)

	• The city relies on waste stabilisation ponds in Kirinya for wastewater treatment. Secondary treatment of the wastewater is undertaken in Kirinya wetland • Most industries have effluent treatment plants, for pre-treatment before disposal of the effluent into the NWSC waste stabilisation ponds • Some industries aren't meeting effluent discharge standards, with reports of discharging untreated effluent into the lake. • The population relying on on-site sanitation system users use cesspool emptiers to empty their lined pit latrines and septic tanks. The faecal sludge is taken to Kirinya wastewater treatment lagoons.
Solid waste	• Solid waste is disposed of at a dumping site in Masese • There is a trommel machine at the dumping site for separating plastics and metals from biodegradable waste to obtain manure. The machine has a capacity to process 10 to 15 tonnes of waste per day. The city faces challenges in meeting the operation costs for the machine. • Industries dispose of their biodegradable and plastic waste at Masese. The hazardous waste is taken to Nakasongola for further management by licenced waste handlers. • Uganda Electricity Generation Company Limited (UEGCL) is collaborating with Jinja City to develop a solid waste-to-energy project at Masese dumping site.
Stormwater	• Stormwater management is challenge given that the existing roads do not have adequate drainage infrastructure • There is a risk of pollution of the lake from debris transported by stormwater. The city has previously tried to provide flood gates to trap silt and plastic waste

Image 22: Meeting with the Jinja City Environment Officer.

Meeting with the Principal Engineer at National Water and Sewerage Corporation

The water and sanitation team met with the Principal Engineer at the NWSC-Jinja branch to obtain first-hand information on the status of water supply and wastewater management infrastructure in Jinja. The information obtained is presented in **Table 2**-2.

Table 2-2: Current state of water supply and wastewater management Infrastructure in Jinja

Water Supply infrastructure	• Jinja has a surface water treatment plant at Masese with a treatment capacity of 35,0000 m^3/day. • This system supplies water to Jinja, Njeru, Kayunga and Iganga. • The system feeds two reservoirs, with one at Masese and the other at Rubaga Hill. • There are plans to add a clarifier to increase the treatment capacity by 3000 m^3/day. The expansion works are expected to be completed by September 2025. • Most of the industries discharge their effluent into the Napoleon Gulf in Lake Victoria, from which NWSC abstracts water, thus affecting the water quality and raising the treatment expenses for NWSC. NWSC has had to extend its intake point 600m further into the lake. • Consumption by industries constitutes about 40% of the water supply. • Power interruptions significantly affect the water supply. • There is another water supply system managed by NWSC in Buwenge. There are four production wells in Buwenge, with yields of 24 m^3/hr, 21 m^3/hr, 16 m^3/hr, and 12 m^3/hr. • There are plans to set up a booster station at Nakabango to boost the supply to Jinja Industrial Park.
Wastewater management	• NWSC relies on waste stabilisation ponds for wastewater treatment • NWSC has lagoons in Kirinya and Kimaka with capacities of 12,000 m^3/day and 5000 m^3/day, respectively. The utilisation of each of these systems is currently at 50%. • Most of the industries in Masese are connected to the sewer system to handle only domestic wastewater. • The population relying on on-site sanitation facilities employs cesspool emptiers to transport the faecal sludge to a treatment facility in Iganga. Sometimes cesspool emptiers are allowed to use the treatment plant in Jinja. • The ponds are de-sludged after a period of 5 to 7 years. Farmers take the treated sludge at no cost. • Some industries discharge their effluent containing oils into the sewer system, and this affects the natural treatment in the stabilisation ponds. • Sunbelt and Keshwara industries cannot connect to the sewer system by gravity.

	• There is stormwater intrusion into the sewer system during the rainy season. It has resulted in flooding at the lagoons and siltation. • Jinja Industrial Park cannot be connected to the sewer system due to the difference in elevation and distance from the city center. • It is also difficult to establish waste stabilisation ponds in the Jinja Industrial Park since there is no buffer, such as a swamp. Therefore, a conventional wastewater treatment plant would have to be established for the park.

Part IV 3. Masese Industrial Area

Busoga Forest Company

Busoga Forest Company was established in 1996. The company deals in timber processing and utility poles, and its trees are sourced from Mayuge, where they have 9000 acres of forests. The company rents this land from the National Forest Authority. The main tree species grown are pine and eucalyptus. They are engaged in sustainable forest utilisation as new trees are planted to replace harvested ones, and the company is certified by the Forest Stewardship Council (FSC), a globally recognised organisation that sets standards for sustainable forest management. The main water uses by the industry are irrigation of nursery beds in Mayuge, steam for sawmilling and dilution of chemicals. All the water from the industrial processes, such as saw milling and chemical dilution, is reused. The main solid wastes generated in this industry are tree barks, sawdust and wood shavings, which are used as mulch, compost and animal bedding. The hazardous waste generated, such as chemical spills, is taken by private waste collectors to Nakasongola hazardous waste treatment plant. The main challenges faced by this industry are export constraints due to many checks within Uganda and at the border, unreliable power supply and poor road infrastructure.

Image 23: The team's visit to Busoga Forest Company.

Nile Agro Industries

Nile Agro Industries deals in edible oil, wheat flour, soap, batteries, paper, pharmaceuticals, tyres, and coffee processing. the industry mainly relies on both surface water from NWSC and the groundwater from the production well at the industry. This industry is heavily invested in recycling and reuse of the waste it produces. For example, fatty matter from edible oil production is a raw material for soap production, margarine and candle wax, cotton cake, soya cake, and sunflower cake are used as animal feeds, and by-products from grain milling are animal feeds. Other solid waste streams are taken to the Masese dumping site, while the hazardous waste is taken to Nakasongola hazardous waste treatment plant, which the industry says is very costly. The industry has an effluent treatment plant within its premises, and the treated grey water is diverted to the NWSC sewer line. Unreliable power supply causes significant losses to the industry.

Image 24: Stakeholder engagement meeting at Nile Agro Industries.

Stakeholder engagement with representatives from different industries in Masese Industrial Area

The team held a workshop with the industry community from Masese Industrial Area on Wednesday, 28th May 2025. The industries represented were Nile Agro Industries, dealing in vegetable oil, soap, batteries, coffee, wheat flour, and drinking water; Agroways Grain Processing, Nyanza Perch Fish Processing, and AGI Steel Company. City officials present were the city clerk, the natural resources officer, the city engineer and the city physical planner. The GGGI team briefed them on the details of the Eco Industrial project and how industries will benefit from the symbiosis created by the EIP.

The general challenge faced by all the industries is unreliable power supply, poor road infrastructure and failure of equipment (most of which are imported and so have to be sent back to the manufacturers for repair). AGI Steel Company faces a challenge with the disposal of dolochart, which is a by-product from the processing of sponge, a raw material for steel processing. the dolochart is produced in enormous quantities, although with no reuse or recycling by AGI Steel. the company would like the eco-industrial park to support it in the recycling of dolochart. Dolochart can be used in wastewater treatment for the removal of cadmium and in road construction aggregate. The industries, especially those abstracting directly from the lake, are hesitant to undertake grey water recycling because water is available in plenty.

The industry representatives said the eco-industrial park project should not only focus on the environment but also on increasing their profit margins. The main infrastructure they would want in the eco-industrial project is reliable power supply, improved road infrastructure, machinery repair workshop, an automobile garage, a research centre and centralised warehousing.

Image 25: Stakeholder meeting with the industry representatives from Masese Industrial Park

Part IV 4. Tororo Industrial Park
Stakeholder engagement with industry representatives of Tororo

A workshop was held on Friday, 30th May 2025, with industry representatives from different industries within Tororo, including cement processing, coffee processing, fruit processing, meat processing, cosmetics and hair processing, soap processing, wood processing and metal fabrication. District officials who were present include the Natural Resources Officer and the commercial officer. The purpose of the workshop was to introduce the proposed eco-industrial park project to the industry players, inform them of how they can benefit from this project, and discuss the challenges they are facing and what infrastructure would be beneficial to them in the eco-industrial park.

The challenges faced by the industry players include: the unregulated businesses which compete for business with the industries as their products tend to be cheaper, expensive machinery, exploitation by consolidators during the importation of machinery, expensive and unreliable power, difficulty in moving goods across borders, and price instability. Potential industry greening opportunities presented by the industry representatives include; production of biofuels from coffee husks to reduce reliance on wood fuel, harnessing of solar energy due to the high solar irradiance in Tororo and utilisation of the Standard Gauge Railway to transport goods to the port thus reducing emissions from the long-distance trucks on roads. They suggested to the team that the industrial park should be tailored to the industry needs of Tororo, and it should be accessible to the small-scale industries. They were advised to register with relevant government agencies such as Uganda Revenue Authority and Uganda Investment Authority so that they can benefit from tax exemptions given to industries engaged in value addition.

Image 26: Meeting with representatives from industries in Tororo.

The district faces challenges from industries, as some of them discharge untreated effluent into the rivers. Furthermore, some industries deny environmental officials access to their industries during routine compliance checks.

The potential sectors that were identified for Tororo Industrial Park, based on discussions with stakeholders, include: coffee processing, seed oil processing, processing of fruits and vegetables, soap manufacturing, maize grain processing, alcohol production, wood processing, warehousing facilities, eco-tourism and cosmetics packaging.

Table 4-1: Information on water and sanitation in Tororo

Water Supply	• The district relies on a piped water supply system managed by NWSC water system. The piped water supply system comprises of two sources, namely, river Manafwa from Mt Elgon and River Malaba • Most of the industries in Tororo do dry production, so they use less amounts of water and, in turn, generate low quantities of wastewater • Some industries have drilled boreholes to meet their water needs.
Wastewater management	• A significant percentage of the town is connected to the sewer system managed by NWSC. • The wastewater from Tororo is treated through waste stabilisation ponds
Solid waste management	• The municipality has a dumping site for handling solid waste in Mukujo sub county. The dumping site is approximately two hectares, and about one hectare has so far been used. • The municipality owns trucks for the collection of solid waste within the town

	• The incineration of medical waste is done at Tororo hospital • Plastics and metal scrap are collected by the scavengers at the dumping site and sold to recycling companies.
Stormwater management	• The western part of site could be vulnerable to flooding due to its flat topography and proximity to River Malaba, however, there are no recent reports of flooding
Other environmental concerns	• The Ministry of Water and Environment has demarcated wetlands near River Malaba

Water and sanitation infrastructure of the industrial park locations

Existing infrastructure

The information on water and sanitation infrastructure for the four potential EIP locations that were assessed during the site pre-assessment mission is summarised in **Table 5-1.**

Table 5-25: Information on the water and sanitation infrastructure of the potential EIP locations

Sites	Water supply infrastructure	Wastewater management	Solid waste management	Stormwater management
Lugazi Industrial Park	• Lugazi relies on an existing water supply system managed by NWSC, whose supply is not reliable • The water supply for Lugazi town can be improved by connection to either the Katosi system or the Buikwe bulk water transfer system • A portion of land in the park was gazetted for the installation of reservoir tanks to supply water to the park (100x100ft plot)	• There is no centralised wastewater treatment plant. • MWE plans to establish a faecal sludge treatment plant in Buikwe • Industries within Lugazi (such as SCOUL, Tembo Steels and Hoopoe Tannery) have effluent treatment plants	• Solid waste is disposed of at a dumping site in Kawolo • Scavengers collect plastics at the dumping site for sale to plastic recycling companies	• The park's terrain is generally sloping, so there is a high likelihood of flooding of the low-lying areas of the park (along the western and north western boundary) if a robust drainage system is not provided
Masese Industrial Area	• Industries closer to L. Victoria abstract water on their own. • NWSC Masese Reservoir supplies water to the industrial area. • NWSC plans to increase water production capacity by 3000 m^3/day • Some industries rely on groundwater supply from their production wells.	• Most industries have effluent treatment plants on their premises. • Domestic wastewater is conveyed through NWSC sewers to Kirinya wastewater lagoons. • Some industries discharge untreated effluent directly into the lake.	• Solid waste is disposed of at a dumping site in Masese. • Industries dispose of their biodegradable and plastic waste at Masese. • Hazardous waste is taken to Nakasongola hazardous waste treatment plant. • There is a trommel machine at the dumping site for separating waste to obtain manure. • UEGCL plans to develop a solid waste-to-energy project at the dumping site.	• Sloped terrain directs surface runoff towards natural streams and low-lying areas and ends up in Lake Victoria
Jinja Industrial Park	• Reservoirs at Kiira Motors are supplied by NWSC. • NWSC plans to set up a booster station at Nakabango to boost the supply to the park and surrounding areas.	• No information was obtained on wastewater management by Kiira Motors Corporation. • The park is not connected to the NWSC sewer system due to elevation	• No information was obtained on solid waste management by Kiira Motors Corporation.	• The site is located in a water logged area. • Kiira Motors Corporation constructed a robust drainage system, and no flooding has been recorded at the industry.

Sites	Water supply infrastructure	Wastewater management	Solid waste management	Stormwater management
		limitations and distance from the city center.		• The site is gently sloping from the northern boundary towards the southern boundary of the park. There is a stream along the western boundary of the park that reportedly floods during the rainy season
Tororo Industrial Park	• The site is close to the Tororo water treatment plant abstracting water from River Malaba.	• The site is located approximately 8.5km south of the NWSC waste stabilisation ponds	• Tororo district has a 2 hectare dumping site. • Plastics and metal scrap at the dumping site are collected by scavengers and sold to recycling companies.	• The western part of site could be vulnerable to flooding due to its flat topography and proximity to River Malaba, however, there are no recent reports of flooding.

Infrastructure options in the potential Eco-Industrial Park sites

Based on desk studies and preliminary assessment of the existing infrastructure during the field mission, the proposals for water and sanitation infrastructure required to develop eco-industrial parks have been provided in subsequent sections. It is important to note that the establishment of these parks and the infrastructure is hinged upon the development of broader district or municipal infrastructure, in areas of water supply, waste management and road infrastructure. The assessment of infrastructure options is based on the promotion of greening in the industrial parks and creation of industrial urban symbiosis. These options will be further assessed for the selected sites.

Lugazi Industrial Park

This is a green field project with no existing water and sanitation infrastructure at the site. It was noted that Softcare, a company that is already constructing at the site, has no clear management plan for wastewater, solid waste and stormwater. The proposed infrastructure for the full-scale development of this park is detailed in Table 3-2 below.

Table 5-2: Infrastructure proposals / options for Lugazi Industrial Park

Component	Infrastructure Proposals / Options
Water supply	• NWSC has mandate for water supply at the industrial park site • The potential connection to the supply from Katosi system or Buikwe systems is expected to meet the water demand requirements at the site. This will be further assessed if the site is selected
Wastewater management	• There is need for a masterplan for the park, with designated areas for waste management. Currently, the ideal location for waste management has been purchased by Softcare. • There is potential to have a centralised wastewater treatment plant at the park, downstream of the respective effluent treatment plants at each industry • There is potential for grey water reuse to supplement water requirements at the park

Component	Infrastructure Proposals / Options
Solid waste management	• There is a possibility of a material recovery facility within the park to process recyclable and reusable waste into useful products such as packaging material and biofuels. However, this will be further assessed if the site is selected and the sectors confirmed • There is potential for development of Kawolo dumping site into a sanitary landfill with solid waste valorisation facilities
Stormwater management	• There is need for a drainage masterplan for the site. There is a risk of poor stormwater management if the industries purchase land without adequate planning • Green infrastructure such as green roofs and permeable paving landscaping, and bioswales to reduce storm runoff • Rainwater harvesting systems to collect and retain stormwater for on-site reuse • There is potential for use of retention basins and ponds to store stormwater for reuse. However, this will also be dependent on space availability in the park. • Tree planting around the park to augment the stormwater management system and environmental protection (carbon dioxide capture and air quality improvement). The park management mentioned that provision would be made for a green area measuring 2.5 acres

Tororo Industrial Park

Development of this park is also a greenfield project. The site is currently occupied by farmlands and eucalyptus trees. No development plan or studies have been carried out by the land owner in regards to development of an industrial park. The water and sanitation infrastructure proposal for the site is highlighted in Table 5-3 below.

Table 5-26: Infrastructure proposals/options for Tororo Industrial Park

Component	Infrastructure Proposals / Options
Water supply	• Water is abstracted from River Manafwa and treated at the Manafwa and Bunghoko water treatment plants with a combined capacity of 9,000 m^3/d. • NWSC in partnership with the Ministry of Water and Environment is currently implementing the Mbale Water Supply and Sanitation Project that will increase the combined water treatment capacity for the two plants to 24,000 m^3/d. • The supply of water to the park can be done through extension from NWSC treatment plant on River Malaba (about 2km away).
Wastewater management	• There is potential for the site to be connected to the existing wastewater treatment plant. However, this would require a lifting station after assessment of the reserve capacity at the plant. • There is a possibility of establishing a sewer network and centralised wastewater treatment plant at the park site; however, this should feed into a master plan for the park

	• There is potential for grey water reuse to supplement water supply to the park
Solid waste management	• There is a possibility of a material recovery facility within the park to process recyclable and reusable waste into useful products such as packaging material and biofuels. However, this will be further assessed if the site is selected and the sectors confirmed • There is potential for the development of the Tororo dumping site into a sanitary landfill alongside solid waste valorisation facilities
Stormwater management	• Green infrastructure such as green roofs and permeable paving landscaping, and bioswales to reduce storm runoff • Rainwater harvesting systems to collect and retain stormwater for on-site reuse • There is potential for use of retention basins and ponds to store stormwater for reuse. However, this will also be dependent on space availability in the park • There is a possibility for further increasing the tree coverage around the park to augment the stormwater management system and environmental protection (carbon dioxide capture and air quality improvement)

Masese Industrial Area

Masese Industrial Area will rely on some of the existing infrastructure of Jinja city, such as the water supply. The infrastructure options for the development of Masese industrial area into an EIP are detailed in Table 5-4 below.

Table 5-27: Infrastructure proposals / options for Masese Industrial Area

Component	Infrastructure Proposals / Options
Water supply	• The existing water production at NWSC treatment plant will be increased by 3000 m^3/day. If the site is selected, there is need to assess the water requirements for existing and upcoming industries in the area
Wastewater management	• There is potential for connection of the industries (downstream from the effluent treatment plants) to the existing sewer system. However, the efficacy of the industries' effluent treatment plants is not known. There are two existing industries that would require lifting stations • There is potential for reuse of treated effluent from the treatment plant to augment water supply • There is potential for treated sludge valorisation, which is already occurring at a small scale (used as soil conditioner by farmers)
Solid waste management	• There is potential for establishment of a material recovery facility in the industrial parks to create industrial symbiosis, for example, waste from coffee and wood processing can be processed into biofuels, and packaging waste can be reused to produce new packaging materials. • There is potential to further enhance the development of waste valorisation facilities at the Masese dumping site, such as composting, landfill gas collection and energy recovery. The city

	is in the process of piloting waste separation at source at the main market • The existing industries are unaware of the solid waste management chain outside their premises (specifically, solid waste re-use). There is a potential to enhance urban symbiosis
Stormwater management	• There is need to develop a comprehensive stormwater drainage management plan for the Masese Industrial area. The plan should be well integrated into the rehabilitation of the Masese Walukuba road. • Green infrastructure such as green roofs, permeable paving, landscaping, and bioswales to reduce storm runoff.

Jinja Industrial Park

Jinja Industrial Park will rely on some of the existing infrastructure of Jinja city, such as the water supply. The infrastructure options for the development of Jinja industrial park into an EIP are detailed in Table 5-5 below.

Table 5-28: Infrastructure proposals/options for Jinja Industrial Park

Component	Infrastructure Proposals / Options
Water supply	• NWSC has already extended supply to the park, specifically for Kiira Motors Corporation. NWSC plans to further boost supply to the area after establishment of more companies in the park
Wastewater management	• There is potential for development of a centralised wastewater treatment plant. The plant can also do polishing of effluent from the effluent treatment plants established within the industries • There is potential for reuse of treated effluent from the treatment plant to augment water supply • There is potential for treated sludge valorisation
Solid waste management	• There is a potential for the establishment of a material recovery facility in the industrial park; however, the extent of this can be assessed on a selection of the site and confirmation of the sectors. • There is need to establish a solid waste management site for the industrial park. The site can also be used by the nearby community
Stormwater management	• There is need for the development of a drainage master plan for the industrial park. • Green infrastructure such as green roofs, permeable paving, landscaping, and bioswales to reduce storm runoff. • There is need to enhance tree planting around the park (in addition to the forest reserve) to augment the stormwater management system and environmental protection (carbon dioxide capture and air quality improvement)

WATSAN conclusions and recommendations

Water Supply

Based on the field missing findings, it is noted that three industrial sites (Jinja, Masese, and Tororo) are supplied using surface water and existing municipal water treatment plants i.e. Jinja and Tororo water treatment plants. On the other hand, Lugazi is supplied from existing ground water based water supply system and which experiences intermittent operations. On this basis, the choice of the industrial park should factor in available water supply capacities and the potential for expansion of existing water treatment plant capacities.

Wastewater Management

Based on the field missing findings, only two industrial sites (Masese and Tororo) are in close proximity to existing waste stabilisation ponds. However, the Tororo site is downstream of the existing waste stabilisation ponds and will require establishing of a pumping station. Presently, all the sites, excluding Masese (that is Jinja, Lugazi and Tororo) are primarily relying on non-sewered sanitation options. On this basis, the choice of the industrial park should factor in available wastewater management options and consider investments in new waste water pre-treatment facilities at each industrial site and construction of new waste stabilisation ponds (Jinja and Lugazi) to enhance urban symbiosis.

Solid Waste Management

Based on the field missing findings, all the industrial sites are in close proximity to existing municipal solid waste management facilities. However, the Jinja site is very distant from the existing municipal solid waste dumping site and may require construction of a new waste to energy and solid waste recycling facility that takes into consideration circular economy principles. In addition, the all the existing sites are dumping sites and do not follow standard landfilling operation and management principles and practices. On this basis, the choice of the industrial park should factor in available solid waste management facilities and consider investments in new and improved solid waste management facilities to enhance urban symbiosis.

Storm Water Management

Based on the field missing findings, one of the industrial sites (Jinja) is located in a low-lying flood prone area that requires further flood risk assessment studies. In addition, the Tororo site is bordered by River Malaba which also experiences frequent flooding events. This therefore necessitates detailed flood risk studies for the site. On the other hand, the Lugazi site is bordered by a stream that feeds in River Musyama. However, no drainage masterplan and provision for a suitable outfall has been made. On this basis, the choice of the industrial park should factor in the existing storm water management facilities and consider investments in innovative storm water management options that include industrial rainwater harvesting systems and implementation of blue-green infrastructure.

Annex (WATSAN): Data Collection Tools

Table 5-6: Data collection tool for Lugazi Industrial Park site

WATER AND SANITATION METHODOLOGICAL TOOLS (Greenfield)	
Site Name	Lugazi Industrial Park
Geographical coordinates	0°22'51.57" N, 32°57'36.63" E
Name of administrative unit (village, parish, sub-county)	Kisaasi Cell, Bulyanteete Ward, Kawolo Division, Lugazi Municipality, Buikwe District
Name of data collector	Joan Kemigisha
Date of assessment	26/05/2025
Question	**Answer**
General	
Do you have the documentation for the eco industrial park, e.g., feasibility studies, site layout, design drawings, particularly Watsan infrastructure masterplans? If yes, can they be availed?	The feasibility study report of the park was provided
How many industries are planned for the area, and what is the allocated acreage?	Currently, six industries are planned for the park. The Park sits on 100 acres.
What are the types of industries (sectors) planned for the park?	Manufacture of sanitary wear and baby diapers, pharmaceutical warehousing, logistics hub, mechanical workshop, agricultural processing (maize grains, vanilla, tea, coffee, cotton), cottage industry
What is the proposed management system for the park?	Lugazi Industrial Park and its financing partners will, as a consortium, award a park management contract to a professional project management company
Water Supply	
What are the possible water sources and their distance from the park?	NWSC supply from Katosi and the Buikwe water system (under construction), grey water reuse
Which sources can sustainably supply the park?	NWSC supply from Katosi and the Buikwe water system (under construction)
Which of the possible sources are already in use by the community?	NWSC supply from Katosi
Does the planned water supply system incorporate green infrastructure or nature-based solutions?	Yes. Considerations for grey water reuse have been made.
Have you taken into consideration any sustainable water management measures, such as water efficiency measures and water reuse?	Yes. Considerations for grey water reuse have been made.
Who is charged with the construction, operation and maintenance of the water supply infrastructure?	The park developer, with support from the government
Wastewater Management	
What is the wastewater management plan for the park?	Connection to a sewer network and then treatment at a centralised effluent treatment plant. The chosen method for wastewater treatment is the use of simple, low-cost, low-maintenance, and efficient Waste Stabilisation Ponds.

Does the management plan provide for water reuse? What percentage of the wastewater produced is planned to be reused?	Greywater reuse for purposes such as landscape irrigation, toilet flushing, and equipment/ vehicle cleaning is under consideration
Will the park have a wastewater and/or faecal sludge treatment plant?	Yes. A centralised effluent treatment plant will be constructed at the park
Who is charged with the construction, operation and maintenance of the wastewater management infrastructure?	The park developer with support from government
Stormwater Management	
What is the topography of the site and the surrounding areas? Please describe	The park's terrain is gently sloping from the eastern and north eastern boundary towards the north western boundary
What is the land use type at the site and surrounding areas?	Agricultural (sugarcane and tea plantations), Industrial (SCOUL, Cable corporation), and partly residential on the upper side of the park
What is the proposed stormwater management system for the site?	Stormwater drainage will be provided through a closed sewerage system utilising underground pipes planned along the right-of-way of the roads
Does it incorporate blue-green infrastructure options (e.g., rainwater harvesting systems, permeable pavements or retention ponds)?	Green infrastructure such as roof catchment and re-use of rainwater at the plot level, permeable pavements, green roofs, bioswales were considered in the feasibility studies of the park.
Are there any specific flood-prone areas or those with erosion risks?	The low-lying areas of the park (along the western and north-western boundary) are prone to flooding
Who is charged with the construction, operation and maintenance of the storm water management infrastructure?	The park developer
Solid Waste Management	
What is the proposed solid waste management plan?	Each industry within the park will be fully responsible for managing its waste. The park management will oversee the
Does the plan consider the waste management hierarchy (priority to recycling and reuse)?	Yes. The plan prioritises prevention, reuse, recycling, recovery and disposal as the least preferable option.
Are there any circular economy considerations or opportunities?	The solid waste management plan is structured around a waste management hierarchy that prioritises options from most to least preferable, aligning with circular economy principles
Who are the existing private sector players in solid waste collection, transportation, and treatment?	Some recycling companies purchase sorted plastic bottles at the dumping site
Will the park/company have protocols for protection against exposure to hazardous materials and disclose potential risks to workers, including special attention to women's health and reproductive health?	Yes. Each industry will be charged with the protection of its workers against hazards by providing personal protective equipment.
How will hazardous waste be disposed of?	Hazardous waste will be disposed of at Nakasongola hazardous waste treatment facility
How much waste is to be taken to landfills?	Less than 50%
Who is charged with the construction, operation and maintenance of the solid waste management infrastructure?	The developer of the park

Table 5-7: Data collection tool for Tororo Industrial Park site

WATER AND SANITATION METHODOLOGICAL TOOLS (Greenfield)	
Site Name	Tororo Industrial Park
Geographical coordinates	0°38'34.52"N, 34°12'14.75"E
Name of administrative unit (village, parish, sub-county)	Asinge C village, Nyalakot parish in Osukuru sub-county
Name of data collector	Joan Kemigisha
Date of assessment	31/05/2025
Question	**Answer**
General	
Do you have the documentation for the eco industrial park, e.g., feasibility studies, site layout, design drawings, particularly Watsan infrastructure masterplans? If yes, can they be availed?	The developer has not carried out any studies for this site
How many industries are planned for the area and what is the allocated acreage?	The park site is about 100 acres. The number of industries planned for the park is not yet known
What are the types of industries (sectors) planned for the park?	coffee processing, seed oil processing, processing of fruits and vegetables, maize grain processing, soap manufacturing, alcohol production, wood processing, warehousing facilities, eco-tourism and cosmetics packaging.
What is the proposed management system for the park?	The private developer intends to manage the park with support through public-private partnerships
Water Supply	
What are the possible water sources and their distance from the park?	NWSC supply from Tororo water treatment plant
Which sources can sustainably supply the park?	The ability of the treatment plant to sustainably supply the park will be assessed in detail if the site is selected
Which of the possible sources are already in use by the community?	NWSC supply from Tororo water treatment plant
Does the planned water supply system incorporate green infrastructure or nature-based solutions?	Greywater reuse and rainwater harvesting can be incorporated to augment the planned water supply system
Have you taken into consideration any sustainable water management measures, such as water efficiency measures and water reuse?	Greywater reuse and rainwater harvesting are potential water efficiency measures
Who is charged with the construction, operation and maintenance of the water supply infrastructure?	The developer plans to lobby for support from the government, through NWSC, to develop water supply infrastructure
Wastewater Management	
What is the wastewater management plan for the park?	There are two options, i.e., connecting the site to the Tororo NWSC treatment plant, or constructing a centralised effluent treatment plant at the park
Does the management plan provide for water reuse? What percentage of the wastewater produced is planned to be reused?	Greywater reuse will be considered in the detailed studies of the site. The percentage of wastewater to be reused will depend on the specific industries at the park
Will the park have a wastewater and/or faecal sludge treatment plant?	There is potential for developing a centralised effluent treatment plant at the park
If no, are there treatment plant (s) in the surrounding areas that can be utilised? What is the proximity to the site?	Tororo wastewater treatment plant, which is about 12km away from the site

Who is charged with the construction, operation and maintenance of the wastewater management infrastructure?	The developer plans to lobby for support from the government, through NWSC, to develop the infrastructure
Stormwater Management	
What is the topography of the site and the surrounding areas? Please describe	The site has a gently sloping topography from the eastern boundary to the western boundary
What is the land use type at the site and surrounding areas?	Agricultural land, forestry and water body (River Malaba)
What is the proposed stormwater management system for the site?	There is no planned stormwater management system for the site. However, the possible stormwater management system could incorporate a storm drainage network in the park and green infrastructure.
Does it incorporate blue-green infrastructure options (e.g., rainwater harvesting systems, permeable pavements or retention ponds)?	Green infrastructure will be incorporated into the stormwater management system during the feasibility studies for the site
Are there any specific flood-prone areas or those with erosion risks?	The western part of the site could be vulnerable to flooding due to its flat topography and proximity to River Malaba. However, no flooding has been recently reported
Who is charged with the construction, operation and maintenance of the storm water management infrastructure?	The developer of the park
Solid Waste Management	
What is the proposed solid waste management plan?	The developer has not yet considered a solid management plan for the park. However, the plan developed at feasibility studies would consider waste management hierarchy, prioritising prevention, reuse and recycling of solid waste
Does the plan consider the waste management hierarchy (priority to recycling and reuse)?	Detailed studies of the site will prioritise prevention, reuse, recycling, recovery and disposal as the least preferable option.
Are there any circular economy considerations or opportunities?	A solid waste management plan, structured around a waste management hierarchy that prioritises options from most to least preferable, aligns with circular economy principles
Who are the existing private sector players in solid waste collection, transportation, and treatment?	Tororo municipal council handles the collection, transportation and treatment of solid waste. Some private companies recycle plastics that are sorted by scavengers at the dumping site
Will the park/company have protocols for protection against exposure to hazardous materials and disclose potential risks to workers, including special attention to women's health and reproductive health?	Yes. Each industry will be charged with the protection of its workers against hazards by providing personal protective equipment.
How will hazardous waste be disposed of?	This will be assessed during the feasibility studies of the park
How much waste is to be taken to landfills?	The waste that will be taken to the landfills is not yet known
Who is charged with the construction, operation and maintenance of the solid waste management infrastructure?	The private developer will be responsible for the construction of the infrastructure. Operation and maintenance of the infrastructure can be done by the individual industries with support and oversight from the park management

Table 5-29: Data collection tool for Masese Industrial Area

WATER AND SANITATION METHODOLOGICAL TOOLS (Brownfield)	
Site Name	Masese Industrial Area
Geographical coordinates	0°26'59.63"N, 33°14'4.26"E
Name of administrative unit (village, parish, sub-county)	Masese Walukuba division, Jinja City
Name of data collector	Joan Kemigisha
Date of assessment	29th May 2025
Question	**Answer**
General	
Do you have the documentation for the eco industrial park, e.g., feasibility studies, site layout, design drawings, particularly WatSan infrastructure masterplans? If yes, can they be availed?	No documentation was provided by Jinja City officials or the individual industries
How many industries were planned for the park and what is the allocated acreage for each? What is the total acreage of the park?	This is an industrial zone for Jinja City with privately owned land, so the number of industries planned is not known.
What are the types of industries (sectors) in the park?	Maize grain processing, vanilla processing, cocoa processing, fish processing, steel rolling, soap manufacturing, vegetable oil processing, wood processing, plastics manufacturing, coffee processing, warehousing,
What is the current level of occupancy? What are the future projections?	The occupancy level is not defined
How is the site managed? Is there a centralised or decentralised (individual) management system?	The industrial zone is managed at individual level by industries with oversight from Jinja City
Water Supply	
What is the average daily water demand for the park?	The average water demand for the industries was not defined. However, NWSC reported that industries consume about 40% of the water supply to Jinja City
What is the type and capacity of the current water supply system?	Masese NWSC reservoir with a capacity of 400,000 litres. Some industries abstract water directly from Lake Victoria
What is the water source and proximity to the site?	Lake Victoria, which bounds the Industrial area in the South
Does the current water supply sustainably meet the current demand for the park? What of the future projections?	The current demands are sustainably met. The capacity to meet future projections depends on the future demands of the existing industries and the new industries that will be established
Does the park share the water source with the community? If yes, is the combined use sustainable now and in the future?	Yes, the park shares the water source with the community. The combined use is currently sustainable. A detailed assessment has to be done to assess the future sustainability

Does the water supply system incorporate green infrastructure or nature-based solutions?	Yes. A riparian buffer is maintained around Lake Victoria to filter pollutants from runoff before it enters the lake
Have you taken into consideration any sustainable water management measures, such as water efficiency measures and water reuse?	Some industries, such as Nile Agro and Busoga Forest Company, have undertaken greywater reuse to reduce their water footprint
Who is responsible for the construction, operation and maintenance of the water supply infrastructure?	NWSC is responsible. However, industries that abstract water from the lake do it at their own cost
What are the water supply-related concerns or challenges that should be considered in the master plan?	Pollution of the water source due to untreated effluent from industries
Wastewater Management	
What is the current wastewater management practice/plan for the park?	Industrial effluent is treated on-site before conveyance into the NWSC sewer network for polishing. Domestic effluent from the industries is conveyed to the Kirinya wastewater treatment.
Does the management plan provide for water reuse? What percentage of the wastewater produced is reused?	Some industries, such as Nile Agro and Busoga Forest Company, have undertaken greywater reuse.
Does the park have an existing wastewater and/or faecal sludge treatment plant?	There is no centralised effluent treatment plant in the industrial zone, but rather individual treatment plants at the industries
What is the proximity of any existing treatment plant(s) to the park?	Kirinya wastewater treatment plant is about 2km from the industrial area
Who is charged with the construction, operation and maintenance of the wastewater management infrastructure?	Individual industries construct their effluent treatment plants
What are the wastewater-related concerns or challenges that should be considered in the master plan?	Some industries are not connected to the sewer due to gravity limitations.
Stormwater Management	
What is the topography of the site and the surrounding areas? Please describe	The site is generally sloping towards the lake
What is the land use type at the site and surrounding areas?	Industrial area, residential area and waterbody
What stormwater drainage system is in place?	There is a drainage network following the right of way of the Masese Walukuba road
Is the system efficiently functioning?	No. Most of the drainage channels and manholes are blocked.
Does the stormwater management system incorporate blue-green infrastructure options (e.g., rainwater harvesting systems, permeable pavements or retention ponds)?	No

Are there any specific flood-prone areas or those with erosion risks?	The industries situated close to the lake are prone to flooding. There have been recent reports of flooding in Masese, specifically at the landing site, due to rising levels of Lake Victoria during the rainy season
Who is responsible for the construction, operation and maintenance of the stormwater management infrastructure?	Individual industries at the industry site and then Jinja city for the whole industrial area
What are the stormwater-related concerns or challenges that should be considered in the master plan?	Rehabilitation of the storm drainage network along the Masese Walukuba road
Solid Waste Management	
What is the existing solid waste management plan, and what options are in use?	Some industries reuse and recycle their solid waste. All industries dispose of their solid waste at Masese dumping site. The hazardous waste is transported to Nakasongola hazardous waste treatment plant
Does the plan consider the waste management hierarchy (priority to recycling and reuse)	Some industries, such as Nile Agro, reuse the waste from one industry as a raw material for another industry, for example, fatty matter from vegetable oil processing is used as a raw material for soap making
Who are the existing private sector players in solid waste collection, transportation, and treatment?	Bisons Consult deals in the mobile truck garbage collection (door-to-door) and disposal
Does the park/company have established protocols for protection against exposure to hazardous materials and disclose potential risks to workers, including special attention to women's health and reproductive health? (Social assessment C6.37)	Workers are provided with personal protective equipment to protect them from exposure to hazardous materials and accidents
How is hazardous waste disposed of?	The hazardous waste is transported to Nakasongola hazardous waste treatment plant
How much waste is taken to landfills?	This varies from industry to industry
Who is responsible for the construction, operation and maintenance of the solid waste management infrastructure?	The industries are charged with collecting and disposing of their waste at the dumping site. Jinja city council is responsible for the operation and maintenance of the dumping site
What are the solid waste management-related challenges that should be considered in the master plan?	The existing industries are unaware of the solid waste management chain outside their premises, such as solid waste reuse.

Table 5-9: Data Collection tool for Jinja Industrial Park

WATER AND SANITATION METHODOLOGICAL TOOLS (Brownfield)	
Site Name	Jinja Industrial Park
Geographical coordinates	**0°33'12.89"N, 33°14'4.48"E**
Name of administrative unit (village, parish, sub-county)	Kagogwa village, Mawoito parish, Kakira Town Council
Name of data collector	Joan Kemigisha
Date of assessment	29th May 2025
Question	**Answer**
General	
Do you have the documentation for the eco industrial park, e.g., feasibility studies, site layout, design drawings, particularly Watsan infrastructure masterplans? If yes, can they be availed?	Uganda Investment Authority is undertaking feasibility studies for the park
How many industries are planned for the area, and what is the allocated acreage?	The park site is about 182 acres. Kiira Motors is occupying 100 acres. Other industries are: UEDCL, Pearl Health Services Ltd, Nile Plywood, Mega Holdings, Jaguar, Nile Fishing Company, Uganda Free Zones Authority
What are the types of industries (sectors) planned for the park?	Agro-processing, manufacturing (steel, textiles, and automotive), fish processing, pharmaceuticals, warehousing, and logistics
What is the proposed management system for the park?	The park will be managed by the government of Uganda through Uganda Investment Authority
Water Supply	
What are the possible water sources and their distance from the park?	NWSC supply from Masese treatment plant
Which sources can sustainably supply the park?	The ability of the treatment plant to sustainably supply the park will be assessed in detail if the site is selected and the water uses for the park are known
Which of the possible sources are already in use by the community?	NWSC supply from Masese treatment plant. The supply line to Kiira Motors also supplies the communities where the transmission mains pass
Does the planned water supply system incorporate green infrastructure or nature-based solutions?	This will be incorporated in the ongoing feasibility studies for the park
Have you taken into consideration any sustainable water management measures, such as water efficiency measures and water reuse?	This will be incorporated in the ongoing feasibility studies for the park
Who is charged with the construction, operation and maintenance of the water supply infrastructure?	The government of Uganda, through NWSC
Wastewater Management	
What is the wastewater management plan for the park?	The site can be connected through a sewer network to the NWSC treatment plant, or a centralised effluent treatment plant could be constructed at the park

Does the management plan provide for water reuse? What percentage of the wastewater produced is planned to be reused?	UIA is prioritising resource efficiency and green production in industrial parks, so greywater use will be incorporated in the wastewater management plan
Will the park have a wastewater and/or faecal sludge treatment plant?	There is potential for the development of a centralised wastewater treatment plant at the park since topography limits the connection of the park to the Kirinya wastewater treatment plant
If no, are there treatment plants (s) in the surrounding areas that can be utilised? What is the proximity to the site?	Kirinya wastewater treatment plant is about 16km from the park
Who is charged with the construction, operation and maintenance of the wastewater management infrastructure?	The government of Uganda, through NWSC
Stormwater Management	
What is the topography of the site and surrounding areas? Please describe	The site is gently sloping from the northern boundary towards the southern boundary of the park
What is the land use type at the site and surrounding areas?	Industrial area, cropland, forestland, built-up area
What is the proposed stormwater management system for the site?	The stormwater management system for the park will be developed in the ongoing feasibility studies
Does it incorporate blue-green infrastructure options (e.g., rainwater harvesting systems, permeable pavements or retention ponds)?	This will be incorporated in the ongoing feasibility studies for the park
Are there any specific flood-prone areas or those with erosion risks?	There is a stream along the western boundary of the park that reportedly floods during the rainy season
Who is charged with the construction, operation and maintenance of the storm water management infrastructure?	The government
Solid Waste Management	
What is the proposed solid waste management plan?	The waste management plan for the park will be developed in the ongoing feasibility studies for the park
Does the plan consider the waste management hierarchy (priority to recycling and reuse)?	This will be incorporated in the ongoing feasibility studies for the park
Are there any circular economy considerations or opportunities?	This will be incorporated in the ongoing feasibility studies for the park
Who are the existing private sector players in solid waste collection, transportation, and treatment?	Jinja City Council has contracted Bisons Consult to collect solid waste from the city and dispose of it at the Masese dumping site. Some recycling companies purchase plastics sorted by scavengers
Will the park/company have protocols for protection against exposure to hazardous materials and disclose potential risks to workers, including special attention to women's health and reproductive health?	Each industry will be charged with the protection of its workers against hazards by providing personal protective equipment.
How will hazardous waste be disposed of?	Hazardous waste treatment could be considered at the Masese dumping site, or else the waste will be taken to Nakasongola hazardous waste treatment plant
How much waste is to be taken to landfills?	The waste that will be taken to the landfills is not yet known
Who is charged with the construction, operation and maintenance of the solid waste management infrastructure?	The government

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